

**MINISTRIES OF POWER; COAL AND
NEW & RENEWABLE ENERGY**

POWER GENERATION – DEMAND AND SUPPLY

**COMMITTEE ON ESTIMATES
(2011-2012)**

THIRTEENTH REPORT

FIFTEENTH LOK SABHA



सत्यमेव जयते

**LOK SABHA SECRETARIAT
NEW DELHI**

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COMMITTEE ON ESTIMATES (2011-2012) (FIFTEENTH LOK SABHA)

MINISTRIES OF POWER; COAL AND NEW & RENEWABLE ENERGY

POWER GENERATION – DEMAND AND SUPPLY



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CONTENTS

	PAGE
Composition of the Committee on Estimates (2011-12)	iv
Composition of the Committee on Estimates (2010-11)	v
Composition of the Committee on Estimates (2009-10)	vi
Introduction	vii
CHAPTER I INTRODUCTORY	1-5
CHAPTER II POWER SCENARIO IN INDIA	6-27
A. Installed Capacity	6
B. Electricity Generation	7
C. Plant Load factor	9
D. Power supply position	9
E. Capacity addition in 11 th Plan	13
F. Demand & Supply projections	18
G. Funding requirements of Power Sector for the XI Plan	19
H. FDI in Power Sector	20
I. Central / State Regulatory Commissions	20
J. Role of State Governments in Power Sector	24
K. Captive Power Plants	24
CHAPTER III ISSUES IN POWER GENERATION	28-61
A. Hydroelectric Power	28
(i) Environmental Clearance to hydro projects	
(ii) Pumped Storage Plants	
B. Thermal Power	34
(i) Production of Coal	
(ii) Demand & Supply of Coal	
(iii) Environmental issues	
(iv) Pilferage of Coal	
(v) Import of Coal	
(vi) Investing in coal assets abroad to secure coal supplies	
(vii) Use of supercritical technology	
(viii) Development of Ultra Mega Power Projects (UMPPs)	
C. Installed capacity vs. Actual output of Power	53
D. Shortage of power equipment	55
E. Renovation & Modernization (R&M)	56
F. Skilled manpower requirement	58
G. Contractual disputes	60
H. Nuclear Power as a source	61

CHAPTER IV	TRANSMISSION & DISTRIBUTION OF POWER	62-76
	A. Transmission	62
	B. National Power Grid/Inter-regional Transmission Capacity	63
	C. Issues related to Distribution	65
	(i) Power theft / pilferage	
	(ii) Restructured- Accelerated Power Development and Reforms Programme (R-APDRP)	
	(iii) Rajiv Gandhi Gramin Vidhyutikaran Yojana (RGGVY)	
	(iv) Use of IT in distribution	
	D. Power Sector Reforms	74
	E. Unbundling of Power Utilities by State Governments	76
CHAPTER V	TOWARDS CLEANER SOURCES OF POWER	77-93
	A. Budgetary allocation of the Ministry	78
	B. Renewable Power - Potential & Achievements	79
	C. Small Hydro Power Programme	80
	D. Jawaharlal Nehru National Solar Mission	81
	E. Tariff for Solar Power	82
	F. Biogas Based Power Generation Programme	84
	G. Biomass Power & Co-generation	84
	H. Remote Village Electrification Programme	85
	I. Wind Power Programme	86
	J. Solar Energy Centre	87
	K. DNI Map	87
	L. Dissemination of Renewable Energy Technology	88
	M. Sale of Power from Renewable sources	89
	N. Research & Development	90
CHAPTER VI	OBSERVATIONS / RECOMMENDATIONS	94-131
	ANNEXURES	132-175
I	State-wise details of Hydro-Electrical potential	132
II	Details of the coal blocks allocated to the power sector	133
III	Generating Units retired during the 11 th Plan	139
IV	List of generating units which have been identified for Life Extension works during the 11 th Plan	141
V	List of generating units which have been identified for R&M works during the 11 th Plan	145
VI	Units Programmed for R&M Works during 11 th Plan	149
VII	State wise AT&C Losses	163
VIII	The details of Private Sector participation in Transmission	164

IX	The Budget Allocation (RE, BE) Ministry of New and Renewable Energy	167
X	Estimated renewable energy potential	169
XI	Year-wise achievements of 11 th plan	170
XII	Small Hydro Power (SHP) Programme- Financial support given to SHP projects	171
XIII	List of the remote unelectrified census villages / hamlets as endorsed by Rural Electrification Corporation (REC)	173
XIV	Progress in the electrification of hitherto unelectrified villages & hamlets	174
XV	Status of Renewable Purchase Obligations of different States	175

APPENDICES

176-198

I	Minutes of the Sitting of the Committee held on 21.01.2010	176
II	Minutes of the Sitting of the Committee held on 16.02.2010	178
III	Minutes of the Sitting of the Committee held on 20.07.2010	180
IV	Minutes of the Sitting of the Committee held on 01.10.2010	183
V	Minutes of the Sitting of the Committee held on 25.03.2011	185
VI	Minutes of the Sitting of the Committee held on 12.07.2011	187
VII	Minutes of the Sitting of the Committee held on 15.09.2011	189
VIII	Minutes of the Sitting of the Committee held on 23.09.2011	192
IX	Minutes of the Sitting of the Committee held on 16.12.2011	194

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* ceased to be Member of Committee w.e.f. 19.01.2011.

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27. Shri Sushil Kumar Singh
28. Shri Lalji Tandon
29. Shri Manish Tewari
30. Shri K.C. Venugopal

INTRODUCTION

I, the Chairman of Committee on Estimates (2011-2012) having been authorized by the Committee to submit the Report on their behalf, present this Thirteenth Report (Fifteenth Lok Sabha) on 'Power Generation – Demand & Supply' pertaining to Ministries of Power; Coal and New & Renewable Energy.

2. The subject was originally selected for detailed examination by the Committee on Estimates (2009-2010), taking into account the worsening power scenario in the country, and the imperative for significantly augmenting power generation capacity across all the sources. The subject 'Power Generation – Demand & Supply' was carried forward for examination & report during the year 2010-2011 and again for the year 2011-12, as the subject entailed an extensive examination of three Ministries.

3. The Committee held nine sittings on the subject. The Committee have been briefed by the Ministries of Power; Coal and New & Renewable Energy on 21st January, 2010, 16th February, 2010 and 01st October, 2010 respectively. The Committee took the oral evidence of the Ministries of Power and Coal together on 20th July, 2010 and on 15th September, 2011. Ministry of New & Renewable Energy gave their oral evidence on 25th March, 2011 and further oral evidence on 23rd September, 2011.

4. The Report was considered & adopted by the Committee at the sitting held on 16th December, 2011.

5. The Committee would like to express their deep appreciation of the valuable work done by the Committee on Estimates (2009-2010 and 2010-2011) in connection with the examination of the subject.

6. The Committee wish to express their gratitude towards the representatives of the Ministries of Power; Coal and New & Renewable Energy, who appeared before them and placed their views on the subject. The Committee also wish to thank them for furnishing the information required in connection with examination of the subject during the briefing and oral evidences.

7. The Committee would also like to place on record their deep sense of appreciation for the invaluable assistance rendered to them by the officials of the Lok Sabha Secretariat attached to the Committee.

8. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters at the end of the Report.

NEW DELHI;
27th December, 2011
Pausa 6,1933 (S)

FRANCISCO SARDINHA,
CHAIRMAN,
COMMITTEE ON ESTIMATES

CHAPTER – I

INTRODUCTORY

Power is a critical input for economic growth. If the country has to grow at a consistent rate then power production capacity needs to be significantly augmented. Though the installed power generation capacity has been increasing over the decades, yet it could not keep pace with the demands of the fast growing economy. As a result energy shortage has been increasing at a fast rate over the years. In terms of percentage, the supply of power was short by 7.1 percent in 2003-04 which has increased to 8.2 percent during April to August, 2011. The power crunch has affected not only the industrial growth but even the common man suffers due to inadequate power supply in his daily activities.

1.2 The Planning Commission had fixed a capacity addition target of 78,700 MW during the 11th Five Year Plan to meet the power requirement of the country. However, based on the inputs provided by the Project Developers and Suppliers, the Central Electricity Authority (CEA) has assessed that capacity of just 62,374 MW is likely to be commissioned during the 11th Plan. The Ministry of Power is required to put strict monitoring mechanism & accountability structure in place to ensure timely completion and minimum slippages. The Ultra Mega Power Projects (UMPPs) & Super Critical bigger size units should increasingly play a greater role in the power generation. Issues relating to secured fuel supply, expedition of awarding contract, critical equipment shortages, Rehabilitation & Resettlement of displaced people are to be looked at. Similarly, Plant Load Factor, Renovation & Modernization and other aspects relating to the existing thermal & hydel units are also to be addressed.

1.3 As per the Annual Report of the Ministry of Power, there were a number of laws which governed the Power Sector before the commencement of the Electricity Act, 2003, for example, the Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948. However, a need was felt to harmonize and rationalize the provisions in the existing laws to create a competitive environment for benchmarking competition and to distance Government from regulatory responsibilities. As a result, the Central Electricity Act, 2003 came into force and obviated the need for individual States to enact their own reform laws and it also introduced

newer concepts like Power Trading, Open Access, Appellate Tribunal etc. The key features of the Act are:

- Easing of requirements for private entry into generation
- De-licensing of generation (thermal) and freeing captive power plants from control of State Electricity Boards (SEBs)
- Opening of transmission and distribution to private participation
- Allowing for multiple distribution licenses
- Non-discriminatory open access to transmission lines
- A new power tariff framework based on competitive bidding
- Mandating universal metering and punishments for electricity theft
- Mandating setting-up of State Electricity Regulatory Commissions (SERCs) in all States

1.4 Private sector has played a greater role in power generation since 1991. This sector has been further liberalized with the enactment of Electricity Act, 2003. FDI/Private capital in power generation has been given further boost through expeditious project clearance norms & transparent tariff determination. In order to improve the overall power situation, concerted efforts are being made for faster power evacuation from surplus areas through better transmission network, and also to remove various glitches at the distribution end.

1.5 Electricity is a concurrent subject at entry No. 38 in the list III of the Seventh Schedule of the Constitution of India. The Ministry of Power is primarily responsible for the development of Electric Energy in the country. The Ministry is concerned with perspective planning, policy formulation, processing of projects for investment decisions, monitoring the implementation of power projects, training and manpower development and the administration and enactment of legislation in regard to Thermal and Hydro power Generation, Transmission and Distribution. The Ministry of Power is further entrusted with the responsibility of administration of the Electricity Act, 2003, the Energy Conservation Act, 2001, The Damodar Valley Corporation Act, 1948 and Bhakra Beas Management Board. Besides, a number of Undertakings/Organizations are under the administrative control of the Ministry. These entities are:-

- a. Damodar Valley Corporation;
- b. Bhakra Beas Management Board (except matters relating to irrigation);

- c. NTPC Limited;
- d. NHPCLimited;
- e. Rural Electrification Corporation Limited;
- f. North-Eastern Electric Power Corporation Limited;
- g. Power Grid Corporation of India Limited;
- h. Power Finance Corporation Limited;
- i. THDC India Limited;
- j. SJVN Limited;
- k. Central Power Research Institute;
- l. National Power Training Institute;
- m. Bureau of Energy Efficiency.

The Ministry also deals with all matters relating to Central Electricity Authority, Central Electricity Board and Central Electricity Regulatory Commission.

1.6 Recent debates on generation capacity augmentation have invariably touched the issue of fuel availability. In terms of choices, large scale options with nuclear & renewable technologies are still some distance away to form the core of power generation in the country. The country has also reconciled to the fact that liquid fuels cannot form the backbone of our long term energy plans. Given these limitations, coal based power generation capacity has been given preference, in view of the relatively greater availability of domestic coal resources and also because the cost of power generation with domestic coal appears to be cheaper at the present levels of relative prices, when compared with other fuels.

1.7 The power sector is the largest consumer of coal in India whose main suppliers are the two large PSUs namely Coal India Limited & Singareni Collieries Company Limited. As informed by the Ministry of Power, at present it is unable to meet generation targets due to coal shortages and assured coal linkages also have become a big challenge for the upcoming power generation projects in India. Various upcoming coal projects are facing delays due to environmental concerns¹ and Rehabilitation and Resettlement (R&R) issues. It is affecting capacity addition in coal production. The Government needs to look into the issue of adequate availability of coal, the supply of coal as per boiler design, the cost of coal at

¹ Particularly application of the Comprehensive Environmental Pollution Index (CEPI), as per the Economic Survey (2010-11).

power stations and the movement of coal. To expedite the availability of coal and to ensure seamless supplies to the power sector, the Ministry of Coal has come up with the New Coal Distribution Policy (NCDP), 2007. This policy provides for issuance of Letter of Assurance (LOA) after the intending consumer submits requisite Commitment Guarantee (CG). The LOA gets converted into Fuel Supply Agreement (FSA) after the consumer fulfils the milestones stipulated therein. The consumer failing to deposit CG or meeting the milestones would be debarred from entering into FSA. The Ministry of Coal has also allocated 93 coal blocks with geological reserves of 28.199 million tonnes to the power sector, for the generation of power. However, as per the Ministry of Coal, the quality of coal in India is poor and thus needs to be washed in Coal Washeries to fulfill the needs of power generating plants

1.8 The proportion of imported coal to the total consumption of coal in India has been rising steadily and this does not auger well for the long term Energy Security of the country. During 2009-10 the import of coal was about 67.744 Million tonnes. But import of coal has become inevitable in India in view of the domestic supply demand mismatch. There is a heightened demand for coal internationally, and in this scenario, there are various uncertainties involved in line of supply of coal. To tide over these uncertainties, there has been a move for securing supplies through long term contracts. This might also act as a check against volatile prices of this internationally valued commodity.

1.9 The per-capita energy consumption in India is quiet low and there are wide regional & demographic disparities. In this scenario, it is inevitable that India should strive for energy efficiency and to look for renewable sources of energy, which are everlasting and self-sustaining without involving any human effort in their evolution and development. The estimated potential for power generation in the country from wind, small hydel and biomass sources has been at over 87,000 MW. The potential from solar is additional @ 20-50 MW / sq. km. Against this, the country's present installed capacity from various renewable energy sources is just around 21,125 MW. India is endowed with ample sunlight, wind and biomass and these resources, if harnessed properly, can definitely help India emerge as a leader in Renewable Energy use, particularly, solar energy. Some important enabling regulations have been framed in this area in the last few years, but there is still a long way to go. The tariff of the power from these sources is still uncompetitive due to higher cost of generation. The Government needs to focus on the crucial role played by R&D activity to tap these sources.

Other issues related to this sector which require attention are coordination with the State Governments, alternative incentive structure that encourage utilities to integrate wind power, small hydel, cogeneration etc into their systems, price subsidies being linked to the outcome, cess on fuels causing environmental damage and above all, a comprehensive policy encompassing all aspects including accurate assessment of potential, an efficient infrastructure, friendly regulatory system and an investment-friendly environment.

1.10 Jawaharlal Nehru National Solar Mission is the flagship programme of the Ministry of New & Renewable Energy. The Mission has set the ambitious target of deploying 20,000 MW of grid connected solar power by 2022 and is aimed at reducing the cost of solar power generation in the country through (i) long term policy; (ii) large scale deployment goals; (iii) aggressive R&D; and (iv) domestic production of critical raw materials, components and products, as a result to achieve grid tariff parity by 2022.

1.11 Subsequent chapters deal with some of the issues critical to power generation & supply in India.

CHAPTER - II

POWER SCENARIO IN INDIA

A. Installed Capacity

As per the Ministry of Power, the installed generating capacity (gross) in the country as on 30th September, 2011 was 1,82,344.62 MW, which has been depicted sector-wise in the following table:

Sector	MW	Percentage
State Sector	83.563.65	45.82
Central Sector	56.572.63	31.02
Private Sector	42.208.34	23.14
Total	1.82.344.62	100

Fuel	MW	Percentage
Total Thermal	118695.98	65.09
Coal	99.753.38	54.70
Gas	17.742.85	9.73
Oil	1.199.75	0.65
Hvdro (Renewable)	38.706.40	21.22
Nuclear	4.780.00	2.62
RES** (MNRE)	20.162.24	11.05
Total	1.82.344.62	100.00

Renewable Energy Sources(RES) include SHP, BG, BP, U&I and Wind Energy
SHP= Small Hydro Project ,BG= Biomass Gasifier ,BP= Biomass Power,
U & I=Urban & Industrial Waste Power, RES=Renewable Energy Sources

2.2 However, citing the factors that may affect optimum power generation as per the capacity, the Ministry of Power clarified that the actual availability of power from the power plants gets reduced to the extent of auxiliary power consumption, planned maintenance which is essential for reliable operation of the units and forced outage of generating units or its auxiliary systems or operating restrictions due to shortage of fuel / water and machine constraints. As regards, hydroelectric power, the Ministry informed that since the generation in Hydel Power Stations (HPSs) depends on the availability of water, during monsoon season, the HPSs operate at maximum possible capacity and during lean hydro season, the

availability of power from HPSs goes down substantially due to reduced water availability. The power ultimately available to the beneficiaries also gets reduced to the extent of losses in transmission of power from the generating stations to the periphery of the States.

B. Electricity Generation

2.3 The electricity generation target for the year 2010-2011 was fixed as 830.757 Billion Units (BU). i.e. growth of around 7.67% over actual generation of 771.551 BU for the previous year (2009-2010). The generation during April, 2010 was 67.104 BU as compared to 62.780 BU generated during April 2009, representing a growth of about 6.89 %.

Target, actual achievement and growth in electricity generation in the country during 2007-08 to 2010-11:-

Year	Target (BU)	Achievement (BU)	% of target	% growth
2007-08	710.0	704.5	99.2	6.3
2008-09	774.34	723.8	93.47	2.74
2009-10	789.511	771.551	97.73	6.6
2010-11	830.757	811.143	97.64	5.56

2.4 The electricity generation target for the year 2010-11 had been fixed at 830.757 BU comprising of 690.857 BU thermal; 111.352 BU hydro; 22.000 nuclear; and 6.548 BU import from Bhutan.

2.5 The Table above shows a continuing shortage of power in the last 3 years in the country, primarily due to growth of capacity addition not being commensurate with the growth in demand for electricity.

2.6 On being asked by the Committee about the steps taken by the Ministry to increase generation of power, the Ministry of Power in a written reply informed that following steps have been taken:

- (1) Quantum jump in generating capacity addition envisaged during the 11th Plan.
- (2) Rigorous monitoring of capacity addition of the on-going generation projects.
- (3) Increased gas allocation for power projects.

- (4) Thrust to import of coal by the Power Utilities to bridge the gap between requirement and availability of coal from the domestic sources.
- (5) Tapping of surplus power from captive power plants.
- (6) Rigorous monitoring of coal receipts and stocks at all major coal based thermal power plants of the country.
- (7) Promoting energy conservation and Demand Side Management measures.
- (8) Renovation, modernization and life extension of old and inefficient generating units.

2.7 The Ministry further added that the Government has taken a number of policy decisions and other initiatives with a view to increase power generation in the country, including the following :

- i. The sector has been thrown open for investment by the Private Sector in electricity generation, transmission and distribution.
- ii. 100% foreign direct investment is permitted in power generation other than nuclear generation, transmission and distribution on automatic route.
- iii. No license is required for setting up of a power generating station if it complies with the technical standards relating to connectivity with the grid. Concurrence of Central Electricity Authority is required only for setting up of a hydro generating station estimated to involve a capital expenditure exceeding the sum fixed by the Central Government.
- iv. Electricity Act, 2003, National Electricity Policy and National Tariff Policy, provide an enabling framework for accelerated and more efficient development of power sector, seeking inter-alia to encourage competition.
- v. Hydro Power Policy revised in 2008, to provide level playing field and permitting merchant sale upto 40% from the new plants in Private Sector. Subsequently, dispensation of merchant sale has been extended to all new hydro power plants.
- vi. The Mega Power Projects Policy, on incentives for development of large projects, first announced in 1995, has been revised from time to time.
- vii. Structural reforms of State Electricity Boards and setting up of Central & State Electricity Regulatory Commissions with a view to improve financial health of power utilities, thereby attracting investment as well.

C. Plant Load Factor (PLF):

2.8 Plant Load Factor (PLF) is a measure of average capacity utilization. It is a measure of the output of a power plant compared to the maximum output it could produce. The Plant Load Factor of a power plant is the ratio of actual output of the plant over a period of time and its potential output if it had operated at full nameplate capacity during the entire period of time. The PLF of thermal units depends on a number of factors such as vintage of the unit, forced and planned outages, availability of required quality and quantity of fuel, etc. Indicator of performance of hydro generating unit is its availability (excluding the time required for its planned maintenance and attending to forced outages).

2.9 The Committee were informed that notwithstanding the fact that many of the Thermal Power Station (TPSs) in the country are very old, the plant load factor has shown improvement over the years 2007-08 to 2009-10, representing higher utilization of the installed capacity.

The PLF during 2007-08 to 2009-10 was as under:

	Target	Actual	Sector-wise Actual (%)		
	(%)	(%)	Central	State	Private Utilities
2007-08	77.14	78.61	86.74	72.89	90.20
2008-09	79.17	77.22	84.34	71.20	91.04
2009-10	77.17	77.53	85.49	70.90	82.41

D. Power Supply Position

2.10 The power supply position in the country during 2007-08 to 2009-10 was as follows:

Year	Energy				Peak			
	Requirement	Availability	Surplus / Deficits(-)		Peak Demand	Peak Met	Surplus / Deficits(-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
2007-08	7,39,345	6,66,007	73,338	9.9	1,08,866	90,793	18,073	16.6
2008-09	7,77,039	6,91,038	86,001	11.1	1,09,809	96,785	13,024	11.9
2009-10	8,30,594	7,46,644	83,950	10.1	1,19,166	1,04,009	15,157	12.7

2.11 The power supply position in different regions in terms of energy as well as peak power during the current financial year (April to August, 2011) is given below :

Energy				
April, 2011 - August, 2011				
	Energy Requirement	Energy Availability	Energy Shortage	
	(MU)	(MU)	(MU)	%
Northern	117,850	112,800	-5,050	-4.3
Western	113,716	103,110	-10,606	-9.3
Southern	103,833	98,938	-4,895	-4.7
Eastern	41,101	39,443	-1,658	-4.0
North_Eastern	4,715	4,262	-453	-9.6
All India	381,215	358,553	-22,662	-5.9
Peak				
April, 2011 - August, 2011				
	Peak Demand	Peak Met	Peak Shortage	
	(MW)	(MW)	(MW)	%
Northern	40,248	37,117	-3,131	-7.8
Western	39,566	33,705	-5,861	-14.8
Southern	33,937	31,489	-2,448	-7.2
Eastern	14,343	13,811	-532	-3.7
North_Eastern	1,920	1,698	-222	-11.6
All India	124,496	114,233	-10,263	-8.2

The State-wise power supply position during April to August, 2011 is given below:

Power Supply Position for 2011-12 (Revised)								
State / System / Region	Energy				Peak			
	April, 2011 - August, 2011				April, 2011 - August, 2011			
	Require ment (MU)	Availabil ity (MU)	Surplus / Deficit (-) (MU)	(%)	Peak Demand (MW)	Peak Met (MW)	Surplus / Deficit (-) (MW)	(%)
Chandigarh	765	765	0	0	263	263	0	0
Delhi	13,084	13,071	-13	-0.1	5,031	5,028	-3	-0.1
Haryana	16,061	15,764	-297	-1.8	6,533	6,259	-274	-4.2
Himachal Pradesh	3,341	3,329	-12	-0.4	1,183	1,141	-42	-3.6
Jammu & Kashmir	5,300	4,176	-1,124	-21.2	2,250	1,560	-690	-30.6
Punjab	22,268	21,767	-501	-2.2	10,471	8,701	-1,770	-16.9

Rajasthan	19,410	19,264	-146	-0.8	7,054	6,768	-286	-4.1
Uttar Pradesh	33,252	30,410	-2,842	-8.5	12,038	10,885	-1,153	-9.6
Uttarakhand	4,369	4,254	-115	-2.6	1,566	1,517	-49	-3.1
Northern Region	117,850	112,800	-5,050	-4.3	40,248	37,117	-3,131	-7.8
Chattisgarh	5,891	5,787	-104	-1.8	3,239	2,745	-494	-15.3
Gujarat	30,642	30,555	-87	-0.3	10,550	10,221	-329	-3.1
Madhya Pradesh	17,163	14,887	-2,276	-13.3	7,442	7,290	-152	-2.0
Maharashtra	55,846	47,820	-8,026	-14.4	20,072	16,340	-3,732	-18.6
Daman & Diu	950	856	-94	-9.9	301	276	-25	-8.3
Dadar Nagar Haveli	1,900	1,890	-10	-0.5	615	605	-10	-1.6
Goa	1,324	1,315	-9	-0.7	514	471	-43	-8.4
Western Region	113,716	103,110	-10,606	-9.3	39,566	33,705	-5,861	-14.8
Andhra Pradesh	35,584	34,705	-879	-2.5	12,636	11,579	-1,057	-8.4
Karnataka	22,998	21,198	-1,800	-7.8	8,479	7,509	-970	-11.4
Kerala	7,985	7,848	-137	-1.7	3,281	3,017	-264	-8.0
Tamil Nadu	36,302	34,232	-2,070	-5.7	11,911	10,566	-1,345	-11.3
Pondicherry	964	955	-9	-0.9	318	312	-6	-1.9
Lakshadweep	16	16	0	0	8	8	0	0
Southern Region	103,833	98,938	-4,895	-4.7	33,937	31,489	-2,448	-7.2
Bihar	5,500	4,324	-1,176	-21.4	2,031	1,738	-293	-14.4
DVC	6,762	6,449	-313	-4.6	2,318	2,018	-300	-12.9
Jharkhand	2,468	2,395	-73	-3.0	1,030	833	-197	-19.1
Orissa	9,403	9,375	-28	-0.3	3,390	3,330	-60	-1.8
West Bengal	16,821	16,754	-67	-0.4	6,409	6,282	-127	-2.0
Sikkim	147	146	-1	-0.7	100	95	-5	-5.0
Andaman- Nicobar	100	75	-25	-25	40	32	-8	-20

Eastern Region	41,101	39,443	-1,658	-4.0	14,343	13,811	-532	-3.7
Arunachal Pradesh	239	218	-21	-8.8	102	103	1	1.0
Assam	2,619	2,477	-142	-5.4	1,112	1,014	-98	-8.8
Manipur	227	204	-23	-10.1	105	102	-3	-2.9
Meghalaya	814	616	-198	-24.3	319	262	-57	-17.9
Mizoram	164	145	-19	-11.6	77	67	-10	-13.0
Nagaland	253	226	-27	-10.7	106	102	-4	-3.8
Tripura	399	376	-23	-5.8	194	191	-3	-1.5
North-Eastern Region	4,715	4,262	-453	-9.6	1,920	1,698	-222	-11.6
All India	381,215	358,553	-22,662	-5.9	124,496	114,233	-10,263	-8.2

Lakshadweep and Andaman & Nicobar Islands are stand- alone systems, power supply position of these, does not form part of regional requirement and availability

Note : Both peak met and energy availability represent the net consumption (including the transmission losses) in the various States. Net export has been accounted for in the consumption of importing States.

2.12 When asked about the steps taken to improve the power supply, the Ministry submitted through a written reply that: -

“Electricity is a concurrent subject. The supply and distribution of electricity to various areas / categories of consumers in a State comes under the purview of the State Government / State Power Utility. Central Government supplements their efforts by implementing power plants and bulk high voltage transmission system through Central Public Sector Undertakings.

To improve power supply position in the country, Government has adopted a multi-pronged strategy, encompassing generation, transmission, distribution, rural electrification as well as energy conservation and Demand Side Management measures, summarized hereunder:

- Quantum jump in capacity addition during the 11th Plan and 12th Plan.

- Development of National grid to facilitate transfer of power from surplus to deficit areas.
- Strengthening of sub-transmission and distribution system through APDRP to reduce Aggregating Technical & Commercial (AT&C) losses.
- Providing access of electricity to rural areas through Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY)
- Initiatives for Energy Conservation and Demand Side Management measures.”

E. Capacity addition in 11th Plan

2.13 The Ministry submitted that the Planning Commission had fixed a capacity addition target of 78,700 MW (comprising 15,627 MW Hydro, 59,693 MW Thermal and 3,380 MW Nuclear) during the 11th Plan to meet the power requirement of the country. However, based on the inputs provided by the project developers and suppliers, CEA has assessed that a total capacity of 62,374 MW is likely to be commissioned with high level of certainty during the 11th Plan. Details of capacity addition likely during the 11th Plan was given as under:

(Figures in MW)				
Sector	Hydro	Thermal	Nuclear	Total
Central	2922	14920	3380	21222
State	2854	18501	0	21355
Private	2461	17336	0	19797
Total	8237	50757	3380	62374

2.14 As per the Annual Report of the Ministry, during the mid-term appraisal carried out by the Planning Commission also, the capacity addition target for the 11th Plan has been revised to 62,374 MW. The details of capacity commissioned/to be commissioned during the Eleventh Plan are given in the Table below:

Source	Mid-term Appraisal target (MW)	Capacity Commissioned (as on 31.10.2011) (MW)	Under Construction (MW)
Hydro	8,237	5260	2977
Thermal	50,757	35823	16985
Nuclear	3,380	880	2500

Total	62,374	41963*	22462
* This includes a capacity of 2,051 MW commissioned from additional projects.			

2.15 On being enquired about the steps taken by the Government to expedite commissioning of the ongoing generating projects as per schedule and meet the capacity addition targets during the 11th Five Year Plan, the Ministry of Power submitted as follows:

- (1) Monitoring mechanism in the Ministry has been strengthened. The progress of generation projects for completion during 11th Plan is reviewed periodically by the Central Electricity Authority, Ministry of Power and Power Projects Monitoring Panel (PPMP). An Advisory Group under the chairmanship of Hon'ble Minister of Power with former Power Secretaries, amongst others, has been set up to suggest ways and means to achieve the 11th Plan capacity addition targets.
- (2) BHEL, the major indigenous manufacturer for main plant equipment in Public Sector, has enhanced its capacity to deliver 10,000 MW of main plant equipment per annum. BHEL has intimated that they also put in place an action plan to enhance capacity to deliver 15,000 MW per annum of plant equipment by March, 2010 and may raise this capacity upto 20,000 MW by March, 2012 depending upon the market demand.
- (3) The issue of supply of equipment by BHEL was discussed in the Committee of Secretaries chaired by the Cabinet Secretary on 8th December, 2009. In pursuance of the decision taken in the meeting, a Group under the Chairmanship of Secretary(Heavy Industry) to finalise a joint action plan which would lay down the schedule /timeframe for completion of projects as per targets , has been set up. Members of the Group include Secretary (Power), Chairperson, CEA, CMD of NTPC and CMD of BHEL.
- (4) Following actions have also been suggested to BHEL:
 - Outsourcing of equipment manufacturing to other ancillary units, as feasible.
 - Advance placement of orders for long delivery and critical items in international market.

- Development of skilled manpower in the area of high pressure welders, fitters, instrumentation technicians, etc.
 - Augmentation of their erection and commissioning infrastructure.
- (5) Joint Venture Companies of (a) L&T with MHI, (b) Bharat Forge with Alstom, (c) JSW with Toshiba, (d) Anslado with GB Engineering and (e) Thermax – Babcock & Wilcox for manufacture of supercritical units in the country have been incorporated.
 - (6) A Joint Venture Agreement has been signed between NTPC and BHEL to take up work related to Engineering, Procurement and Construction (EPC) for power plants and other infrastructure projects.
 - (7) All stakeholders have been sensitized towards enlarging the vendor base so as to meet the Balance of Plant (BoP) requirements.
 - (8) Based on discussions with project authorities and equipment suppliers, specific milestones for supply and erection activities have been identified for regular monitoring.
 - (9) Pre-qualification requirement for super critical unit manufacturers has since been modified so as to qualify new Joint Venture between Indian company and the technology provider company.
 - (10) Bulk ordering of 11 units of 660 MW each with supercritical technology with mandatory phased indigenous manufacturing programme has been initiated to promote indigenous manufacturing.
 - (11) To overcome the shortage of skilled manpower, 'Adopt an ITI' initiative has been taken up.
 - (12) Periodical meetings are held with concerned Ministries viz. Ministry of Coal, Ministry of Petroleum and Natural Gas and Ministry of Environment & Forests and at other forums at highest level to address the inter ministerial issues with regard to availability of fuel and grant of Environment & Forest clearance to projects.
 - (13) An Accountability System for the 11th Plan central sector power projects has been put in place to ensure that the capacity addition targets are realized and projects are commissioned as per schedule.

- (14) CERC w.e.f. 01.04.2009 has provided for additional ROE of 0.5% for timely completion for Central Sector Power Projects. Government of India has instituted Meritorious Performance Award for early completion of power projects in the Central, State and Private sectors.
- (15) At the beginning of 11th Plan, an International Conclave on key inputs for 11th Plan and beyond was convened in July, 2007 by MoP / CEA to sensitise the industry about the requirements of the Power sector. Subsequently, in August, 2009, another International Conclave on key inputs for accelerated development of power sector for 12th Plan and beyond was convened by CEA / MOP in partnership with Industry Association (CII, IEEMA) to sensitise the Industry, Utilities, State Governments and Regulatory Commissions about the requirement of the 12th Five Year Plan to review their preparedness and to identify constraints and roadblocks experienced by the stakeholders for taking necessary remedial actions.
- (16) Power Ministers' Conference was held twice in the year 2009 on 23.06.2009 and 15.11.2009 to review the capacity addition programme for 11th Plan and to address the critical issues and bottlenecks being faced in implementation of Generation Projects.

2.16 When asked to elaborate upon the New Accountability System, the Ministry informed as follows:

“A number of 11th Plan Projects have suffered slippages and it is imperative to have a robust monitoring mechanism in place. Officials and engineers who are handling different projects should be accountable for timely completion of projects and for exercising due diligence and economy. According to the Government the broad contours of the proposed accountability system for officers involved in implementation of projects scheduled for commissioning in the Eleventh Plan is as follows:-

- (i) As per the extant practice, MoUs between each PSU in the power sector and the Ministry of Power may be signed at the beginning of the financial year. The rating parameter in terms of timelines for evaluation of the performance of the CMD may continue.

- (ii) Specific performance requirements from other departments, so far as implementation of projects are concerned, should also be clearly spelt-out in the MoU, as is being done in the RFD.
- (iii) Performance of the Chairman & Managing Director with respect to projects implementation would be assessed as per the terms & conditions stipulated in the MoU with the Ministry of Power. Slippages in performance of the Chairman & Managing Directors would be assessed by the CEA and reported to Ministry of Power for suitable action. CEA would make specific recommendations with respect to slippages in the performance of the Chairman & Managing Directors in project implementation.
- (iv) Key Performance Areas (KPA) of project implementation for each layer of hierarchy beginning with the level of Chief Engineer and up to the level of Director (Projects) should be fixed at the beginning of each year. KPA would stipulate the milestone for each critical activity including the timeline for each of these.
- (v) KPAs would be reviewed once in a six month at each level beginning with the level of Chief Engineer. For example, KPAs agreed between the Chief Engineer and the General Manager would be reviewed by the General Manager, between General Manager and Executive Director by the Executive Director, and so on. Outcomes of the review meetings would be reported by the respective layer to the Chairman & Managing Director. CMD, in turn, would furnish the consolidated report of the review meetings to CEA and the Ministry of Power within 15 days of holding the review meeting.
- (vi) Evaluation criteria for rating performance of a particular KPA indicator as well as overall performance of the officer upto the level of Director (Projects) would be as follows:-
 - Excellent (100% of the target).
 - Very Good (90% of the target).
 - Good (80% of the target).
 - Fair (70% of the target).
 - Poor (60% of the target).

- (vii) Each performance indicator would be assigned a weight and sum of the weights would be equal to 100. Weighted average of the score of each KPA indicator would determine the overall performance of the officer.
- (viii) Specific performance requirements and deliverables from other organizations would also be clearly spelt-out at the beginning of each year, while fixing the KPAs.

Each CMD, after the half-yearly reviews, would apprise of the action taken to the CEA and the Ministry of Power within 15 days of the review meetings.”

F. Demand & Supply projections

2.17 On being inquired by the Committee whether any long term perspective plan is in place specifying the demand & supply projections of power in the country, the Ministry of Power clarified as under:

“The National Electricity Plan prepared by Central Electricity Authority has been notified in the Gazette of India in August, 2007 with the approval of Central Government. The plan covers 11th Plan generation projects in detail and the perspective planning for 12th Plan (2012-17). As per the report of 17th Electric Power Survey (EPS), the likely demand of the electrical energy in the country is projected as under:

	2011-12	2016-17	2021-22
Peak Demand (MW)	1,52,746	2,18,209	2,98,253
Energy Requirement (BU)	969	1392	1914
MW : Mega Watt		BU : Billion Unit	

As per the studies carried out in CEA, likely generation capacity addition required during 12th & 13th Plan would be of the order of 1 lakh MW each to meet the above projections in respect of demand for electricity in the country.”

2.18 The feedback from EPS has to be incorporated in Policy Formulations for the future. When asked about the capacity addition programmes of the Ministry for 12th Plan and 13th Plan, the Ministry submitted:

“Working Group is yet to be set up by Planning Commission to finalize the 12th Plan. However, as per the preliminary studies, the requirement of capacity addition during 12th plan to meet the demand projections of 17th EPS works out to about 1,07,000 MW (based on likely capacity addition of 62,374 MW during 11th Plan) as per details given below:

Hydro	- 16,360 MW
Nuclear	- 4,800 MW
Thermal	- 85,310 MW

Further, Thermal capacity addition has the following breakup:-

Coal	- 69,810 MW
Lignite	- 2,500 MW
Gas	- 13,000 MW (to be reviewed subject to availability of gas)

Capacity aggregating to about 60,600 MW is under execution at present for likely benefits during 12th Plan. As per preliminary studies, the capacity addition requirement during 13th Five Year Plan, to meet the demand projections of 17th EPS, works out to about 87,000 MW (excluding renewable).”

G. Funding requirements of Power Sector for the XI Plan

2.19 The funding requirement for the capacity expansion envisaged in the XI Plan as described above, plus investment in transmission and distribution is estimated to be about ₹10,59,515 crore as per the details given below: -

(₹ in Crores)

Particulars	State	Centre	Private	Total
Projects under Construction (including projects commissioned and under best efforts)	65,841	1,28,563	71,876	2,66,280
Advance action for XII Plan	52,452	76,092	71,410	1,99,954
Total Generation	1.18.293	2.04.655	1.43.286	4.66.234
Decentralized Distribution Generation	-	10,000	-	10,000
New & Renewable Energy Sources	22,500	-	45,000	67,500

Captive Power Plants	-	-	48.000	48.000
Integrated Generation	1.40.793	2.14.655	2.36.286	5.91.734
Renovation & Modernization (R&M)	15.875			15.875
Renovation & Modernization (R&M)	15.875			15.875
Transmission	65.000	75.000	-	1.40.000
Total Transmission	65.000	75.000	-	1.40.000
Sub-Transmission & Distribution	1.97.000	-	-	1.97.000
RGVY	51.000	-	-	51.000
APDRP	51.577	-	-	51.577
Others	10.000	-	-	10.000
Total Distribution & Rural Electrification	3.09.577	-	-	3.09.577
Human Resource Development (HRD)	-	462	-	462
Research & Development	-	1.214	-	1.214
Demand Side Management (DSM)	-	653	-	653
Total Others	-	2.329	-	2.239
Grand Total	5.31.245	2.91.984	2.36.286	10.59.515

Source : Interim report of the sub-committee on Financial Issues of Power Sector

H. FDI in power sector

2.20 The total FDI inflow in power sector from April 2000 to December 2009 is ₹20,099 Crore (US\$ 4,448 million). The year wise investment made in power sector from 2006-07 to 2009-10 (April to December, 2009) is as under:

Year	2006-07	2007-08	2008-09	2009-10 (April to December, 2009)
FDI in ₹ Crores	713	3,875	4,382	6,088
FDI in US\$ Million	157	967	985	1,258

Source : Website of Department of Industrial Policy & Promotion

I. Central / State Regulatory Commissions

2.21 The Electricity Regulatory Commissions Act, 1998 has mandated the powers & functioning of the Central / State Electricity Regulatory Commissions and they were given

powers to determine tariffs. However, the constitution of State Electricity Regulatory Commissions (SERCs) was optional for the States. These Regulatory Commissions were instrumental in distancing Government from tariff determination.

2.22 The Electricity Act, 2003, which replaced the Electricity Regulatory Act, 1998, further streamlined the functioning of these Commissions. As per the said Act, the functions of Central / State Commissions are:

Functions of Central Commission

1. The Central Commission shall discharge the following functions, namely:-
 - (a) to regulate the tariff of generating companies owned or controlled by the Central Government;
 - (b) to regulate the tariff of generating companies other than those owned or controlled by the Central Government specified in clause (a), if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one State;
 - (c) to regulate the inter-State transmission of electricity ;
 - (d) to determine tariff for inter-State transmission of electricity;
 - (e) to issue licenses to persons to function as transmission licensee and electricity trader with respect to their inter-State operations.
 - (f) to adjudicate upon disputes involving generating companies or transmission licensee in regard to matters connected with clauses (a) to (d) above and to refer any dispute for arbitration;
 - (g) to levy fees for the purposes of this Act;
 - (h) to specify Grid Code having regard to Grid Standards;
 - (i) to specify and enforce the standards with respect to quality, continuity and reliability of service by licensees.
 - (j) to fix the trading margin in the inter-State trading of electricity, if considered, necessary;
 - (k) to discharge such other functions as may be assigned under this Act.

2. The Central Commission shall advise the Central Government on all or any of the following matters, namely:- (i) formulation of National Electricity Policy and Tariff

Policy: (ii) promotion of competition, efficiency and economy in activities of the electricity industry; (iii) promotion of investment in electricity industry; (iv) any other matter referred to the Central Commission by that Government.

3. The Central Commission shall ensure transparency while exercising its powers and discharging its functions.
4. In discharge of its functions, the Central Commission shall be guided by the National Electricity Policy, National Electricity Plan and tariff policy published under section 3.

Functions of State Commissions

1. The State Commission shall discharge the following functions, namely:
 - (a) determine the tariff for generation, supply, transmission and wheeling of electricity, wholesale, bulk or retail, as the case may be, within the State: Providing that where open access has been permitted to a category of consumers under section 42, the State Commission shall determine only the wheeling charges and surcharge thereon, if any, for the said category of consumers;
 - (b) regulate electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through 46 agreements for purchase of power for distribution and supply within the State;
 - (c) facilitate intra-state transmission and wheeling of electricity;
 - (d) issue licenses to persons seeking to act as transmission licensees, distribution licensees and electricity traders with respect to their operations within the State;
 - (e) promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity

from such sources, a percentage of the total consumption of electricity in the area of a distribution licence;

- (f) adjudicate upon the disputes between the licensees, and generating companies and to refer any dispute for arbitration;
- (g) levy fee for the purposes of this Act;
- (h) specify State Grid Code consistent with the Grid Code specified under clause (h) of sub-section (1) of section 79;
- (i) specify or enforce standards with respect to quality, continuity and reliability of service by licensees;
- (j) fix the trading margin in the intra-State trading of electricity, if considered, necessary; and
- (k) discharge such other functions as may be assigned to it under this Act.

2. The State Commission shall advise the State Government on all or any of the following matters, namely: -

- i. promotion of competition, efficiency and economy in activities of the electricity industry;
- ii. promotion of investment in electricity industry;
- iii. reorganization and restructuring of electricity industry in the State;
- iv. matters concerning generation, transmission , distribution and trading of electricity or any other matter referred to the State Commission by that Government.

The State Commission shall ensure transparency while exercising its powers and discharging its functions.

In discharge of its functions the State Commission shall be guided by the National Electricity Policy, National Electricity Plan and Tariff Policy published under section 3.

J. Role of State Government in power sector

2.23 When asked to specify the role of Central Government vis-à-vis State Government in power sector, the Ministry made the following reply:

“Electricity is a concurrent subject under the Constitution of India. Supply and distribution of electricity in a State is the responsibility of the concerned State Government/Power Utility which makes arrangements for supply of power to various categories of consumers/areas in the State. Government of India supplements the efforts of State Governments by setting up generating stations in the Central Sector through CPSUs.”

K. Captive Power Plants

2.24 The Committee were informed by the Ministry that a large number of captive plants including co-generation power plants of varied types and sizes exist in the country which are either utilized in process industry or used for in-house power consumption. A number of industries have set up their own captive plants so as to get reliable and quality power. Some Captive plants are also installed as stand-by units for operation only during emergencies when the grid supply is not available. The installed capacity of CPPs (1 MW and above) has increased from 588 MW in 1950 to about 31,000 MW in March 2011.

By the end of FY 2008-2009 , there were 3024 industrial units having Captive generation plants with demand of 1 MW and above with the installed capacity of about 26,673 MW. During financial year 2008-09, the installed Captive Power Plant Capacity registered a growth of about 6.75% over the financial year 2007-08. The Captive Power Plant generated around 99.72 Billion Unit during 2008-09 and registered a growth of about 10.22% over the generation in the financial year 2007-08.

About 12,000 MW of capacity addition is likely during 11th Plan. A capacity addition of approximately 13,000 MW is likely during the 12th plan (April 2012 to March 2017).

2.25 Provisions in the Electricity Act regarding Captive Power Plants are as under:

Electricity Act, 2003 defines “Captive Generating Plant” as a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any co-operative society or association of persons for generating electricity primarily for use of members of such co-operative society or association.

The captive power plant can be set up as stipulated under Section 9 of the Act, whose provisions are as follows:

(i) Notwithstanding anything contained in this Act, a person may construct, maintain or operate a captive generating plant and dedicated transmission lines :

Provided that the supply of electricity from the captive generating plant through the grid shall be regulated in the same manner as the generating station of a generating company. Provided further that no license shall be required under this Act for supply of electricity generated from a captive generating plant to any licensee in accordance with the provisions of this Act and the rules and regulations made there under and to any consumer subject to the regulations made under sub-section (2) of section 42.

(ii) Every person, who has constructed a captive generating plant and maintains and operates such plant, shall have the right to open access for the purposes of carrying electricity from his captive generating plant to the destination of his use :

Provided that such open access shall be subject to availability of adequate transmission facility and such availability of transmission facility shall be determined by the Central Transmission Utility or the State Transmission Utility, as the case may be :

Provided further that any dispute regarding the availability of transmission facility shall be adjudicated upon by the Appropriate Commission.

2.26 The Electricity Rules regarding Captive Power Plants are as under:

The Electricity Rules issued by MoP notification dated 8.6.2005 prescribes that no power plant shall qualify as a 'captive generating plant' under Section 9 read with clause (8) of section 2 of the Act unless:

(a) Captive power plants are regulated on the basis of their definition under Electricity Act, 2003 which is as follows, as per/in part (ii) below :

(i) not less than twenty six percent of the ownership is held by the captive user(s), and

(ii) not less than fifty one percent of the aggregate electricity generated in such plant, determined on an annual basis, is consumed for the captive use:

Provided that in case of power plant set up by registered cooperative society, the conditions mentioned under paragraphs at (i) and (ii) above shall be satisfied collectively by the members of the co-operative society;

Provided further that in case of association of persons, the captive user(s) shall hold not less than twenty six percent of the ownership of the plant in aggregate and such captive user(s) shall consume not less than fifty one percent of the electricity generated, determined on annual basis, in proportion to their shares in ownership of the power plant within a variation not exceeding ten percent;

(b) In case of a generating station owned by a company formed as special purpose vehicle for such generating station, a unit or units of such generating station identified for captive use and not the entire generating station satisfy(s) the conditions contained in paragraphs (i) and (ii) of sub-clause (a) above, including

Explanation :

(i) The electricity required to be consumed by captive users shall be determined with reference to such generating unit or units in aggregate identified for captive use and not with reference to generating station as a whole; and

(ii) The equity shares to be held by the captive user(s) in the generating station shall not be less than twenty six per cent of the proportionate of the equity of the company related to the generating unit or units identified as the captive generating plant.

Illustration :

(1) In a generating station with two units of 50 MW each namely Units A and B, one unit of 50 MW namely Unit A may be identified as the Captive Generating Plant. The captive users shall hold not less than thirteen percent of the equity shares in the company (being the twenty six percent proportionate to Unit A of 50 MW) and not less than fifty one percent of the electricity generated in Unit A determined on an annual basis is to be consumed by the captive users.

(2) It shall be the obligating of the captive users to ensure that the consumption by the Captive Users at the percentages mentioned in sub-clauses (a) and (b) of sub-rule (1) above is maintained and in case the minimum percentage of captive use is not complied with in any year, the entire electricity generated shall be treated as if it is a supply of electricity by a generating company.

Explanation : (1) For the purpose of this rule :

(a) “Annual Basis” shall be determined based on a financial year;

(b) “Captive User” shall mean the end user of the electricity generated in a Captive Generating Plant and the term “Captive Use” shall be construed accordingly;

(c) “Ownership” in relation to a generating station or power plant set up by a company or any other body corporate shall mean the equity share capital with voting rights. In other cases ownership shall mean proprietary interest and control over the generating station or power plant;

(d) “Special Purpose Vehicle” shall mean a legal entity owning, operating and maintaining a generating station and with no other business or activity to be engaged in by the legal entity.

CHAPTER III

ISSUES IN POWER GENERATION

A. Hydro Electric Power

The re-assessment study of hydro-electric potential of the country was completed by the Central Electricity Authority in 1987. According to this study, the hydro power potential in terms of Installed Capacity (IC) is estimated at 1,48,701 MW, out of which 1,45,320 MW of the potential consists of hydro electric schemes having Installed Capacity above 25 MW. Of the above identified capacity, 33,920.8 MW (23.34%) has so far been developed and another 14,707 MW (10.12%) is under development. The State-wise details including Jammu & Kashmir are given at **Annexure – I**.

3.2 The Ministry furnished the following information regarding hydro capacity expected to be added during the 11th Plan to 15th Plan:

Plan Period	Hydro Capacity Addition (MW)	Total Hydro Capacity at the end of plan (MW)
11 th Plan (2007-08 to 2011-12)	15627	51181
12 th Plan (2012-13 to 2016-17)	20334	71515
13 th Plan (2017-18 to 2021-22)	30000	101515
14 th Plan (2022-23 to 2026-27)	30000	131515
15 th Plan (2027-28 to 2031-32)	13805	145320

Note: Hydro capacity at the end of 10th Plan was 34653.77 MW.

3.3 When asked about the development of hydro-electric power, the Government furnished the following information through a written reply:-

“A total number of 151 HE Schemes with aggregate capacity of 61283.5 MW have been identified by CEA/ States in NE region including Sikkim for implementation during 12th Plan and beyond. Out of these, 102 Schemes with aggregate capacity of 33778.5 MW have been allotted to private sector while 17 Schemes with an aggregate capacity of 10437 MW have been allotted to CPSUs. The remaining Schemes are either to be implemented in State Sector or are yet to be allotted.....”

3.4 On the potential of hydro-electricity in North Eastern Region, the Ministry informed:

“The identified potential in NE Region including Sikkim together constitutes about 43% of the total identified hydro power potential in the country. Presently, just about 2 % of the identified potential (above 25 MW) has been developed in N.E. region and another about 5% is under various stages of development. In Sikkim, 13.4 % of the assessed potential (above 25 MW) has been developed and another about 49% is under development. Thus, there is scope to give boost to the hydro electricity generation especially in NE region.”

3.5 When asked about the proactive steps taken by the Government towards development of hydropower, the Ministry submitted the following through a written reply:-

“A number of initiatives have been taken by the Ministry of Power for expeditious development of hydro power in the country starting with Policy Liberalization in 1991 to encourage greater participation by private entrepreneurs in electric power generation to bring in additional resources for the capacity addition in the Power Sector.

A Hydro Policy incorporating several steps and measures for development of hydro power in the country was announced in August, 1998. The Policy, among others, laid emphasis on basin-wise development, evolving consensus on inter-state issues, mitigation of geological risks, simplified procedure for transfer of clearances, promoting joint venture arrangements, etc.

The National Electricity Policy was announced by the Government in February, 2005, which, among others, lays emphasis on harnessing hydro potential speedily to facilitate economic development of States, particularly North-Eastern States, Sikkim, Uttarakhand, Himachal Pradesh and Jammu and Kashmir.

In 2003, 50,000 MW hydro electric initiative was launched by the Hon'ble Prime Minister. Under this initiative, Preliminary Feasibility Reports were prepared in respect of 162 hydro electric schemes in the country, which helped Developers to identify potentially attractive schemes in various States and participate in the hydro power development in the country in a big way.

Keeping in view the requirements of power projects located in special category States of J&K, Sikkim and the seven states of North East, the minimum qualifying capacity of hydro power plants to avail mega project benefits, has been reduced from 500 MW to 350 MW.”

The Ministry also stated that the Electricity Act, 2003, which replaced the earlier Electricity Act, 1910, the Electricity A (Supply) Act, 1948 and Electricity Regulatory Act, 1998, has emphasized the development of hydro power and safety of the structures including dams etc.

3.6 In order to facilitate quicker development of hydroelectricity, Hydro Power Policy, 2008 has been notified by Government of India on 31st March, 2008. The salient features of the policy were given to the Committee as below:

- Provides level playing field to private developers –tariff to be determined by the Electricity Regulatory Commission under section 62 of the Electricity Act, 2003, as is being done for PSUs up to January, 2011.
- Transparent selection criteria for awarding sites to private developers – Regulatory Commissions to decide.
- Enables Developer to recover his additional costs through merchant sale of up to a maximum of 40% of the saleable energy. Balance power to be supplied to distribution utilities based on long term PPA.
- Additional 1% free power from the project for a Local Area Development Fund, to create regular revenue stream for welfare schemes, creation of additional infrastructure and common facilities.
- The State Governments are also expected to contribute a matching 1% from their share of 12% free power.
- For 10 years from the date of commissioning, Developer to provide 100 units of electricity per month to each Project Affected Family (PAF) – in cash or kind or a combination of both.
- Project Developer assists in implementing rural electrification in the vicinity of the project area and contribute 10% share of the State Government under the RGGVY scheme.

3.7 When asked about the reasons for the slow development of hydropower in the country, the Ministry adduced following reasons, through a written reply:

“The development of hydro-electric projects is an intricate and long drawn process spanning over 3-5 years. Long time is required for survey and investigation, preparation of DPR, obtaining of statutory and non statutory clearances including environment and forest clearances, concurrence by CEA, investment decision and financial closure. Once the projects achieve financial closure, implementation takes another 5-8 years. Thus, hydro projects usually have long gestation period and require larger capital investment. This inherent long gestation period of a hydel project coupled with unforeseeable reasons such as land acquisition problems, environment & forest issues, extent of Resettlement & Rehabilitation problems, Law & Order problem and geological surprises further slow down the development of hydro-power.”

3.8 During the oral evidence of the Ministry before the Committee, the Secretary (Power) elucidated on various difficulties in execution of Hydro projects, as follows: -

“Now, development of hydro project is extremely difficult, and all of us know that. It is not only difficult from the point of view of construction as such which throws up a number of surprises, geological surprises. You really do not know what is under the ground? Whereas in a thermal project, you are working above the ground; there are no surprises of that kind. So, one of the difficulties one faces is in actual construction. That is why, you will find that hydro projects take a long time, much more than what is initially estimated for the simple reason that you really do not know what you are dealing with. That is one.

Secondly, the concerns these days are in terms of environment, in terms of forests, in terms of rivers being holy and rivers being allowed to flow. So, there are agitations preventing hydro projects. We have examples of agitations against hydro projects. Probably, where half of the work has been done, a lot of money has been spent, there the agitations are on different grounds like on religious grounds, on grounds of ecology, on grounds of environment, on grounds of water

flow in the river not being allowed to flow. So, it is very difficult to construct hydro projects.

The way things are happening, one is really doubtful about the future of the hydro power projects in the country. We have had bad experience of projects being stopped half way. Nobody is against the hydro projects. Hydro projects should be there but the way things are happening it is even more difficult to construct hydro projects. In North Eastern States, especially Arunachal Pradesh has huge potential of hydro power. Every attempt is being made to develop these projects there but all these would be subject to different clearances, different approaches and emotions of people who are involved there.”

(i) Environmental clearance to hydro projects

3.9 A number of hydro projects in the country are facing delays/suspension due to difficulties in getting environmental clearance on time. In this regard the Committee enquired as to how issues like submergence of forest land, ecological degradation, changing in water level down-streams etc. were being addressed. The Ministry of Power informed that these aspects were being looked after by the Ministry of Environment & Forests, and furnished the following details:

“The Ministry of Environment and Forests accords Environment and Forest clearances to each project as per procedures laid down by them through various Notifications issued by them from time to time. As per ‘Model TOR of hydro projects’ issued by MoEF, under the head Methodology, it has been mentioned that the baseline studies for all 3 seasonal studies (Pre-monsoon, monsoon and winter seasons) are to be conducted in the study areas.

It is also mentioned that the environmental issues mainly relate to river Ganga basin and river Brahmaputra basin. The main concern affecting the development of hydro electric projects in Uttarakhand is their ecological impact on river Ganga. To assess the feasibility of the hydro electric projects that are proposed on the major tributaries of river Ganga namely rivers Bhagirathi and Alaknanda, Ministry of E&F has decided to get studies conducted by Indian Institute of Technology, Roorkee and Wildlife Institute of India, Dehradun. In addition, a National Ganga River Basin Authority (NGRBA) has recently been

constituted by the Government under the Chairmanship Hon'ble Prime Minister vide Gazette Notification No. S.O 521 (E) dated 20.02.2009 to address such environmental concerns. The first meeting of the NGRBA was held on 05.10.2009. similarly, the major environmental concern in North Eastern Region is the adverse impact in the downstream areas in Assam due to construction of hydro electric projects in upper reaches of Bramhaputra river system. The Inter Ministerial Group (IMG), constituted by Ministry of Water Resources, has recommended carrying out of basin wise Environment Impact Assessment studies to know the downstream impact of development of hydro electric projects in cascading manner and minimum release required to maintain aquatic life downstream. As per the recommendations, the study of Siang and Subansiri basins have been entrusted to Central Water Commission. As regards to Lohit basin, MoE&F has entrusted the study to WAPCOS.”

(ii) Pumped Storage Plants

3.10 During the study tour of the Committee to Chennai in June, 2010, the Committee were briefed about Kundah HE Project in the Nilgiris, which is a pumped storage plant. It is not a conventional hydroelectric project, but here power is also used to pump water to the upstream reservoir. Therefore, pumped storage plants do not allow water to simply run off, rather it maximizes the use and potential of the same. The advantages from these type of projects is flexibility & grid security.

3.11 Later, while briefing the Committee on the subject, the Secretary (Power) deposed in the following way: -

“.....We as a country must go for more and more hydro power with the pump storage. We should not go only for hydro power station where water is let off. Tomorrow water is going to be a scarce commodity in our own life time. Wherever you put up hydro power stations. There should be a system for the reversible turbine where you pump water back so that water could be used at least once more, if not twice. We must have in all hydro power stations, wherever it is possible, reversible turbines...”

3.12 When asked to give advantages/disadvantages of pumped storage plants *vis-à-vis* conventional HE Plants, the Ministry gave the following information:

- (i) It allows additional generation during peak hours utilizing energy during non-peak hours.
- (ii) By Installing Pumped Storage Scheme, the water which otherwise would have been unutilized is being pumped back for re-generation & other purposes such as drinking etc.
- (iii) With the increase in the cost of coal, day by day, the relatively higher capital cost of pumped storage scheme can be justified.
- (iv) Just in case of a conventional hydroelectric project, the operational cost of pumped storage is very small.”

3.13 The Ministry further added that: -

“Keeping in view the above considerations, it is felt that pumped storage schemes should be promoted if site and grid conditions permit. Also the economics of pumped storage schemes depends on availability / rate of off peak energy required for pumping.

Pumped storage schemes are generally preferred in the states/regions where conventional hydro potential has been exploited considerably, where upper/lower reservoir are existing/under construction, water availability is less but topography permits locating two reservoirs/pondage (weekly/daily basis) at different levels providing high head, when water availability reduces in long term due to development of irrigation/consumptive uses in the upstream etc.

B. Thermal Power

3.14 Thermal power is the mainstay of power generation programme in the country, with an installed capacity of 118695.98 MW as on 30.09.2011. Around 84% of this capacity is coal based and therefore coal is likely to remain as the main source of power for the country in the near future.

3.15 On the requirement of coal in power plants for the year 2011-12, the Ministry furnished following information:

CEA has worked out the coal requirement at 455 MT for power utilities and against this requirement, the indigenous coal availability has been estimated at 402 MT. The details are given below: -

S.No.	Description	2011 – 12 (in Million Tonnes)
1.	Coal requirement	455
2.	Availability	
	(a) CIL	347
	(b) SCCL	33
	Sub-Total	380
	(c) Captive Mines	22
	(d) Total	402
3.	Gap	53

Note: The gap between availability and estimated requirement will be met by power utilities through targeted import of 35 MT during 2011-12, which is considered equivalent to about 53 MT of indigenous coal.

(i) Production of coal

3.16 It was also informed that the total coal inventory in India as per estimates made by Geological Survey of India as on 01.04.2011 stood at 285.86 billion tonnes.

3.17 As informed by the Ministry of Coal, through sustained programme of investment and greater thrust on application of modern technologies, the production of coal was raised from a level of about 70 million tonnes at the time of nationalization of coal mines in early 1970's to 492.95 million tonnes (All India – including Meghalaya) in 2008-09.

3.18 Coal India limited and its subsidiaries are the major producers of coal. 403.73 million tonnes of coal was produced by Coal India and its subsidiaries during 2008-09. Singareni Collieries Company Limited (SCCL) is the main source of supply of coal to the southern region. The company produced 44.54 million tonnes of coal during 2008-09.

3.19 During the briefing before the Committee, the Secretary (Coal) gave the following details:

“Regarding reserves, the total reserves as on 1st April, 2009 has been assessed at 268 million tonnes, of which 106 million tonnes is of proved category of

reserves, 129 million tonnes is of indicated category and 38 million tonnes is of inferred category. This categorization is done on the basis of bore-hole data and the spacing of bore-holes which are made over the respective coal fields. They can estimate the extent of availability may be with a greater degree of confidence through this exercise.”

3.20 On the steps taken to increase the production of coal, the Ministry of Coal submitted that:-

“Exploration for coal is taken up well in advance to assess the mining potentiality of the block. Normally, the Geological Reports (GRs), based on such exploration, are available 5-7 years before the start of actual production. Central Mine Planning & Design Institute Limited (CMPDI) is increasing the capacity of exploration through modernization & expansion of departmental resources and through outsourcing.”

3.21 The Secretary (Coal) during the briefing further added:

“In the meantime, finding out that the basic crux to increasing availability of coal is intensive drilling, our arm, which is CMPDE, which is responsible for drilling and exploration, has multiplied its capacity for drilling. It is already double of what it was in 2006-07. We are having a capacity of 200,000 mts. per year. That is now close to 400,000 metres and they have plans to increase it to 600,000 mts. by 2011-12. But the point is that the drilling capacity will remain idle because all the inferred indicated reserve mostly are in the forest areas. So, this waiver of forest clearance has to be there.”

(ii) Demand and supply of coal

3.22 The Central Electricity Authority has estimated that the total requirement of power utilities during 2011-12 would be 455 MT. CIL has to supply 347 MT, SCCL 33 MT and captive mines were to supply around 22 MT. To meet the gap between estimated requirement and indigenous availability, Ministry of Power gave a target of importing 35 Mt of coal by power utilities, which is equivalent to the balance requirement of 53 MT.

3.23 On the mismatch between demand and supply of coal, the Secretary (Power) informed the Committee during evidence that:

“...nearly 85 power stations in our country under our purview are not functioning fully because of the non-availability of coal in required quantities during the last three years period. The growth of the economy could suffer if this sector is not attended to by the coal sector. There is a mis-match between our sector and the coal sector. When you talk about power generation in our country, there is an urgent requirement for an attempt by my counterpart Ministry of Coal to augment the coal supply. This is one of the major issues that will confront us tomorrow. As you know, the minute we add another 60,000 MW or 70,000 MW capacity plant in the next two and a half years there will be tremendous pressure on the coal sector. We may go on putting machines, coal based thermal power stations but if we do not get the equivalent or commensurate coal supply to our units we will have this major problem of generation of power. We may have machines but we may not be able to run them because of lack of coal. I will give you the latest example of last 100 days. Since the last September to December, in four months we lost heavily in coal generation in thermal sector because of lack of coal especially in the Eastern sector; Talcher in Orissa, Farakka in West Bengal, Kahalgaon and also sometimes Ramagundam in Andhra Pradesh. Ramagundam is a critical station in the entire South because it supplies power all over the South, right up to Kerala. This is one of major constraints which we may face tomorrow. I visualize that in the next one and a half year unless the coal sector improves its performance, the performance of our power sector will be greatly affected. So, there is a close relation between the two sectors. The future of the power Ministry depends on the action initiated by the coal sector.”

3.24 When asked to explain shortage of coal to power plants despite signing of fuel supply agreement, the Ministry of Coal furnished following information through a written reply:

“The New Coal Distribution Policy (NCDP) stipulates supply of coal to all consumers including those of power sector through Fuel Supply Agreement (FSA). After protracted negotiations with active intervention of Ministry of Power, a mutually acceptable position for signing Fuel Supply Agreement between supplying Coal Companies of CIL and power utilities had emerged. CEA allocated powerhouse-wise Annual Contracted Quantity (ACQ) for all existing

power stations drawing coal till 31st March'09. The quantity allocated for existing power stations being 306 MT, remaining 7Mt of total 313 MT is kept apart for capacity additions of 2009-10. The model FSA assures committed supplies/lifting at the guaranteed level of 90% of Annual Contracted Quantity (ACQ). There is adequate provision for incentives and penalties for deviations from committed level of supplies.

While the supplies to power utilities from CIL sources, in general, has been much above the committed level. Till the end of February, 2009-10 despatch to utilities from CIL sources has been 271.8 Mt (provisional) against prorata ACQ of 280.2 Mt, thereby ensuring materialization to the level of 97%. However, there were a few power stations which faced coal stock crisis for various logistics and operational reasons, which attracted media attention.”

3.25 Explaining the reasons for less supply of coal to power plants, Secretary (Coal) stated during evidence:

“...of course, there are issues but I think it is not entirely attributable to Coal India limited. This can be seen from the fact that at the end of the year 2009-10 we had 63 million tonnes of coal at the pithead awaiting evacuation. Overall the Coal India Limited was required to produce and despatch about 460 million tonnes of coal in 2010. The cushion that is available is the coal at the pithead which is 57 million tonnes, as I mentioned. I think it is based on this we are committing another 50 million tonnes additionally on the best effort basis to the power sector. But much will depend on the availability of rakes for evacuation.

It will also require a quicker turnaround time at the power station. When the rakes arrive there, the time taken to unload has to be quicker so that quicker turnaround time will allow a better utilisation of the rake capacity. On the part of the coal companies, we are trying to reduce the time taken from the pithead to railway siding. We have a difficulty there and the coal companies are addressing these issues.

The sum total of what I am saying is that there is a need for coordinated action between the power plants, the coal companies and the railways. They

have to work in a coordinated manner so that we satisfy the demand of this very important sector.”

3.26 He further added:

“...In 2010-11, the target for coal supply to power stations is 335 million tonnes... We require about 185 railway rakes per day, if we want to reach the demand of 335 million tonnes. But today we are getting about 156 rakes per day. During the first quarter, against a requirement of 197 we have got 153 rakes per day. That is why the supply has been poor. In the second quarter against the planned movement of 180 rakes per day, the actual loading till date has been 158 rakes of which 124 rakes have been for the power sector.

So, the problem is once you lose this capacity, you cannot make good again. You have to have rakes supply on a daily basis. It will be a very daunting task to recover this lost evacuation capacity once it is lost. There is a Rail-Coal Interface Meeting, which Secretary (Power) has mentioned, which keeps meeting and addressing this issue. Through this mechanism we will keep looking at what best can be done to meet the demand of the power sector. But the fact remains that the coal demand is no doubt increasing at a much faster pace than the production. The coal production has been stepped up from around 5.9 per cent in 2007-08 to 7.8 per cent in 2008-09. And we expect that this would be 7.9 per cent in the last financial year. But the major constraints in achieving faster growth again, as said, both for the captive power as well as for Coal India, is environmental and forestry clearances. That is coming in the way in a big way. I think we need a dialogue at various levels to simplify this process and then only we can move forward at the pace which we require and we are expected to move in terms of coal production...”

3.27 On being asked about the need to take up this matter with Ministry of Railways, the Ministry of Coal submitted through a written reply:

“On the basis of the detailed discussion and decisions taken at the Annual Rail-Coal Interface meeting for coal movement from CIL sources through different coal loading zonal railways, the issue of actual availability of rakes is regularly

taken up with Railways in various fora from the field level between coal companies and the concerned zonal railways to weekly meetings of the inter-ministerial Sub-group, constituted at Ministry of Coal by the Infrastructure Constraints Review Committee under the Chairmanship of Secretary (Co-ordination), Cabinet Secretariat. The issue of rake availability at coalfields from different zonal railways is also discussed in the monthly coordination meeting between CIL and Director-Railway Board Kolkata.”

3.28 The Ministry further added, that

“The average growth in coal production is about 5% whereas growth in availability of railway wagons for coal movement has been a little more than 2 % in the last five years. This has resulted in accumulation of pithead stock for consecutive years and had been almost 70 MT in the beginning of current year inspite of demand-supply gap. Coal stacking capacity at ports being limited, movement of imported coal normally gets priority over movement of indigenous coal. In this milieu, apart from port-handling capacity, railway logistics will be a major constraint for movement of imported coal to hinterland consuming points.”

3.28A Considering the hindrances in transportation of coal through railways, the Committee wanted to know whether the Ministry of Power mulled over the proposal to set up generating units at the pit head itself. To this the Ministry of Power in a written reply explained:

“It has been inter-alia stipulated in the National Electricity Policy that for thermal power, economics of generation and supply of electricity should be basis for choice of fuel from among the options available. It would be economical for new generating stations to be located either near the fuel sources i.e. pit-head locations or load centres. It is also stipulated in the National Electricity Policy that the imported coal based thermal power stations, particularly at coastal locations would be encouraged based on their economic viability.

Location of thermal power plants near the coal mines is always preferable provided adequate land, water and other infra structural facilities are available. However, locating thermal power projects near coal mines is not always feasible due to non-availability of a large area of land, large quantity of water for cooling and other infrastructure facilities like road and rail connectivity for transportation of equipments

and coal. Thermal power projects are, therefore, being set up in different states depending upon availability of land, water and other infrastructure facilities.

As per the coal linkage policy for 12th Plan projects issued by Ministry of Power in October 2009, additional weightage is given to the pit-head thermal power projects while prioritising the projects for coal linkage.

The capacity addition in the 11th Plan envisage about 36% of the coal based capacity at pithead. New coal based thermal power plants totalling to about 31,000 MW at pithead are under construction or where orders have been placed with the clearances in place. These are likely to be commissioned during the 12th Plan.

The Ultra Mega Power Projects (UMPPs) being promoted by Government of India envisage setting up of large thermal power project either at pit-head based on captive coal mines or at coastal location based on imported coal. The following UMPPs are envisaged at pithead:

- i) Sasan UMPP in Madhya Pradesh – 4,000 MW – Project awarded and under construction.
- ii) Talaiya UMPP in Jharkhand – 4,000 MW – Project awarded and land acquisition under process.
- iii) Orissa UMPP – 4,000 MW – under bidding process.
- iv) Chhattisgarh UMPP – 4,000 MW – under bidding process.
- v) Two additional UMPPs in Orissa – 4,000 MW each – sites under investigation.
- vi) Additional UMPP in Jharkhand – 4,000 MW – site under investigation.”

3.29 When asked about the steps taken by the Ministry to obviate disruptions in coal supply due to law & order problems, the Ministry submitted in a written reply:

“Whenever supply from a particular coalfield is affected due to Law & Order problem, supplies from other subsidiary coal companies linked to the affected Power Station are augmented to the extent possible to provide necessary relief. Generally supplies from the coalfields of CCL are affected due to frequent Law & Order problems. Power Stations linked to CCL are mainly located in northern region and partly in the eastern region.”

3.30 The Ministry of Coal also expressed a view that as the quality of domestic coal is not good and needs to be washed, the price of coal for Power Sector should be revised. Elaborating it further, the Secretary, Coal stated *inter alia* as under:

“Our country is embodied with poor quality of coal. The coal quality is not inherently very good. The only answer to that is having washeries. Now, we have not been able to make washeries because the power sector was reluctant to bear the washing cost. We have now very clearly told the power sector and it has been accepted in the Government that we shall build washeries because washing is the best practice, and we have to go for washing because we must be able to conform to the coal quality that we stipulate. Therefore, we will bear the washing charges. But washed coal certainly cannot be sold at the prices for ROM coal. They have to pay for the better value that they get in terms of consistent quality of coal and better heat value.”

3.31 As informed by the Ministry of Coal so far 93 coal blocks with geological reserves of 28.199 billion tonnes have been allocated for generation of power. The details are given in **Annexure – II.**

3.32 As stated by the Ministry of Coal, with the progressive allocation of coal blocks, the number of coal blocks available for allocation are decreasing, while the number of applicants per block are increasing in terms of the escalating demand of coal. This has made selection of an applicant in respect of a block difficult and vulnerable to criticism on the ground of lack of transparency and objectivity. In a meeting convened on 10.08.2009, the Minister of State (Independent Charge) for Coal had also asked the State Governments to form a Monitoring Committee headed by the Chief Secretary to facilitate expeditious development of coal/lignite blocks.

(iii) Environmental issues

3.33 There are multiple environmental concerns related to the Coal sector. Most of the coal reserves in India are situated in highly forested and tribal inhabited areas, which pose the challenges for environmental conservation and rehabilitation. A number of projects are facing difficulties due to the delays in getting environmental clearance. The Ministry of Coal has

made it quite evident that the Environment Ministry's measures such as classifying forests as "no go" / "go" and the moratorium on clusters with high comprehensive environmental pollution index are the cause of a shortfall in coal production.

3.34 The Secretary (Coal), during the briefing before the Committee submitted about restrictions to drill boreholes in forest areas with potential coal reserves, as under:

"We have again taken it up with them saying that this level of density does not serve our purpose at all for resources like coal and other minerals, which sought similar dispensation, and we want that should be increased ten-fold. We have asked for 15 to 20 bore holes per square kilometer. We also made the plea that sinking these bore holes for the purpose of estimates does not cost permanent or any exhaustive damage to the environment.

There is some agreement with the Ministry and finally we have got permission to use this arrangement of sinking in greater number of bore holes in three projects. Though this agreement was made between the two Ministries, Minister of Coal and Minister of Environment and Forests, about six months back, the correspondence is yet to trickle down to the Forest Department through their sources. So, we have still not made that progress. We wanted to use this in each of our major coal fields, that is, the coal fields we have listed North Karanpura in Jharkhand, Talchar Valley in Orissa and Mand-Raigarh in Chhatisgarh"

3.35 The Ministry further furnished following information through a written note:-

"In September 2009, Ministry of Environment and Forests (MoEF) issued a letter to begin prospecting in three forest covered blocks on trial basis to assess the impact of exploration on flora and fauna. MoEF again issued a letter on 10.03.10 conveying the approval of Central Govt. for trial exploratory drilling in the same three blocks. Permission for trial drilling has allowed average drilling of 17 to 20 boreholes per sq.km. as envisaged for revision in guidelines.

To carry out trial drilling in 2 blocks namely, Baitarni East in Orissa & Bijul in MP, local DFOs have issued permission in May-June'10 and exploration has

started in June'10. After drilling of two boreholes in Baitarni East, further drilling has been suspended. Difficulty is being faced at ground level due to resistance from local 'Van Suraksha Samiti'. Once this is overcome, drilling would resume and other drills will be shifted. However, permission for exploration in 3rd block, i.e. Chirra North in Chhattisgarh, is yet to be granted by local DFO. On submission of joint impact assessment report (CMPDI with Forest Division), Central Government will revisit the guidelines on prospecting of coal/ other minerals."

3.36 As the Ministry of coal had specifically pointed out certain constraints in the roll out of new projects, the Committee felt concerned about these road blocks and steps taken to remove them. Responding to a query from the Committee, on rehabilitation of persons from whom land is acquired for coal blocks, Chairman (CIL) gave the following reply during the briefing:

"... we made significant changes in our Resettlement and Rehabilitation Policy....

... Our package provides a very liberal employment. We promise employment of one person for every two acres of land acquired. It is flat and guaranteed; irrespective of whether there is a vacancy or no vacancy, we will adjust it somewhere in the system. So, that kind of an assured employment is there. That has actually enabled us to crack in many cases. We have created rehabilitated villages which are absolutely state of the art. It gives tribal rehabilitation villages in many places which have most of facilities that you can think of in a normal township. The facilities such as drinking water, electricity, education facility and places of worship, and everything are there. We are exposing tribals to modern education, keeping their identity and culture intact. These are some of the great value additions that we have done.

We run 85 hospitals with 1600 doctors and 6000 hospital beds. In many places, that is the only facility available, and the State does not give any facility. So, with these things, we are able to acquire land and increase production at six to seven per cent which is not a small thing in today's parlance. But the power sector demand is going at 10 per cent. That is for sure because the capacity addition programme has picked up. There is a need for providing power for all. "

(iv) Pilferage of Coal

3.37 When asked about the alleged pilferage of coal, the Ministry submitted through a written reply:

“The term of sale by CIL is on Free-on-Rail (FOR) colliery basis, therefore, coal companies are not responsible for any en-route pilferage of coal. So far as theft of coal is concerned, it is carried out stealthily and clandestinely. As such, it is not possible to specify the exact quantum of coal stolen and losses incurred on account of theft / pilferage of coal.

Law & Order is a State subject, hence primarily; it is the responsibility of the State/District administration to take necessary deterrent action to stop/curb theft/pilferage of coal.”

3.38 The Ministry further gave an overview of the steps being taken by the Coal companies to prevent illegal mining, which are as follows:

- a) Rat holes created by illegal mining are being dozed off and filled up with stone and debris wherever possible.
- b) Concrete walls have been erected on the mouth of the abandoned mines to prevent access and illegal activities in these areas.
- c) Regular raids/checks are being conducted by security personnel and static security pickets including armed guards during the night hours are being deployed at pithead depots.
- d) Surprise raids/checks are being conducted jointly by security personnel and law and order authorities of the concerned State Governments.
- e) Fencing is being constructed at various illegal mining sites along with displaying of signboards mentioning “Dangerous and Prohibited Place.”
- f) Dumping of the overburden is being done on the outcrop zones, which are not required to be mined.
- g) Collection of intelligence reports about illegal coal depots and illegal movement of coal and informing district authorities of the same for taking preventive action.
- h) Installation of check-posts at vulnerable points to check transport documents;

- i) Training of existing security personnel, refresher training of CISF personnel and basic training of new recruits in security discipline for strengthening the security setup;
- j) The coal companies maintain close liaison with the State authorities.
- k) Committee/task force has been constituted at different level (block level, sub-divisional level, district level, State level) at some subsidiaries of CIL to monitor different aspects of illegal mining.

(v) Import of Coal

3.39 As regard import of coal, which seems inevitable due to inadequate supply of domestic coal for some power stations, constraints in transportation of coal to power plants etc, the Ministry of Coal informed the Committee as under:

“For the year 2010-11, to bridge the gap of 46 MT between the requirement for thermal power stations designed on indigenous coal and indigenous coal availability, power utilities have been advised to import 35 MT of coal. While some of the power utilities have imported coal in accordance with the proportionate target, import by other utilities is falling short of the target due to delay in getting clearance from state Government, delay in placement of orders, etc.”

When asked about ensuring the quality of imported coal, it was informed as follows:

“Coal import is being done by the Power Utilities and the mechanism for ensuring quality of coal supplied to them vis-à-vis the specifications laid down in their order(s) also rests with them.”

Responding to a specific query on establishing the calorific value of imported coal, it was stated:

“The power utilities are having testing facilities at the power stations where - in the calorific value of both the domestic and imported coal is determined.”

3.40 In their written note, the Ministry of Coal supplied further information as under:

“CIL was advised by the Government to import 4 Million tonnes of coal for supply to the power utilities during 2009-10. Accordingly, CIL Board, in principle

decided for import of 4 Million tonne of coal during 2009-10 for supply to power utilities, subject to getting firm commitment from the indenting power utilities for accepting imported coal at cost plus price. CIL had taken up with all the power utilities to ascertain the quantity of coal required by them for import through CIL during 2009-10 and the response has not been positive, except for one case of DVC who had indicated a requirement of 0.8 Million tonne of coal that too during the period beginning the 2nd quarter of 2010-11 till March 2011.

As per Planning Commission, CIL has been advised to import 8 Million tonne for power utilities in the year 2010-11 out of a total requirement of 47 Million tonnes of imported coal required to bridge the gap between demand and indigenous supply. CIL has initiated necessary steps to be in preparedness subject to receiving firm demand from power utilities.

Coal India Limited has informed that the actual quantum of such reasonable return is yet to be decided. However, same would be comparable with the charges being levied for import by Public Sector Undertakings like Minerals and Metals Trading Corporation (MMTC), State Trading Corporation (STC) etc. CIL has reported that they are not aware of any negative response from the power utilities on the issue of reasonable return being proposed to be charged by CIL.”

3.41 Secretary (Power) added, during evidence:

“...this (import of coal) is only a temporary relief. Unless the country’s supply, the basic supply is not maintained we can only make some addition here or there. It can never be the source of main supply”.

3.42 Concurring with the statement made by the Secretary (Power), the Secretary (Coal) during briefing submitted as under:

“Sir, if you look at the Integrated Energy Policy, it projects a total demand of two billion tonnes in 2031-32. The current consumption is 550 million tonnes last year. So, if you work out on 550 million tonnes in 2008-09 and two billion tonnes in 2031-32, it is an increase of 6.2 or 6.3 per cent per annum CAGR. So, on a longer term, the rate at which we are expanding is good enough but in a shorter

term, because of this 'Power For All' Programme, there is a bunching of demand. All of a sudden the demand has gone up. It will continue like this may be for a decade or so, and then over a period of longer term we will be able to match. During this period, we have to import.”

(v) Investing in assets abroad to secure coal supplies

3.43 Import of coal has become inevitable in India in view of the domestic supply demand mismatch. There is a heightened demand for coal internationally, and in this scenario, there are various uncertainties involved in the line of supply of coal. To tide over these uncertainties, there has been a move for securing supplies through long term contracts. This might also act as a check against volatile prices of this internationally valued commodity.

3.44 As informed by the Ministry of Coal, Coal India Limited (CIL) emerged as the successful bidder in the global tender process run by Govt. of Mozambique and acquired prospecting license (PL) of two coal blocks in Mozambique, namely A1 and A2, covering an area of 22,400 hectares in Tete Province. The PL entitles CIL to explore and develop the coal blocks over a period of 5 years. A 100% wholly owned subsidiary of CIL namely, Coal India Africana Limitada, has been registered in Mozambique for investment in coal resources. The prospecting license of A1 and A2 were transferred in the name of Coal India Africana Limitada on 06.08.2009. The PL has been granted for a period of 5 years during which the coal blocks shall be explored and developed. Therefore, the production from these coal blocks can be expected after exploration activities to a satisfactory level has been carried out within the period allocated for PL. The production potential can be assessed only after mine planning and design of the blocks based on exploration results are over and hence the expected production cannot be indicated at this juncture.

3.45 The latest status with regard to CIL's initiative for strategic partnership with foreign coal companies for securing additional coal supplies from abroad was given to the Committee as below:

1. A global Expression of Interest (EOI) was floated by Coal India Limited (CIL) in July, 2009 to select Strategic Partner(s) in Australia, USA, South Africa and Indonesia.

2. The intent of CIL was to select Strategic Partner(s) in preferred destination countries like Australia, USA, South Africa and Indonesia to acquire stakes in the existing or Greenfield coal resources under the following deal structures:

i. Model I - Equity investment by CIL with long-term offtake contract at a price less than prevailing import price.

ii. Model II - Only long-term offtake contract on cost plus basis at a price less than prevailing import price, with financial assistance (if required) by way of loan from CIL for production augmentation.

iii. Model III - Formation of JV for exploration, development and operation of coal assets in any of the destination countries.

3. Based on the present level of production, 12 Firms from USA, Australia, South Africa and Indonesia were identified at the first instance for a detailed presentation during December, 2009 – January, 2010 before the Empowered Board Level Committee constituted to examine the proposals and rank them according to technical and financial aspects. The Committee had been entrusted upon to finalize the evaluation criteria for assessment of the presentation to be made by the short-listed firms.

4. The recommendations of the Empowered Board Level Committee were placed before the CIL Board for deciding the future course of action with regard to the Expression Of Interest (EOI) process.

5. The recommendations were deliberated in the CIL Board meeting held on 30.01.2010. The Board has directed to commence due-diligence of first two proposals in order of rank for each country under Model-I and Model-III. However, proposals in Model-II were decided to be taken up later.

6. As per the directives of the CIL Board, the process of due diligence was restricted to only 5 (five) proposals under Model-I & III in 3 (three) listed companies in Australia, Indonesia and USA.

7. Three teams of two officials each from CIL for three countries were constituted to undertake the technical due diligence of the above assets in association with the Technical consultants & Merchant Bankers (MB/IB).

8. Technical due diligence in association with Technical Consultant and Merchant Bankers of the identified coal assets in Indonesia, USA & Australia have been completed. The transaction models for the assets under reference are being evaluated and are under finalization.

9. Meanwhile, the long-term coal off take proposed by CIL under Model-II was reviewed by Central Vigilance Commission. CVC has advised to invite fresh Expressions of Interest (Eoi) specifically for long term off-take contracts (Model-II) mentioning that it is not necessary for those parties who had already been shortlisted under this group on the basis of earlier Eoi invited for Strategic Partnership. Accordingly, an Expression of Interest (Eoi) incorporating the views of CVC is under formulation.

(vi) Use of supercritical technology

3.46 The size of generating units has gradually increased from 30 MW in 1950's to 500 MW, which is presently the largest unit size in operation in coal based thermal power stations. The increase in unit size has been associated with corresponding increase in steam parameters so as to improve efficiency. The present 500 MW units employ steam parameters of 170 kg/cm², 537/537° Centigrade which are almost peak steam parameters possible in the subcritical range. Recently, BHEL have also brought out 600 MW subcritical units with same steam parameters as 500 MW units.

3.47 When asked about the feasibility of supercritical technology in India, the Ministry replied as under:

“Supercritical technology has been adopted to further increase the generation efficiency which has become necessary in the wake of increasing environmental concerns. Improving generation efficiency of coal fired units is a vital component of our low carbon growth strategy. Currently, 660 and 800 MW supercritical units are under construction. For inland stations using indigenous coal, maximum unit size envisaged so far is 660 MW; however, unit size upto 800 MW can also be

adopted for inland stations depending upon logistics of transportation of heavy equipment. For coastal stations using imported coal, maximum unit size envisaged so far is 800 MW.

Given the very large capacity addition programme envisaged in the country, it is considered essential to adopt large size supercritical units to improve the pace of capacity addition, Also, supercritical technology used for 660/800 MW units would result in lower GHG² emissions. The large unit size offers benefits of economies of scale and would ultimately lead to lower cost in the long run. The overall land requirement and O&M cost would also be lower for large size supercritical units as compared to equivalent capacity through smaller size units.”

(vii) Development of Ultra Mega Power Projects (UMPPs)

3.48 For meeting the growing needs of the economy, generation capacity is to double itself in every ten years in next three decades at least. As such there is need to develop large capacity projects at the national level to meet the requirement of different States. Development of Ultra Mega Power Projects (UMPPs) is one step in that direction. These are very large sized projects, approximately 4000 MW each involving an estimated investment of about \$ 4 billion.

3.49 These projects will meet the power needs of a number of States/distribution companies located in these States, and are being developed on a Build, Own, and Operate (BOO) basis. In view of the fact that promotion of competition is one of the key objectives of the Electricity Act, 2003, and of the legal provisions regarding procurement of electricity by distribution companies, identification of the project developer for these projects is being done on the basis of tariff based competitive bidding.

3.50 As informed by the Ministry of Power, the salient features of these plants are as follows:

- The Ultra Mega Power Projects would use Super Critical Technology with a view to achieve higher levels of fuel efficiency, which results in fuel saving and lower greenhouse gas emissions.

² Green House Gas

- Flexibility in unit size subject to adoption of specified minimum Supercritical parameters.
- Integrated power project with dedicated captive coal blocks for pithead projects.
- Coastal projects to use imported coal

3.51 As per the Annual Report of Ministry of Power (2010-11), 16 UMPPs have been identified to be located at Madhya Pradesh (Sasan), Gujarat (Mundra), Chhattisgarh (Sarguja), Karnataka, Maharashtra (Munge), Andhra Pradesh (Krishnapatnam), Jharkhand (Tilaiya), Tamil Nadu (Cheyyur), Orissa (Bedabahal), Andhra Pradesh 2nd UMPP (Nayunipalli), 2 Additional UMPPs in Orissa, 2nd UMPP in Tamil Nadu, Gujarat and Jharkhand and 3rd UMPP in Andhra Pradesh. On the status of development of these projects, the Ministry furnished the following information through a written reply:

“Four Ultra Mega Power Projects i.e. Sasan in Madhya Pradesh, Mundra in Gujarat, Krishnapatnam in Andhra Pradesh and Tilaiya in Jharkhand have already been transferred to the identified developers and they are at different stage of developments. The fourth UMPP at Tilaiya was transferred to the successful developer on 7th August 2009.

Regarding UMPPs in pipeline, all the pre-RfQ activities in respect of Chhattisgarh³ UMPP, have been completed and RfQ has been issued on 15th March, 2010. For Tamil Nadu UMPP, the site at Cheyyur has been finalized along with the captive port at Panaiyur. Consultants have been appointed by the SPV of PFC for carrying out various studies. For Orissa (Bedabahal) UMPP, Section 4 notification of project land is to be issued, for which the State Government has been requested so that the RfQ could be issued.

Development of other UMPPs to be located in the States of Karnataka, Maharashtra, second UMPP in Andhra Pradesh and Gujarat and additional UMPPs in Orissa is contingent upon requisite clearances from the respective State Governments.”

3.52 On being asked as to why no UMPP has been planned for power starved Northern States, the Ministry replied as under:

³ In district Sarguja (Annual Report, Ministry of Power, 2010-11)

“Ultra Mega Power Projects are being developed keeping in view the logistics of supply of coal either near coal pit-head or near the sea coast where imported coal can be used. Hence UMPPs are being developed in the States where coal blocks are located or which are near the sea coast. No site has so far been offered for UMPP in Northern States. However, power from the UMPPs being set up in other States has been allocated to Northern States as well.”

C. Installed Capacity versus Actual Output of Power

3.53 While the installed capacity represents the gross capacity of the stations, the capacity available for supply of power gets reduced to the extent of planned maintenance and forced outages, which is of the order of 15%. The actual availability of power from the available capacity gets reduced to the extent of auxiliary power consumption in the power plant equipment (average 6.5%) as well as operating restrictions due to shortage of fuel / water and machine constraints. The utilization of installed capacity of a generating unit is linked to the type of generation. While the thermal units are meant to be utilized continuously as base-load units, hydro units are to be utilized depending on availability of water / reservoir level. The PLF of thermal units depends on a number of factors such as vintage of the unit, forced and planned outages, availability of required quality and quantity of fuel, etc. Indicator of performance of hydro generating unit is its availability (excluding the time required for its planned maintenance and attending to forced outages).

3.54 The details of utilization of thermal power stations in terms of PLF and Operating Availability of hydro power stations for the year 2007-08 & 2008-09 are given below:-

	2007-08	2008-09
A. Thermal		
i. Target PLF (%)	77.1	79.2
ii. Actual PLF (%)	78.6	77.2
B. Hydro		
Operating Availability (%)	92.0	91.2

The Ministry furnished following reasons for Plant Load Factor going down to 77.2 % in 2008-09 from 78.6 % in 2007-08:-

- Loss of generation of 10.9 Billion Unit (BU) due to shortage of coal at some of the thermal power plants.

- Delay in achieving commercial operation / commencement of full generation from some of the newly commissioned thermal units due to non-completion of balance of plants works.
- Lacking performance of some of the new thermal units due to initial stabilization problem.

3.55 Sector-wise details of PLF during 2007-08 to 2009-10 are given below:

	Target	Actual	Sector-wise Actual (%)		
	(%)	(%)	Central	State	Private Utilities
2007-08	77.14	78.61	86.74	72.89	90.20
2008-09	79.17	77.22	84.34	71.20	91.04
2009-10	77.17	77.53	85.49	70.90	82.41

3.56 When asked about the reasons for low Plant Load Factor of Central and State sector plants as compared with Private Sector, the Ministry cited following reasons:

- (1) Most of the private sector units have been newly commissioned and hence are operating at its optimum capacity. Moreover, some of the stations under Central Sector & State Sector are very old and have completed its full life span but are still running after carrying out the R&M activities / Life Extension works based on residual life assessment (RLA) studies. Such plants though, give improved output but are unable to contribute like new plants.
- (2) Arranging fuel supplies of the required quantity and quality by the private sector utilities.

3.57 The concept of Plant Load Factor (PLF) is also related to the actual operating efficiency of units. New breakthroughs in Science and Technology have ensured that the efficiency of Thermal units is increased world over. Thermal plants are also responsible for emitting a lot of CO₂ in the atmosphere and therefore contributing to Global warming. In a likely scenario of greater environmental concern and vigilantism, it is imperative to improve the efficiency per unit of electricity produced.

3.58 When asked about the major steps taken to increase the energy efficiency of the plants, the Ministry made the following reply:

“Under the "National Action Plan on Climate Change" (NAPCC) Ministry of Power have initiated National Mission on Enhanced Energy Efficiency (NMEEE) for enhancing energy efficiency by four new initiatives. Working Group - III was one of the three Working Groups set by Ministry of Power which was entrusted with the task of examining the various aspects relating to energy efficiency enhancement with existing thermal plants.”

3.59 The Working Group III in its report (Dec. 2008) has inter-alia recommended:

“To retire all non-reheat units of 100 MW or less rating in a phased manner over a period of next ten years. However, those units where major R&M/LE activities have been undertaken and are performing well, such units may continue to operate for another 10 years from the date of post R&M/LE.

All reheat type units above 100 MW with more than 25 years in operation but performing poorly would be examined on case to case basis for their retirement/LE, based on techno-economic considerations and their inability to achieve benchmarked level of efficiency in a specified period of time would render these liable for retirement.

To prioritize the retirement of units according to their level of performance subject to the conditions 1 & 2 above.”

3.60 Working Group III suggested that in 11 Plan old small sized thermal units with aggregate capacity of around 5000 MW having low level of operating efficiency be retired. During the 11th Plan generating units aggregating 1218 MW thermal generating capacity have already been retired (**Annexure – III**) and further additional thermal capacity of 2768.88 MW consisting of unit size varying from 30 to 120 MW is under consideration.

D. Shortage of power equipment

3.61 There has been a critical shortage of power equipment in the country over the last couple of years. Without the timely supply of critical equipment like boilers and turbines, the capacity addition targets are likely to be delayed. The Committee were informed by the Ministry that BHEL has enhanced its capacity to deliver 10,000 MW of main plan equipment per annum. BHEL has also put an action plan to enhance capacity to deliver 15,000 MW per annum by March 2010 and may raise this capacity upto 20,000 MW by March 2012

depending upon the market demand. Also some joint venture companies have been formed to manufacture power equipment.

3.62 According to the Ministry the latest status of various Joint Ventures initiated to manufacture power plant equipment and indicated timelines for production is as under:-

Planned Manufacturing capacity per annum

Venture	Boilers	Turbine-generators	Present Status
L&T-MHI	4000 MW	4000 MW	Shops for Boiler and turbine manufacturing constructed and production commenced
Alstom -Bharat Forge	-	5000 MW	Civil construction of plant started in Sept 2010 and is in progress Plant expected to be functional for manufacture of turbines by June 2013.
Toshiba- JSW	-	3000 MW	Probable date of completion of all manufacturing facilities, assembly & testing- April 2013
Gammon-Ansaldo	4000 MW	-	Probable date of completion of facilities December, 2012(2000 MW) and December 2014 (additional 2000 MW)
Thermax-Babcock & Wilcox	3000 MW		Erection of all sheds to be completed by March-2012 Probable date of completion and operationalising of manufacturing facilities by Sept-2012.
BGR Hitachi Boilers Private Ltd.	5 Boiler per annum (~3000 MW)		Construction of manufacturing facilities to Completion by July-2012 (Coil Shop), Oct-12 (Panel shop) and Jan-13 (Header shop)
BGR Hitachi Turbine generator Private Ltd.		5 Turbine generators per annum (~3000 MW)	Construction of manufacturing facilities Completion by Jan-2013 (Blade Shop), July-13 (Casing shop) and July-14 (Rotor shop)

E. Renovation and Modernization (R&M)

3.63 As the thermal units get older, they require more periodic maintenance. In order to minimize the gap between installed capacity and generating capacity, appreciable Renovation and Modernization (R&M) work has to be carried out. The Renovation and Modernization (R&M) programme of the Ministry of Power is primarily aimed at generation sustenance and overcoming problems due to:

- Generic defects.
- Design deficiencies /modifications.
- Avoidance of inefficient operation
- Non-availability of spares because of obsolescence of equipment / components.
- Poor quality of coal.
- Major replacements of equipment arising due to unforeseen failures and /or generation sustenance not covered under regular O&M.
- Stringent environmental regulation.
- Safety requirements, etc.

3.64 The Committee were informed that Life Extension (LE) works are carried out in thermal power plants due to following reasons:

“The equipment subjected to fatigue stresses and creep due to high temperatures such as turbine rotor and casings, HP piping, boiler headers, Boiler drum, main steam piping and valves, feed discharge lines etc. are designed for a given fatigue life of about 25-30 years of operation. However, many equipment/ components might become prematurely weak metallographically due to various operational stresses like frequent temperature and pressure excursions, full load trippings, frequent start and stops etc. and accordingly there is need to check the remaining life of these components after about 20 years of life or 1,60,000 hours of operation lest it may result into serious failures. A systematic study called the Residual Life Assessment (RLA) study involving non-destructive and destructive tests would reveal the remaining life of various critical components of plants and equipment so as to take steps to extend the life of the plant by a further period of about 15-20 years by appropriate repairs/replacements. A RLA study may be carried out earlier, say after 15 years or 1,00,000 hrs. of operation if the plant condition so necessitates and as stipulated in IBR 391 A.”

3.65 Asked about the details of units which have been identified for R&M and the estimated expenditure, the Ministry of Power in a reply stated:

“The list of generating units which are in operation for a long period and have been identified for Life Extension works and R&M works during the 11th Plan are tabulated in **Annexures – IV & V** respectively along with their PLF for last five years. The estimated expenditure is about ₹16532 Crore for Life Extension works and ₹4971 Crore for R&M works.”

3.66 The status of the units programmed for R&M works during 11th Plan are placed at **Annexure –VI.**

3.67 When asked about the details of R&M related work being carried out in various units, the Ministry submitted in a written reply:

“Twenty five (25) numbers of thermal units of 30 MW and above having aggregate capacity of 2155 MW had been under shut down since more than a year. Out of these, 2 units viz. Barauni TPS Unit 6 and Muzaffarpur Unit 2 have been restored and programmed for Life Extension works along with Barauni TPS unit 7 and Muzaffarpur unit 1 which are still under long shut down. Another 4 units (Obra unit 9, Amarkantak unit 2, Patratu unit 9 &10) are under shut down due to R&M / Life Extension works being carried out. Balance 17 units are under shut down due to either uneconomical operation or some major defects. Out of these 17 units, 11 units have been identified to be retired during the 11th Plan period. Decision in respect to balance 6 units is yet to be taken by concerned power utilities.”

3.68 As stated by the Ministry of Power the reasons for appreciable Renovation & Modernisation (R&M) activity not being carried out in some of these units are due to following:

- “(i) Smaller size units below 100 MW non- reheat type are identified for retirement
- (ii) Low design efficiency thus techno-economic viability not established
- (iii) Technological obsolescence, non-availability of spares etc.”

F. Skilled manpower requirement

3.69 The ambitious power augmentation programme would require commensurate increase in the availability of skilled manpower. This should be done keeping in view the changing skills & technological requirements. Attention need to be paid not only to the quantity, but also the quality of manpower across the vertical chain right from the engineers to the semi-skilled workers.

3.70 As informed by the Ministry of Power, following steps have been taken by the Government to improve availability of skilled manpower:

(a) Ministry of Power and CEA have taken initiative under “Adopt an ITI” scheme since July 2007. Under this scheme, the State Government ITIs are being adopted by power sector CPSUs and Private Project developers under Public Private Partnership scheme of the Directorate General of Employment and Training, Ministry of Labour and Employment to invest in augmentation and up-gradation of the training assets of ITIs around their project areas, especially in respect of trades that are relevant to the power industry. CPSUs have adopted 52 ITIs (including 8 new ITIs under construction). The private developers have also adopted 12 ITIs.

(b) The issue of Manpower requirement and their skill development has been emphasized during the Chief Ministers conference (2007), and the Power Ministers Conferences held in June 2009 and November, 2009. State Governments have also been requested to facilitate adoption of ITIs by their State Power Utilities.

(c) Master Skill Development Plan for instructors of ITIs - 100 days training of Master trainers. The Master Skill development i.e Training of trainers is being undertaken to improve the quality of trainers in ITIs by following methodology:

- Experienced highly skilled employees / supervisors of Power Sector Companies/ PSUs will train the instructors.
- Instructors are being sponsored for training in various Institutes run by State Governments / other training institutes. The cost of the training is being borne by the adopting PSUs.
- Visits of the instructors are being organized to nearby power stations of the adopting CPSUs so that the instructors observe the actual process of jobs being done.

(d) Training is being imparted at 68 training institutes recognized by CEA in the Central, State and Private Sectors. These Institutes are providing induction training, refresher and advanced training, simulator based training, training in Transmission & Distribution (T&D) and grid management, training for capacity building of franchisees and training in energy efficiency and energy conservation. Training is also being imparted through other institutes namely, Indian Institute of Managements (IIMs),

Administrative Staff College of India (ASCI), Engineering Staff College of India (ESCI), Management Development Institute (MDI) and other institutes including distance learning programme of Indira Gandhi National Open University (IGNOU).

Manpower planning for power sector was undertaken for the 11th Plan on the basis of envisaged generation capacity of about 78,000 MW and 1.0 lakh circuit kilometers of transmission lines and extension and augmentation of the requisite sub-transmission and distribution network (including that under RGGVY and APDRP). It has been identified that during 11th Plan, 10 lakh personnel will be required for construction, operation and maintenance of power plants including 1,50,000 skilled workers, 1,60,000 semi skilled workers and 5,03,500 unskilled and non-technical personnel.

3.71 When asked to elaborate on the shortage of manpower for the power sector, the Ministry replied as under:-

“Given the number of graduates passing out of the existing colleges and other institutions each year, it is expected that there will be no shortage of manpower of any category, technical or non-technical, skilled or unskilled, in the country. The quality of engineers and supervisors graduating from the above institutions is also adequate. They will require induction and in-service training in order to be able to meet the challenges of working in today’s technologically highly sophisticated power industry.

However, there are shortages in respect of skilled workers in certain critical trades e.g. Fitter, Electrician, Welder, Wireman, Turner, Mechanic, Carpenter, Sheet metal, Mason, Tool & die maker and Plumber in some of the States. Various steps are being taken by the Government to fulfill this demand.”

G. Contractual Disputes

3.72 In a written note to the Committee, the Ministry of Power informed that contractual dispute between the developers & the contractors is one of the major bottlenecks in timely completion of power projects.

3.73 When the Ministry was asked about the steps taken to obviate these contractual disputes, they replied as under:

“... Ministry of Power, Government of India, constituted a Task Force under the Chairmanship of Chairperson, Central Electricity Authority (CEA) to prepare a Model Contract Document for civil works of hydro projects. The Model Contract Document has recently been prepared by the CEA and the same has also been submitted to the Government. The document, inter-alia, includes various clauses which would help in minimizing the contractual disputes particularly clause regarding risk sharing between the contractors & the developers.”

H. Nuclear Power as a source

3.74 Nuclear Power Projects aggregating 3,380 MW form part of the capacity addition target of 78,700 MW fixed by the Planning Commission for the 11th Plan, as per details given below :

Project & Unit(s)	State	Status	Capacity (MW)	Commissioning Schedule
KAIGA U-3	Karnataka	C	220	2007-08
KAIGA U-4	Karnataka	UC	220	2009-10
RAPP U5	Rajasthan	C	220	2009-10
RAPP U6	Rajasthan	UC	220	2009-10
KUDANKULAM U 1,2	Tamil Nadu	UC	2000	2010-11
PFBR (Kalapakkam)	Tamil Nadu	UC	500	2011-12
C: Commissioned		UC : Under Construction		

3.75 Emphasizing on the important role of nuclear power projects in generation of electricity, the Secretary, Ministry of Power stated as follows:

“Today only 2% of power is generated by nuclear. Nuclear power has to go double or triple”.

CHAPTER - IV

TRANSMISSION & DISTRIBUTION OF POWER

A. Transmission

With the increase in the power generation capacity, the country also requires sturdy and reliable transmission infrastructure. It is indispensable to establish the requisite transmission capacity to match the generation capacity addition and encourage inter-state/inter-regional exchange of power to mitigate the situation of surplus/deficit in various regions. But the power system in our country is beset with heavy transmission losses. Energy losses occur in the process of supplying electricity to consumers due to technical and commercial reasons. The technical losses are due to energy dissipated in the conductors and equipment used for transmission, transformation, sub-transmission and distribution of power. These losses would depend on the pattern of energy use, intensity of load demand, load density, and capability and configuration of the transmission and distribution system that vary for various system elements. These technical losses are inherent in a system and can be reduced to a certain level. Pilferage by hooking and bypassing meters etc., defective meters and errors in meter reading and in estimating un-metered supply of energy cause the commercial losses. The technical losses coupled with Commercial loss are called as Transmission & Distribution (T&D) losses. In order to account for the losses due to poor revenue collection efficiency of the utilities the concept of Aggregate Technical and Commercial (AT&C) losses has been introduced. Details of State-wise AT&C losses are given in **Annexure VII**.

4.2 As informed by the Ministry of Power the main factors for high system losses are as follows:

(i) Technical Losses

- Overloading of existing lines and substation equipments:
- Absence of up gradation of old lines and equipment:
- Low HT: LT ratio
- Poor repair and maintenance of equipment

(ii) Commercial Losses

- Low metering/billing/collection efficiency

- Theft and Pilferage and tampering of meters:
- Absence of Energy Accounting and Auditing
- Low accountability of employees

4.3 For the reduction of AT&C losses upto 15% and improvement in power distribution sector, Government of India has launched Restructured-Accelerated Power Development and Reforms Programme (R-APDRP) during 11th Plan period with a total outlay of ₹51,577 Crores. Projects under the scheme are being taken up in two parts. Part - A of the scheme envisages establishment of baseline data, Automatic Meter Reading (AMR), Geographical Information System (GIS) mapping, Supervisory Control and Data Acquisition (SCADA) & adoption of IT facilities, etc. Loan will be given to various SEBs/Distribution Companies and Government proposes to invest ₹10,000 crores under part - A. Initially it will be given as loan and entire amount will be converted into grant subject to fulfillment of certain conditions. Part - B of the scheme is for System Improvement projects and Government proposes to invest ₹40,000 crores which include renovation, modernization and strengthening of 11 kV level substations, transformers/transformer Centers, re-conductoring of lines at 11 kV level and below, load bifurcation, feeder separation, load balancing, HVDS (11 kV), Aerial Bunched Conductoring in dense areas, replacement of electromagnetic energy meters with tamper-proof electronic meters, installation of capacitor banks and mobile service centers, etc. In exceptional cases, where sub-transmission system is weak, strengthening at 33 kV or 66 kV levels may also be considered. Further details of the scheme are given in the section on issues related to distribution of power.

B. National Power Grid/ Inter-regional Transmission Capacity

4.4 According to the Ministry, a national power grid in the country is being developed in a phased manner. Initially, a set of inter-regional links were developed under the Centrally sponsored programme for facilitating exchange of operational surpluses among the various Regions in a limited manner. Because the Regional Grids operated independently and had different operational frequencies and the power exchanges on these inter-regional links took place only in radial mode. In 1992, the Eastern Regional Grid and the North-Eastern Regional Grids were connected by a 220 kV double circuit transmission line, and have

operating in synchronism since then. Total inter-regional transmission capacity by the end of 9th Plan was 5,750 MW.

During 10th Plan i.e. 2002-07, a total of 8,300 MW of inter-regional capacities were added. During 11th Plan i.e. 2007-12, inter-regional transmission systems of 17,600 MW capacity are planned as per the mid-term review for 11th Plan. Out of this, 9,700 MW has already been added in the 11th Plan up to 31st July, 2011. As on 31st July, 2011, the regional inter-transmission capacity was 23,750 MW. The remaining schemes are under various stages of implementation.

All the regional grids have already been inter-connected. At present, Northern – Eastern – North-Eastern – Western Grids are inter-connected in synchronous mode and are operating in parallel; the Southern Regional Grid is connected with Eastern and Western Regional Grid asynchronously and its synchronous interconnection is planned for completion in 2014.

4.5 The Ministry furnished the following information regarding 11th Plan targets and the actual implementation of this ambitious programme:

“Under the 11th Plan, it was planned to witness the inter-regional transmission capacity to 38,650 MW. Out of this, 6,000 MW HVDC Bipole from NER to NR/WR was shifted to 12th Plan because of delay in materialization of associated generation projects i.e. Subansiri HEP (2000 MW) and Kameng HEP (600 MW). Accordingly, 18,600 MW inter-regional transmission capacity addition during the 11th Plan was targeted. Out of the 18,600 MW programme for 11th Plan, a capacity addition of 6,700 MW has already been achieved up to 30.6.2010. Out of the balance 11,900 MW, 7,200 MW capacity are programmed to be added during 2010-11 and 2011-12. The balance 4,700 MW may slip to early 12th Plan mainly due to deferment of Sasaram Fatehpur 765 S/C line (2,100 MW) on account of delay in generation capacity addition in Eastern Region like North Karanpura, Barh, Nabinagar etc. Further, LOI for Bongaigaon-Siliguri 400 kV D/C quad line (1600 MW) which is being implemented through competitive bidding route was issued in January 2010 with implementation period of three years. The South West

inter regional link (1000 MW) is also likely to slip to early 12th Plan. Thus, the inter-regional transmission capacity by the end of 11th Plan is likely to be 27,950 MW.”

A recent announcement⁴ by the Government indicated the possibility of a power grid of a potential 1 lakh MW capacity in the South Asian region, linking SAARC countries including India, Bangladesh, Nepal, Pakistan and Sri Lanka, on which the Indian Government was stated to be preparing three papers.

4.6 When asked about the scope and extent of private sector participation in the transmission network, the Ministry replied that the participation of private sector is through the following routes:

- (i) Private Sector participation through Public Private Partnership (JV Route).
- (ii) Private Sector Participation through Competitive Bidding Route.
- (iii) Competitive bidding route under directions of CERC (IPTC).
- (iv) Dedicated Transmission Lines.

The details of private sector participation in transmission are placed at **Annexure – VIII**.

C. Issues related to Distribution

(i) Power Theft / pilferage

4.7 According to the Ministry, electricity is stolen through bypassing and tampering of meters and by hooking the LT lines. The majority of commercial losses are due to this reason. To stop this, tamper-proof meters, High Voltage Distribution System and Aerial Bunched Cables for LT lines need to be adopted as much as possible. Vigilance and legal measures in accordance with the Electricity Act, 2003 are also required to be taken up for arresting theft and pilferage.

4.8 Various steps taken by Ministry of Power, Govt. of India to curb the theft/pilferage of electricity are as follows: -

⁴ On 27th April, 2011

“Section 151 of the Electricity Act, 2003 pertains to cognizance of offences. This Section has been made more stringent by addition of proviso under Section 151 and new Sections 151A and 151B with Electricity(Amendment) Act, 2007 (26A of 2007) dated 28.5.2007.”

Section 151 has been amended with the addition of the following:

“Provided that the Court may also take cognizance of an offence punishable under this Act upon a report of a police officer filed under section 173 of the Code of Criminal Procedure, 1973 (2 of 1974):

Provided further that a Special Court constituted under section 153 shall be competent to take cognizance of an offence without the accused being committed to it for the trial.”

Under Electricity (Amendment) Act, 2007 Section (151-A), for the purpose of investigation of an offence punishable under this Act, the police officer have all the powers as provided in Chapter XII of the Code of Criminal Procedure, 1973 (2 of 1974).

Under Section 151–B, certain offences have been made cognizable and non-bailable. Notwithstanding anything contained in the Code of Criminal Procedure 1973 (2 of 1974), and offence punishable under sections 135 to 140 or section 150 shall be cognizable and non-bailable.

(ii) **Restructured- Accelerated Power Development and Reforms Programme (R-APDRP)**

4.9 According to the Ministry of Power, the Accelerated Power Development Reforms Programme (APDRP) was launched in 2002-03 as additional central assistance to the States for strengthening and up-gradation of sub-transmission and distribution systems of high-density load centers like towns and industrial areas with main objectives of reduction in Aggregate Technical & Commercial (AT&C) losses, to improve quality and reliability of supply of power etc. Total 574 projects at the cost of ₹17,329.07 Crore were sanctioned in 10th Plan APDRP.

It was targeted to reduce the AT&C losses in the States upto 15%. However, AT&C losses have reduced up to 28.44% during 2008-09 from 36.64% in 2002-03. The AT&C losses from 2002-03 to 2008-09 are as under:

Year	AT&C Losses (%)
2002-03	36.64
2003-04	34.78
2004-05	34.33
2005-06	33.02
2006-07	30.59
2007-08	29.24
2008-09	28.44
(Source: PFC)	

The APDRP was short closed from March 2009. For reduction of AT&C losses upto 15% and improvement in power distribution sector, Government of India has launched Restructured-Accelerated Power Development and Reforms Programme (R-APDRP) during 11th Plan period as a central sector scheme. Base-line data is accorded high priority in R-APDRP. The expected programme size of R-APDRP during 11th Plan is ₹51,577 Crore.

4.10 Projects under the scheme are being taken up in two parts.

Part – A: Preparation of Base-line data for the project areas covering Consumer Indexing, GIS Mapping, metering of Distribution Transformers and Feeders, and Automatic Data Logging for all Distribution Transformers and Feeders and SCADA / DMS system for big cities only.

Part – B: Renovation, modernization and strengthening of 11 kV level Substations, Transformers / Transformer Centers, Re-conductoring of lines at 11 kV level and below, Load Bifurcation, Load Balancing, HVDS, installation of capacitor banks and mobile service centers, etc. In exceptional cases, where sub-transmission system is weak, strengthening at 33 kV or 66 kV levels may also be considered.

The programme size is ₹51,577 Crore. Expected investment in Part-A (Baseline System) would be ₹10,000 Crore and that in Part-B would be ₹40,000 Crore. PFC is the nodal agency for operationalising the programme. Initially funds for projects under both the

parts would be provided through loan. The entire amount of loan for Part-A projects would be converted into grant on the completion of the project and up-to 50% (90% for special category States) loan of Part-B projects would be converted into grant on achieving the 15% AT&C loss in the project area on a sustainable basis.

Total eligible towns for Part-A (IT enabled system) in the country are about 1400. Out of these, towns where AT&C loss is below 15%, are not eligible for Part-B. The estimated eligible towns for Part-A (SCADA) and Part-B are 60 and 1100, respectively.

Part-A (IT enabled system) projects worth ₹5,177 Crore for 1401 towns; 42 Part-A (SCADA) projects worth ₹982.45 Crore; and 907 Part-B projects worth ₹19,367.43 Crore have been sanctioned till June 30, 2011, under the programme. ₹4,179.14 Crore (₹4,052.88 Crore loan and ₹126.26 Crore grant) has been released till June 30, 2011, under the R-APDRP.

Summary of Projects sanctioned under Part-A of R-APDRP

(₹ Crore)				
S.No.	State Name	No. of Towns	Sanctioned Cost	Disbursement
1	Andhra Pradesh	113	388.82	116.63
2	Arunachal Pradesh	10	37.67	11.30
3	Assam	67	173.76	51.97
4	Bihar	71	194.58	58.35
5	Chandigarh	1	33.34	0.00
6	Chhattisgarh	20	122.45	36.74
7	Goa	4	110.74	31.46
8	Gujarat	84	225.34	67.65
9	Haryana	36	165.60	49.70
10	Himachal Pradesh	14	96.40	28.91
11	Jammu & Kashmir	30	151.99	45.63
12	Jharkhand	30	160.61	29.98
13	Karnataka	98	391.37	117.31
14	Kerala	43	214.38	64.34
15	Madhya Pradesh	83	228.76	68.42
16	Maharashtra	130	324.29	97.33
17	Manipur	13	31.55	9.47

18	Meghalaya	9	33.98	10.21
19	Mizoram	9	35.12	10.55
20	Nagaland	9	34.58	10.37
21	Puducherry	4	27.53	0.00
22	Punjab	47	272.83	81.88
23	Rajasthan	87	315.95	94.82
24	Sikkim	2	26.30	7.89
25	Tamil Nadu	110	417.05	125.10
26	Tripura	16	35.20	10.33
27	Uttar Pradesh	168	636.52	206.69
28	Uttarakhand	31	125.82	37.74
29	West Bengal	62	164.37	49.34
	Totals :	1401	5176.90	1530.11

Summary of Sanctioned Projects Part-B

S. No.	State Name	No. of Towns	Approved Cost	Disbursement
1	Andhra Pradesh	42	1056.59	158.48
2	Assam	56	391.41	0.00
3	Bihar	1	506.14	0.00
4	Chhattisgarh	16	216.56	0.00
5	Gujarat	63	993.78	149.07
6	Haryana	29	673.58	0.00
7	Himachal Pradesh	14	322.18	96.65
8	Jammu & Kashmir	30	1665.27	0.00
9	Karnataka	88	948.98	142.42
10	Kerala	42	872.17	130.85
11	Madhya Pradesh	82	1977.64	295.26
12	Maharashtra	122	3284.20	492.64
13	Punjab	42	1496.14	216.20
14	Rajasthan	82	1540.49	230.41
15	Sikkim	2	68.46	20.54
16	Tamil Nadu	87	3279.56	491.95
17	Uttar Pradesh	161	3283.59	274.73

18	Uttarakhand	30	392.63	0.00
19	West Bengal	50	675.23	82.04
	Totals :	1039	23644.60	2781.24

(iii) Rajiv Gandhi Gramin Vidhyutikaran Yojana (RGGVY)

4.11 This scheme of Rural Electricity Infrastructure and Household Electrification has been introduced in April, 2005 for achieving the National Common Minimum Programme objective of providing access to electricity to all Rural Households. Rural Electrification Corporation (REC) is the nodal agency for the programme. Under this scheme 90% capital subsidy will be provided for rural electrification infrastructure and the balance 10% will be loan assistance on soft terms by REC. Initially the program was scheduled to run for four years, but it has been extended as the implementation action was slow.

4.12 As informed by the Ministry of Power there have been some major issues during the implementation of RGGVY, which slowed down the progress of works under the scheme. These are:

- Detailed Project Reports (DPRs) from some States were received late;
- Delay in forest clearance for execution of the Projects in some States;
- Land acquisition for 33/11 kV sub-stations was unduly delayed by the States;
- Limited number of qualified agencies available for execution of turnkey contracts;
- Shortage of material and high prices;
- The road permit and issue of way bills by few States caused late execution of projects;
- Very poor upstream rural electricity infrastructure in some States
- Difficult terrain in some States;
- Law & order problem including Maoist Violence in some States; and
- The BPL household electrification requires support of distribution utilities in terms of availability of BPL lists and formalities to be completed for providing connections, which are under respective State Governments. In few States the support from such distribution utilities is not forthcoming. (source: Note on “Transmission and Distribution Systems and Networks” for examination by the Standing Committee on Energy dated 17.6.2010)

4.13 Under Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), 235 projects covering electrification of 68,763 un/de-electrified villages and release of free electricity connections to 83.10 lakh Below Poverty Line (BPL) households were sanctioned under X Plan. Under XI Plan, 338 projects covering electrification of 49,736 un/de-electrified villages and release of free electricity connections to 163.35 lakh Below Poverty Line (BPL) households have been sanctioned for implementation. Thus, total 573 projects have been sanctioned under RGGVY. Cumulatively, as on 15.02.2011 the electrification works in 92,689 un/de-electrified villages have been completed and electricity connections to 148.80 lakh BPL households including Scheduled Caste (SC) and Scheduled Tribe (ST) households have been released under RGGVY.

4.14 The number of Un-electrified/Electrified Villages where Electrification Works are Completed under RGGVY as on 30.11.2011 are given as under:

Sl.	State	Achievements (30-11- 2011)	
		Un-electrified / De-electrified villages	Already Electrified Villages
1	2	3	4
1	Andhra Pr.		22,101
2	Arunachal Pr.	1,023	732
3	Assam	7,249	10,849
4	Bihar	21,505	3,537
5	Chattisgarh	336	9,891
6	Gujarat		12,554
7	Haryana		2,139
8	Himachal Pr.	39	1,059
9	J&K	130	2,219
10	Jharkhand	17,398	5,339
11	Karnataka	61	24,401
12	Kerala		37
13	Madhya Pr.	447	15,007
14	Maharashtra		30,473
15	Manipur	337	333
16	Meghalaya	334	1,385
17	Mizoram	74	290
18	Nagaland	75	615
19	Orissa	13,612	18,817
20	Punjab		

21	Rajasthan	3,896	28,414
22	Sikkim	23	366
23	Tripura	123	354
24	Tamilnadu		9,923
25	Uttar Pr.	27,759	2,982
26	Uttarakhand	1,510	8,968
27	West Bengal	4,169	15,722
	Total	100,100	228,507

4.15 It was further informed that to accelerate the pace of works under the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), following steps have been undertaken by the Government of India:

- (i) Government has set up inter-Ministerial Monitoring Committee which periodically meets to sanction projects and review progress of their implementation.
- (ii) States have been advised to set up district committees to monitor the progress of rural electrification works. All the states have notified formation of district committees.
- (iii) The States have also been requested to hold monthly meetings under the Chairmanship of Chief Secretary to resolve the bottlenecks in implementation of RGGVY.
- (iv) The Government of India as well as Rural Electrification Corporation (REC), the nodal agency for RGGVY, conduct frequent review meetings with all the stakeholders, the concerned State Governments, State Power Utilities and implementing agencies for expeditious implementation of the scheme as per agreed schedules.
- (v) For speedier and effective implementation of projects, their execution has been taken up on turnkey basis.
- (vi) To ensure qualitative execution of rural electrification works, a three-tier quality control mechanism has been enforced under RGGVY for 11th Plan projects.
- (v) Grant amount of BPL connection has been enhanced to ₹2200/- in 11th Plan from ₹1500/- in 10th Plan.

(iii) Use of IT in distribution

4.16 The use of IT can help power utilities overcome distribution losses and also to get quicker feedback from consumers. The Ministry furnished following information about use of IT in distribution:

“The use of Information Technology in distribution sector is enormous and is being used for control, data acquisition, energy auditing & accounting etc. Discoms are using Information Technology in Supervisory Control and Data Acquisition (SCADA) system, Geographical Information System (GIS), Demand Side Management (DSM), Outage Management System, controlling the Grid Substations from remote, Automating Meter Reading, remote control of street lighting system, etc....

...Under Part-A of R-APDRP, so far 1400 projects at the cost of ₹5288.47 crore have been approved to 29 States. This include Part-A SCADA projects worth ₹150.90 crore for 5 towns of Rajasthan. ₹1466.62 Crore have been disbursed by the PFC to various States/utilities.”

4.17 The Ministry has provided following information about the updates in the use of IT in Hydro-Electric projects:

“Hydro NET was launched in the year 2007. It is an IT portal that envisages dissemination of information and monitoring critical activities of PSUs engaged in hydropower development under Ministry of Power.”

4.18 Another important IT tool to check distribution losses is the Integrated Management System-I (IMS-I) and it is under implementation by CEA. It is an online based system that uses on line access for filling up of input data by utilities engaged in the power sector. Integrated Management System-II (IMS-II) is an extension of IMS-I, where in more intensive and comprehensive IT based monitoring system of under execution power projects is to be developed. IMS-II also involves provision for adequate redundancy in the existing data centre to enhance reliability and availability of the system and to build separate disaster recovery data centre. Consultant for IMS-II has prepared a draft report on requirements for IMS-II.

D. Power Sector Reforms

4.19 As per the Economic Survey (2010-11) document, Electricity reform in India started in the early 1990s, prompted by the rising losses of State Electricity Boards (SEBs) and their inability to meet demand. It followed worldwide reforms that began in the United Kingdom, Norway, Canada, and the USA and were later adopted in Latin America as well. In developed countries, sweeping reforms focused on restructuring vertically integrated cost-of-service monopolies and introducing wholesale competition, while developing countries focused on their need to accelerate power generation investment. In India, reforms have made major progress in the following areas:

- entry by private independent power producers (IPP); corporatization of state-owned enterprises; unbundling of generation, transmission, and distribution (T&D)
- a national enabling legislation (Electricity Act 2003); independent power regulation at national level (CERC) and in States
- bulk transmission improvements (for example Powergrid), with wholesale electricity markets emerging in inter-State trading and merchant power sales (as an alternative to long-term power purchase agreements in cost-of-supply memorandums of understanding [MOUs] with States) and spot and futures markets
- Some, limited, private entry into distribution (for example Orissa, Delhi,), and splitting up of some State electricity distribution companies into discoms (distribution companies); and
- Central incentives (APDRP, accelerated power development, and reform programme) to support the implementation of electricity reform in States including accelerated metering and reducing high unaccounted-for T&D losses.

A composite reform index (although it does not assess quality), ranks India among the top reformers worldwide---comparable to Latin America (for example Chile, Brazil), better than East Asia (for example China, Indonesia, Thailand) and a step behind the most advanced (for example France, the UK, some US states). Among States in India itself, there remain significant variations. The highest ranked include most of the larger states, i.e. Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Maharashtra, and West Bengal (as evident in their utilization of APDRP incentives), apart from Orissa and Delhi, two States with private

distribution (with mixed impacts). With expected lags and some temporary reversals, outcomes are now beginning to emerge : accelerated power generation investments and competition; switch to tariff-based awards for new power projects; more efficient fuel sourcing (offshore natural gas, imported coal); rapid development of a national grid (with four out of five regions synchronized and the fifth--southern-- interconnected), with greater reliability; and increased wheeling of electricity generated with emergence of a national bulk market with open access to States and wholesale trading.

4.20 The Annual Report of the Ministry of Power (2010-11) provided the status of power sector reforms as under:

1. The Electricity (Amendment) Act, 2007, brought into force w.e.f. 15th June, 2007, with features such as
 - (i) Central Government, jointly with State Governments, to endeavour to provide access to electricity to all areas including villages and hamlets through rural electricity infrastructure and electrification of house-holds.
 - (ii) No License required for sale from captive units.
 - (iii) Definition of theft expanded to cover use of tampered meters and use for unauthorized purpose.
 - (iv) Theft made explicitly cognizable and non-bailable.
 - (v) Deletion of the provision for elimination of cross subsidies. The provision for reduction of cross subsidies would continue.
2. Mandatory procurement of power by distribution licenses, even for public sector projects w.e.f. 6th January, 2011.
3. Issuance of Standard Bidding Documents for procurement of power by Distribution licenses through competitive bidding.
4. Encouraging non-discriminatory open access in intra-State transmission and distribution of power.
5. Reorganisation of State Electricity Boards by 18 States.

E. Unbundling of power utilities by State Governments

4.21 Despite various reforms, the Power sector is still beset with huge operational losses. The financial health of Central Power utilities have improved over the years, but power sector reforms at the State level are yet to gain momentum. Unbundling of State power utilities into generation, transmission and distribution streams is an integral part of power sector reforms.

4.22 When asked about unbundling of power utilities by State Governments, the Ministry furnished following information through a written reply:

“Most of the States have already re-structured their Electricity Boards. Three (3) States, namely Bihar, Jharkhand and Kerala are yet to un-bundle their State Electricity Boards.

As per section 172 of the Electricity Act, extension can be mutually decided by the Central Government and the State Government.”

CHAPTER - V

TOWARDS CLEANER SOURCES OF POWER

Even though there is a huge capacity addition planning for conventional energy sectors, there is little doubt that current energy shortages will only increase. Simultaneously, there is a growing recognition, for more than one reason, of the dangers inherent in continuing with the model of economic development based on excessive consumption of fossil fuels. At the present rate of consumption, the limited reserves of fossil fuels would not last very long. Another aspect that has come into sharp focus is that developing countries can ill-afford to depend excessively upon petroleum imports. According, energy security, in recent years, has gained immense strategic importance. Side by side climate change has also been recognized as mainly being caused by greenhouse gas emissions from energy intensive human economic activities based on fossil fuels. There is also the important issue of providing energy access and it has been accepted that 40 per cent of the population is currently denied this. In a situation of power shortage, therefore, it also appears difficult to fill this gap in the conventional way. Therefore, India has no alternative but to strive for energy efficiency and to look for renewable sources of energy, not only to provide additional power to the grid but also to provide energy access to the poor. There is also a need to replace consumption of fossils and also to reduce the demand for electricity wherever possible by providing alternate source of power to the people.

5.2 As per the available information, the Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of Government of India at the national level for all matters relating to new and renewable energy such as solar, wind, biomass, small hydro, hydrogen, biofuels, geothermal etc. The Ministry adopted a three-fold strategy for the development, promotion and use of renewable energy technologies across the country:

- a) providing budgetary support for research, development and demonstration of technologies;
- b) facilitating institutional finance through various financial institutions: and
- c) promoting private investment through fiscal incentives, tax holidays, depreciation allowance and remunerative returns for power fed into the grid.

5.3 Under the Allocation of Business Rules, the MNRE has been assigned the following specific items:

- Research and development of biogas and programmes relating to biogas units;
- Commission for Additional Sources of Energy (CASE);
- Solar energy including solar photovoltaic (SPV) devices and their development, production and applications;
- All matters relating to small/mini/micro hydel projects of, and below, 25 MW capacity;
- Programme relating to improved chulhas and research and development thereof;
- Indian Renewable Energy Development Agency Limited;
- Research and development of other nonconventional/renewable sources of energy and programmes relating thereto;
- Tidal energy;
- Integrated Rural Energy Programme (IREP);
- Geothermal energy;
- Bio-fuels: (i) National Policy; (ii) research, development and demonstration on transport, stationary and other applications; (iii) setting up of National Bio-fuels Development Board and strengthening the existing institutional mechanism; and (iv) overall coordination.

A. Budgetary allocation of the Ministry

5.4 The Committee desired to be apprised of the Budgetary Estimates (BE) & Revised Estimates (RE) for the year 2009-10, 2010-11 & BE for 2011-12 for the MNRE, which was provided as reproduced in **Annexure IX**.

5.5 The Secretary, MNRE while briefing the Committee explained the need for increasing the budget of the Ministry as follows:

“This year our Budget has been increased to ₹1000 crore. Last year it was ₹660 crore. But, in the RE – although we have met the Finance Ministry officials – according to the norm for general reduction, it was reduced to ₹560 crore, but we finally got ₹549 crore. We have already done 520 by September. So, when you

will tell me that I can do more, I will plan for more. But when you restrict my budget, I cannot plan.”

B. Renewable Power Potential and Achievements

5.6 The Committee were further informed that the estimated medium-term potential for renewable energy / power generation in the country from wind, small hydro and biomass has been estimated at over 87,000 MW. This excludes the potential from solar which is estimated at 20-50 MW / sq. km. The details are given in **Annexure – X**. The current grid interactive renewable power generation capacity installed in the country at the beginning of FY 2011-12 (1.4.2011) was 19,973 MW, Further capacity of 1,152 MW has been added till August 2011 leading to total installed capacity of 21,125 MW as on 31-8-2011. The same corresponds to a contribution of about 11% in the total installed capacity of 1,81,320 MW from all sources. The renewable power capacity of 21,125 MW includes 14,989 MW from wind power, 3,154 MW from small hydro, 2,863 MW from biomass, 73 MW from waste-to-energy and 46 MW from solar. Apart from this, around 620 MW off-grid-captive power generation capacity from various renewable energy sources has been deployed till 31-8-2011.

5.7 The Committee were also apprised about several steps / measures taken to promote power generation from renewable sources in the country. These include the following:

- Fiscal and financial incentives, such as, capital/ interest subsidy, accelerated depreciation, nil/ concessional excise and customs duties.
- Preferential tariff for grid interactive renewable power in most potential States.
- Directives under Electricity Act 2003 to all States for fixing a minimum percentage for purchase of electricity from renewable energy sources taking into account local factors.
- Normative guidelines by CERC for fixation of such preferential tariffs.
- Generation Based Incentives Scheme for Wind Power to attract private investment by Independent Power Producers not availing Accelerated Depreciation benefit.
- Jawaharlal Nehru National Solar Mission initiated recently to give a boost to deployment of solar energy systems, solar photovoltaic as well as solar thermal.

C. Small Hydro Power Programme

5.8 The estimated potential for power generation in the country from small hydro projects is over 15,000 MW. Out of this potential about 50% lies in Himachal Pradesh, Uttarakhand, Jammu & Kashmir and Arunachal Pradesh. In the plain region Maharashtra, Chhattisgarh, Karnataka and Kerala have sizeable potential. About 5,718 potential sites with an aggregate capacity of 15,384 MW have been identified.

5.9 While being optimistic about the future prospects of small hydro development, the Ministry detailed out the achievements so far:

“There has been increasing interest of the private sector to set up SHP projects. Against a target of capacity addition of 550 MW during the 10th Plan period, projects with an aggregate capacity of about 537 MW were installed during the plan. The total installed capacity of small hydro projects (up to 25 MW), at the end of 10th Plan, was 1975 MW. So far 752 small hydropower projects aggregating to 2,767 MW have been set up in various parts of the country and 266 projects of about 730 MW are in various stages of implementation.”

5.10 A target of capacity addition of 1400 MW from SHP projects has been set for the 11th Plan period with an estimated outlay of ₹700 crore. Year wise achievements are being shown in **Annexure – XI**.

5.11 The Ministry is providing Central Financial Assistance (CFA) to set up small/ micro hydro projects both in public and private sector. CFA is provided for following:

- Identification of new sites and preparation of perspective plan (State Government)
- Subsidy to New SHP projects in State Sector
- Subsidy to New SHP Commercial Projects
- Renovation & Modernization of Old SHP projects (State sector)
- Water Mills and micro hydel projects (SNAs, NGOs, local bodies etc.)

Details of the CFA provided are given at **Annexure – XII**.

D. Jawaharlal Nehru National Solar Mission

5.12 The Mission has set the ambitious target of deploying 20,000 MW of grid connected solar power by 2022 and is aimed at reducing the cost of solar power generation in the country through (i) long term policy; (ii) large scale deployment goals; (iii) aggressive Research & Development; and (iv) domestic production of critical raw materials, components and products, as a result to achieve grid tariff parity by 2022. Mission aims at creating an enabling policy framework to achieve this objective and make India a global leader in solar energy.

5.13 The Ministry provided the targets of this ambitious programme, which are as under:-
“Government has approved the implementation of the first phase of the Mission (up to 2013) and the target to set up 1,100 MW grid connected solar plants including 100 MW of roof top and small solar plants and 200 MW capacity equivalent off-grid solar applications in the first phase of the Mission, till 2012-13, through both solar photovoltaic and solar thermal routes. The 1000 MW of grid solar power will be developed and procured through the NVVN (NTPC Vidyut Vyapar Nigam), with 500 MW capacity each from solar thermal and solar photovoltaic routes.”

5.14 The following is the break-up of the funds sanctioned for the first phase: -

S. No.	Activity	Funds Required for 11 th Plan period (₹ Cr.)	Funds required For the phase 1 (₹ Cr.)
1	Generation based Incentive (GBI) for Roof Top and small grid connected solar power plants	230	537
2	R&D and Technical Assistance	175	300
3	Promotion of off grid solar applications	2080	3415
4	Support to Solar thermal manufacturing	20	50
5	HRD	22	35
	TOTAL	2527	4337

5.15 Recently a new technology of solar submersible pumps have come up, which has huge potential for providing power to farmers during peak hours for irrigating their fields.

During evidence the representative of the Ministry made the following assessment of this technology:

“Actually, one of the important areas in the solar mission is the off grid applications. Even in the off grid applications we have an ambitious target of 200 MW till 2013. Before the solar mission, we were doing around 4 MW to 5 MW a year. Now, that has been scaled up to almost 50 MW to 60 MW a year. These are the applications, which are very easily put for the applications like the solar pumps. These applications go for tribal hostels. These applications go for PHCs, for forest ranges, for electrifying small communities with 10 KW plants where it is difficult to take the line. They have a number of decentralized applications. So, in terms of applications in remote areas, in rural villages these are probably the best applications of solar. Even though they are costly, but the whole viability comes from the fact that you are not able to take the electric lines to these places. Even if the electric lines are there, you do not get proper supply.”

5.16 When asked about the initiatives taken in other countries for the popularization of solar power, the representative of the Ministry replied during the briefing:

“In Germany, a major programme is going on to generate solar power from panels fixed on rooftops. They set up the plant on rooftops of households and industrial buildings. Last year they generated 3,600 MW through solar photo voltaic systems and Spain generated 2,500 MW and because of financial reasons they reduced the target to only 500 MW and in USA they have a major programme only in California. The fourth major country which is doing considerably well is Japan.”

E. Tariff for Solar Power

5.17 High cost of solar power has been a big deterrent in popularization of this green source of power. In this regard the Committee were apprised by the Ministry in as under: -

“CERC has fixed tariff of ₹17.91 per unit for solar PV and ₹15.31 per unit for solar thermal power project for 2010-11. This tariff will be applicable for all PV projects commissioned by March, 2012 and March 2013 for solar thermal projects.”

5.18 When asked about the reasons for this high cost & the likelihood of it coming down, the representative of the Ministry replied during briefing:

“..... basically the raw material which is used to make solar modules, that is the same material which is used all over in semi-conductor devices, is very expensive and that constitute about 60 per cent of the cost of the solar module. Globally, the efforts are to find alternatives for this. In last few years, some alternatives have come, but still they have to be brought to that level of scale that the cost can be brought down to a level. Like in the Mission (JNNSM), we have estimated that by 2022 we should be able to reduce the capital investment to something like ₹6 crore per MW, which is today about ₹16 crore to ₹17 crore per MW. Globally also the investments are of the same order. All our efforts are to reduce this cost.”

5.19 When asked about comparative cost of solar power vis-à-vis other sources, the representative of the Ministry replied:

“If you see coal, it is ₹4 crore to ₹5 crore. Hydro large is of the same order, and small hydro is ₹5 to ₹6 crore. Today among various renewables, solar is the most expensive.”

5.20 On being asked about the steps taken by the Ministry to achieve grid-parity in tariffs for solar power by 2011, the Ministry submitted through a written reply: -

“Ministry has taken several initiatives to work towards achieving grid tariff parity. This includes creating the enabling policy framework, announcement of targets for purchase of grid solar power through competitive bidding, support for research and technology validation, training and manpower development etc. The bidding process has helped in reducing the tariff of solar PV power projects from ₹17.91 per unit to ₹12.16 per unit as average tariff. Government propose to continue bidding process in the next round of selection of projects for which process was started in September, 2011. In the recent years the cost of solar PV modules is declining globally as well as in India. This coupled with increased production capacities and improvements in technology are expected to help in achieving grid tariff parity.”

F. Biogas Based Power Generation Programme

5.21 Being home to a large population of people and livestock, India has a huge potential in tapping biogas as a source of power. Towards this a major programme was launched by the Government in 2006. The Committee were apprised about implementation of the programme as follows: -

“Since inception 351 nos. of projects with aggregated power generation capacity of 6.96 MW having cumulative biogas generation capacity of 68572 m³ have been sanctioned in 18 states. 122 nos. of these plants with 1.554 MW aggregated power generation capacity have been installed up to August 2011. In the year 2011-12, 23 nos. of projects with aggregated power generation capacity of 0.47 MW having cumulative biogas generation capacity of 4455 m³ have been sanctioned up to August 2011.”

G. Biomass Power & Co-Generation Programme

5.22 The Committee were informed about the potential and achievements of the Biomass Power & Co-Generation Programme by the Ministry, which is as follows:

“The current potential for power generation from surplus agro and forestry residues is estimated at 17000 MW. With progressive higher steam parameters and efficient project configuration in new sugar mills and modernization of existing ones, the potential of surplus power generation through bagasse cogeneration in sugar mills is estimated at 5000 MW. The potential for bagasse cogeneration lies mainly in the nine sugar producing States, with the maximum potential of about 1250 MW each in the States of Maharashtra and Uttar Pradesh.

A target for 1700 MW (1200 MW Bagasse Cogen and 500 MW Biomass Power) has been planned for the 11th Plan period, involving an estimated outlay of ₹120 crores approved for 11th Plan. The achievements as on 31.08.2011 are shown in the following table:-

Year	Achievement (MW)
2007-08	266
2008-09	345
2009-10	447
2010-11	465
2011-12	198 (as on 31.08.2011)
Total	1721

A cumulative capacity of 2862 MW has so far been commissioned mainly in the states of Tamil Nadu, Uttar Pradesh, Karnataka, Andhra Pradesh, Maharashtra, Chhattisgarh, Punjab and Rajasthan, which includes 1082 MW from biomass power and 1780 MW (surplus power) from bagasse cogeneration in sugar mills.”

H. Remote Village Electrification Programme

5.23 There are a number of unelectrified remote villages/hamlets in the country where grid connectivity would not be feasible for a variety of reasons. Remote Village Electrification Programme deals with their electrification through renewable sources. Small Hydro Power Generation systems, biomass gasification based electricity generation systems, solar photovoltaic power plants, etc., in distributed power generation mode may be used depending upon the availability of resources for generation of required electricity.

5.24 List of the remote unelectrified census villages / hamlets as endorsed by Rural Electrification Corporation (REC) as on 30.07.2011 is shown at **Annexure – XIII**.

Central Financial Assistance for the projects

5.25 Central Financial Assistance of up to 90% of the project costs, subject to pre-specified maximum amounts for each technology, is provided for approved projects for electrification of remote unelectrified census villages/hamlets through Non-conventional Energy Sources. The maximum amounts of CFAs for different technology options are given in following table:

Technology	(in Rupees)	
	General Category States	Special Category States
SPV homelighting systems Model-I	5895	6165

Solar photovoltaics homelighting system Model-II	11250	11250
SPV streetlighting system	19602	20578
Small Hydro systems 10-1000 KW	68400 to 98100/KW	86400 to 1,16,100/KW
Biomass Gasifiers	43726 to 68040/KW	48099 to 74844/KW

Maximum CFA per household will be ₹18,000.

5.26 In line with the provisions under Rajiv Gandhi Grameen Vidyutikaran Yojana, for BPL households, one light connection will be provided with 100% support from the Ministry, subject to pre-specified maximum amounts. The progress in the electrification of hitherto unelectrified villages & hamlets as on 30.07.2011, are shown at **Annexure – XIV**.

I. Wind Power Programme

5.27 The Ministry apprised the Committee that the country has a wind power potential of over 48,000 MW with 1% land availability in potential areas for setting up wind farms @12 ha/MW. India now ranks 5th in the World after USA, Germany, China & Spain with a wind power installed capacity of over 14,989 MW (as on 31.08.2011).

5.28 The Ministry submitted the following information regarding the Wind Resource Assessment in the country to the Committee:-

“The most prominent feature of the wind climatology in India are the monsoon circulations. Winds in India are influenced by the strong south-west summer monsoon, which starts in May-June, when cool, humid air moves towards the land and the weaker north-east winter monsoon, which starts in October, when cool, dry air moves towards the ocean. During the period, March to August, the winds are uniformly strong over the whole Indian Peninsula, except the eastern peninsular coast. Wind speeds during the period November to March are relatively weaker, though higher winds are available during a part of this period on the Tamil Nadu coastline. These two monsoon winds make the generation potential in Tamil Nadu much higher than in most other states and are one of the factors for the quicker and greater development of wind energy in Tamil Nadu.”

5.29 But the achievements so far do not do justice with this optimistic outlook. Only total capacity of 14,989 MW can be established up to August, 2011, mainly in Tamil Nadu, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Rajasthan. Wind electric generators of unit sizes between 225 KW & 2.1 MW have been deployed across the country.

5.30 In order to promote Wind Energy, the Government is providing a number of incentives. The Ministry in a written reply gave the following details about the fiscal incentives being provided to the Wind Energy Sector: -

“An attractive package of fiscal and financial incentives is available which includes concessions such as 80% accelerated depreciation, concessional custom duty on certain items, excise duty exemption, sales tax exemption, income tax exemption for 10 years on the profit, etc. In addition, most states are offering preferential tariffs for electricity generated from wind power projects. The benefit of accelerated depreciation is utilized only by the profit making companies. In order to attract independent power producers, foreign direct investment, NGOs, trusts etc, recently, a generation based incentive scheme has been introduced to provide ₹0.50 per unit of electricity generated from wind power projects which do not avail accelerated depreciation benefit.”

J. Solar Energy Centre

5.31 The Solar Energy Centre is the technical focal point of the Ministry for development of solar energy technologies & its related science & engineering. Given its huge mandate it can be instrumental in bringing solar energy to the doorsteps of the people & making it more viable.

5.32 When asked about the reasons for incomplete utilization of funds by SEC, the Secretary (MNRE) replied,

“Yes it is mentioned that Solar Energy Centre has surrendered 44-76 per cent of the funds allocated during 2002 till 2007. That means, it was a bad planning...”

K. DNI Map

5.33 Direct Normal Irradiance (DNI) is the amount of solar radiation received per unit area by a surface that is always held perpendicular (or normal) to the rays that come in a straight

line from the direction of the sun at its current position in the sky, and, it is considered indispensable for proper assessment of solar potential across the country. But India is still to have a DNI map covering the entire terrain.

5.34 When asked about the absence of a complete DNI Map of India, the Ministry in a written reply furnished the following information:

“DNI data is available for some stations from India Meteorological Department which is based on actual measurements at these stations. In addition, solar radiation maps including DNI map of India is available from National Renewable Energy Laboratory, USA under a joint project with Solar Energy Centre of the Ministry. These maps have been developed based on satellite measurements. In order to cover more sites through surface measurements for solar radiation, the Ministry has initiated a project to set up solar radiation measurement stations at 50 sites having high potential for solar power projects. The project is being implemented by CWET, Chennai. Developers are also undertaking assessment in areas / sites identified by them for the projects.”

L. Dissemination of Renewable Energy Technology

5.35 As Renewable energy holds enormous potential for a sustainable future, the Government needs to popularize it in a big way & stimulate newer scientific findings in this area. Secretary (MNRE) apprised the Committee about the steps taken by the Government towards this end:

“On the education front, at the school level, it has not happened, but there are many institutions in the country which are doing renewable energy courses. Now, we have taken it up in a big way, particularly with solar. We are starting very, very specific courses for M.Tech, for B.Tech, and also for Diploma through the IGNOU and also ITI courses. We will have fellowships and we will have Ph.D in this area. In the next few years, the scenario is going to change very substantially. We have made course material for solar. It is on the website. We are writing to all the engineering colleges, all the IITs, and NITs and many of

them are responding. It is required. We require a huge amount of skilled manpower.”

M. Sale of Power from Renewable sources

5.36 In pursuant to provisions of section 86 (1)(e) of the Electricity Act 2003, the National Electricity Policy 2005 & the Tariff Policy 2006, the State Electricity Regulatory Commissions (SERC) are required to fix a minimum percentage of purchase of energy from renewable energy sources taking into account availability of such resources in the region and its impact on retail tariffs. Most of the SERCs have specified percentages for purchase of electricity from renewable sources of energy. Status of Renewable Purchase obligations of different states are given in **Annexure-XV**.

5.37 On being asked about the steps taken by the Ministry so that State adhere to the Renewable Purchase Obligations (RPO), the Ministry in a written reply stated:

“There cannot be any guarantee mechanism to ensure that the RPO fixed by an SERC is achieved in that State because the economic viability / attractiveness to investors of such projects is highly resource and site specific and also depends on the availability cost of the other available competing power supply options in a region. The Government’s present intention is not to force setting up of renewable power projects in States through laws but to promote such projects with private investment through various financial and fiscal incentives, without discriminating rich or poor States. The States also need to put in place conducive policy environment for the same. It will then be in own interest of States with high renewable energy potential to fix ambitious RPO to spur setting up of such projects towards realizations of their full potential of renewable energy and contributing to States overall socio-economic development.”

5.38 The resources endowment of Renewable sources vary from State to State. On being asked about a level playing field for various renewable sources of energy across the States, the Ministry in a written reply submitted:

“The Ministry has been promoting development of all renewable energy sources without any bias towards one technology or State over other. It is only that the techno-economic viability of harnessing differs from resource to resource due to several factors like resource availability / potential, resource intensity / density, the other energy options available and cost thereof, State’s own promotional polity for renewables, the general investment environment / law and order situation, etc, which require different levels of incentives to make them economically attractive to invest. For example if the cost of generation of power from a particular resource is say around ₹2 to ₹4 per unit as in case of small hydro, it will not be justified to give the same level of incentive as for solar power which costs around ₹18 per unit.”

N. Research & Development

5.39 Research & Development (R&D) is crucial for bringing down costs in renewable energy sector. That’s why it has been seen as a dynamic sector, which is full of innovative possibilities, for the people in the field of clean energy. The Ministry has provided the details of R&D projects taken up with amount sanctioned (MNRE share) in different areas of new & renewable energy during 2007-08, 2008-09, 2009-10 and 2010-11, as given below:

(₹ in Crore)

S. No.	Area of Project	2007-08		2008-09		2009-10		2010-11	
		No. of Projects	Amount Sanctioned	No. of Projects	Amount sanctioned	No. of Projects	Amount sanctioned	No. of Projects	Amount sanctioned
1.	Solar Thermal	5	1.21	4	2.97	5	42.42	9	104.00
2.	SPV	6	5.11	5	2.30	3	9.60	8	74.46
3.	Bio-energy	1	1.00	4	10.87	-	-	1	17.38
4.	Special Project on Cookstove	-	-	-	-	1	0.37	4	2.08
5.	Biogas	12	3.49	1	1.08	8	4.48	8	9.74
6.	Bio-fuel	2	0.47			1	4.33	12	7.80
7.	Waste to energy	1	1.93					-	-
8.	Hydrogen	8	4.87	4	1.62	10	31.19	6	14.26

9.	Fuel Cell	5	2.13					4	1.77
	Total	40	20.21	18	18.84	28	92.39	52	231.49

5.40 When asked to elaborate on R&D efforts undertaken in the solar energy sector, the Ministry submitted through a written reply: -

“The R&D efforts in the solar energy sector have resulted in development of several materials, components devices and production during the last three decades. More recently amorphous silicon thin film technology developed under a research project, funded by the Ministry at Indian Association for Cultivation of Science, Kolkata, has been taken up by a Bangalore based industry to set up a commercial plant. In recent years the cost of solar systems is declining globally and also in India. JNNSM aims to bring down the cost further and achieve grid tariff parity by 2022.”

5.41 The Ministry in a post evidence reply furnished the following information regarding the details of various international collaborations being undertaken in the field of New & Renewable Energy: -

“The Indian Renewable Energy Programme has received increased recognition internationally in recent years. Many countries evinced interest in cooperation with India for promotion of new and renewable energy. The Ministry of New and Renewable Energy has been interacting with developed and developing countries for cooperation in New and Renewable Energy. The focus of the interaction for cooperation has been to explore opportunities for exchange of scientists to share experience and for taking up joint research, design, development, demonstration and manufacture of new and renewable energy systems/devices by R&D institutions/organizations of both countries and thereby establishing institutional linkages between institutions of India and other countries. Bilateral/multilateral cooperation frameworks have been established for cooperation.

As on date 24 dedicated Memorandums of Understanding (MOUs) / Agreements in Renewable Energy have been signed with 18 countries. Progress

of action taken under these MOUs is continuously reviewed through the mechanism of Joint Working Groups.

In addition, India has been collaborating under various multi-lateral/tri-lateral cooperation frameworks like South Asian Association for Regional Co-operation (SAARC), Association of South-East Asian Nations(ASEAN), Bangladesh, Russia, India and China (BRIC), India-Brazil, South Africa (IBSA), and Asia Pacific Partnership on Climate Change and Development (APPCDC), etc.

Presently many projects/programmes in Renewable Energy like Solar Electrification of villages, setting up of Bio-mass gassifiers and Solar Charging Stations and specialized training programmes have been planned for implementation in African countries under the aegis of India-Africa Forum Summit (AIFS-II) and in ASEAN countries under Indo-ASEAN Co-operation Programme. These are in addition to two ongoing projects being implemented in Sudan and Namibia for electrification of villages through Solar Energy with financial assistance provided by MNRE.

Moreover, various international/multi-national funding agencies, like World Bank, United Nations Development Programme (UNDP), Asian Development Bank (ADB), and United National Industrial Development Organization (UNIDO) and Global Environmental Facility (GEF) also provide project based assistance for renewable energy programme in India. At present, following externally aided projects are being implemented:-

- (i) UNDP/GEF Assisted Project on Global Solar Water Heating Market Transform Strengthening Initiative.
- (ii) UNDP Project on 'Removal of Barriers to Biomass Power Generation in India'
- (iii) UNDP/MNRE projects on enhancing access to clean energy.

Apart from the above, the following externally aided projects are proposed:

- (i) Market Development and Promotion of Solar Concentrator based Process Heat Applications in India
- (ii) UNIDO-GEF project on promoting Energy Efficiency and Renewable Energy in selected micro, small and medium enterprises (MSME) clusters in India.”

OBSERVATIONS / RECOMMENDATIONS

6.1 India is a fast growing economy. Power is one of the critical inputs for the growth of economy and if the nation has to grow at a consistent rate of 8 to 9 per cent, the power generation capacity needs to be significantly augmented. Despite a rise in the installed power generation capacity over the past decades, the demands of fast growing economy like ours are not being met fully due to under-performance in the power sector in several fronts as well as shortage of required coal linkages. As a result the gap between demand and supply of power has been widening over the years. In terms of percentage, the supply of power was short by 7.1 percent in 2003-04, which has increased to 8.2 percent during April to August, 2011.

During the current year 2011-12, which is also the terminal year of the XIth Five Year Plan period, the Ministry of Power has reportedly kept the lowest ever target of only around 7,675 MW capacity addition, instead of the earlier target of 20,000 MW. The power sector in the country is bogged down by the problem of supply of coal. Coal based energy is the main source of Power in India. It would continue to play the main role in the years to come. Coal based power generation capacity has been given preference, in view of the large domestic coal reserves and the cost of power generation with domestic coal being cheaper when compared to other fuels. But of late, there have been certain issues with the supply of domestic coal to the power sector despite India being the fourth largest producer of coal in the World. As a result, the generation of power has suffered. The reliance on imported coal has also increased over the years. There are a number of issues related to the availability of coal to the power sector.

In a scenario where power is not equitably available and coal based plants are causing environmental pollution by CO₂ emissions, it is inevitable that alternate

sources of energy are seriously explored to power homes and industries. The estimated potential for power generation in the country from wind, small hydel, solar & biomass has been estimated at over 87,000 MW. Against this, the country's present installed capacity from various renewable energy sources is mere 21,125 MW. The Committee feel that holistic efforts are urgently required to meet the power deficit in the country. It is in this backdrop that the Committee had selected the subject 'Power Generation – Demand & Supply' for examination. The observations and recommendations of the Committee on the subject after a detailed study and scrutiny of the same are given in the subsequent paragraphs.

6.2 The Committee note that the capacity addition target for the 11th Plan was fixed at 78,700 MW which was reduced to 62,374 MW by the Planning Commission following the mid-term appraisal of the Plan. Against this, till 31.10.2011 only 41,963 MW of the capacity has been commissioned. The Committee are aghast to note that only about 67 per cent of the scaled down target has been met in the last four years. Though a number of steps have been taken by the Ministry to meet the target of the 11th Plan including introduction of a New Accountability System, yet the Ministry of Power has apparently further reduced the Plan target to around 52,000 MW only. In the opinion of the Committee, monitoring the officials and engineers handling power projects and holding them accountable for lapses should have been in place much earlier. The Committee are apprehensive as to whether within the remaining period of the 11th Plan period, it would be possible to achieve even the reduced target by the Ministry of Power. Besides, slippages in the 11th Plan target would definitely spillover into the 12th Plan.

The Committee, therefore, are of the view that setting the target of 78,700 MW for the 11th Five Year Plan was completely unrealistic. The Committee deplore the fact that the Government had initially set unrealistic targets, then reduced it at the Mid-term appraisal stage. The Committee strongly recommend that the targets for the Five Year Plans should be set up after doing a scientific analysis and by a real time assessment of all the factors involved in the construction of power plants, the limited coal supply etc., as well as the analysis of the delay-causing issues during the 11th Plan. It is only when the targets are realistic that the slippages will be minimum. The Committee, therefore, strongly recommend that the Central Electricity Authority, which projects targets, may carry out necessary studies to prepare a realistic blueprint of the 12th Plan targets.

6.3 The Committee have learnt that as per the report of the 17th Electric Power Survey (EPS), the demand of electrical energy in the country is likely to be around 2,18,209 MW for 2016-17 and 2,98,253 MW for 2021-22. These estimates show that the projected demand will be straightway doubled from 1,52,746 MW in 2011-12 in the next five years which requires a capacity addition of more than 1 lakh MW in the 12th Plan.

The Committee are of the considered view that the findings of the Power Survey must be incorporated into the policy formulations. Although the Ministry had worked out the requirement of capacity addition of 1,07,000 MW during 12th Plan to meet the projections made in the said survey, the Committee have serious doubts about achievement of the same, keeping in view the downward revision of the capacity addition targets of the 11th Plan. As power projects have a high gestation period, the Committee feel that capacity augmentation programmes should be envisaged for 7-8 years period and planned in a realistic manner. The Committee are also of the view that five year plans are a narrow window for the implementation of power projects and thus in order to avoid inordinate delays in execution & obviate slippages in capacity addition targets, the Government must assess reasons for under achievement of previous targets, strive to address those earnestly & then resort to long term planning.

The Committee observe that the Captive Power Plants are playing a big role in meeting country's huge demand for power, as they provide an option for generating seamless & reliable power to various industries. As on March, 2011, the total installed capacity of captive power plants was 31,000 MW. These plants do not require elaborate transmission & distribution infrastructure & provide customized solutions for power. Therefore, the Committee are of the opinion that the setting-up of Captive Power Plants should be encouraged by the Government. The Committee further note

that the Ministry hopes for a capacity addition of around 13,000 MW during the 12th Five Year Plan by Captive Power Plants and hence recommend that the Government should come out with a policy to provide for duty free import of machinery for Captive Power Plants, as it would go a long way in augmenting the power generation capacity of the country.

6.4 The funds required for the XI Five Year Plan towards capacity addition, transmission, distribution and other projects was estimated as a whopping ₹10,59,515 crore. It would be a monumental task to arrange for such large funding, therefore, it is imperative for the Government to streamline the funding procedure for the Power Sector. In this context, the Committee note the recommendations of the Sub-Committee of Group of Ministers on financial issues to the Power Sector and would like that its recommendations should be taken on board by the Government at the earliest. The Committee understand that another High-Powered Committee consisting of representatives of various financial institutions and banks also exists to deliberate on the issue of availability of finance to the Power Sector. The Committee recommend that the recommendations of the afore-mentioned Committees should be seriously considered and implemented by the Government without any further loss of time. The progress in this regard should be submitted to the Committee at the Action Taken stage.

The Committee further note with displeasure that a National Electricity Fund (NEF) has been set-up by the Government for loans to be disbursed for Transmission & Distribution schemes as electricity distribution has been identified as the 'weakest part' in the Country's Power Sector due to heavy Aggregate Technical & Commercial (AT&C) losses by the Planning Commission in their mid-term appraisal. Such undesirable situation has led to the inability of most of the State Electricity Boards to raise funds or to do so only at very high rates of interest. The Committee also note the Ministry's expectation that the new fund will address this issue. The Committee, however, are aware that the Planning Commission has decided to get the NEF Scheme reformulated with two key changes, i.e. instead of PFC (Power Finance Corporation) and REC (Rural Electrification Corporation) only, the loans would be disbursed by

commercial banks too, and secondly, in the initial two years, only the distribution schemes would be targeted. The Committee would like to know, as to how apart from the current status of the reformulated NEF, the amount of ₹227.64 crore provided to the Ministry for NEF in the Annual Plan 2010-11 has been disbursed. The Committee also desire that the Ministry of Power should submit a detailed note on the modalities of the National Electricity Fund so as to enable them to go further into the issue.

6.5 The State Electricity Boards (SEBs) have been unbundled into three distinct entities viz. Generation, Transmission & Distribution. Also with the enactment of the Electricity Act, 2003, these entities are supposed to be monitored and regulated by independent State Electricity Regulatory Commissions (SERC). Still, the State Governments play a predominant role indirectly, by virtue of providing funds to the SERCs. Moreover, many SERC Members in the State are former employees of the SEBs that they are now expected to regulate, independently. In such cases, SERCs are weakened since inception, which allows large State utilities to remain unresponsive to their regulations. The above-mentioned issues stem predominantly from a fundamental structural flaw in the current operational and regulatory structure of the power sector. Since the reforms in the sector have progressed only to the extent of unbundling and establishing regulatory bodies without actually changing ownership, the effectiveness of the regulator to regulate the utility (which is another arm of the Government) is obviously limited. The policy maker, the regulator and the utility are all different parts of the government. The Committee, therefore, recommend that there should be operational autonomy for the utilities, and functional & financial autonomy for the SERCs, which can be ensured by debarring employees/ex-employees of the SEBs to shift from one authority to the other in the same sector. Besides, as some States are still in the process of reorganizing their SEBs, the Committee desire that the Government should issue an advisory to all State Governments on this issue.

6.6 The Government have opened up the power sector since 1991, and the investment measures were further liberalized by coming into force of the Electricity Act, 2003. Since the advent of economic reforms in India, Foreign Direct Investment (FDI) has played a big role in stimulating economic activity. The Committee note that the cumulative FDI inflow in the power sector from April 2000 to December 2009 was US \$ 4,448 million. In the opinion of the Committee, it is not commensurate with the requirements of the power sector. The estimated fund requirement for power sector during XIth Five Year Plan was nearly ₹ 11 lakh crore. With the 12th Plan scheduled to start soon, the fund requirement for this sector is set to rise manifold. The Committee, therefore, recommend that in order to attract greater FDI inflows, the policy regime in the power sector should be further liberalized. The Committee would also like to be apprised of the blueprint, if any, made for the Government's future strategy on the matter.

6.7 The Hydroelectric potential in the country has been pegged at 1,48,701 MW, out of which 1,45,320 MW of the potential consists of hydro electric schemes having installed capacity above 25 MW. The Committee are constrained to note that out of the above identified capacity only 33,920.8 MW (23.34%) has so far been developed & another 14,707 MW (10.12%) is under process. Thus around 67% of the potential remains untapped so far. The Committee express their dissatisfaction over such huge under-utilization of the country's hydro potential.

As on 30th June, 2010, 98967.2 MW of Hydro Capacity is yet to be developed in the country. The Committee note that Government have planned to add 20334 MW of Hydro capacity during the XIIth Five Year Plan period. However, even if the stipulated capacity is added, after the XIIth Plan in 2016, around 78,633 MW capacity of Hydro Power would remain untapped. In certain States like Haryana, Chhattisgarh, Goa, Bihar, West Bengal, Manipur, Nagaland, Himachal Pradesh, Mizoram etc. nearly 100% of the Hydro Power remains untapped. In the opinion of the Committee, such a huge under utilization of the country's resources is highly deplorable. Besides being a relatively cheap and an environmentally benign source of power, the focus must shift towards full development of hydropower in future. The Committee, therefore, recommend that the Government should identify the projects for the XIIth Plan in right earnest and start the awarding procedure, in order to ensure timely execution of the projects. The Committee should be apprised about the progress achieved in this regard at the action taken stage.

The Committee are dismayed to note that a number of hydro power projects in the country are facing delays/suspensions due to difficulties in getting environmental clearance in time. This leads to an unwanted lock up of capital and resources which could have been used for other purposes. The Committee firmly believe that the

Government of India should not promote any sort of ‘Environmental Dogmatism’, as the issues of environmental conservation & development need to be seen in unison. It would be impractical to allow one issue to overshadow the other. The Committee recommend that the Government should expeditiously resolve all the pending environmental issues in a pragmatic manner. As per the Ministry of Environment & Forests, the major issues are concentrated on the Ganga River Basin in Uttarakhand and the Siang, Subansiri and Lohit Basins in North Eastern States. Various Environment Impact studies are stated to be underway by the Central Water Commission, IIT Roorkee and Wildlife Institute of India, Dehradun. The Committee note that these studies were entrusted to these authorities since the year 2009. They would like to be apprised of the progress made so far on the matter. They also desire that decisions taken thereafter should be in the overall interest of the country’s development. The Committee are aware that the Ministry of Power is in touch with the Ministry of Environment and Forests, the various State Governments and the local stakeholders in the matter. They urge the Ministry of Power that it should prevail upon all the stakeholders to fast track their consultations so that the delays/suspensions in various hydro power projects could be prevented.

6.8 The Committee note that in order to utilize the optimum potential of power generated, pumped storage plants are used, particularly in those areas where availability of water is in abundance. However, the Committee find that these plants often store power by curtailing supply of power from those who need it most. They feel that pumped storage plants should continue to supply power till the scope of power consumption exists, since according to the Ministry, such plants are better for meeting of peak hour demand. The Committee are, thus of the opinion, that pumped storage plants should ensure that the existing demand for power is completely met before pumping back the water for re-generation of surplus power.

6.9 The Committee note with great concern that mismatch between demand and supply of coal acts as a major hindrance in the generation of power. They have identified various issues in this connection, for instance the inadequate production of coal, slippages in supply, poor quality, excessive dependence on a single entity for supply, i.e. Coal India Limited (CIL) and the cost involved in coal washeries. During the oral evidence, the Ministry of Power stated that the Ministry of Coal could not supply adequate quantities of coal to the power units. However, the Ministry of Coal stated that during the year 2009-2010, maximum target for supply of coal was achieved. The Ministry of Coal, also took the stand that they sell coal at 50 percent of the international prices and further argued that the Power Sector was reluctant to bear the cost of washing coal for power generation as the quality of domestic coal was not good.

The Committee, in this regard, have learnt that a huge increase in the demand for coal due to the Government's aim of providing 'Power to All by 2012' has put substantial pressure on the coal producing companies. The projected demand of coal for power generation in the current year is 457 million tonnes. The Committee feel that the Government should work out a long-term plan for the same. The plan should specify not only the production targets to be achieved in the long run but also the measures to be taken in case any shortfall in demand is to be met. For this, initiative of CIL for strategic partnership with foreign coal companies and entry of private players in coal mining are the developments to be taken forward seriously. The Committee desire that the long term plan should cover these aspects and specify ways and means to encourage such partnerships. Besides, they would specifically like to know the recommendations of the T.L. Shankar Committee on domestic coal production and the action taken on the same. The Committee further desire to be apprised of the new

Coal Distribution Policy to streamline the supply of coal to the power sector in order to ensure that power generation is not adversely affected due to shortage of good quality coal.

6.10 (i) In the opinion of the Committee, the present state of affairs in the matter of availability of coal to the power plants is unsatisfactory. They have been given to understand that the gap in supply of coal to the power utilities is mainly due to logistics and operational reasons. The number of rakes being provided by Railways to transport coal are insufficient. As against the demand of 185 rakes per day, only 156 rakes are made available. In addition to this, the turnaround time at power stations is very slow which ultimately leads to low utilization of the rake capacity. Besides, uncovered rakes used for coal transportation lead to pilferage or spoilage of coal in adverse weather conditions. The Committee note that there is a provision of Rail-Coal Interface meeting, and the issue of actual availability of rakes is regularly being discussed with the Railways in various fora. However, these efforts have failed to bring the required change in the situation. The Committee are of the opinion that resolution of these issues require effective coordination between all the stakeholders i.e. Ministries of Coal, Power & Railways. The Committee, therefore, recommend that a permanent mechanism in the form of a Coordination Committee consisting of the Secretaries of Power and Coal Ministries and the Chairman, Railway Board be constituted at the earliest for this purpose.

The Committee further note that in some areas, the supply of coal gets affected due to frequent law & order problems. The Committee strongly urge that adequate security arrangements should be made in and around coal fields to permit seamless production & uploading of coal. The Government should also prepare contingency plans in coordination with the concerned State Governments to prevent loss of production from coal fields affected by law & order problems.

(ii) The issue of pilferage of coal & alleged activities of 'coal mafia' engaged serious attention of the Committee during their deliberations with the Ministry of Coal.

The Committee also noticed that the Ministry was rather unwilling to acknowledge the severity of the problem. The Committee are pained to note that even the Ministry's written replies on this issue were quite evasive and failed to specify the quantum of coal stolen and losses incurred on account of theft/pilferage of coal. The Committee are of the view that the Ministry and various coal companies can not simply wash off their hands by arguing that maintenance of law & order is a State subject. In the opinion of the Committee, a substantial portion of coal is pilfered due to lack of vigil & proper oversight on the part of the coal companies too. The Committee are convinced that certain unscrupulous elements within the system are hand-in-glove with the 'coal mafias' which needs to be probed to fix accountability on the erring officials. The measures being taken by the coal companies to prevent illegal mining of coal need to be effective to show desired improvement in the current situation.

In this scenario, the Committee strongly recommend that the reality of illegal activities of coal pilferage in coal mines and coal trading areas must be acknowledged and dealt with sternly at the earliest by the Government. The Committee also recommend that an independent audit of coal production & actual dispatches should be carried out on a quarterly basis.

6.11 The Committee observe that there are multiple environmental concerns related to the coal sector and much attention has not been given by the Government to this aspect. Most of the coal reserves in India are situated in highly forested and tribal inhabited areas where the mining activity is perceived as a major challenge to environmental conservation and rehabilitation measures. The Committee are aware that a number of Coal projects are facing difficulties due to delays in getting environmental clearance. According to the Ministry of Coal, in order to translate indicated reserves into proved category, detailed drilling of the particular land must be carried out. During oral evidence, the Committee were informed that the Ministry of Environment & Forests has serious reservations about sinking of boreholes in the forest area to ascertain the quality and quantity of the coal reserves. The Committee have learnt that though more boreholes per square kilometers were allowed by the Environment Ministry on a selective basis, it could not settle the issue permanently. The Committee feel that technical procedures cannot be compromised in such matters to save the huge cost and manpower involved in the coal mining activity and thus recommend that Government must allow requisite 15-20 boreholes per square kilometer, in order to confirm newer coal reserves and to expedite the process of bringing it to production stage.

The demarcation of the forest areas into ‘Go’ & ‘No Go’ by the Ministry of Environment & Forests have generated a lot of debate in the recent past. While noting that the Ministry of Environment has relented a bit in its classification of ‘No Go’ areas and has allowed to run projects in these areas, the Committee feel that environmental conservation vis-à-vis development can be balanced by a careful yet practical approach of both the stakeholders. The Committee deprecate any attempts of Environmental dogmatism which can jeopardise vital decisions. The Government

needs to come out with a comprehensive policy on granting environmental clearance to the projects in the forest areas. The Committee desire that the Government should examine these issues sincerely. They would also like to be informed by the Ministry of Coal regarding the final decision taken in the matter at the earliest.

6.12 (i) The Committee understand that the designs and specifications of the thermal units have improved a lot since the 1950's, with a gradual increase in the size of the generating units so as to improve their efficiency but are unhappy to note that the state of the art technology has not been adopted and implemented fully particularly in the PSUs of the Ministry of Power like NTPC etc. From 30 MW, the technology has moved to 600-800 MW, which is termed as super critical units. The Committee note that their advantage is better efficiency due to corresponding rise in the steam parameters, lower O&M costs in the long run as well as lower Green House Gas emissions. In the backdrop of the country's dependence on coal based thermal power generation as well as the very large capacity generation programme to be taken up in the near future, the Committee find a lot of scope for 660/800 MW supercritical units in India. The Committee also note that BHEL has brought out 600 MW units. They would like that the PSUs under the Ministry of Power like NTPC must utilize the Super Critical technology without any further loss of time. The Committee recommend that as far as possible the new capacity addition programmes of the Government should be undertaken by adopting more 660/800 MW supercritical units. The Ministry of Power has further informed that coastal stations can use the unit size of 800 MW, however, for inland stations, transportation of heavy equipment is an issue. In the opinion of the Committee, the Government should arrange logistics of transportation of heavy equipment & machinery for the inland stations to use supercritical units keeping in view its advantages in the long run.

The Committee further note that the Ultra Mega Power Projects (UMPPs) of 4000 MW capacity have the potential to address the power deficit in the country but out of 16 UMPPs identified, only 4 UMPPs have so far been transferred to the developers. The Committee, therefore, recommend that the transfer of the remaining UMPPs to

developers should be expedited. All the pre-RfQ (Request for Quotation) activities in respect of the UMPPs in the pipeline should be completed at a faster pace, so that they can be awarded to the suitable party. For the 4 UMPPs already awarded, the Committee would like to be apprised about their implementation status. The Committee would also like to be informed by the Ministry of Power about the factors responsible for perceptible delays in getting requisite clearances from the respective State Governments for various UMPPs. They urge the Ministry to take further concrete action for clearance of these UMPPs without any further delay.

(ii) The Committee would also recommend that regional imbalances in the availability of power should be mitigated at the earliest by the Government, as they are a big hindrance in the balanced development of the nation. In the opinion of the Committee, a sturdy system of National Grid would go a long way in realizing faster evacuation of power from the surplus to the deficit areas and is definitely indispensable for mitigating regional imbalances. In this regard, the Committee are constrained to note that the inter regional transmission capacity by the end of 11th Plan is only likely to be 27,950 MW. Besides, in several areas, transmission lines have not been established. Under these circumstances, the Committee strongly recommend that a big push should be given to augment the inter regional transmission capacity of the country. As all regional grids have already been interconnected and developed in the form of the National Power Grid, the Committee expect that the regions facing acute power shortage would be benefitted by the exchange of operational surpluses. Those regions/States, which are facing acute power deficit much above the national average of 9%, should get priority to meet their power deficit. Since the National Electricity Plan, prepared by the Central Electricity

Authority, also includes perspective planning for Twelfth Plan, the Committee recommend that the issue of regional power imbalances must be appropriately addressed therein. The Committee desire specific action to be taken on the same and would like to be apprised on it.

6.13 The Committee have learnt that among various parameters to measure the efficiency of Thermal Power Plants, Plant Load Factor (PLF) is most important, which measures the average load to the installed capacity of a Power Plant. The PLF of thermal units depends on a number of factors such as vintage of the Unit, forced & planned outages, availability of required quality & quantity of fuel etc. From the figures submitted to them regarding PLF of Central, State and Private Power Plants in the last 3 years, the Committee note that the PLF of plants in the private sector is between 85 to 91 percent which is more than the Central Sector thermal units where the PLF has remained in 84 to 86 percent bracket. In this backdrop the Committee feel that the Government should strive to raise the PLF of their thermal power plants. Wherever it is not possible to achieve these figures due to the vintage of the units, fresh Renovation & Modernization work should be initiated. The Committee also recommend that Renovation & Modernization works should be carried out within a stipulated time, to avoid forced outages. Further, Life Extension (LE) works should be carried out only in those units which have the viability of running smoothly in future.

6.14 The Committee note with dissatisfaction that one of the significant reasons for underachievement in the implementation of Power Generation Augmentation Programme is contractual disputes between the project authorities and the contractors and their vendors/sub-vendors. In the opinion of the Committee these disputes not only delay the projects, but also lock up the project resources for the disputed period. Such disputes need to be avoided at all costs by the Government. For this, it is essential that appropriate model contract agreements addressing all future issues are prepared in advance and made available to the stakeholders. In addition, only those having technical expertise and efficient managerial skills should be given charge of power projects. As the power sector has now been thrown open for investment by the Private Sector, the Committee hope that better professional skills would be attracted in this sector to reduce occurrence of disputes. The Committee also recommend that the Government should revisit the system of awarding of contracts to assess whether any streamlining of the procedure is required in order to obviate disputes in future.

6.15 The Committee are dismayed to observe that one of the important areas that has been neglected by the Ministry is that of shortage of skilled manpower in the power sector. The ambitious capacity addition programmes in the Power Sector would require commensurate increase in the supply of skilled manpower, as the skill requirement in this field is highly technical. Shortage of skilled manpower for erection and commissioning has been identified by the Ministry as one of the major bottlenecks in the implementation of ongoing power projects. The Committee would emphasize that development of a wide base of skilled manpower in the area of high pressure welding, fittings, instrumentation etc. to man various specialized requirements across the Generation, Transmission, and Distribution Units is imperative. The Committee desire that the Government should immediately make an assessment of the manpower requirement across various trades and take remedial measures well in advance. They note that the Ministry have taken 'Adopt an ITI' initiative for this purpose. The Committee would like to be apprised of the data regarding the exact number of ITI trained persons absorbed in the power sector post this initiative. The Committee are also of the view that the Government should look beyond the ITIs to impart specialized technical skills to the youth and absorb them in the power sector. As the Committee have already been informed about the training being imparted at 68 training institutes in the country, they would like the Ministry to assess as to whether it has actually addressed their need to have 1,50,000 skilled workers for power projects during the XIth Plan.

The Committee also note with concern the critical shortage of power equipment like Boilers & Turbines in the country, which is likely to adversely affect the capacity addition targets. They have been informed about an action plan being pursued by BHEL on the matter as well as launch of various Joint Ventures to produce and deliver

various equipment. The Committee also find that most of these ventures are expected to complete their manufacturing facilities by the year 2011 or 2012. The Committee urge that the Ministry should monitor the progress and ensure that the production of requisite equipment commences on time.

6.16 The Nuclear Power Projects aggregating 3,380 MW constitute a major part of the overall capacity addition targets for the XI Five Year Plan. As per the expert opinion, the emissions from Nuclear Power Stations are low. Nuclear Power is economically viable and comparable to renewable sources. As nuclear is an environmentally benign source of power, the Committee is of the opinion that time has come to pool it with hydropower and thermal power, for which it needs the required thrust by the Government. The contribution of the Nuclear Energy needs to be augmented substantially from the present level of just two per cent in the power generation programme. The exemptions from the IAEA & Nuclear Suppliers Group (NSG) have set the stage to catapult India into the Nuclear power era. The Committee are aware that increasing nuclear power generation capacity is the mandate of the Department of Atomic Energy. They hope that the Ministry of Power are working in coordination with them to identify achievable capacity addition targets. The Committee are also of the view that there is still scope to enhance and improve the public perception of nuclear power in the country while the Government expands its Nuclear Power Programme in the years to come.

6.17 The Committee are pained to note that the Power sector is beset with high Transmission & Distribution (T&D) losses due to technical and commercial reasons. It results in the wastage of huge amount of power which could have been otherwise put to good use. It is also a financial drag on the power utilities, as the power losses translate into revenue forgone. The Committee are surprised to learn that during the year 2008-2009, the Aggregate Technical & Commercial (AT&C) losses were nearly 28.44%. It is very high compared to developed nations, where these losses are mostly in single digits. While expressing their displeasure over such consistently high AT&C losses, the Committee feel that the institutional mechanism has failed to check it. They, therefore, strongly recommend that the Government needs to invest more to develop sturdy transmission network in the country, besides taking strict action against those States who fail to achieve targets in reducing AT&C losses. In the opinion of the Committee, it would go a long way in reducing technical losses.

The Committee are more perturbed about the commercial losses, which are nothing but pilferage of power, through drawal of unmetered electricity. It is a major bane for the power sector in India. The Committee, while acknowledging the amendment in Section 151 of the Electricity Act 2003, for strengthening action against theft / pilferage of electricity and making it a cognizable and non-bailable offence, recommend that swift, stringent and deterrent action must be taken against such offenders. The Committee are aware of the limited role of the Central Government vis-à-vis distribution issues. They would like the Government to raise this issue with the State Governments in all fora and suggest measures like installation of effective camera surveillance systems at select locations registering very high power thefts, installation of tamper proof/secured meters and Aerial bunched cables for LT lines. State Governments should be advised to undertake 100% metering of all areas and

installation of feeder meters which are meant to assess commercial loss of power in their respective localities. The Committee also feel that in case commercial losses persist despite taking all the suggested measures, connivance of departmental staff can not be ruled out. In such situations strong penal actions should be taken against officials found guilty. In the opinion of the Committee, the distribution losses cannot come down without the proactive intervention of the State Governments. The matter should therefore be taken up at the highest level with the State Governments. The Committee further feel that it should also be the responsibility of the consumers to report cases of theft of power to concerned authorities, so that early action could be initiated to prevent pilferage of power.

In this regard, the Committee further note that the Restructured-Accelerated Power Development & Reform Programme (R-APDRP) has been introduced as a major programme, targeted to reduce the AT&C losses upto 15%, but its implementation has lacked steam. The Committee recommend that a reliable monitoring mechanism should be developed by the Government to oversee the proper implementation of the already sanctioned projects under R-APDRP.

6.18 The Committee feel that there is a lot of scope to use Information Technology (IT) in distribution and its proper usage can lead to significant cuts in AT&C losses. Part A of R-ADDRP comprises the dissemination of some popular IT tools in the power sector like Supervisory Control and Data Acquisition System (SCADA). Electricity is supplied in the country through a very complex power grid system and the losses that occur in transmission and distribution are very large in comparison with major developed countries. This occurs mainly due to inefficient safety, monitoring and control devices that are persisting in present distribution system. The most advanced automatic control system, which can perform the operations like monitoring and control is SCADA. SCADA is the application of computers in power system. Distribution automation is the major upgradation of any distribution system. This can be achieved by implementing SCADA. Some of the States & UTs like Gujarat and Chandigarh have reported huge improvement in their power distribution system by establishing SCADA. The Committee, therefore, recommend that SCADA should be implemented across all the power distribution networks in the various States.

6.19 Rajiv Gandhi Gramin Vidhyutikaran Yojana (RGGVY) is the flagship programme of the Government to provide access to electricity to all rural households in the country. The Committee regret to note that the programme has suffered due to improper implementation at various levels and insufficient or faulty coverage of eligible rural house-holds. The Ministry of Power has also cited certain major issues in RGGVY, for instance, late receipt of Detailed Project Report (DPRs) from States, poor rural electricity infrastructure etc. The Committee, in this regard, have been informed that the Government has set up an Inter-Ministerial Monitoring Committee and advised the States to form District Committees for the purpose. The Committee recommend that the Government should continuously take feedback from these panels, and convey it to the implementing agencies on the ground. Further, proper audits through independent agencies and surveys to seek views from the beneficiaries should be conducted to ensure quality and longevity of the infrastructure created under RGGVY as well as coverage of all eligible villages in the DPRs being prepared under the scheme.

The Committee are of the firm opinion that RGGVY can prove to be a golden opportunity to electrify all villages of the country and therefore its coverage should not be limited to just providing free connection to the BPL families. Poverty and deprivation in rural India is so pervasive that a water tight compartmentalization between APL & BPL households is highly untenable. In this scenario, leaving out APL households for electricity connection would lead to needless social strife and tensions. The Committee, therefore, would like to recommend that suitable changes should be incorporated under RGGVY so as to cover APL households too. As regards rural electrification under RGGVY, the Committee also note that the transformers set up in the villages for the purpose are small capacity transformers, which often break

down due to their inability to cope with increased load. The Committee, therefore, recommend that higher capacity transformers need to be installed in villages under RGGVY, keeping in view the future load expansion brought in the wake of increased rural electrification and rising standards of living. The Committee feel that the Ministry should revisit various norms and guidelines under RGGVY in the light of their suggestions so that rural electrification in the entire country could become a reality.

6.20 Our country is fortunate, being blessed with an abundance of sunlight, wind, water and biomass sources. The Committee feel that people in all walks of life are now more aware of the benefits of renewable energy, especially decentralized energy required in villages and semi-urban / urban centres. The Ministry of Non-Conventional Energy has the mandate to assess and promote renewable energy through solar thermal devices, solar Photo Voltaic, biogas units, small hydro power units, wind turbines etc. After holding due deliberations with the Ministry on this aspect, the Committee's recommendations are as under:

(i) Sufficient budgetary support is indispensable for carrying out any particular activity satisfactorily to the desired level. The Committee, however, observe that the budget of the Ministry of New & Renewable Energy is quite inadequate being only 0.024% of the Union Budget Estimates for 2010-11. Though the future of power sectors depends heavily on renewable energy sources, the fact that the Ministry is facing a lot of difficulties due to the budgetary constraints, was the high point of the oral evidence of this Ministry before the Committee.

The Committee believe that in view of the fact that there are huge energy disparities in the country, considerable investment in the renewable energy would give us manifold returns in the future. Such investments have the potential to improve the lives of the marginalized sections of society like rural poor, tribals & women. It would also come as a boon to the people living in remote & inaccessible areas. Therefore the Committee recommend that the budget of the Ministry of New & Renewable Energy needs to be increased to at least 1% of the Union Budget. They feel that the Ministry of New & Renewable Energy should accordingly work out the details of the requirements for Feed-in-Tariff, capital subsidy, risk guarantee, R&D, village minigrids, etc and

pursue with the Planning Commission / Ministry of Finance with proper details for better allocation in next year's Budget.

(ii) A number of regulations respectively govern various areas of the Renewable Energy sector like wind power, small hydro, solar photovoltaic etc. But, there is conspicuous absence of a comprehensive law which integrates these distinct sectors and provides them direction and a sense of purpose, in a holistic manner. The Committee recommend that the Government must strive to implement the National Renewable Energy Policy in a comprehensive manner that clearly sets a time-bound and ambitious target to be achieved and lays down a transparent and stable long-term incentive structure for promoting socially responsible private investment. Since renewable energy plants are capital intensive, a long-term and reliable incentive structure will earn the confidence of both public & private sector investors. This will also require suitable amendments in the Central Electricity Act, the Integrated Energy Policy & National Tariff Policy. In this connection, the Committee are aware that the Ministry of Power has already amended their Tariff Policy by fixing a minimum percentage of the total consumption of electricity in the area of distribution licensee from solar energy. However its implementation remains to be done. Overall, the Committee feel that the Government should mobilize all stakeholders and promote institutional linkages to provide a new thrust to its renewable energy programmes.

(iii) The estimated medium-term potential for renewable energy power generation in the country from wind, small hydro, solar & biomass has been estimated at over 87,000 MW. Despite having such a good potential, the Committee are distressed to note that the total installed capacity from all the Renewable sources as on 31.08.2011 stands abysmally low at 21,125 MW. In a scenario where burning of

fossil fuels have generated huge environmental debate and the availability of oil to the developing world is going down, this under utilization of existing renewable resources warrants immediate remedy. The Committee, while taking cognizance of several enabling measures ushered by the Government, are constrained to observe that they are not yielding the required results. As per the Electricity Act, 2003, National Electricity Policy 2006 & Tariff Policy, 2006, the SERCs are required to fix a minimum percentage of energy from renewable energy sources. According to Ministry of New & Renewable Energy, it does not intend to force this upon the States through laws in view of diverse trends in economic viability/attractiveness to investors as well as availability cost of other available competing power supply options in States. The Committee feel that the Ministry is shirking from its responsibility of ensuring implementation of the above-mentioned Act and Policies. The Committee, therefore, recommend that the Ministry should atleast advise States rich in renewable energy resources to fully exploit the power potential of these sources and encourage and counsel them to formulate Policy & Plans in line with the Acts & Policies of the Central Government.

(iv) The estimated potential for power generation in the country from small hydro projects (SHPs) is 15,384 MW in Hilly States like J&K, Uttarakhand, Himachal Pradesh, Arunachal Pradesh, as well as some states in the plains. The Committee are displeased to note that the Government has so far developed capacity of only 537 MW in the 10th Plan and 1400 MW has been targeted during the 11th Plan. Thus a major chunk of the available potential remains unexploited. As the State Governments play the biggest role in the development of SHPs, the Committee are of the opinion that various issues need to be addressed in close coordination with the State Governments.

(v) In so far as solar energy is concerned, the Committee have learnt that the Government has embarked upon an ambitious Solar Mission of deploying 20,000 MW of grid connected solar power by the year 2022. In this regard, the Committee note further that Direct Normal Irradiance (DNI), which is the amount of solar radiation received per unit area by a surface that is always held perpendicular (or normal) to the rays that come in a straight line from the direction of the sun at its current position in the sky, is considered to be an indispensable tool in proper assessment and full utilization of the solar potential in any region. The Committee are dismayed to note that despite the ambitious JL Nehru Solar Mission, the Government is yet to prepare a complete DNI map covering the entire country that would make identification of high potential sites much easier. In this connection the Committee recommend that the Government must urge the Centre for Wind Energy Technology (CWET), Chennai to expedite the project relating to the DNI map of India on an urgent basis. The Committee also recommend that the Government should take initiative to prepare a high resolution Renewable Energy map of India.

(vi) Recently a new technology of solar submersible pumps has come up, which has a huge potential to alleviate power woes of the farmers and saving of substantial amount of power from the national grid. The Committee recommend that Government should popularize & disseminate this technology among the farmers and simultaneously invest in Research & Development in this field.

Various State Governments are providing open ended power subsidies to the farmers and once this technology is adopted on a wider scale, it can greatly ease the burden of huge power subsidies carried by these State Governments. Therefore, the Committee recommend that the opinion of State Governments should also be taken on

board, and they must be persuaded to invest in the solar submersible pump technology.

(vii) The Committee also strongly recommend that solar photo-voltaic plants should be installed on the rooftops of all the public buildings in Urban and Rural areas, particularly in the Primary Health Centres (PHCs) and Panchayat Bhawans. The Ministry of New & Renewable Energy should urgently take up this matter with the Ministries of Urban and Rural development as this would help the Government to save a huge amount towards the cost of fuel for diesel gensets being run in various PHCs & Panchayat Buildings. The mobile towers using diesel gensets can also be converted into solar power utilizing entities. It would also stop the obnoxious practice of siphoning-off the diesel meant for the gensets in the black market. Besides, the initial comparatively high installation cost of a PV Plant is quiet justifiable, vis-à-vis the cost incurred towards the fuel expenses.

(viii) The potential of biogasifiers that use agricultural residue like ricehusk to provide off grid power is enormous in the country and in the opinion of the Committee this must be adequately tapped. In certain areas, for instance Champaran District in Bihar, this programme has been running quiet successfully, and now time has come for it to be replicated in other parts of the country.

(ix) There are a number of unelectrified remote villages/hamlets in the country where grid connectivity would not be possible for a variety of reasons. Therefore, Small hydro power generation systems, biomass gasification based electricity generation systems, solar photovoltaic power plants etc. in distributed power generation mode need to be used depending upon the availability of resources for generation of required electricity. The Committee are of the considered view that the

Government must pay attention to the Off-Grid Electrification of villages, as the power through these sources at the village level would be more reliable & predictable, and would save substantial expenditure towards erecting transmission network. In this connection, the Committee would like to draw the attention of the Government towards the imperative need of creating proper repair & maintenance systems for the Renewable Power infrastructure. Further, the Government should not only pursue the targets of addition to the installed capacity, but also focus at the actual generation of power from these projects in the long run. It has come to the notice of the Committee that the installed capacity of renewable power falls to disuse after initial operations. This dereliction should be avoided at any cost to ensure full tapping of renewable energy in a sustained manner.

(x) Kerosene is consumed widely in the rural & semi-urban areas of the country towards lighting & cooking purposes. The Government of India is also providing subsidy for the purchase of kerosene, but a major portion of this subsidized kerosene is pilfered and sold in the black market. The Committee, therefore, are of the opinion that Government must make available solar lanterns & solar 'chullahs' to the rural poor and thereby discourage the use of subsidized kerosene. The subsidy which Government is giving on kerosene would be enough to fund this ambitious programme & therefore no additional resources would be required. The Committee are of the considered view that this may be taken up as a pilot project in certain districts.

(xi) Power from Renewable Energy is a new frontier in the emerging market economy of energy, but the sector is beset with high cost issues, uncertainties and risks. As a result, entrepreneurs are reluctant to invest in the renewable sector. Due to incipient risks, banks are also rather un-willing to finance these projects. The

Committee, therefore, recommend that a separate Risk Guarantee Fund for Renewable Energy Projects should be created out of the Clean Energy Fund without any delay. In the opinion of the Committee, the operationalization of such a fund would cover various types of technological & financial risks to the investors. The Committee are aware that such a fund, in operation in many countries, has proved to be highly successful. The corpus of the fund should be such as can meet the funding requirements of all major clean energy initiatives in the Country in future.

(xii) The Committee while making a note of various Research & Development activities being undertaken under the aegis of the Ministry are of the firm view that renewable energy should be made available to the masses at an affordable price. In other words the transition from the laboratory to the market must be smooth & swift. As regards solar energy, the Ministry has expressed hope to bring down the costs steadily and achieve grid parity by the year 2022. International Cooperation & R&D in renewable energy field have been underway with the signing of memoranda/agreements with 18 countries, as well as various externally - aided projects. The Committee, while appreciating such initiatives, feel that the Government must encourage innovation to develop indigenous technology in this field. The Committee also recommend that the Government should enhance funding towards Research & Development in a time bound manner, so that setting up of commercial plants to produce renewable energy could be materialized.

NEW DELHI;
27th December, 2011
Pausa 6,1933 (S)

FRANCISCO SARDINHA,
CHAIRMAN,
COMMITTEE ON ESTIMATES

State-wise details of Hydro-Electrical potential

STATUS OF HYDRO ELECTRIC POTENTIAL DEVELOPMENT

(In terms of Installed capacity - Above 25 MW)

As on 30.06.2010

Region/ State	Identified Capacity as per reassessment study		Capacity Developed		Capacity Under construction		Capacity Developed + Under Construction		Capacity yet to be developed	
	Total	Above 25 MW								
	(MW)	(MW)	(MW)	%	(MW)	(%)	(MW)	(%)	(MW)	%
NORTHERN										
Jammu & Kashmir	14146	13543	2260.0	16.69	1189.0	8.78	3449.0	25.47	10094.0	74.53
Himachal Pradesh	18820	18540	6001.0	32.37	4600.0	24.81	10601.0	57.18	7939.0	42.82
Punjab	971	971	1206.3	100.00	0.0	0.00	1206.3	100.00	0.0	0.00
Haryana	64	64	0.0	0.00	0.0	0.00	0.0	0.00	64.0	100.00
Rajasthan	496	483	411.0	85.09	0.0	0.00	411.0	85.09	72.0	14.91
Uttaranchal	18175	17998	3026.4	16.81	2025.0	11.25	5051.4	28.07	12946.7	71.93
Uttar Pradesh	723	664	501.6	75.54	0.0	0.00	501.6	75.54	162.4	24.46
Sub Total (NR)	53395	52263	13406.3	25.65	7814.0	14.95	21220.3	40.60	31042.8	59.40
WESTERN										
Madhya Pradesh	2243	1970	2395.0	100.00	400.0	20.30	2795.0	100.00	0.0	0.00
Chhattisgarh	2242	2202	120.0	5.45	0.0	0.00	120.0	5.45	2082.0	94.55
Gujarat	619	590	550.0	93.22	0.0	0.00	550.0	93.22	40.0	6.78
Maharashtra	3769	3314	2487.0	75.05	0.0	0.00	2487.0	75.05	827.0	24.95
Goa	55	55	0.0	0.00	0.0	0.00	0.0	0.00	55.0	100.00
Sub total (WR)	8928	8131	5552.0	68.28	400.0	4.92	5952.0	73.20	2179.0	26.80
SOUTHERN										
Andhra Pradesh	4424	4360	2060.8	47.26	527.0	12.09	2587.8	59.35	1772.3	40.65
Karnataka	6602	6459	3585.4	55.51	0.0	0.00	3585.4	55.51	2873.6	44.49
Kerala	3514	3378	1831.5	54.22	150.0	4.44	1981.5	58.66	1396.5	41.34
Tamilnadu	1918	1693	1708.2	100.00	60.0	3.54	1768.2	100.00	0.0	0.00
Sub Total (SR)	16458	15890	9185.9	57.81	737.0	4.64	9922.9	62.45	5967.2	37.55
EASTERN										
Jharkhand	753	582	233.2	40.07	0.0	0.00	233.2	40.07	348.8	59.93
Bihar	70	40	0.0	0.00	0.0	0.00	0.0	0.00	40.0	100.00
Orissa	2999	2981	2027.5	68.01	0.0	0.00	2027.5	68.01	953.5	31.99
West Bengal	2841	2829	77.0	2.72	292.0	10.32	369.0	13.04	2460.0	86.96
Sikkim	4286	4248	570.0	13.42	2066.0	48.63	2636.0	62.05	1612.0	37.95
A& Nicobar	0	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Sub Total (ER)	10949	10680	2907.7	27.23	2358.0	22.08	5265.7	49.30	5414.3	50.70
NORTH EASTERN										
Meghalaya	2394	2298	156.0	6.79	166.0	7.22	322.0	14.01	1976.0	85.99
Tripura	15	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Manipur	1784	1761	105.0	5.96	0.0	0.00	105.0	5.96	1656.0	94.04
Assam	680	650	375.0	57.69	0.0	0.00	375.0	57.69	275.0	42.31
Nagaland	1574	1452	75.0	5.17	0.0	0.00	75.0	5.17	1377.0	94.83
Arunachal Pd	50328	50064	405.0	0.81	2710.0	5.41	3115.0	6.22	46949.0	93.78
Mizoram	2196	2131	0.0	0.00	0.0	0.00	0.0	0.00	2131.0	100.00
Sub Total (NER)	58971	58356	1116.0	1.91	2876.0	4.93	3992.0	6.84	54364.0	93.16
ALL INDIA	148701	145320	32167.8	22.14	14185.0	9.76	46352.8	31.90	98967.2	68.10

Note : 1 In addition to above 4785.6 MW PSS are under operation

DETAILS OF THE COAL BLOCKS ALLOCATED TO THE POWER SECTOR

Name of the party	Date of Allotment	Block allocated	Estimated Geological Reserves Mt
RPG Industries/CESC Ltd.	10.08.1993	Sarisatolli	140.47
Hindalco Industries	25.02.1994	Talabira-I	22.55
WBSEB	14.07.1995	Tara (East)	84.47
WBPDC	17.04.1996	Tara (West)	125.71
Central Collieries Ltd. (cancelled)	29.05.1998	Takli-Jena- Bellora(South)	40
Utkal Coal Ltd.(formerly ICCL)	29.05.1998	Utkal-C	208.77
Jindal Power Ltd	01.07.1998	Gare-Palma-IV/2	123
Jindal Power Ltd	01.07.1998	Gare-Palma-IV/3	123
Punjab State Electricity Board	28.12.2001	Pachwara Central	562
GVK Power (Govindwal Sahib) Ltd	07.01.2002	Tokisud North	92.3
WBPDC	23.06.2003	Gangaramchak	10
WBPDC	23.06.2003	Barjora	8
WBPDC	23.06.2003	Gangaramchak- Bhadulia	4
Tenughat Vidyut Nigam Limited	03.11.2003	Badam	144.63
KPCL	10.11.2003	Baranj – I	68.31
KPCL	10.11.2003	Baranj - II	
KPCL	10.11.2003	Baranj - III	
KPCL	10.11.2003	Baranj - IV	
KPCL	10.11.2003	Kiloni	39.51
KPCL	10.11.2003	Manora Deep	44.7

Name of the party	Date of Allotment	Block allocated	Estimated Geological Reserves Mt
Shree Baidyanath Ayurved Bhawan Ltd.	27.11.2003	Bhandak West	36.18
NALCO	27.08.2004	Utkal 'E'	194
CSEB	23.09.2004	Gidhmuri	80.27
CSEB	23.09.2004	Patoria	269.25
NTPC	11.10.2004	Pakri-Barwadih	1600
Damodar Valley Corporation	03.03.2005	Barjora (North)	85.49
Damodar Valley Corporation	03.03.2005	Kagra Joydev	196.15
WBPDCCL	26.04.2005	Pachvara North	125.71
MCL	10.11.2005	Talabira II	152.33
NLC	10.11.2005	Talabira II	
Hindalco Industries	10.11.2005	Talabira II	
MCL	29.11.2005	Utkal-A	
JSW Steels Ltd./ Jindal Thermal Power Ltd.	29.11.2005	Utkal-A	333.4
Jindal Stainless Steel Ltd.	29.11.2005	Utkal-A	
Shyam DRI Ltd.	29.11.2005	Utkal-A	
Andhra Pradesh Power Generation Corpn. Ltd.	06.12.2005	Tadicherla-I	61.28
Tenughat Vidyut Nigam Limited	13.01.2006	Gondulpara	140
Damodar Valley Corporation	13.01.2006	Gondulpara	
NTPC	25.01.2006	Talaipali	965
NTPC	25.01.2006	Kerandari	229
NTPC	25.01.2006	Chatti Bariatu	243
NTPC	25.01.2006	Dulanga	260

Name of the party	Date of Allotment	Block allocated	Estimated Geological Reserves Mt
NTPC +CIL JV	25.01.2006	Brahmini	1900
NTPC +CIL JV	25.01.2006	Chichro Patsimal	356
GSECL	06.02.2006	Mahanadi Machhakata	480
MSEB	06.02.2006	Mahanadi Machhakata	720
Essar Power Ltd.	12.04.2006	Mahan	144.2
Hindalco Industries	12.04.2006	Mahan	
Chhattisgarh State Electricity Board	02.08.2006	Parsa	150
Maharastra State Mining Corpn.	02.08.2006	Gare Pelma Sector II	768
Tamil Nadu State Electricity Board	02.08.2006	Gare Pelma Sector II	
Tenughat Vidyut Nigam Limited	02.08.2006	Rajbar E&D	385
Jharkhand State Electricity Board	02.08.2006	Banhardih	400
NCT of Delhi, Delhi	02.08.2006	Mara II Mahan	477.50
Haryana Power Generation Generation Corp Ltd	02.08.2006	Mara II Mahan	477.50
Power Finance Corporation Orissa UMPP	13.09.2006	Meenakshi	285.24
Power Finance Corporation Orissa UMPP	13.09.2006	Meenakshi B	250
Power Finance Corporation Orissa UMPP	13.09.2006	Dip side of Meenakshi	350
Power Finance Corporation Sasan UMPP	13.09.2006	Moher	402
Power Finance Corporation Sasan UMPP	13.09.2006	Moher-Amlori Extn	198
Power Finance Corporation Sasan UMPP	26.10.2006	Chhatrasal	150
Essar Power Generation Ltd.	20.02.2007	Chakla	83.05
Jindal Steel & Power Ltd.	20.02.2007	Jitpur	81.09
Andhra Pradesh Power Generation Corpn. Ltd.	20.02.2007	Anesttipali	26.89

Name of the party	Date of Allotment	Block allocated	Estimated Geological Reserves Mt
Andhra Pradesh Power Generation Corpn. Ltd.	20.02.2007	Punkula-Chilka	38.11
Andhra Pradesh Power Generation Corpn. Ltd.	29.05.2007	Penagaddppa	110.87
UPRVUNL	25.07.2007	Chendipada, Chendi-II	794.5
CMDC	25.07.2007	Chendipada, Chendi-II	500
MAHAGENCO	25.07.2007	Chendipada, Chendi-II	294.5
Kerala State Elec. Board	25.07.2007	Baitarni West	200.66
Orissa Hydro Power Generation Cor	25.07.2007	Baitarni West	200.66
Gujarat Power Generation Corp	25.07.2007	Baitarni West	200.66
Assam Mineral Dev. Cor	25.07.2007	Mandakini B	300
Meghalaya Mineral Dev. Corp	25.07.2007	Mandakini B	300
Tamil Nadu State Electricity Board, Chennai	25.07.2007	Mandakini B	300
Orissa Mining Corporation	25.07.2007	Mandakini B	300
NTPC	25.07.2007	Chhati Bariatu South	354
Damodar Valley Corporation	25.07.2007	Saharpur Jamarpani	600
Orissa Power Generation Corporation	25.07.2007	Manoharpur	181.68
Orissa Power Generation Corporation	25.07.2007	Dipside Manoharpur	350
GMDC	25.07.2007	Naini	500
PIPDICL	25.07.2007	Naini	
JSEB	25.07.2007	Urma Paharitora	437
BSMDCL	25.07.2007	Urma Paharitora	263
RRVUNL	25.06.2007	Parsa East	180
RRVUNL	25.06.2007	Kanta Basan	180

Name of the party	Date of Allotment	Block allocated	Estimated Geological Reserves Mt
Power Finance Corporation Tilaiya UMPP Jharkhand	20.07.2007	Kerandari BC	972
Hindalco	01.08.2007	Tubed	189
Tata Power Ltd	01.08.2007	Tubed	
Essar Power Ltd.	06.11.2007	Ashok Karkatta Central	110
Bhushan Power and Steel Ltd.	06.11.2007	Patal East	200
AES Chhattisgarh Energy Pvt. Ltd	06.11.2007	Sayang	150
DB Power Ltd.	06.11.2007	DurgapurII/Sarya	91.67
Balco	06.11.2007	DurgapurII/Taraimar	211.37
Adani Power Ltd	06.11.2007	Lohara West Extn.	169.832
Monet Ispat and Energy Ltd	09.01.2008	Mandakini	96.84
Jindal Photo Ltd	09.01.2008	Mandakini	96.84
Tata Power Company Ltd	09.01.2008	Mandakini	96.84
Arcelor Mittal India Ltd	09.01.2008	Seregarha	83.33
GVK Power (Govindwal Sahib) Ltd	09.01.2008	Seregarha	66.67
CESC Ltd	09.01.2008	Mahuagarhi	110
Jas Infracore Capital Pvt Ltd	09.01.2008	Mahuagarhi	
Jindal Steel and Power Ltd	17.01.2008	Amarkonda Murgadangal	205
Gagan Sponge Iron Pvt. Ltd	17.01.2008	Amarkonda Murgadangal	205
Sterlite Energy Ltd. (IPP)	17.01.2008	Rampia & Dip Side of Rampia	112.22
GMR Energy (IPP)	17.01.2008	Rampia & Dip Side of Rampia	112.22
Arcelor Mittal India Ltd.. (CPP)	17.01.2008	Rampia & Dip Side of Rampia	84.16
Lanco Group Ltd. (IPP)	17.01.2008	Rampia & Dip Side of Rampia	112.22

Name of the party	Date of Allotment	Block allocated	Estimated Geological Reserves Mt
Navbharat Power Pvt. Ltd. (IPP)	17.01.2008	Rampia & Dip Side of Rampia	112.22
Reliance Energy Ltd. (IPP)	17.01.2008	Rampia & Dip Side of Rampia	112.22
JLD Yavatmal Energy Ltd	23.01.2008	Fatehpur East	99.12
R.K.M. Powergen Pvt. Ltd	23.01.2008	Fatehpur East	99.12
Visa Power Ltd	23.01.2008	Fatehpur East	99.12
Green Infrastructure Pvt Ltd	23.01.2008	Fatehpur East	99.12
Vandana Vidyut Ltd	23.01.2008	Fatehpur East	53.52
SKS Ispat and Power Ltd	06.02.2008	Fatehpur	73.85
Prakash Industries Ltd	06.02.2008	Fatehpur	46.15
MAHAGENCO (M/s Aurangabad Co.Ltd., SPV)	17.07.2008	Bhivkund	100
Goa Industrial Development Corporation	12.11.2008	Gare Pelma Sector III	210.2
West Bengal Power Development Corporation	27.02.2009	East of Damogoria (Kalyaneshwari)	337
Rungta Mines Limited	28.05.2009	Mednirai	80.83
Tata Steel Ltd.	28.05.2009	Ganeshpur	137.88
Adhunik Thermal Energy Ltd.	28.05.2009	Ganeshpur	
Karanpura Energy Ltd. (SPV of JSEB)	26.06.2009	Mourya	225.35
Himachal EMTA Power Ltd.	10.07.2009	Gourangdih ABC	68.85
JSW Steel Ltd.	10.07.2009	Gourangdih ABC	68.85
Akaltara Power Ltd. (SPV of Chhattisgarh UMPP)	09.09.2009	Putra Parogia	692.16
Akaltara Power Ltd. (SPV of Chhattisgarh UMPP)	09.09.2009	Pindrakhi	421.51
			28199.90

Generating Units retired during the 11th Plan

Sl. No.	Name of Station / Plant	Unit No.	Installed Capacity (MW)	Remarks
1	Dhuvaran TPS	1	63.50	
2	Dhuvaran TPS	2	63.50	
3	Dhuvaran TPS	3	63.50	
4	Dhuvaran TPS	4	63.50	
5	Galeki GP S Mobile	1	3.00	
6	Galeki GP S Mobile	2	3.00	
7	Galeki GP S Mobile	3	3.00	
8	Kothalguri G P S Mobile	4	3.00	
9	Kothalguri G P S Mobile	5	3.00	
10	Kothalguri G P S Mobile	6	3.00	
11	Kothalguri G P S Mobile	7	3.00	
12	Bongaigaon TPS	1	60.00	NTPC is setting up 3 units of 250 MW capacity.
13	Bongaigaon TPS	2	60.00	
14	Bongaigaon TPS	3	60.00	
15	Bongaigaon TPS	4	60.00	
16	Patna (Karbigha) TPS	1	1.500	
17	Patna (Karbigha) TPS	2	1.500	
18	Patna (Karbigha) TPS	3	3.00	
19	Patna (Karbigha) TPS	4	7.50	
20	Harduaganj TPS	2	50.00	UPRVUNL is setting up 2x250 MW units.
21	Harduaganj TPS	4	60.00	
22	Diesel Power Station (CHD)	1 to 5	2.00	

23	Amarkantak TPS	1	30.00	Unit #3 of 210 MW commissioned.
24	Amarkantak TPS	2	30.00	
25	Obra TPS	3	50.00	
26	Obra TPS	4	50.00	
27	Obra TPS	5	50.00	
28	Faridabad TPS	2	60.00	
29	Faridabad TPS	1	60.00	
30	I Pstation Unit	2	62.50	
31	I Pstation Unit	3	62.50	
32	I Pstation Unit	4	62.50	
33	I Pstation Unit	5	60.00	
	Total Capacity		1218.00	

GPS = Gas Power station

TPS = Thermal Power Station

List of generating units which have been identified for Life Extension works during the 11th Plan

**LIST OF UNITS IDENTIFIED FOR LIFE EXTENSION WORKS DURING 11TH PLAN.
1.0 STATE SECTOR**

Status as on 31-7-2010

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)	PLF (%)				Present status / Expected Date of Completion	
						2005-06	2006-07	2007-08	2008-09		2009-10
Uttar Pradesh											
1	UPRVUNL	Obra	1	1968	40	0.00	0.00	0.00	0.00	82.04	Unit synchronised on 4th May 2009 (2009-10)
2			2	1968	40	0.00	0.00	0.00	8.46	75.52	Unit synchronised on 2nd February 2009 (2008-09)
3			6	1973	94	0.00	0.00	0.24	66.15	49.36	Unit synchronised on 20-03-08 (2007-08)
4			9	1980	200	53.43	49.40	49.59	26.53	0.00	Contract agreement signed with BHEL in Feb, 2007. Unit -9 taken under s/d on 2-11-2009. U-9 likely to be synchronised by August 2010.
5			10	1979	200	48.60	47.80	41.70	52.28	54.99	Shutdown of Unit No. 10 & 11 will be taken after stabilisation of unit-9. There after unit 12&13 will be taken up.
6			11	1977	200	66.24	52.40	58.76	53.26	55.83	
7			12	1981	200	56.88	57.00	51.38	46.47	48.48	
8			13	1982	200	53.95	53.70	59.47	53.32	57.08	
		Total	8		1174						
9		H'Gunj	5	1977	60	0.00	0.00	0.00	37.88	34.64	Work completed, unit synchronised in May'08. (2008-09)
10			7	1978	110						LOI issued to BHEL on 25.03.09. Advance payment released in June'09. Supply of structural material has started.
		Total	2		170	12.93	48.30	49.09	39.66	55.63	
11		Parichha	1	1984	110	29.35	69.50	46.55	55.68	48.61	Contract has been negotiated with UPRVUNL by BHEL during Oct'09.
12			2	1985	110	49.84	48.40	22.66	48.64	50.85	
		Total	2		220						
13		Panki	3	1976	105	45.62	49.90	65.15	66.07	65.37	BHEL has been asked to furnish scope of work. Order will be placed in 11th Plan, completion in 12th Plan.
14			4	1977	105	53.39	46.50	46.56	80.35	68.28	
		Total	2		210						
15		Anpara 'A'	1	1985	210	76.42	80.50	67.30	86.14	78.42	BHEL has been asked to furnish scope of work. Order will be placed in 11th Plan, completion in 12th Plan.
16			2	1986	210	64.73	80.30	87.75	75.80	88.24	
17			3	1988	210	82.38	70.10	64.08	87.17	86.54	
		Total	3		630						

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)	PLF (%)				Present status / Expected Date of Completion	
						2005-06	2006-07	2007-08	2008-09		2009-10
Haryana											
18	HPGCL	Panipat	1	1979	110	59.40	62.60	25.37	28.94	84.59	Unit synchronised on 4th Nov'08.
		Total	1		110						
Punjab											
19	PSEB	Bathinda	3	1978	110						Order placed on BHEL on 6.11.2006. S/d on unit -3 have been taken from 14.1.2010, dismantling work started. Unit expected to be recommissioned by Oct. 2010. Thereafter unit-4 will be taken up.
20			4	1979	110	74.88	71.00	71.77	68.65	55.75	
		Total	2		220	68.43	69.60	74.16	64.61	63.43	
21		Ropar	1	1984	210	78.14	90.50	87.28	79.06	94.58	RLA completed, Order expected to be placed in 2010-11, completion in 12th Plan.
22			2	1985	210	87.33	81.90	97.77	90.47	81.93	
		Total	2		420						
Gujarat											
23	GSECL	Ukal	1	1976	120						Unit -1 was taken under s/d on 06.9.2006 for LE works, Unit synchronised on 24.5.2008. Unit running at 100 -105 MW load.
24			2	1976	120	54.53	20.90	0.24	24.53	50.68	Unit -2 was taken under s/d for LE on 12.8.2008. Synchronised on 24-2-2010.
		Total	2		240	54.19	45.40	55.51	18.99	2.10	
25		Gandhinagar	1	1977	120	45.60	59.30	60.42	61.66	56.03	Order awarded to BHEL on 28 May 2007. BHEL has supplied material at site.
26			2	1977	120	62.15	64.70	53.69	78.11	50.22	
		Total	2		240						

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)	PLF (%)				Present status / Expected Date of Completion	
						2005-06	2006-07	2007-08	2008-09		2009-10
Madhya Pradesh											
27	MPPGCL	Amarkantak Ext.	1	1977	120	45.24	51.60	51.69	47.42	45.97	Works on 11 packages out of 12 completed. Order for Turbine package placed on NASL in July 07. Works on Unit-2 has been commenced from 26.7.09. Completion schedule in 2010-11.
28			2	1977	120	45.38	53.90	40.38	49.05	13.80	
		Total	2		240						
West Bengal											
29	WBPDCCL	Bandel	5	1982	210	58.34	10.30	49.87	74.03	54.81	Taken up under World Bank programme, single bidder was responsive for first stage bids for BTG packages, hence WBPDCCL decided for rebidding, fresh bidding document under preparation.
		Total	1		210						
Bihar											
30	BSEB	Barauni	6	1983	110	8.66	0.00	13.32	10.68	28.22	Unit #6 has been restored by BHEL under Rashtriya Sam Vikas Yojana. LOA has been awarded to BHEL on 15th Feb.2010.
31			7	1985	110	3.89	3.90	0.00	0.00	0.00	
		Total	2		220						
32	KBUNL	Muzaffarpur	1	1985	110	0.00	0.00	0.00	0.00	0.00	Unit #2 has been restored under RSVY. LOA awarded on 15th April 2010.
33			2	1986	110	0.00	0.00	1.12	23.41	47.80	
		Total	2		220						
TOTAL OF STATE SECTOR (1.0)			33		4524						

2.0 CENTRAL SECTOR

2.1 COAL FIRED

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)	PLF (%)				Present status / Expected Date of Completion	
						2005-06	2006-07	2007-08	2008-09		2009-10
1	NTPC	Badarpur	4	1978	210	90.73	79.50	90.12	93.16	89.59	Scheme for LEP reviewed by CEA, NIT floated in June '08. Tender document (Technical) under evaluation. Order is expected to be placed by Sept'2010.
2			5	1981	210	82.50	87.50	79.71	86.00	75.11	
		Total	2		420						
3		Singrauli STPS	1	1982	200	79.90	86.20	98.36	103.56	87.66	Scheme under finalisation.
4			2	1982	200	96.37	95.20	98.06	93.72	103.80	
		Total	2		400						
5		Korba STPS	1	1983	200	96.36	97.40	94.22	104.73	97.84	Scheme under finalisation.
		Total	1		200						
6		Ramagundam	1	1983	200	79.51	96.40	90.80	89.05	99.13	Scheme under finalisation.
		Total	1		200						
		TOTAL OF (2.1)	6		1220						

2.2 GAS FIRED

7	NTPC	Dadri GT	1	1992	131						Scheme finalised.
8			2	1992	131						
9			3	1992	131						
		Total	3		393						
10		Auraiya GT	1	1989	111.19						Scheme finalised.
11			2	1989	111.19						
12			3	1989	111.19						
		Total	3		333.57						
13		Anta GT	1	1989	89						Work completed in Feb.2010.
14			2	1989	89						
15			3	1989	89						
		Total	3		267						
16		Kawas GT	1	1992	106						Scheme finalised.
17			2	1992	106						
18			3	1992	106						
		Total	3		318						
19		Gandhar GT	1	1994	131						Scheme in advance stage of finalisation.
20			2	1994	131						
		Total	2		262						
		TOTAL OF (2.2)	14		1573.57						
		TOTAL CEN. SECTOR (2.0)	20		2793.57						

GRAND TOTAL (1.0+2.0) = 53 | 7318

List of generating units which have been identified for R&M works during the 11th Plan

LIST OF UNITS IDENTIFIED FOR RENOVATION & MODERNIZATION WORKS DURING 11TH PLAN.

1.0 STATE SECTOR

1.1 COMPLETED UNITS

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)	Year of Completion	PLF %				Remarks					
							2005-06	2006-07	2007-08	2008-09		2009-10				
Punjab																
1	PSEB	Ropar	1	1984	210	2007-08	78.14	90.50	87.28	79.06	94.58	Schemes completed in March'08 (2007-08)				
2			2	1985	210		87.33	81.90	97.77	90.47	81.93					
3			3	1988	210		78.52	84.00	82.43	93.60	93.46					
4			4	1989	210		86.44	95.30	87.57	88.79	91.36					
5			5	1992	210		92.85	90.30	93.34	79.39	96.58					
6			6	1993	210		83.83	89.20	82.89	91.12	88.75					
			Total		1260		88.53	88.55	87.07	91.11						
Maharashtra																
7	Mahagenco	Koradi	5	1978	200	2007-08	65.75	79.40	70.84	71.71	65.37	Schemes completed in March'08 (2007-08)				
8			6	1982	210		70.83	78.60	76.07	68.60	64.55					
9			7	1983	210		83.50	77.90	78.78	72.68	82.30					
				Total	3			620		73.48	76.30		70.95	64.95		
10			Chandrapur		1		1983	210	2008-09	80.04	79.90		62.65	66.31	71.79	Schemes completed in March'09 (2008-09)
11					2		1984	210		64.33	77.60		69.87	72.71	64.06	
12					3		1985	210		83.96	88.70		83.69	79.97	79.43	
13	4	1986			210	87.91	90.40	82.71		84.58	72.84					
14	5	1991			500	22.60	25.60	77.03		67.54	72.12					
15	6	1992			500	81.27	78.30	80.26		69.07	72.28					
		Total	6		1840		64.32	91.82	76.86	71.77	72.12					
16	Parli		3	1980	210	2008-09	75.98	69.60	76.63	69.07	59.02	Schemes completed in March'09 (2008-09)				
17			4	1985	210		87.24	67.70	52.44	69.07	69.63					
18			5	1987	210		92.07	86.40	79.91	69.07	72.86					
		Total	3		630		85.10	74.57	69.66	69.07	67.17					
SUB TOTAL (1.1)			18		4380											

1.2 ON-GOING UNITS

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)	Completion Schedule (Targeted)	PLF %				Present Status		
							2005-06	2006-07	2007-08	2008-09		2009-10	
Uttar Pradesh													
19	UPRVUNL	Anpara'B	4	1993	500	2011-12 (Target)	77.02	97.10	74.36	82.10	73.65	Scope of work yet to be finalised (Targeted in 2011-12)	
20			5	1994	500		93.02	87.60	95.12	82.91	93.87		
		Total	2		1000		85.02	92.35	84.74	82.505	83.76		
21		Obra	7	1974	100	2011-12 (Target)	26.66	38.10	46.19	37.47	32.26		BHEL to submit scope of work (Targeted 2011-12)
22			8	1975	100		40.52	41.00	41.39	34.57	12.01		
		Total	2		200		33.59	39.55	43.79	36.02	22.14		
Delhi													
23	IPGCL	Rajghat	1	1969	67.5	2010-11 (Target)	54.94	47.90	69.22	71.48	64.69	Works are in progress (Targeted in 2010-11)	
24			2	1969	67.5		42.19	59.50	81.76	76.86	44.41		
		Total	2		135		48.57	53.7	75.49	74.17	54.55		
Jharkhand													
25	JSEB	Patratu	9	1964	110	2011-12 (Target)	28.05	8.90	0.00	0.00	0.00	Restoration works are in progress (Targeted in 2011-12)	
26			10	1966	110		5.04	12.60	0.00	0.00	0.00		
		Total	2		220		16.55	10.75	0.00	0.00	0.00		
West Bengal													
27	DPL	Durgapur	6	1965	110	2011-12 (Target)	59.50	25.00	1.04	60.11	49.16	Works are in progress (Targeted in 2011-12).	
		Total	1		110								
		SUB TOTAL (1.2)	9		1665								
TOTAL OF STATE SECTOR (1.0) :			27		6015								

2.0 CENTRAL SECTOR

2.1 COMPLETED UNITS

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)	Year of Completion	PLF %					Present Status
							2005-06	2006-07	2007-08	2008-09	2009-10	
1	DVC	Durgapur TPS	3	1965	130	2008-09	62.91	60.20	65.34	44.99	74.05	Works completed (2008-09).
2			4	1984	210	2008-09	55.90	72.00	49.66	76.61	65.38	Works completed (2008-09).
		Total	2		340		58.58	67.49	55.56	64.52	68.70	
1	NTPC	Vindhyanchal STPS	1	1987	210		92.76	84.60	98.74	87.34	95.26	
2			2	1987	210		94.70	93.40	98.00	85.97	101.29	
3			3	1989	210	2009-10	88.27	86.40	91.51	99.05	95.32	Works completed (2009-10)
4			4	1990	210		90.03	93.09	87.73	97.61	90.85	
5			5	1990	210		94.07	99.60	88.26	89.82	95.76	
6			6	1991	210		96.25	92.50	89.53	95.00	101.04	
		Total	6		1260		92.68	91.58	92.30	92.47	96.59	
7		Korba STPS	1	1983	200		96.36	97.40	94.22	104.73	97.84	
8			2	1983	200		94.13	96.70	92.02	98.93	102.54	
9			3	1984	200	2009-10	96.11	97.40	98.57	105.73	93.64	Works completed (2009-10)
10			4	1987	500		63.87	100.50	93.65	93.24	100.15	
11			5	1988	500		92.88	75.50	100.04	93.14	93.59	
12			6	1989	500		93.94	84.10	96.10	93.96	98.59	
		Total	6		2100		86.98	89.69	96.12	96.21	97.60	
13		Ramagundem STPS	1	1983	200		79.51	96.40	90.80	89.05	99.13	
14			2	1984	200		89.50	91.60	96.46	86.70	99.92	
15			3	1984	200	2009-10	88.42	82.70	95.48	88.66	96.82	Works completed (2009-10)
16			4	1988	500		88.87	88.50	82.40	99.76	93.46	
17			5	1989	500		83.33	96.60	84.79	90.48	99.88	
18			6	1989	500		87.58	89.30	90.07	100.51	80.15	
		Total	6		2100		86.37	91.11	88.18	94.41	93.29	
19		Farakka Stg-I	1	1986	200		84.22	85.80	82.44	85.47	75.30	
20			2	1986	200	2009-10	83.77	78.90	88.82	87.79	71.80	Works completed (2009-10)
21			3	1984	200		85.23	80.80	89.01	67.12	78.85	
		Total	3		600		84.41	81.83	86.76	80.13	75.32	
22		Tanda TPS	1	1986	110	2009-10	84.29	90.80	93.25	80.62	99.47	Works completed (2009-10).
23			3	1990	110		86.77	92.80	96.57	82.12	89.82	
24			4	1998	110	2010-11	87.47	86.60	83.39	98.51	86.54	Works completed (2010-11).
		Total	3		330		86.18	90.07	91.07	87.06	91.94	
25		Talcher TPS	5	1982	110	2009-10	82.49	76.30	94.57	91.65	84.04	Works completed (2009-10).
26		Stg-II	6	1983	110		78.06	87.60	82.66	93.16	85.04	
		Total	2		220		80.28	81.95	88.62	92.41	84.54	

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)	Year of Completion	PLF %				Remarks	
							2005-06	2006-07	2007-08	2008-09		2009-10
27	NTPC	Singrauli STPS	1	1982	200	2009-10	79.90	85.20	98.38	103.56	87.66	Works completed (2009-10).
28			2	1982	200		96.37	95.20	98.06	93.72	103.80	
29			3	1983	200		93.81	84.40	93.95	89.43	101.98	
30			4	1983	200		101.54	87.30	96.37	101.46	98.69	
31			5	1984	200		97.83	92.90	90.41	96.35	103.79	
32			6	1986	500		93.80	62.10	90.33	80.77	87.71	
33			7	1987	500		72.39	94.80	85.50	88.29	85.25	
		Total	2000		88.49	83.83	91.67	90.72	92.83			
34		Unchahar TPS	1	1988	210	2009-10	94.77	99.00	98.34	85.10	102.53	Works completed (2009-10).
35			2	1989	210		97.74	100.30	90.88	96.61	92.21	
		Total	420		96.26	99.65	94.61	90.86	97.37			
36		Rihand Stg - I STPS	1	1988	500	2009-10	73.42	81.90	97.96	89.36	100.27	Works completed (2009-10).
37			2	1989	500		93.58	94.20	95.09	99.59	99.99	
		Total	1000		83.50	88.05	96.53	94.48	100.13			
	Sub Total NTPC Completed in Central Sector		37		10030							
			39		10370							

ON-GOING UNITS

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)	Completion Schedule (Targeted)	PLF %				Present Status	
							2005-06	2006-07	2007-08	2008-09		2009-10
1		Tanda	2	1989	110	2011-12 (Target)	87.06	94.40	93.78	96.34	93.13	Likely completion in 2011-12
		Total	1		110							
2		NCTPP, Dabri	1	1992	210	2011-12 (Target)	88.80	94.90	100.54	96.19	103.25	Scope of work finalised (Target completion in 2011-12).
3			2	1992	210		93.22	92.80	101.93	96.75	102.80	
4			3	1993	210		93.68	95.20	95.33	102.01	98.46	
5			4	1994	210		92.22	99.90	94.77	102.47	97.86	
			Total	4		840						
6		Farakka Stg-II	4	1992	500	2011-12 (Target)	80.28	83.70	82.70	77.37	71.30	Scheme under finalisation by NTPC (Targeted completion in 2011-12)
7			5	1994	500		80.17	78.40	80.61	72.12	72.09	
			Total	2		1000						
8	Kahaigaon	1	1992	210	2011-12 (Target)	80.23	81.05	81.66	74.75	71.70	Scheme under finalisation by NTPC (Targeted completion in 2011-12)	
9		2	1994	210		90.00	86.60	91.99	82.15	66.10		
10		3	1995	210		89.00	91.20	93.45	76.80	83.08		
		Total	3		630							
	NTPC On - Going		10		2580							
	TOTAL CEN. SECTOR (2.0):		49		12950							
	TOTAL OF R&M (1.0+2.0) :		76		18965							

UNITS PROGRAMMED FOR R&M WORKS DURING 11th PLAN (Present Status)**1.0 STATE SECTOR**

Status as on 28-02-2010

1.1 ON-GOING UNITS

	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)		Make		Present Status
					Rated	Derated	Boiler	TG	
Uttar Pradesh									
	UPRVUNL	Anpara'B	4	1993	500	500	BHEL	BHEL	Scope of work yet to be finalised
			5	1994	500	500	BHEL	BHEL	
			Total	2		1000	1000		
		Obra	7	1974	100	100	BHEL	BHEL	BHEL to submit scope of work
			8	1975	100	100	BHEL	BHEL	
			Total	2		200	200		
Delhi									
	IPGCL	Rajghat	1	1989	67.5	67.5	BHEL	BHEL	Works are in progress
			2	1989	67.5	67.5	BHEL	BHEL	
			Total	2		135	135		
Jharkhand									
	JSEB	Patratu	9	1984	110	110	BHEL	BHEL	Restoration works are in progress, civil works are delayed by 7-8 months.
			10	1986	110	110	BHEL	BHEL	
			Total	2		220	220		

West Bengal									
	DPL	Durgapur	6	1985	110	110	AVB	BHEL	Works are in progress, funding from own resources.
		Total	1		110	110			
SUB TOTAL (1.1)			9		1665	1665			

2.0 CENTRAL SECTOR

ON-GOING

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)		Make		Present Status
					Rated	Derated	Boiler	TG	
1	NTPC	Singrauli	1	1982	200	200	BHEL	BHEL	Likely completion in March 2010.
2			2	1982	200	200	BHEL	BHEL	
3			3	1983	200	200	BHEL	BHEL	
4			4	1983	200	200	BHEL	BHEL	
5			5	1984	200	200	BHEL	BHEL	
6			6	1986	500	500	BHEL	BHEL	
7			7	1987	500	500	BHEL	BHEL	
		Total	7		2000	2000			
8		Tanda	2	1989	110	110	BHEL	BHEL	Likely completion in 2011-12
9			4	1998	110	110	BHEL	BHEL	Target completion by March 2010.
			Total	2		220	220		
10		NCTPP, Dadri	1	1992	210	210	BHEL	BHEL	Scope of work finalised,
11			2	1992	210	210	BHEL	BHEL	
12			3	1993	210	210	BHEL	BHEL	

13		4	1994	210	210	BHEL	BHEL	
	Total	4		840	840			
14	Unchahar	1	1988	210	210	BHEL	BHEL	12 packages out of 36 no. completed so far.
15		2	1989	210	210	BHEL	BHEL	
	Total	2		420	420			
16	Rihand Stg - I	1	1988	500	500	BHEL	BHEL	Work in progress, 9 packages out of 29 no. completed so far.
17		2	1989	500	500	BHEL	BHEL	
	Total	2		1000	1000			
18	Farakka Stg-II STPS	4	1992	500	500	Ansaldo	BHEL	Scheme under finalisation by NTPC
19		5	1994	500	500	Ansaldo	BHEL	
	Total	2		1000	1000			
20	Kahalgaon	1	1992	210	210	BHEL	BHEL	Scheme under finalisation by NTPC,
21		2	1994	210	210	BHEL	BHEL	
22		3	1995	210	210	BHEL	BHEL	
	Total	3		630	630			
	NTPC On - Going	22		6110	6110			

Total

31

7775

7775

STATUS OF UNITS PROGRAMMED FOR R&M WORKS DURING 11TH PLAN.

1.0 STATE SECTOR

1.1 COMPLETED UNITS

Status as on 28-02-2010

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)		Make		Present Status
					Rated	Derated	Boiler	TG	
Punjab									
1	PSEB	Ropar	1	1984	210	210	BHEL	BHEL	Schemes completed in March'08.(XI Plan)
2			2	1985	210	210	BHEL	BHEL	
3			3	1988	210	210	BHEL	BHEL	

4			4	1989	210	210	BHEL	BHEL		
5			5	1992	210	210	BHEL	BHEL		
6			6	1993	210	210	BHEL	BHEL		
		Total	6		1260	1260				
Maharashtra										
7	Mahagenco	Koradi	5	1978	200	200	BHEL	BHEL	Schemes completed in March'08 (XI Plan)	
8			6	1982	210	210	BHEL	BHEL		
9			7	1983	210	210	BHEL	BHEL		
			Total	3		620	620			
10		Chandrapur		1	1983	210	210	AVB	BHEL	Schemes completed in March'09 (XI Plan)
11				2	1984	210	210	AVB	BHEL	
12				3	1985	210	210	BHEL	BHEL	
13				4	1986	210	210	BHEL	BHEL	
14				5	1991	500	500	BHEL	BHEL	
15				6	1992	500	500	BHEL	BHEL	
			Total	6		1840	1840			
16		Parli		3	1980	210	210	BHEL	BHEL	One activity dropped. Schemes completed in March'09 (XI Plan)
17				4	1985	210	210	BHEL	BHEL	
18				5	1987	210	210	BHEL	BHEL	
					Total	3		630	630	
SUB TOTAL (1.1)			18		4350	4350				

1.2 ON-GOING UNITS

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)		Make		Present Status
					Rated	Derated	Boiler	TG	
Uttar Pradesh									
19	UPRVUNL	Anpara'B	4	1993	500	500	BHEL	BHEL	Scope of work yet to be finalised
20			5	1994	500	500	BHEL	BHEL	
			Total	2		1000	1000		
21		Obra	7	1974	100	100	BHEL	BHEL	BHEL to submit scope of

22			8	1975	100	100	BHEL	BHEL	work
		Total	2		200	200			
Delhi									
23	IPGCL	Rajghat	1	1989	67.5	67.5	BHEL	BHEL	Works are in progress
24			2	1989	67.5	67.5	BHEL	BHEL	
		Total	2		135	135			
Jharkhand									
25	JSEB	Patratu	9	1984	110	110	BHEL	BHEL	Restoration works are in progress, civil works are delayed by 7-8 months.
26			10	1986	110	110	BHEL	BHEL	
		Total	2		220	220			
West Bengal									
27	DPL	Durgapur	6	1985	110	110	AVB	BHEL	Works are in progress, funding from own resources.
		Total	1		110	110			
SUB TOTAL (1.2)			9		1665	1665			
TOTAL OF STATE SECTOR (1.0) :									
			27		6015	6015			

On Going	5	465
Under finalisation	4	1200

2.0 CENTRAL SECTOR

2.1 Completed units

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)		Make		Present Status
					Rated	Derated	Boiler	TG	
1	DVC	Durgapur	3	1966	130	130	B&W,UK	GE,USA	Works completed.
2			4	1984	210	210	BHEL	BHEL	Works completed.
			Total	2		340	340		
1	NTPC	Vindhyanchal	1	1987	210	210	USSR	USSR	Works completed
2			2	1987	210	210	USSR	USSR	
3			3	1989	210	210	USSR	USSR	
4			4	1990	210	210	USSR	USSR	
5			5	1990	210	210	USSR	USSR	
6			6	1991	210	210	USSR	USSR	
			Total	6		1260	1260		
7	Korba	Korba	1	1983	200	200	BHEL	BHEL	Works completed.
8			2	1983	200	200	BHEL	BHEL	
9			3	1984	200	200	BHEL	BHEL	
10			4	1987	500	500	BHEL	BHEL	
11			5	1988	500	500	BHEL	BHEL	
12			6	1989	500	500	BHEL	BHEL	
	Total	6		2100	2100				
13	Ramagundem STPS	Ramagundem STPS	1	1983	200	200	Ansaldo	Ansaldo	Works completed.
14			2	1984	200	200	Ansaldo	Ansaldo	
15			3	1984	200	200	Ansaldo	Ansaldo	
16			4	1988	500	500	BHEL	BHEL	
17			5	1989	500	500	BHEL	BHEL	
18			6	1989	500	500	BHEL	BHEL	
	Total	6		2100	2100				
19	Farakka Stg-I STPS	Farakka Stg-I STPS	1	1986	200	200	BHEL	BHEL	Works completed.
20			2	1986	200	200	BHEL	BHEL	
21			3	1984	200	200	BHEL	BHEL	

		Total	3		600	600			
22		Tanda	1	1988	110	110	BHEL	BHEL	Works completed.
23			3	1990	110	110	BHEL	BHEL	
		Total	2		220	220			
24		Talcher TPS Stg-II	5	1982	110	110	BHEL	BHEL	Works completed.
25			6	1983	110	110	BHEL	BHEL	
		Total	2		220	220			
Sub Total NTPC			25		6500	6500			
Completed in Central Sector			27		6840	6840			

ON-GOING

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commissioning	Capacity (MW)		Make		Present Status
					Rated	Derated	Boiler	TG	
1	NTPC	Singrauli	1	1982	200	200	BHEL	BHEL	Likely completion in March 2010.
2			2	1982	200	200	BHEL	BHEL	
3			3	1983	200	200	BHEL	BHEL	
4			4	1983	200	200	BHEL	BHEL	
5			5	1984	200	200	BHEL	BHEL	
6			6	1986	500	500	BHEL	BHEL	
7			7	1987	500	500	BHEL	BHEL	
			Total	7		2000	2000		
8		Tanda	2	1989	110	110	BHEL	BHEL	Likely completion in 2011-12
9			4	1998	110	110	BHEL	BHEL	Target completion by March 2010.
		Total	2		220	220			
10		NCTPP, Dadri	1	1992	210	210	BHEL	BHEL	Scope of work finalised,
11			2	1992	210	210	BHEL	BHEL	
12			3	1993	210	210	BHEL	BHEL	

13		4	1994	210	210	BHEL	BHEL	
	Total	4		840	840			
14	Unchahar	1	1988	210	210	BHEL	BHEL	12 packages out of 36 no. completed so far.
15		2	1989	210	210	BHEL	BHEL	
	Total	2		420	420			
16	Rihand Stg - I	1	1988	500	500	BHEL	BHEL	Work in progress, 9 packages out of 29 no. completed so far.
17		2	1989	500	500	BHEL	BHEL	
	Total	2		1000	1000			
18	Farakka Stg-II	4	1992	500	500	Ansaldo	BHEL	Scheme under finalisation by NTPC
19	STPS	5	1994	500	500	Ansaldo	BHEL	
	Total	2		1000	1000			
20	Kahalgaon	1	1992	210	210	BHEL	BHEL	Scheme under finalisation by NTPC,
21		2	1994	210	210	BHEL	BHEL	
22		3	1995	210	210	BHEL	BHEL	
	Total	3		630	630			
	NTPC On - Going	22		6110	6110			
TOTAL CEN. SECTOR (2.0):		49		12950	12950			
TOTAL OF R&M (1.0+2.0) :		76		18965	18965			

STATUS OF UNITS PROGRAMMED FOR LIFE EXTENSION WORKS DURING 11TH PLAN.

1.0 STATE SECTOR

Status as on 28-02-2010

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)			Make		Present status / Expected Date of Completion
					Rated	Present De-rated	Expected after	Boiler	TG	

										LEP
Uttar Pradesh										
1	UPRVUNL	Obra	1	1968	50	40	50	TPE	TPE	Unit synchronised on 4th May 2009.
2			2	1968	50	40	50	TPE	TPE	Unit synchronised on 2nd February 2009.
3			6	1973	100	94	100	BHEL	BHEL	Unit synchronised on 20-03-08.
4			9	1980	200	200	216	BHEL	BHEL	Contract agreement signed with BHEL in Feb, 2007. Unit -9 taken under s/d on 2-11-2008 for LE works. U-9 likely to be synchronised by May 2010.
5			10	1979	200	200	216	BHEL	BHEL	
6			11	1977	200	200	216	BHEL	BHEL	
7			12	1981	200	200	216	BHEL	BHEL	
8			13	1982	200	200	216	BHEL	BHEL	
		Total	8		1200	1174	1280			
9		H'Gunj	5	1977	60	60	60	BHEL	BHEL	Work completed, unit synchronised in May'08.
10			7	1978	110	110	120	BHEL	BHEL	LOI issued to BHEL on 25.03.09. Advance payment released in June'09, draft contract prepared by BHEL has been cleared by UPRVUNL and consultant NTPC. Supply to commence by March 2010.
		Total	2		170	170	180			

11		Parichha	1	1984	110	110	110	BHEL	BHEL	LOI with advance on BHEL is awaited.
12			2	1985	110	110	110	BHEL	BHEL	
		Total	2		220	220	220			
13		Panki	3	1976	110	105	120	BHEL	BHEL	BHEL has been asked to furnish scope of work. Order will be placed in 11th Plan, completion in 12th Plan.
14			4	1977	110	105	120	BHEL	BHEL	
		Total	2		220	210	240			
15		Anpara 'A'	1	1986	210	210	210	BHEL	BHEL	BHEL has been asked to furnish scope of work. Order will be placed in 11th Plan, completion in 12th Plan.
16			2	1986	210	210	210	BHEL	BHEL	
17			3	1988	210	210	210	BHEL	BHEL	
		Total	3		630	630	630			
Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)			Make		Present status / Expected Date of Completion
					Rated	Present De-rated	Expected after LEP	Boiler	TG	
Haryana										
18	HPGCL	Panipat	1	1979	110	110	117.8	BHEL	BHEL	Unit synchronised on 4th Nov'08.
		Total	1		110	110	117.8			
Punjab										
19	PSEB	Bathinda	3	1978	110	110	120	BHEL	BHEL	Order placed on BHEL on 14.11.2006. Rs. 471.56 Crore has been sanctioned by REC.
20			4	1979	110	110	120	BHEL	BHEL	
		Total	2		220	220	240			
21		Ropar	1	1984	210	210	210	BHEL	BHEL	RLA completed, Order likely to be

			2	1985	210	210	210	BHEL	BHEL	placed in 11th plan, completion in 12th Plan.
22										
		Total	2		420	420	420			
Gujarat										
23	GSECL	Ukai	1	1976	120	120	120	BHEL	BHEL	Unit -1 synchronised on 24.5.2008. Unit running at 85 -95 MW load. Full load 120 MW yet to achieve, PG test not yet done. Unit -2 taken under s/d for LE on 12th August'08.
24			2	1976	120	120	120	BHEL	BHEL	
		Total	2		240	240	240			
25		Gandhinagar	1	1977	120	120	120	BHEL	BHEL	LOI for LE works placed on BHEL on 12.10.2006. Order awarded to BHEL on 28 May 2007. 15% material received. Tendering process for all the BOP packages are under progress. Due to excessive delay GSECL is rethinking of LE works in these units.
26			2	1977	120	120	120	BHEL	BHEL	
		Total	2		240	240	240			
Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)			Make		Present status / Expected Date of Completion
					Rated	Present De-rated	Expected after LEP	Boiler	TG	
Madhya Pradesh										

27	MPPGCL	Amarkantak Ext.	1	1977	120	120	120	BHEL	BHEL	Works on 11 packages out of 12 completed. Order for Turbine package placed on NASL in July 07. Works on Unit 2 has been commenced from 26.7.09.
28			2	1977	120	120	120	BHEL	BHEL	
		Total	2		240	240	240			
West Bengal										
29	WBDCL	Bandel	5	1982	210	210	210	AVB	BHEL	Taken up under World Bank programme, Tender floated.
		Total	1		210	210	210			
Bihar										
30	BSEB	Barauni	6	1983	110	110	110	BHEL	BHEL	Unit #6 has been restored by BHEL under Rashtriya Sam Vikas Yojana. Scope of work finalised for both the units.
31			7	1985	110	110	110	BHEL	BHEL	
		Total	2		220	220	220			
32	KBUNL	Muzaffarpur	1	1985	110	110	110	BHEL	BHEL	Unit #1 has been restored under RSVY. Scope of work for both the units finalised.
33			2	1986	110	110	110	BHEL	BHEL	
		Total	2		220	220	220			
TOTAL OF STATE SECTOR (1.0)			33		4560	4524	4697.8			

2.0 CENTRAL SECTOR

2.1 COAL FIRED

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Capacity (MW)			Make		Present status / Expected Date of Completion
					Rated	Present De-rated	Expected after LEP	Boiler	TG	
1	NTPC	Badarpur	4	1978	210	210	216	BHEL	BHEL	Scheme for LEP reviewed by CEA. NIT floated in June '08, likely award of contract by Mar'09.
2			5	1981	210	210	216	BHEL	BHEL	
			2		420	420	432			
			Total							
3		Singrauli STPS	1	1982	200	200	200	BHEL	BHEL	Scheme under finalisation / approval.
4			2	1982	200	200	200	BHEL	BHEL	
			2		400	400	400			
			Total							
5		Korba STPS	1	1983	200	200	200	Ansald o	Ansald o	Scheme under finalisation / approval.
			1		200	200	200			
		Total								
6	Ramagundam	1	1983	200	200	200	Ansald o	Ansald o	Scheme under finalisation/ approval.	
		1		200	200	200				
		Total								
	TOTAL OF (2.1)		6		1220	1220	1232			

2.2 GAS FIRED

7	NTPC	Dadri GT	1	1992	131	131	131	SIEMENS	Scheme approved by CEA on 30.5.08.
8			2	1992	131	131	131	SIEMENS	
9			3	1992	131	131	131	SIEMENS	
		Total	3		393	393	393		
10	Auraiya GT	1	1989	111.19	111.19	111.19	MITSUBISHI	Scheme approved by CEA in Dec'07.	
11		2	1989	111.19	111.19	111.19	MITSUBISHI		
12		3	1989	111.19	111.19	111.19	MITSUBISHI		
		Total	3		333.57	333.57	333.57		
13	Anta GT	1	1989	89	89	89	ABB	Work in progress. Likely to be	
14		2	1989	89	89	89	ABB		

15		3	1989	89	89	89	ABB	completed during 2009-10.
	Total	3		267	267	267		
16	Kawas GT	1	1992	106	106	106	GE	Scheme approved by CEA.
17		2	1992	106	106	106	GE	
18		3	1992	106	106	106	GE	
	Total	3		318	318	318		
19	Gandhar GT	1	1994	131	131	131	ABB	
20		2	1994	131	131	131	ABB	
	Total	2		262	262	262		
TOTAL OF (2.2)		14		1573.57	1573.57	1573.57		
TOTAL CEN. SECTOR (2.0)		20		2793.67	2793.57	2805.57		
GRAND TOTAL (1.0+2.0) :		53		7354	7318	7503		

STATE WISE AT&C LOSSES**(in Percentage)**

Sl. No.	State	2007-08	2008-09	2009-10
1	Bihar	47.38	34.37	43.92
2	Jharkhand	23.34	54.01	10.43
3	Orissa	41.68	42.20	39.7
4	Sikkim	51.20	46.82	51.37
5	West Bengal	23.24	25.81	33.24
6	Arunachal Pradesh	61.59	60.22	52.99
7	Assam	35.18	32.68	29.03
8	Manipur	79.61	81.37	48.02
9	Meghalaya	39.45	43.39	48.73
10	Mizoram	28.40	41.11	39.06
11	Nagaland	49.12	44.08	45.97
12	Tripura	30.26	31.94	29.17
13	Delhi	34.59	17.92	20.78
14	Haryana	33.02	33.30	28.99
15	Himachal Pradesh	17.15	12.85	18.47
16	Jammu & Kashmir	71.92	69.05	70.45
17	Punjab	19.10	18.51	17.73
18	Rajasthan	33.02	29.83	30.07
19	Uttar Pradesh	43.10	40.12	39.65
20	Uttrakhand	38.32	35.37	33.53
21	Andhra Pradesh	16.19	12.99	16.43
22	Karnataka	32.13	24.94	25.43
23	Kerala	21.52	21.61	14.89
24	Pondicherry	18.71	18.46	19.35
25	Tamilnadu	16.19	14.39	20.15
26	Chhattisgarh	27.59	32.73	37.89
27	Goa	13.10	21.69	7.77
28	Gujarat	22.81	22.05	22.81
29	Madhya Pradesh	45.85	46.61	41.03
30	Maharashtra	31.32	31.19	25.02
	Grand Total	29.45	27.74	27.15

THE DETAILS OF PRIVATE SECTOR PARTICIPATION IN TRANSMISSION

1. Private Sector participation through Public Private Partnership (JV Route) :

- (a) At present Transmission System associated with Tala HEP implemented through Joint Venture route (JV between PGCIL and Tata Power) has already been commissioned successfully in August' 2006 with project cost of Rs 1611 Crore. PGCIL has 49% equity participation in it.
- (b) In addition to the above, Power Grid Corporation of India had entered in to JV with following companies :
- (i) JV with **Torrent Power AEC Ltd (Torrent Powergrid Co. Ltd.)** (TPL-74%, PGCIL-26%) - for implementation of transmission system of evacuation of power from 1100 MW generation project being developed by them near Surat in Gujarat.The estimated cost of the scheme is Rs 358 crore.
- (ii) JV with **Jaiprakash Hydro Power Ltd (Jaypee Powergrid Ltd.)** (JHPL-51%, JPVNL-23%, PGCIL-26%) - for implementation of transmission system for evacuation of power from proposed 1000 MW Karcham-Wangtoo HEP in Himachal Pradesh being developed by M/S Jaypee Karcham Hydro Corporation Ltd.The estimated cost of the scheme is Rs 882 crore.
- (iii) JV with **Reliance Energy Ltd (Parbati Koldam Transmission system Co. Ltd.)** (REL-74%, PGCIL-26%) - for implementation of part transmission system for evacuation of power from proposed Parbati-II & III (800 MW and 520 MW of NHPC) and Koldam HEP (800 MW of NTPC) in Himachal Pradesh.The estimated cost of the scheme is Rs 660 crore.(As per investment approval based on 2005 PL) .
- (iv) JV with **Teesta Urja. Ltd (Teestavalley Power Transmission Ltd.)** (TUL-74%, PGCIL-26%) - for implementation of part transmission system for development of pooling station in Sikkim and transfer of power to a new pooling station in north West Bengal / Bihar.The estimated cost of the scheme is Rs 770 crore.
- (v) JV with **North East transmission Company Ltd)** (OTPC-64% initially and shall offload 38 % retaining finally 26%, Govt of Tripura-10%, PGCIL-26%) – for implementation of evacuation system for 740 MW Pallatana gas based project in Tripura viz Pallatana-Silchar 400 kV D/C, and Pallatana-Bongaigaon 400 kV D/C line) . The estimated cost of the scheme is 1770 crores

2. Private Sector Transmission through Competitive Bidding Route

- (a) The following three schemes are in the process of implementation by the Transmission service Providers selected through the bidding process. The estimated cost of the three

schemes is Rs 5800 crores . Details indicating nodal agency and implementing agency are as under:

S.no	Name of the Project	Nodal Agency for the bidding process	Implementing agency/ Transmission Service Provider ,
1.	Scheme for enabling import of NER/ER surplus by NR	PFC	Sterlite Technologies
2.	System Strengthening in NR for import of power from North Karanpura and other projects outside NR and System Strengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within Western Region.	REC	Reliance Power Transmission Company Ltd
3.	Talcher-II Augmentation System	REC	Reliance Power Transmission Company Ltd

(b) The following three schemes are under bidding process. The RfQ has been issued. The RfP is in the process of being issued. The estimated cost of the three schemes is of the order of Rs 5060 crores

S.no	Name of the Project	Nodal Agency for the bidding process	Implementing agency/ Transmission Service Provider ,
1.	System strengthening common for WR and NR	PFC	Bidding in process Implementing agency yet to be finalized
2.	Transmission System Associated with Krishnapattnam UMPP-Synchronous interconnection between SR and WR (Part-B)	REC	Bidding in process Implementing agency yet to be finalized
3.	System strengthening for WR	PFC	Bidding in process Implementing agency yet to be finalized

3. Competitive bidding route under directions of CERC (IPTC)

Two schemes viz. (i) Western Regional System Strengthening-II-B at an estimated cost of Rs. 964 crores and (ii) Western Region System Strengthening-II-C at an estimated cost of Rs. 546 crores in private sector are under implementation through 100% private participation. The process of selection of Independent Power Transmission Company (IPTC) was coordinated by PGCIL under directions of CERC. The schemes are being implemented by two shell companies of RETCL. The total investment for through this route is estimated to be Rs. 1510 crores.

4. Dedicated Transmission Lines

Dedicated Transmission Lines (DTL) are such identified components of transmission system for evacuation of power from a generating plant, which are implemented by the generating company. These include transmission lines from switchyard of the generating plant to interconnecting grid points. A number of these DTLs are being taken up by private sector generation developers and are being encouraged as participation of private sector in development of transmission network. Total investment for schemes under implementation/process of implementation under this route is estimated to be Rs.4265 crore.

MINISTRY OF NEW AND RENEWABLE ENERGY

DEMAND NO. 68

Ministry of New and Renewable Energy

A. The Budget allocations, net of recoveries, are given below:

Major Head	(In crores of Rupees)												
	Actual 2009-2010			Budget 2010-2011			Revised 2010-2011			Budget 2011-2012			
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total	
Revenue	518.47	12.72	531.19	944.70	10.50	955.20	941.15	13.50	954.65	1132.50	14.38	1146.88	
Capital	19.63	...	19.63	53.30	...	53.30	53.30	...	53.30	65.50	...	65.50	
Total	538.10	12.72	550.82	998.00	10.50	1008.50	994.45	13.50	1007.95	1198.00	14.38	1212.38	
1. Secretariat-Economic Services	3451	11.28	11.91	23.19	13.40	9.50	22.90	11.90	12.50	24.40	15.00	13.38	28.38
New and Renewable Energy													
2. Grid Interactive and Distributed Renewable Power	2810	200.88	...	200.88	452.00	...	452.00	442.90	...	442.90	664.00	...	664.00
3. Renewable Energy for Rural Applications	2810	137.17	...	137.17	143.00	...	143.00	162.00	...	162.00	176.00	...	176.00
	3601	15.25	...	15.25	20.00	...	20.00	21.00	...	21.00	19.00	...	19.00
<i>Total</i>	<i>152.42</i>	<i>...</i>	<i>152.42</i>	<i>163.00</i>	<i>...</i>	<i>163.00</i>	<i>183.00</i>	<i>...</i>	<i>183.00</i>	<i>195.00</i>	<i>...</i>	<i>195.00</i>	
4. Renewable Energy for Urban, Industrial and Commercial Applications	2810	64.73	...	64.73	25.00	...	25.00	37.00	...	37.00	10.00	...	10.00
5. Research, Design & Development in Renewable Energy	2810	58.87	...	58.87	144.70	...	144.70	119.70	...	119.70	77.50	...	77.50
	4810	0.03	...	0.03	3.30	...	3.30	3.30	...	3.30	15.50	...	15.50
<i>Total</i>	<i>58.90</i>	<i>...</i>	<i>58.90</i>	<i>148.00</i>	<i>...</i>	<i>148.00</i>	<i>123.00</i>	<i>...</i>	<i>123.00</i>	<i>93.00</i>	<i>...</i>	<i>93.00</i>	
6. Supporting Programmes													
6.01 External Support(EAP)	2810	1.82	...	1.82	3.00	...	3.00	3.00	...	3.00	6.00	...	6.00
6.02 Domestic Support	2810	37.11	0.81	37.92	42.60	1.00	43.60	42.65	1.00	43.65	44.50	1.00	45.50
<i>Total- Supporting Programmes</i>	<i>38.93</i>	<i>0.81</i>	<i>39.74</i>	<i>45.60</i>	<i>1.00</i>	<i>46.60</i>	<i>45.65</i>	<i>1.00</i>	<i>46.65</i>	<i>50.50</i>	<i>1.00</i>	<i>51.50</i>	
7. Other Expenditure	2810	...	...	...	0.10	...	0.10	0.10	...	0.10	0.10	...	0.10
	3601	3.94	...	3.94	0.90	...	0.90	0.90	...	0.90	0.40	...	0.40
<i>Total</i>	<i>3.94</i>	<i>...</i>	<i>3.94</i>	<i>1.00</i>	<i>...</i>	<i>1.00</i>	<i>1.00</i>	<i>...</i>	<i>1.00</i>	<i>0.50</i>	<i>...</i>	<i>0.50</i>	
8. Investment in Public Enterprises	4810	19.60	...	19.60	50.00	...	50.00	50.00	...	50.00	50.00	...	50.00
Total-New and Renewable Energy	539.40	0.81	540.21	884.60	1.00	885.60	882.55	1.00	883.55	1063.00	1.00	1064.00	
9. Lumpsum Provision for N.E.Region & Sikkim	2552	...	...	...	100.00	...	100.00	100.00	...	100.00	120.00	...	120.00
10. Actual Recoveries	2810	-12.58	...	-12.58	...	...	...	...	...	...	...	...	...
Grand Total	538.10	12.72	550.82	998.00	10.50	1008.50	994.45	13.50	1007.95	1198.00	14.38	1212.38	

	Head of Dev	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total	Budget Support	IEBR	Total
B. Investment in Public Enterprises													
8.01 Indian Renewable Energy Development Agency	12810	19.60	1221.27	1240.87	50.00	950.00	1000.00	50.00	1496.65	1546.65	50.00	950.00	1000.00
Total		19.60	1221.27	1240.87	50.00	950.00	1000.00	50.00	1496.65	1546.65	50.00	950.00	1000.00
C. Plan Outlay*													
1. New and Renewable Energy	12810	538.63	1221.27	1759.90	900.00	950.00	1850.00	895.00	1496.65	2391.65	1080.00	950.00	2030.00
2. North Eastern Areas	22552	...	...	...	100.00	...	100.00	100.00	...	100.00	120.00	...	120.00
Total		538.63	1221.27	1759.90	1000.00	950.00	1950.00	995.00	1496.65	2491.65	1200.00	950.00	2150.00
<i>*Inclusive of works outlay in the Ministry of Urban Development</i>													
Demand No 102	12810	0.53	...	0.53	2.00	...	2.00	0.55	...	0.55	2.00	...	2.00

1. **Secretariat:** Provision is for Secretariat expenditure.

2. **Grid-Interactive and Distributed Renewable Power:** Provision of CFA for about 3540 MW Grid-interactive Power capacity addition from Wind, Small Hydro, Biomass Power/ Cogeneration, Urban & Industrial Waste to Energy and Solar Power; and deployment of about 135 MW equivalent Off Grid/Distributed Renewable Power Systems. These figures include 300 MW grid power and 32 MW equivalent Off-grid/ distributed solar power systems to be installed under Solar Mission. It also includes provision of Central Financial Assistance for Scheduled Castes beneficiaries.

3. **Renewable Energy for Rural Applications:** Provision of basic electricity/ lighting facility through SPV/other RE Systems and devices, including DRPS in 500 remote villages/hamlets; and 0.30 million m3 capacity (1.5 lakh numbers) Family-type Biogas Plants. It also includes provision for Scheduled Castes beneficiaries.

4. **Renewable Energy for Urban, Industrial and Commercial Applications:** Deployment of Solar Water Heating Systems of 0.60 million m2; Promotion of Energy-efficient buildings (5 million m2 floor area); and master plans for Solar Cities.

5. **Research, Design and Development in Renewable Energy:** R&D activities on different aspects of new and renewable energy technologies; support to MNRE Centres/ Institutions (SEC, C-WET and NIRE); Standards & Testing; Renewable Energy Resource Assessment (including Research Design & Development activities to be undertaken under Solar Mission)

6. **Supporting Programmes:** Information, Publicity and Extension (IPE) of Renewable Energy Systems; International Relations; Administration and Monitoring including HRD & Training; Support to States and Industries (including HRD & Training activities to be undertaken under Solar Mission).

7. **Other Expenditure:** To cater to the spillover liabilities of 10th Plan Programmes.

8. **Investment in Public Enterprises:** This includes provision for equity support to the Indian Renewable Energy Development Agency (IREDA) which had been set up to lend support to various new and renewable sources of energy projects and schemes.

9. **Provision for NE Region & Sikkim:** Includes provision of Central Financial Assistance for implementation of projects in NE Region States including Sikkim under different programmes of the Ministry.

ESTIMATED RENEWABLE ENERGY POTENTIAL¹

S. No.	Resource	Estimated Potential (In MW_{eq.})
1.	Solar Energy	20-50 MW/ sq. km.
2.	Wind Power	48,500 ²
3.	Small Hydro Power (up to 25 MW)	15,000 ³
4.	Bio-Power:	
	Agro-Residues	16,000 ⁴
	Cogeneration - Bagasse	5,000 ⁵
	Waste to Energy:	
	- Municipal Solid Waste to Energy	1,700 ⁶
	- Industrial Waste to Energy	1,000
	Total	87,200⁷

MW_{eq.} = Megawatt equivalent;

Note: -

- (1): Not all of this potential may be suitable for grid-interactive power for technical and / or economic reasons.
- (2): Potential based on areas having wind power density (wpd) greater than 200 W/m² assuming land availability in potential areas @ 1% and requirement of wind farms @ 12 ha/MW. The lower end of the potential might be suitable for off-grid applications.
- (3): Technically feasible hydro potential of all sites upto 25 MW station capacity,
- (4): Based on surplus agro-residues,
- (5): With new sugar mills and modernization of existing ones, technically feasible potential is assessed at 5000 Mwe.
- (6): With expansion of urban population post census 2001, current technically feasible municipal waste-to-energy potential is assessed at 1700 MWe,
- (7): Estimates do not include potential for solar power that is dependent on future developments that might make solar technology cost-competitive for grid-interactive power generation applications.

YEAR-WISE ACHIEVEMENTS OF 11TH PLAN

Period	Physical		Financial	
	Target (MW)	Achievement (MW)	Allocation (RE) (₹ in crore)	Expenditure (₹ in crore)
11 th Plan	1400		700.00	
2007-08	200	204.75	50.00	49.95
2008-09	250	248.93	82.50	82.49
2009-10	300	305.27	107.00	106.94
2010-11	300	307.21	152.00	151.99
Total in first 4 years of 11 th Plan	1050	1066.16	391.50	391.37
2011-12	350	111.30 (as on 31.8.11)	140 (BE)	101.16 (as on 31.8.11)

SMALL HYDRO POWER (SHP) PROGRAMME- FINANCIAL SUPPORT GIVEN TO SHP PROJECTS**1. Support to new SHP projects in State sector:**

Category	Above 100 KW and up to 1000 KW	Above 1 MW – 25 MW
Special category and NE States	Rs.50,000 / KW	Rs. 5.00 crore for first MW + Rs.50 lakh / MW for each additional MW
Other States	Rs.25,000 / KW	Rs. 2.50 crore for first MW + Rs.40 lakh / MW for each additional MW

- Minimum of 10% contribution of the project cost from the implementing organization.
- The subsidy would be released in four installments based on progress in the project.

2. Support to new SHP project in private / co-operative / joint sector:

Category	Up to 1000 KW	Above 1 MW – 25 MW
Special category and NE States	Rs. 20,000 / KW	Rs. 2.00 crore for first MW + Rs.30 lakh / MW for each additional MW
Other States	Rs. 12,000 / KW	Rs. 1.20 crore for first MW + Rs.20 lakh / MW for each additional MW

- Minimum of 50% contribution of the project cost from the project developer/ owner of the project.
- The subsidy would be released in two installments. 50% subsidy will to be released to the financial institution, during execution of the project (after placement of order for electro-mechanical equipment and 50% loan disbursement) and balance after performance testing.
- In case a project is set up by a developer fully through its own resources, the subsidy will be released directly to him (such as tea garden, captive power projects etc.).
- All the projects where the work has commenced after 1.1.2007 will be given above subsidy

3. Scheme to support Renovation & Modernization of old SHP projects in public sector:

S.No.	Category	Up to 1000 KW	Above 1 MW – 25 MW
1	Special category and NE States	Rs.25,000 / KW	Rs. 2.50 crore for first MW + Rs.50 lakh / MW for each additional MW
2	Other States	Rs.15,000 / KW	Rs. 1.50 crore for first MW + Rs.35 lakh / MW for each additional MW

- Minimum of 50% contribution of the project cost from the State sector project implementing organization of the works.
- The subsidy would be released in 3 installments based on progress in the project.

4. Watermills:

S. No.	Category of Watermill	Amount of CFA
1.	Mechanical output only	Rs. 35,000/- per Watermill
2.	a) Electrical output (up to 5 kW) or, b) Both mechanical and electrical output (up to 5 kW)	Rs. 1,10,000/- per Watermill

5. Micro Hydel Projects up to 100 kW Capacity:

S. No.	Areas	Amount of CFA
1	International Border Districts (excluding Arunachal Pradesh as it is already covered under the PM package)	Rs.1,00,000/- per KW
2	North Eastern and Special category States (other than 1 above)	Rs. 80,000/- per KW
3	Other States (other than 1 above)	Rs. 40,000/- per KW

A minimum contribution of 10% of project cost for North Eastern & special category States (S. No. 2) and 20% for other states (S. No. 3) should be met by the beneficiaries/ project owners.

LIST OF THE REMOTE UNELECTRIFIED CENSUS VILLAGES / HAMLETS AS ENDORSED BY RURAL ELECTRIFICATION CORPORATION (REC)

(As on 30.07.2011)

Sl. No.	State	Number of villages/hamlets verified by REC	
1.	Karnataka	23	150
2.	Madhya Pradesh	972	
3.	Assam	2232	
4.	Maharashtra	362	
5.	Meghalaya	158	
6.	Arunachal Pradesh	145	
7.	Himachal Pradesh	1	
8.	Rajasthan	417	90
9.	Manipur	166	
10.	West Bengal	93	
11.	Gujarat	49	
12.	Orissa	1581	
13.	Jharkhand	832	
14.	Chhattisgarh	1112	
15.	Uttarakhand	178	52
16.	Uttar Pradesh	63	138
17.	Tamil Nadu	0	73
18.	Nagaland	11	
19.	Jammu & Kashmir	391	620
20.	Haryana	0	149
21.	Kerala	0	73
22.	Bihar	80	
23.	Andhra Pradesh	0	112
24.	Tripura	23	460
Total		8889	1917
Grand Total		10806	

ANNEXURE – XIV**PROGRESS IN THE ELECTRIFICATION OF HITHERTO UNELECTRIFIED
VILLAGES & HAMLETS**

(As on 30.07.2011)

Sl. No	State	Villages Sanctioned	Villages Completed	Ongoing villages	Hamlets sanctioned	Hamlets completed
1.	Arunachal Pradesh	297	297	0	1	0
2.	Andhra Pradesh	0	0	0	13	13
2.	Assam	2157	1688	325	0	0
3.	Chhattisgarh	682	568	0	0	0
4.	Gujarat	38	38	0	0	0
5.	Haryana	0	0	0	286	286
6.	Himachal Pradesh	21	21	0	1	0
7.	Jammu & Kashmir	440	160	280	20	0
8.	Jharkhand	591	449	122	0	0
9.	Karnataka	22	16	2	57	14
10.	Kerala	0	0	0	607	607
11.	Madhya Pradesh	603	381	203	0	0
12.	Maharashtra	353	338	12	0	0
13.	Manipur	237	191	46	3	0
14.	Meghalaya	163	97	66	0	0
15.	Mizoram	20	20	0	0	0
16.	Nagaland	11	11	0	0	0
17.	Orissa	1424	602	763	23	0
18.	Rajasthan	327	292	11	90	0
19.	Sikkim	0	0	0	13	13
20.	Tamil Nadu	0	0	0	184	101
21.	Tripura	62	60	0	944	715
22.	Uttarakhand	667	472	142	147	34
23.	Uttar Pradesh	284	98	18	223	86
24.	West Bengal	1201	1176	25	9	2
25.	Goa				19	
Total		9600	6975	2015	2640	1871

STATUS OF RENEWABLE PURCHASE OBLIGATIONS OF DIFFERENT STATES

S. No.	State/UT	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Andhra Pradesh	5.00%					
2	Assam	2.80%	4%	6%	7.00%		
3	Bihar	2.50%	4%	4.50%	5%		
4	Chhattisgarh	5.25%	5.75%				
5	Goa UTs	2%	3%				
6	Gujarat	6.00%	7.00%				
7	Haryana	1.50%	2.00%	3.00%			
8	Himachal Pradesh	11.10%	12.10%				
9	Jammu & Kashmir	3%	5%				
10	Jharkhand	3%	4%				
11	Karnataka	10%/7%					
12	Kerala	3.30%	3.60%	3.90%	4.20%	4.50%	4.80%
13	Madhya Pradesh	2.50%	4.00%	5.50%	7.00%		
14	Maharashtra	7%	8%	9%	9%	9%	
15	Manipur	3.00%	5.00%				
16	Meghalaya	0.75%	1.00%				
17	Mizoram	6.00%	7.00%				
18	Punjab	2.40%	2.90%	3.50%	4%		
19	Rajasthan	6.00%	7.10%	8.20%			
20	Nagaland	7.00%	8.00%				
21	Tamil Nadu	9%					
22	Tripura	1.00%	2.00%				
23	Uttar Pradesh	5%	6%				
24	Uttarakhand	5%	6%				
25	West Bengal	3%	4%	5%	6%		
26	Delhi	2%	3.40%	4.80%	6.20%		

MINUTES OF THE SIXTEENTH SITTING OF THE ESTIMATES COMMITTEE
(2009-2010)

The Committee sat on Thursday, the 21st January, 2010 from 1500 hrs. to 1720 hrs.

PRESENT

Shri Francisco Sardinha – Chairman

MEMBERS

2. Smt. Harsimrat Kaur Badal
3. Shri Ramesh Jigajinagi
4. Shri P. Karunakaran
5. Shri Chandrakant Khaire
6. Shri Prabodh Panda
7. Shri Kabindra Purkayastha
8. Shri C. Rajendran
9. Shri Jagdish Singh Rana
10. Shri M. Sreenivasulu Reddy
11. Shri Sushil Kumar Singh
12. Shri Manish Tewari

SECRETARIAT

- | | | | |
|----|--------------------|---|-----------------|
| 1. | Shri Bhupesh Kumar | - | Director |
| 2. | Smt. Juby Amar | - | Under Secretary |

WITNESSES

MINISTRY OF POWER

- | | | |
|----|--------------------------|-------------------|
| 1. | Shri Hari Shankar Brahma | Secretary |
| 2. | Shri Anil Kumar | Special Secretary |
| 3. | Shri Sudhir Kumar | Joint Secretary |
| 4. | Shri Devender Singh | Joint Secretary |
| 5. | Shri M. Ravi Kanth | Joint Secretary |

CENTRAL ELECTRICITY AUTHORITY

- | | | |
|-----|---------------------|--------------------|
| 6. | Shri Rakesh Nath | Chairperson, CEA |
| 7. | Shri Gurdial Singh | Member (HE), CEA |
| 8. | Shri S.M. Dhiman | Member (GO&D), CEA |
| 9. | Shri V. Ramakrishna | Member (PS), CEA |
| 10. | Shri S. Sheshadri | Member (Th), CEA |
| 11. | Dr. Jaipal Singh | Member (E&C), CEA |

PSU, AUTONOMOUS BODIES, STATUTORY BODIES

12.	Shri S.K. Garg	CMD, NHPC
13.	Shri P. Uma Shankar	CMD, REC
14.	Shri H.K. Sharma	CMD, SJVNL
15.	Shri P.K. Nath	Secretary, DVC
16.	Shri V.B. Bassi	Member (P), BBMB

2. At the outset, the Chairman welcomed the Members of the Committee and representatives of the Ministry of Power to the sitting of Committee.

3. Thereafter, the representatives of the Ministry of Power briefed the Committee on the subject 'Power Generation – Demand & Supply'. The Members of the Committee raised questions on various issues relating to the subject and the officials of the Ministry replied to the same. The Secretary was requested to furnish replies in writing to the questions for which answers were not readily available during the course of briefing.

4. A verbatim record of the proceedings has been kept.

The Committee then adjourned.

MINUTES OF THE EIGHTEENTH SITTING OF THE ESTIMATES COMMITTEE
(2009-2010)

The Committee sat on Tuesday, the 16th February, 2010 from 1500 hrs. to 1700 hrs.

PRESENT

Shri Francisco Sardinha – Chairman

MEMBERS

2	Shri Sanjay Singh Chauhan
3	Shri T.K.S. Elangovan
4	Shri Mohinder Singh Kaypee
5	Shri M. Krishnaswamy
6	Shri Prabodh Panda
7	Shri Kabindra Purkayastha
8	Shri C. Rajendran
9	Shri S. Semmalai
10	Shri Madan Lal Sharma
11	Dr. Raghuvansh Prasad Singh
12	Shri Sushil Kumar Singh
13	Shri Manish Tewari
14	Shri K.C. Venugopal

SECRETARIAT

1.	Shri U.S. Saxena	-	Joint Secretary
2.	Shri Bhupesh Kumar	-	Director
3.	Smt. Juby Amar	-	Under Secretary

WITNESSES

MINISTRY OF COAL

1	Shri C. Balakrishnan	Secretary (Coal)
2	Shri Alok Perti	Additional Secretary (Coal)
3	Shri R.K. Mahajan	Joint Secretary (LA)
4	Shri K.S. Kropa	Joint Secretary (Coal)
5	Shri Sanjiv Mittal	JS / FA
6	Shri A.K. Jyotishi	Director

COAL INDIA LTD

7	Shri P.S. Bhattacharyya	Chairman
8	Dr. A.K. Sarkar	Director (Marketing)
9	Shri N.C. Jha	Director (Technical)
10	Shri Amitabha Ray	CGM (Sales & Marketing)

2. At the outset, the Chairman welcomed the Members of the Committee and representatives of the Ministry of Coal to the sitting of Committee.

3. Thereafter, the representatives of the Ministry of Coal gave evidence before the Committee on the subject 'Power Generation – Demand & Supply'. The Members of the Committee raised questions on various issues relating to the subject and the officials of the Ministry replied to the same. The Secretary was requested to furnish replies in writing to the questions for which answers were not readily available during the course of evidence.

4. A verbatim record of the proceedings has been kept.

The Committee then adjourned.

MINUTES OF FIFTH SITTING OF COMMITTEE ON ESTIMATES (2010-2011)

The Committee sat on Tuesday, the 20th July, 2010 from 1445 hrs. to 1745 hrs.

Shri Francisco Sardinha – Chairman

MEMBERS

- 2 Shri Bhakta Charan Das
- 3 Shri Ramesh Jigajinagi
- 4 Dr. Sanjeev Ganesh Naik
- 5 Shri Prabodh Panda
- 6 Shri Ravindra Kumar Pandey
- 7 Shri Kabindra Purkayastha
- 8 Shri S. Semmalai
- 9 Shri Arjun Charan Sethi
- 10 Shri Brij Bhushan Sharan Singh
- 11 Dr. Raghuvansh Prasad Singh
- 12 Shri Sushil Kumar Singh
- 13 Shri Lalji Tandon

SECRETARIAT

1. Smt. Anita B. Panda - Additional Director
2. Shri Janmesh Singh - Committee Officer

WITNESSES

MINISTRY OF COAL

1. Shri D.K. Sikri Secretary
2. Shri Alok Perti Additional Secretary
3. Shri R.K. Mahajan Joint Secretary (LA)
4. Shri A.K. Bhalla Joint Secretary (Coal)
5. Shri P.R. Mandal Adviser (Projects)
6. Shri Kailashpati Economic Adviser
7. Shri A.K. Jyotishi Director (CPD)
8. Shri P.S. Bhattacharya Chairman, Coal India Ltd.
9. Shri N.C. Jha Director (Technical), Coal India Ltd.
10. Shri Narsing Rao CMD, Singareni Collieries Company Ltd.

MINISTRY OF POWER

1. Shri P. Uma Shankar Secretary
2. Shri G.B. Pradhan Addl. Secretary
3. Shri Sudhir Kumar Joint Secretary

4.	Dr. M. Ravi Kanth	Joint Secretary
5.	Shri Devender Singh	Joint Secretary
6.	Shri I.C.P. Keshari	Joint Secretary
7.	Shri Rakesh Jain	Joint Secretary & FA
8.	Shri Kapil Mohan	Director
9.	Shri Puneet Goel	Director
10.	Shri A.K. Saxena	Director
11.	Shri A.A. Tazir	Director
12.	Shri Rajiv Kumar Gupta	Director
13.	Shri Arun Kumar	Director

CENTRAL ELECTRICITY AUTHORITY

1.	Shri Gurdial Singh	Chairperson
2.	Shri S.M. Dhiman	Member
3.	Dr. Jaipal Singh	Member

PSU, AUTONOMOUS BODIES, STATUTORY BODIES

1.	Dr. J.M. Phatak	CMD, REC
2.	Shri Sanjiv Garg	GM, REC
3.	Shri R.S. Sharma	CMD, NTPC
4.	Shri A.B.L. Srivastava	Director, NHPC
5.	Shri D.P. Bhargava	Director, NHPC
6.	Shri S.K. Chaturvedi	CMD, Powergrid
7.	Shri Satnam Singh	CMD, PFC
8.	Shri H.K. Sharma	CMD, SJVNL
9.	Shri R.S.T. Sai	CMD, THDC
10.	Shri U Moral	ED, NEEPCO
11.	Shri Umesh Kumar	Secretary & FA, DVC
12.	Shri A.N. Mishra	Director, DVC
13.	Shri G. Chaudhary	Res. Director, DVC
14.	Shri A.B. Agrawal	Chairman, BBMB

2. At the outset, the Chairman welcomed the Members to sitting of the Committee.

3. *** **

4. *** **

5. Thereafter, representatives of the Ministry of Coal, Ministry of Power, Central Electricity Authority, PSUs/Autonomous Bodies/Statutory Bodies were ushered in for the sitting of Committee.

6. After formal welcome by Hon'ble Chairman, the representatives of both the Ministries gave PowerPoint presentation on the subject 'Power Generation – Demand &

Supply'. The Members of the Committee sought clarification on various issues relating to the subject to which the representatives of the Ministries, CEA/PSUs/Autonomous Bodies/Statutory Bodies responded. The Hon'ble Chairman requested both the Secretaries to furnish replies in writing to the questions for which answers were not readily available during the course of briefing.

7. The Committee decided to have an oral evidence of the representatives of the Ministry of New & Renewable Energy in the next sitting of the Committee.

8. A verbatim record of the proceedings has been kept.

The Committee then adjourned.

MINUTES OF FOURTEENTH SITTING OF COMMITTEE ON ESTIMATES (2010-2011)

The Committee sat on Friday, the 01st October, 2010 from 1500 hrs. to 1720 hrs in Main Committee Room, Parliament House Annexe, New Delhi.

Shri Francisco Sardinha – Chairman

MEMBERS

- 2 Shri Bhakta Charan Das
- 3 Dr. Sanjay Jaiswal
- 4 Shri Ramesh Jigajinagi
- 5 Shri P. Karunakaran
- 6 Shri Chandrakant Khaire
- 7 Shri M. Krishnaswamy
- 8 Dr. Sanjeev Ganesh Naik
- 9 Shri M. Sreenivasulu Reddy
- 10 Smt. Yashodhara Raje Scindia
- 11 Shri S. Semmalai
- 12 Shri Brij Bhushan Sharan Singh
- 13 Shri Sushil Kumar Singh

SECRETARIAT

1. Smt. Anita B. Panda - Additional Director
2. Smt. Juby Amar - Deputy Secretary

WITNESSES

MINISTRY OF NEW AND RENEWABLE ENERGY

1. Shri Deepak Gupta Secretary
2. Shri Rajarshi Bhattacharya AS & F
3. Smt. Gauri Singh JS
4. Shri Hari Kumar JS
5. Dr. N.P. Singh Scientist 'G'
6. Dr. B. Bandyopadhyay Scientist 'G'
7. Shri D. Majumdar CMD (IREDA)
8. Dr. B. Bhargava Scientist 'F'
9. Dr. J.R. Meshram Scientist 'F'
10. Shri A.K. Varshney Scientist 'F'
11. Shri Dilip Nigam Scientist 'F'
12. Dr. Ashvini Kumar Scientist 'F'
13. Shri A.K. Dhussa Scientist 'F'
14. Dr. P. Saxena Scientist 'F'
15. Shri Girish Kumar Director (Parl.)
16. Shri A.K. Kaushik Director (F)

2. At the outset, the Chairman welcomed the Members of the Committee and representatives of the Ministry of New and Renewable Energy to the sitting of the Committee.

3. The representatives of the Ministry gave a PowerPoint presentation on the subject 'Power Generation – Demand & Supply'. The Members of the Committee sought clarification on various issues relating to the subject to which the representatives of the Ministry responded. The Hon'ble Chairman requested the Secretary to furnish replies in writing to the questions for which answers were not readily available during the course of briefing.

4. A verbatim record of the proceedings has been kept.

The Committee then adjourned.

MINUTES OF TWENTY SIXTH SITTING OF COMMITTEE ON ESTIMATES (2010-2011)

The Committee sat on Friday, the 25th March, 2011 from 1500 hrs. to 1720 hrs.

Shri Francisco Sardinha – Chairman

MEMBERS

2. Shri Bhakta Charan Das
3. Shri Milind Deora
4. Dr. Sanjay Jaiswal
5. Shri Chandrakant Khaire
6. Shri Vikrambhai Arjanbhai Maadam
7. Dr. Sanjeev Ganesh Naik
8. Shri Prabodh Panda
9. Shri M. Sreenivasulu Reddy
10. Shri Brij Bhushan Sharan Singh
11. Shri Sushil Kumar Singh

SECRETARIAT

1. Shri P. K. Grover - Joint Secretary
2. Smt. Anita B. Panda - Additional Director

WITNESSES

MINISTRY OF NEW AND RENEWABLE ENERGY

1. Shri Deepak Gupta Secretary
2. Shri Shashi Shekhar Jt. Secy.
3. Dr. N.P. Singh Sci. 'G' (JS level)
4. Dr. B. Bandyopadhyay Sci. 'G'
5. Dr. A.R. Shukla Sci. 'G'
6. Shri Sudhir Mohan Sci. 'G'
7. Shri D. Majumdar CMD (IREDA)
8. Dr. B. Bhargava Sci. 'F'
9. Dr. J.R. Meshram Sci. 'F'
10. Shri A.K. Varshney Sci. 'F'
11. Shri Dilip Nigam Sci. 'F'
12. Dr. Ashvini Kumar Sci. 'F'
13. Shri. A.K. Dhussa Sci. 'F'
14. Dr. P. Saxena Sci. 'F'
15. Dr. A. Raza Sci. 'F'
16. Shri Girish Kumar Dir. (Parl)

17.	Shri A.K. Kaushik	Dir. (F)
18.	Dr. Pankaj Saxena	Sci. 'D'

2. At the outset, the Hon'ble Chairman welcomed the Members of the Committee to the sitting of the Committee.

3. Thereafter, representatives of the Ministry of New and Renewable Energy were ushered in.

4. After formal welcome by the Hon'ble Chairman, the representatives of the Ministry gave a PowerPoint presentation on the subject '**Power Generation – Demand and Supply**'. The Members of the Committee sought clarifications on various issues related to the subject to which the representatives of the Ministry responded. The Hon'ble Chairman requested the Secretary to furnish replies in writing to the questions for which answers were not readily available during the course of evidence.

5. A verbatim record of the proceedings has been kept.

The Committee then adjourned.

MINUTES OF FIFTH SITTING OF COMMITTEE ON ESTIMATES (2011-2012)

The Committee sat on Tuesday, the 12th July, 2011 from 1430 hrs. to 1725 hrs.

Shri Franscisco Sardinha – Chairman

Members

2. Shri E. T. Mohammed Basheer
3. Shri Bhakta Charan Das
4. Shri Dhruvanarayana
5. Shri T. K. S. Elangovan
6. Shri P. Karunakaran
7. Shri Bapi Raju Kanumuru
8. Shri Chandrakant Khaire
9. Shri M. Krishnaswamy
10. Shri Datta Meghe
11. Shri Prabodh Panda
12. Shri Magunta Sreenivasulu Reddy
13. Shri S. Semmalai
14. Shri Arjun Charan Sethi
15. Shri M. I. Shanavas
16. Shri Jagada Nand Singh
17. Shri Radha Mohan Singh
18. Shri Sushil Kumar Singh
19. Smt. Annu Tandon

SECRETARIAT

- | | | |
|------------------------|---|----------------------|
| 1. Shri P. K. Grover | - | Additional Secretary |
| 2. Smt. Anita B. Panda | - | Additional Director |
| 3. Smt. Juby Amar | - | Deputy Secretary |

2. At the outset, the Chairman welcomed the Members to the sitting of the Committee.
3. Thereafter, the Committee took up the draft Report on the subject 'Power Generation – Demand & Supply' pertaining to Ministries of Coal, Power and New & Renewable Energy for consideration and adoption.

4. During the course of discussion, certain modifications were suggested by the Members of the Committee.

5. As the suggested modifications were required to be supported by the specific response of the concerned Ministries, the Committee decided to take another evidence of the representatives of Ministries of Coal Power & New & Renewable Energy and finalise the draft Report thereafter.

6. *** **

7. *** **

8. A verbatim record of the proceedings has been kept.

The Committee then adjourned.

MINUTES OF SIXTH SITTING OF COMMITTEE ON ESTIMATES (2011-2012)

The Committee sat on Thursday, the 15th September, 2011 from 1100 hrs. to 1300 hrs. in Committee Room 'C', Parliament House Annexe, New Delhi.

PRESENT

Shri Franscisco Sardinha - Chairman

Members

20. Shri Raj Babbar
21. Smt. Bijoya Chakravarty
22. Shri Bhakta Charan Das
23. Shri Ninong Ering
24. Shri Prahlad Venkatesh Joshi
25. Shri Chandrakant Khaire
26. Shri Prabodh Panda
27. Shri Magunta Sreenivasulu Reddy
28. Smt. Yashodhara Raje Scindia
29. Shri S. Semmalai
30. Shri Brijbhushan Sharan Singh
31. Shri Ganesh Singh
32. Shri Ijyaraj Singh
33. Shri Jagada Nand Singh
34. Shri Radha Mohan Singh
35. Shri Sushil Kumar Singh
36. Smt. Annu Tandon

SECRETARIAT

- | | | |
|------------------------|---|----------------------|
| 1. Shri P. K. Grover | - | Additional Secretary |
| 2. Smt. Anita B. Panda | - | Additional Director |
| 3. Smt. Juby Amar | - | Deputy Secretary |

WITNESSES

MINISTRY OF COAL

- | | | |
|----|-------------------|----------------------|
| 1. | Shri Alok Perti | Secretary (Coal) |
| 2. | Shri R.K. Mahajan | Joint Secretary (LA) |

3. Ms. Anjali Anand Srivastava JS & FA
4. Shri Kailash Pati Economic Advisor

COAL PSUs

5. Shri A.R. Ansari CMD, Neyveli Lignite Corpn. Ltd.
6. Shri Narsing Rao Singareni Collieries Co. Ltd.
7. Shri T.K. Lahiri CMD, Bharat Coking Coal Ltd.
8. Shri V.K. Singh CMD, Northern Coalfields Ltd.
9. Shri D.C. Garg CMD, Western Coalfields Ltd.
10. Shri R.K. Saha CMD, Central Coalfields Ltd.
11. Shri A.K. Sinha CMD, South Eastern Coalfields
12. Shri A.N. Sahay CMD, Mahanadi Coalfields Ltd.
13. Shri H.K. Vaidya CGM (S&M), Coal India Ltd.

MINISTRY OF POWER

1. Shri Ashok Lavasa Addl. Secretary
2. Shri Sudhir Kumar Joint Secretary
3. Ms. Rita Acharya Joint Secretary
4. Shri Rakesh Jain Joint Secretary & FA

CENTRAL ELECTRICITY AUTHORITY

5. Shri A.S. Bakshi Chairperson
6. Dr. Jaipal Singh Member (E&C)
7. Shri K.K. Agrawal Member (GO&D)

PSUs, AUTONOMOUS BODIES, STATUTORY BODIES

8. Shri A.B.L. Srivastava CMD, NHPC
9. Shri Satnam Singh CMD, PFC
10. Shri R.S.T. Sai CMD, THDC
11. Shri R.P. Singh CMD, SJVNL
12. Dr. Ajay Mathur DG, BEE
13. Shri I.H. Hazarika ED, NEEPCO
14. Shri A.K. Singhal Director, NTPC
15. Shri I.S. Jha Director, Powergrid
16. Shri P.J. Thakkar Director, REC

2. At the outset, the Chairman welcomed the Members of the Committee and representatives of the Ministries of Coal and Power, PSUs and other statutory bodies to the sitting of Committee.

3. The representatives of Coal India Limited gave a Power Point presentation on the subject 'Power Generation – Demand & Supply'. The Members of the Committee raised queries on various issues relating to the subject and the representatives of the Ministries of Coal and Power responded to the same. Thereafter, the Chairman directed the Secretary, Ministry of Coal and Additional Secretary, Ministry of Power to furnish replies, in writing to the questions for which answers were not readily available during the course of evidence.

4. A verbatim record of the proceedings has been kept.

5. *** **

The Committee then adjourned.

MINUTES OF SEVENTH SITTING OF COMMITTEE ON ESTIMATES (2011-2012)

The Committee sat on Friday, the 23rd September, 2011 from 1100 hrs. to 1310 hrs. in Committee Room 'C', Parliament House Annexe, New Delhi.

PRESENT

Shri Francisco Sardinha - Chairman

Members

2. Shri Raj Babbar
3. Smt. Harsimrat Kaur Badal
4. Shri E.T. Mohammed Basheer
5. Shri Bhakta Charan Das
6. Shri Dhruvanarayana
7. Shri T.K.S. Elangovan
8. Shri Prahlad Venkatesh Joshi
9. Shri Bapi Raju Kanumuru
10. Shri Chandrakant Khaire
11. Shri M. Krishnaswamy
12. Shri Datta Meghe
13. Shri Prabodh Panda
14. Shri Jagdish Singh Rana
15. Shri S. Semmalai
16. Shri Arjun Charan Sethi
17. Shri M.I. Shanavas
18. Shri Brijbhushan Sharan Singh
19. Shri Ganesh Singh
20. Shri Jagada Nand Singh
21. Shri Radha Mohan Singh
22. Shri Sushil Kumar Singh
23. Smt. Annu Tandon
24. Shri Hukamdeo Narayan Yadav

SECRETARIAT

1. Shri P. K. Grover - Additional Secretary
2. Smt. Anita B. Panda - Additional Director
3. Smt. Juby Amar - Deputy Secretary

WITNESSES

MINISTRY OF NEW & RENEWABLE ENERGY

1.	Shri Deepak Gupta	Secretary
2.	Shri Rajarshi Bhattacharya	Additional Secretary & FA
3.	Shri Shashi Shekhar	Joint Secretary
4.	Shri Tarun Kapoor	Joint Secretary
5.	Ms. Sunanda Sharma	Economic Advisor
6.	Dr. N.P. Singh	Scientist 'G'
7.	Dr. B. Bandyopadhyay	Scientist 'G'
8.	Dr. A.R. Shukla	Scientist 'G'
9.	Shri Sudhir Mohan	Scientist 'G'
10.	Shri D. Majumdar	CMD (IREDA)

2. At the outset, the Chairman welcomed the Members of the Committee and representatives of the Ministry of New & Renewable Energy to the sitting of Committee.

3. The representatives of the Ministry of New & Renewable Energy gave a Power Point presentation on the subject 'Power Generation – Demand & Supply'. The Members of the Committee raised queries on various issues relating to the subject and the representatives of the Ministry responded to the same. Thereafter, the Chairman directed the Secretary, Ministry of New & Renewable Energy to furnish replies, in writing to the questions for which answers were not readily available during the course of evidence.

4. A verbatim record of the proceedings has been kept.

5. *** **

The Committee then adjourned.

MINUTES OF ELEVENTH SITTING OF COMMITTEE ON ESTIMATES (2011-2012)

The Committee sat on Friday, the 16th December, 2011 from 1400 hrs. to 1510 hrs. in Main Committee Room, Parliament House Annexe, New Delhi.

PRESENT

1. **Shri Bhakta Charan Das – In the Chair**
2. Shri R. Dhruvanarayana
3. Shri Ninong Ering
4. Shri Chandrakant Khaire
5. Shri M. Krishnaswamy
6. Shri S. Semmalai
7. Shri M. I. Shanavas
8. Shri Ganesh Singh
9. Shri Ijyaraj Singh
10. Shri Jagadanand Singh
11. Shri Sushil Kumar Singh
12. Shri Hukamdeo Narayan Yadav

SECRETARIAT

- | | | |
|-------------------------|---|----------------------|
| 1. Shri P. K. Grover | - | Additional Secretary |
| 2. Shri S. C. Chaudhary | - | Director |
| 3. Smt. Anita B. Panda | - | Additional Director |
| 4. Smt. Juby Amar | - | Deputy Secretary |

2. In the absence of Hon'ble Chairman, the Committee chose Shri Bhakta Charan Das, M.P. to act as Chairman for the Sitting under Rule 258(3) of the "Rules of Procedure and Conduct of Business in Lok Sabha".

3. The Committee then took up for consideration following Draft Reports for consideration and adoption

- (i) 'Power Generation – Demand & Supply' pertaining to the Ministries of Power; Coal and New & Renewable Energy.

(ii) *** **

4. The Committee adopted the draft Reports at (i) and *** ** above with some modifications suggested by the Members of the Committee as per Annexure.

5. The Committee then authorized the Chairman to finalize the Reports in the light of modifications suggested as well as other consequential changes arising out of the factual verification, if any, by the concerned Ministries and present the same to the Parliament.

The Committee then adjourned.

Annexure

Modifications carried out in the Recommendations portion of the Draft Report on the subject 'Power Generation – Demand & Supply'

1. On Page No. 106 : For the existing Para No. 6.8 the following paragraph may be substituted:-

“6.8. The Committee note that in order to utilize the optimum potential of power generated, pumped storage plants are used, particularly in those areas where availability of water is in abundance. However, the Committee find that these plants often store power by curtailing supply of power from those who need it most. They feel that pumped storage plants should continue to supply power till the scope of power consumption exists, since according to the Ministry, such plants are better for meeting of peak hour demand. The Committee are, thus of the opinion, that pumped storage plants should ensure that the existing demand for power is completely met before pumping back the water for re-generation of surplus power.”

2. On Page No. 114, Para No. 6.12: Following Sub-Para 6.12 (ii) may be added to the existing Para as under:-

“The Committee would also recommend that regional imbalances in the availability of power should be mitigated at the earliest by the Government, as they are a big hindrance in the balanced development of the nation. In the opinion of the Committee, a sturdy system of National Grid would go a long way in realizing faster evacuation of power from the surplus to the deficit areas and is definitely indispensable for mitigating regional imbalances. In this regard, the Committee are constrained to note that the inter regional transmission capacity by the end of 11th Plan is only likely to be 27,950 MW. Besides, in several areas, transmission lines have not been established. Under these circumstances, the Committee strongly recommend that a big push should be given to augment the inter regional transmission capacity of the country. As all regional grids have already been interconnected and developed in the form of the National Power Grid, the Committee expect that the regions facing acute power shortage would be benefitted by the exchange of operational surpluses. Those regions/States, which are facing acute power deficit much above the national average of 9%, should get priority to meet their power deficit. Since the National Electricity Plan, prepared by the Central Electricity Authority, also includes perspective planning for Twelfth Plan, the Committee recommend that the issue of regional power imbalances must be appropriately addressed therein. The Committee desire specific action to be taken on the same and would like to be apprised on it.”

3. On Page No. 120, Para No. 6.17: The recommendation may be modified as under:-

(i) In the 9th line (from the top) of the first paragraph, after **“losses”** add the following lines:-

“... .. , the Committee feel that the institutional mechanism has failed to check it. They, therefore, strongly recommend that the Government needs to invest more to develop sturdy transmission network in the country, besides taking strict action against those States who fail to achieve targets in reducing AT&C losses.”

(ii) In the 11th line (from the top) of the second paragraph, after **“LT lines”** the following lines may be added:-

“... .. State Governments should be advised to undertake 100% metering of all areas and installation of feeder meters which are meant to assess commercial loss of power in their respective localities. The Committee also feel that in case commercial losses persist despite taking all the suggested measures, connivance of departmental staff can not be ruled out. In such situations strong penal actions should be taken against officials found guilty.”

(iii) At the end of the second paragraph on the same page, the following lines may be added:-

“... .. The Committee further feel that it should also be the responsibility of the consumers to report cases of theft of power to concerned authorities, so that early action could be initiated to prevent pilferage of power.”

4. On Page No. 123, Para No. 6.19: At the end of the Second paragraph, following lines may be added:-

“... ... As regards rural electrification under RGGVY, the Committee also note that the transformers set up in the villages for the purpose are small capacity transformers, which often break down due to their inability to cope with increased load. The Committee, therefore, recommend that higher capacity transformers need to be installed in villages under RGGVY, keeping in view the future load expansion brought in the wake of increased rural electrification and rising standards of living. The Committee feel that the Ministry should revisit various norms and guidelines under RGGVY in the light of their suggestions so that rural electrification in the entire country could become a reality.”