CHAPTER-III

ECONOMIC SECTOR (PUBLIC SECTOR UNDERTAKINGS)

3.1 Overview of Government Companies and Statutory Corporations

Introduction

3.1.1 The State Public Sector Undertakings (PSUs) consist of State Government Companies and Statutory Corporations. The State PSUs are established to carry out activities of commercial nature while keeping in view welfare of the people. In Manipur there are ten PSUs (all Companies including three non-working) as on 31st March 2012. None of the Companies were listed on the stock exchange(s). The State PSUs play a minor role in the State economy. The State working PSUs registered a turnover of ₹ 3.54 crore for 2011-12 as per their latest finalized accounts as of September 2012. This turnover was equal to 0.03 *per cent* of State Gross Domestic Product (GDP) for 2011-12. The State PSUs incurred a loss of ₹ 5.17 crore in the aggregate for the year 2011-12 as per their latest finalized accounts.

Audit Mandate

3.1.2 Audit of Government Companies is governed by Section 619 of the Companies Act, 1956. According to Section 617, a Government company is one in which not less than 51 *per cent* of the Paid up capital is held by Government(s). A Government Company includes a subsidiary of a Government Company. Further, a Company in which 51 *per cent* of the paid -up capital is held in any combination by Government(s), Government Companies and Corporations controlled by Government(s) is treated as if it were a Government Company (deemed Government Company) as per Section 619-B of the Companies Act.

3.1.3 The accounts of the State Government Companies (as defined in Section 617 of the Companies Act, 1956) are audited by Statutory Auditors, who are appointed by the CAG as per the provisions of Section 619(2) of the Companies Act, 1956. These accounts are also subject to supplementary audit conducted by the CAG as per the provisions of Section 619 of the Companies Act, 1956.

Investment in State PSUs

3.1.4 As on 31 March 2012, the Investment (Capital and Long-Term Loans) in the ten PSUs was ₹ 56.48 crore as per details given below:

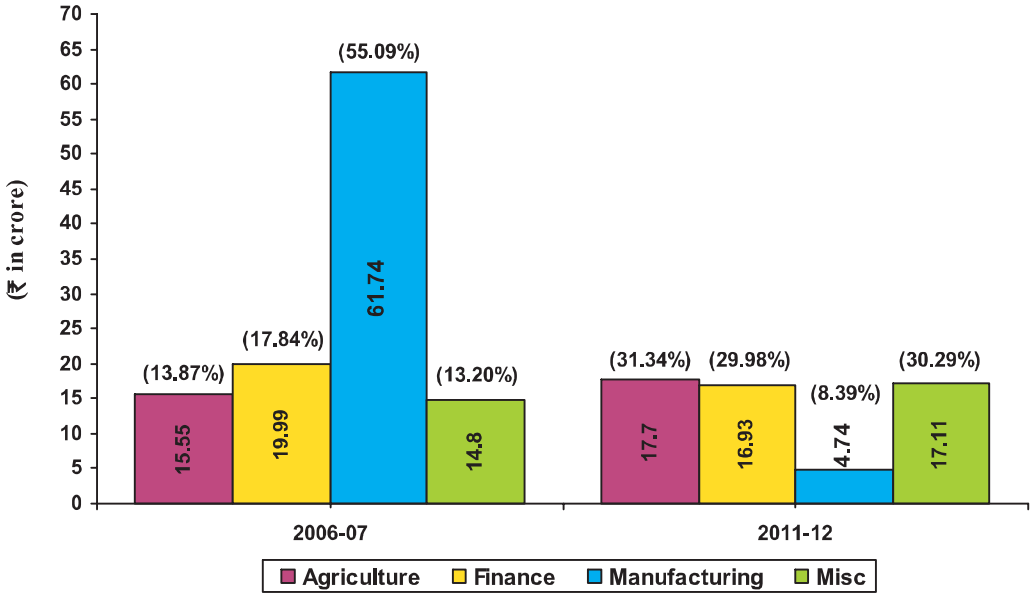
(₹ in crore)

Type of PSUs	Government Companies		
	Capital[1]	Long Term Loans[2]	Total
Working PSUs	29.34	5.90	35.24
Non-working PSUs	16.71	4.53	21.24
Total	**46.05**	**10.43**	**56.48**

A summarised position of Government Investment in State PSUs is detailed in **Appendix-3.1.**

As on 31 March 2012, of the total Investment in State PSUs, 62.39 *per cent* was in working PSUs and the remaining 37.61 *per cent* in non-working PSUs. The total Investment consisted of 81.53 *per cent* in Capital and 18.47 *per cent* in Long-Term Loans.

3.1.5 The Investment in various important sectors and percentage thereof at the end of 31 March 2007 and 31 March 2012 is indicated in the chart below.



(Figures in brackets show the percentage of total investment)

The total Investment in manufacturing sector decreased from ₹ 61.74 crore in 2006-07 to ₹ 4.74 crore in 2011-12. This was due to exclusion of four non-working PSUs[3] which had been liquidated during this period.

Budgetary outgo, grants/subsidies, guarantees and loans

3.1.6 There was no budgetary outgo towards Equity, Loans, Guarantees issued, Loans converted into Equity and Interest waived in respect of State PSUs during the year 2011-12. However, the budgetary outgo towards

[1] ₹ 40.67 crore from State Government and ₹ 5.38 crore from Central Government.
[2] ₹ 0.97 crore from State Government, ₹ 1.18 crore from Central Government and ₹ 8.28 crore from other sources.
[3] (i) Manipur Cycle Corporation Ltd.; (ii) Manipur Cement Ltd.; (iii)Manipur Spinning Mills Corporation Ltd.;(iv) Manipur State Drugs and Pharmaceuticals Ltd.

Grants/Subsidy was ₹ 89.00 lakh and loans written off was ₹ 21.39 lakh in respect of Manipur Film Development Corporation Limited.

Reconciliation with Finance Accounts

3.1.7 The figures in respect of Equity and Loans outstanding as per records of State PSUs should agree with that of the figures appearing in the Finance Accounts of the State. In case the figures do not agree, the concerned PSUs and the Finance Department should carry out reconciliation of differences. The position in this regard as at 31 March 2012 is stated below:

(₹ in crore)

Outstanding in respect of	Amount as per Finance Accounts	Amount as per records of PSUs	Difference
Equity	38.62	40.67	2.05
Loan	-	0.97	0.97

3.1.8 Audit observed that the differences occurred in respect of 8 PSUs and some of the differences were pending reconciliation over a period of more than 15 years. The matter was taken up with the Administrative Department of respective PSUs and the Managing Directors of PSUs periodically to reconcile figures. The Government and the PSUs should take concrete steps to reconcile the differences in a time-bound manner.

Performance of PSUs

3.1.9 The financial results of PSUs are detailed in **Appendix-3.2.** A ratio of PSU turnover to State GDP shows the insignificant contribution of the PSUs in the State economy. Table below provides the details of working PSUs' turnover and State GDP for the period 2006-07 to 2011-12.

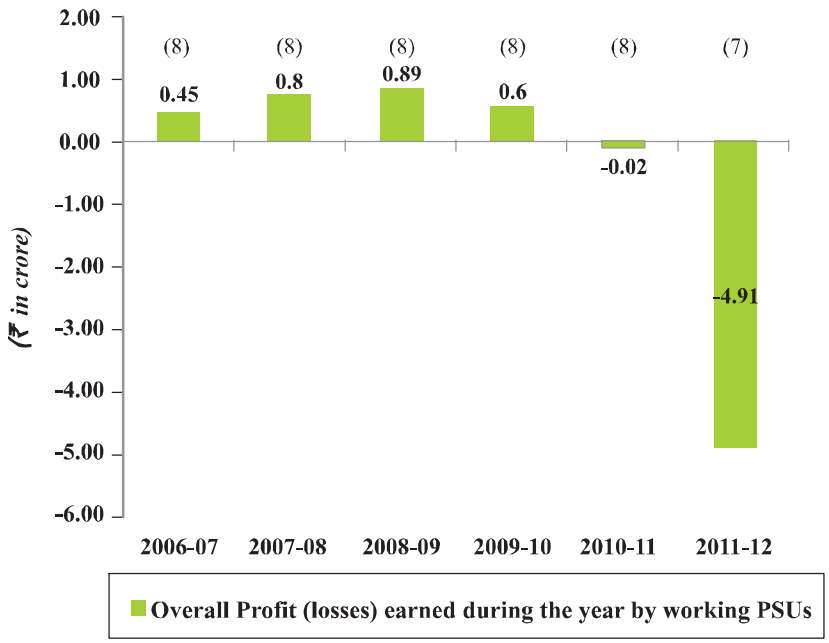
(₹ in crore)

Particulars	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12[4]
Turnover	6.39	6.75	6.77	6.51	5.71	3.54
State GDP	6501	5704	6344	8687	9198	10618
Percentage of Turnover to State GDP	0.09	0.12	0.10	0.07	0.06	0.03

The turnover of working PSUs decreased from ₹ 6.39 crore in 2006-07 to ₹ 3.54 crore in 2011-12. The percentage of turnover to State GDP decreased from 0.09 *per cent* in 2006-07 to 0.03 *per cent* in 2011-12.

3.1.10 Profits earned/losses incurred by State working PSUs during 2006-07 to 2011-12 are given below in a bar chart.

[4] Turnover as per the latest finalised accounts as of 30 September.



Figures in brackets show the number of working PSUs in respective years

During the year 2011-12, out of seven working PSUs, two PSUs earned profit of ₹ 0.39 crore and four PSUs incurred loss of ₹ 5.30 crore. One working PSU[5] had not started its commercial activities. The major contributor to profit was Manipur Police Housing Corporation Ltd. (₹ 0.29 crore). Heavy losses were incurred by Manipur Handloom & Handicrafts Development Corporation Ltd. (₹ 0.52 crore) and Manipur Industrial Development Corporation Ltd. (₹ 4.32 crore).

3.1.11 The losses of PSUs are mainly attributable to deficiencies in financial management, planning and inefficient running of their operations and lack of proper monitoring. A review of three latest Audit Reports of CAG shows that the State PSUs incurred losses to the tune of ₹ 18.97 crore which was controllable with better management. The year-wise details from Audit Reports are stated below:

(₹ in crore)

Particulars	2009-10	2010-11	2011-12	Total
Net Loss	0.43	1.87	4.91	7.21
Controllable losses as per CAG's Audit Report	3.75	15.22	-	18.97

3.1.12 The above losses pointed out in the Audit Reports of the CAG were based on test-check of records of PSUs. The actual controllable losses would be much more. The above table shows that with better management, the losses could be minimized. The PSUs can discharge their role efficiently only if they are financially self-reliant. The above situation points towards a need for professionalism and accountability in the functioning of PSUs.

3.1.13 Some other key parameters pertaining to the seven State working PSUs are given below:

[5] The Manipur Food Industries Corporation Ltd.

(₹ in crore)

Particulars	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Return on Capital Employed (*per cent*)	2.83	2.52	2.66	2.08	(-)2.23	(-)14.96
Debt	26.79	30.91	19.50	30.73	31.06	5.91
Turnover[6]	6.39	6.75	6.77	6.51	5.71	3.54
Debt/ Turnover Ratio	4.19	4.58	2.88	4.72	5.44	1.67
Accumulated losses	7.17	7.17	5.22	5.18	6.94	10.37

As per the latest finalized accounts of seven working Companies, the Capital Employed worked out to ₹ 26.30 crore and total return thereon amounted to ₹ (-) 3.93 crore in 2011-12 as compared to Capital Employed of ₹ 17.20 crore and total return on Capital Employed of ₹ 1.21 crore in 2006-07.

3.1.14 The State Government had not formulated (September 2012) any dividend policy.

Arrears in finalization of accounts

3.1.15 The accounts of the Companies for every financial year are required to be finalized within six months from the end of the relevant financial year under Sections 166, 210, 230, 619 and 619-B of the Companies Act, 1956. The table below provides the details of progress made by working PSUs in finalization of accounts by September 2012:

Sl. No.	Particulars	2007-08	2007-08	2008-09	2009-10	2010-11	2011-12
1	Number of Working PSUs	8	8	8	8	8	7[7]
2	Number of accounts finalised during the year	2	2	2	2	23	17
3	Number of accounts in arrears	123	123	129	135	142	116
4	Average arrears of accounts *per* PSU (3/1)	15.37	15.37	16.12	16.87	15.00	16.57
5	Number of Working PSUs with arrears in accounts	8	8	8	8	8	7
6	Extent of arrears (in years)	10 to 25	10 to 25	10 to 26	10 to 27	11 to 28	9 to 27

The reasons for delay in finalization of accounts are attributable to:

- Lack of required control over the Companies by Government;
- Abnormal delay in compilation and approval of the accounts and delayed submission of the same to the Statutory Auditors by the management; and
- Delay in adoption of accounts in Annual General Meeting.

3.1.16 In addition to above, there were arrears in finalisation of accounts by non-working PSUs also. Three non-working PSUs, had arrears of accounts for for a period of 17 to 28 years.

3.1.17 The State Government had invested ₹ 27.56 crore (Equity: ₹ 27.56 crore), in eight PSUs during the years for which accounts have not been

[6] Turnover of working PSUs as per the latest finalised accounts as of 30 September.
[7] Manipur State Power Development Corporation was struck off from the Register of Companies on 13 June 2011

finalized as detailed in **Appendix-3.3.** In the absence of accounts and their subsequent audit, it cannot be ensured whether the investments and expenditure incurred have been properly accounted for and the purpose for which the amount was invested has been achieved or not and thus Government's investment in such PSUs remained outside the scrutiny of the State Legislature. Further, delay in finalization of accounts may also result in risk of fraud and leakage of public money apart from violation of the provisions of the Companies Act, 1956.

3.1.18 The administrative departments have the responsibility to oversee the activities of these entities and to ensure that the accounts are finalized and adopted by these PSUs within the prescribed period. However, there were huge arrears in finalization of accounts as discussed in Paras 3.1.15 and 3.1.16. Thus, due to arrears in finalization of accounts, the net worth of these PSUs could not be assessed in audit. The State Government needs to take adequate steps to expedite the backlog of arrears in a time bound manner.

3.1.19 In view of above state of arrears, it is recommended that the Government monitor and ensure timely finalization of accounts with special focus on liquidation of arrears and compliance with the provisions of Companies Act, 1956.

Winding up of non-working PSUs

3.1.20 There were six non-working PSUs as on March 2011. Of the six non-working PSUs, three[8] have been liquidated during the year 2011-12 under the provisions of the Companies Act, 1956. Thus, there are three non-working PSUs as on 31 March 2012.

The remaining three non-working PSUs need to be considered for closure as their existence would not serve any meaningful purpose.

3.1.21 The process of voluntary winding up under the Companies Act is much faster and needs to be adopted vigorously. The Government may also consider setting up a cell to expedite closing of its non-working Companies.

Accounts Comments and Internal Audit

3.1.22 Six working Companies[9] forwarded fifteen audited accounts to Accountant General (Audit) during the year 2011-12. The audit reports of Statutory Auditors appointed by CAG and the supplementary audit of CAG indicate that the quality of maintenance of accounts needs to be improved substantially.

3.1.23 Some of the important comments in respect of accounts of Companies are stated below:

[8] (i)Manipur Spinning Mills Corporation Limited, (ii) Manipur Cycle Corporation Limited and (iii)Manipur Cement Limited.

[9] Manipur Tribal Development Corporation Ltd., Manipur Film Development Corporation Ltd., Manipur Police Housing Corporation Ltd.,Manipur Food Industries Corporation Ltd., Manipur Industrial Development Corporation Ltd., and Manipur Electronics Development Corporation Ltd.

Manipur Industrial Development Corporation Ltd. (Accounts for the year 1993-94)

No provision was made in the accounts for probable loss of ₹ 82.81 lakh invested towards Equity shares of non-working subsidiary company.

No provision was made in the accounts for an amount of ₹ 21.49 lakh receivable from another PSU (Manipur Handloom & Handicrafts Development Corporation Ltd.), which remained unrealized since 1976-77.

Manipur Electronics Development Corporation Ltd. (Accounts for the year 2004-05)

No provision was made in the accounts for an amount of ₹ 7.17 lakh, invested to Manipur Rural Electronics Co-operative Federation Ltd., a non-functioning entity.

The annual accounts of the Company for the year 2002-03 were certified by the Statutory Auditor on 21 February 2011 before adoption of previous years accounts (1997-98 to 2001-02) in the Annual General Meeting of the Company.

Debit (minus) balance of ₹ 2,51,272.54 in the United Bank of India, Takyelpat (Account No 32) has been carried forward in the accounts since 31 March 2001 without any adjustment/reconciliation.

3.1.24 The Statutory Auditors (Chartered Accountants) are required to furnish a detailed report upon various aspects including internal control/internal audit systems in the Companies audited in accordance with the directives issued by the CAG to them under Section 619 (3) (a) of the Companies Act, 1956 and to identify areas which need improvement. An illustrative resume of major comments made by the Statutory Auditors on possible improvement in the internal audit/ internal control system in respect of three Companies[10] for the year 2010-11 and another two Companies[11] for the year 2011-12 are given below:

[10] (i) Manipur Industrial Development Corporation Ltd., (ii) Manipur Food Industries Corporation Ltd.,(iii) Manipur Electronics Development Corporation Ltd.

[11] (i) Manipur Industrial Development Corporation Ltd. and (ii) Manipur Tribal Development Corporation Ltd.

Sl. No.	Nature of comments made by Statutory Auditors	Number of Companies where recommendations were made	Reference to serial number of the Companies as per Appendix 5.2
1.	Absence of internal audit system commensurate with the nature and size of business of the company	2	A-1, A-3
2.	Non-maintenance of proper records showing full particulars including quantitative details, situations, identity number, date of acquisitions, depreciated value of fixed assets and their locations	3	A-1, A-5, A-6

Disinvestment, Privatization and Restructuring of PSUs

3.1.25 There were cases of disinvestment/privatization of PSUs in the State.

Reforms in Power Sector

3.1.26 Joint Electricity Regulatory Commission (JERC) for the states of Manipur and Mizoram was formed (January 2005) under Section 83 (5) of the Electricity Act, 2003 with the objective of rationalization of electricity tariff, advising in matters relating to electricity generation, transmission and distribution in the State and issue of licenses.

The JERC (Manipur and Mizoram) became operational in January 2008. The tariff approved by the Commission on 15 March 2011 became effective from 21 March 2011.

3.1.27 Memorandum of Understanding (MoU) was signed in July, 2004 between the Union Ministry of Power and the State Government as a joint commitment for implementation of reforms programme in power sector with identified milestones. One of the objectives of reforms was to set up Corporation for generation, transmission and distribution of electricity in the State by August 2004 and made fully functional by July 2005. Although the State Government has formed a Company (Manipur State Power Development Corporation (MSPDC) Ltd.) in March 1997, it was not made functional even after 14 years. The Company (MSPDC Ltd.) was finally dissolved during 2011-12. Presently the Electricity Department Manipur (EDM) is responsible for distribution and trading functions of electricity in the State

The progress achieved so far in respect of important milestones is stated below:

Sl. No.	Milestone	Achievement as at September 2011
1	For generation, transmission and distribution of electricity in the State, Corporation to be set up by August 2004 and made fully functional by July 2005.	The progress of implementing power sector reforms was slow and the Corporation has not become operational as of September 2011.
2	State Government to set up State Electricity Regulatory Commission (SERC)/Joint Electricity Regulatory Commission (JERC) by November 2004 and file tariff petition immediately thereafter.	The JERC (Manipur and Mizoram) constituted in January 2005 and became operational in January 2008. The tariff approved by the Commission on 15 March 2011 became effective from 21 March 2011.
3	State Government to provide full support to the SERC/JERC to enable it to discharge its statutory responsibilities. The tariff orders issued by SERC/JERC will be implemented fully unless stayed or set aside by a court order.	Tariff orders are implemented.
4	State Government to ensure timely payment of subsidies required in pursuance of orders on the tariff determined by the SERC/JERC.	The department has not provided any information as to release of subsidy by Government.
5	State Government to achieve 100 *per cent* electrification of villages by 2007 subject to adequate funds being provided by the GOI under Pradhan Mantri Gramodaya Yojana or any other relevant scheme.	The State Government was to complete 100 *per cent* metering and billing of all consumers by March 2003 but only 1,66,709 consumers (out of 1,93,661) were provided with energy meters.
6	State Government to install meters on all 11 KV feeders by 31.12.2004.	Out of 105 numbers of 11 KV outgoing feeders, 91 feeders are provided with energy meters as of September 2010. The present status, though called for, has not yet been received from the Electricity Department.

The updated information, though called for, has not been furnished by the Electricity Department (1/2013).

PERFORMANCE AUDIT (COMMERCIAL)

POWER (ELECTRICITY) DEPARTMENT

3.2 Performance Audit on Power Transmission Activities of Electricity Department, Government of Manipur

Executive Summary

Planning and Development

The Department had completed construction of only two substations against the plan for construction of five new /augmentation of existing 132/33 KV substations and five transmission lines during 2007-12.

Project management of Transmission System

Works of construction/augmentation of 132 KV and 33 KV substations and transmission lines were delayed by 5 to 91 months due to delay in tendering activities, statutory clearances, frequent revisions of scope etc.

The Department procured tower material which did not confirm to the standard norms.

Performance of Transmission System

The Department was able to meet only 62.96 per cent of the system peak load during 2007-12 due to non-completion of 132 KV Jiribam-Leimatak line, which was not restored even after ten years of its break- down.

Grid Management

None of the substations had Remote Terminal Units/Substation Management Systems for monitoring and recording real time data for efficient Energy Measurement System.

Disaster Management

Adequate Disaster Management facilities did not exist for black-start operations.

Material Management

The Department did not have any Material Management policy. It had not fixed any standard minimum level or reorder level of material.

Monitoring and Control

Internal control mechanism was weak as instances of preparation of bills and drawing cheques in anticipation of delivery of equipment, passing of bills based on printed invoice of another project, in admissible payments etc. were noticed in audit.

Conclusion

The Department did not complete the transmission projects planned for execution during the five year plan 2007-12. The projects were not executed as per recommendation of the Task Force. The Department had not drawn its allotted power from NEG. Facilities for Disaster Management were not adequate.

Introduction

3.2.1 With a view to supplying reliable and quality power to all by 2012, the Government of India (GoI) prepared the National Electricity Policy (NEP) in February 2005 which recognized the need for adequate and timely investment in the Transmission System, development of a robust and integrated power system through efficient and coordinated action and development of National and State Grid with the coordination of Central/ State Transmission Utilities. Electricity Department, Government of Manipur (the Department) has been mandated to cater to the power requirements of the state including generation, transmission and distribution activities since February 1970.

3.2.2 Principal Secretary/Commissioner (Power) is the overall in charge of the Department. Chief Engineer (Power) (CE) as Head of the Department looks after the day-to-day operations of the Department. The Department consists of eight circles which are under the control of Chief Engineer/Additional Chief Engineers. Each circle is further divided into Divisions which are controlled by Superintending Engineers. For the operations relating to the transmission of electricity, the CE is assisted by one Superintending Engineer (Transmission) (SE-T) at the Circle level and five Executive Engineers[12] (EE) at the Division level. During 2007-08, 509.62 MUs of energy were transmitted by the Department which increased to 520.52 MUs during 2011-12 *i.e.* an increase of 2.14 *per cent.* As on 31 March 2012, the Department had 406.210 Circuit Kilometer (Ckm) of 132 KV transmission network and nine substations at the same voltage level with installed capacity of 283.8 Mega Volt Ampere (MVA). The income of the Department from sale of power and other sources was ₹ 94.73 crore in 2011-12, which was equal to 0.89 *per cent* of the State Gross Domestic Product[13]. The Department had *3,073* employees as on 31 March 2012.

A Performance Audit on Power Generation and Power Distribution Activities of the Department was included in the Report of the Comptroller and Auditor General of India (Civil), Government of Manipur for the year ended 31 March 2010 and 31 March 2011 respectively. The Committee on Public Undertakings (COPU) had not yet discussed the above stated Reports.

Scope and Methodology of Audit

3.2.3 The present Performance Audit conducted during April 2012 to September 2012 covers performance of the Department vis-à-vis transmission of electricity during 2007-08 to 2011-12. Audit examination involved scrutiny of records of different wings at the Head Office and four[14] Divisions under Transmission Circle.

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[12] (1) Sub – Station Construction Division – I, **(SCD – I)** (2) Sub – Station Construction Division – II, **(SCD – II)** (3) Transmission Construction Division – I, **(TCD – I)** (4) Transmission Construction Division – II **(TCD – II)** and (5) Sub -Transmission Division

[13] GSDP of Manipur by Industry of Origin at current prices – advance estimates of ₹ 10,618.52 crore.

[14] SCD – I, SCD – II, TCD – I, TCD – II

Creation/augmentation of transformation capacity by 136 MVA (involving nine Substations) and addition of 103.390 CKM transmission lines (six lines) and 24 ongoing works[15] (10 SS with installed capacity of 125.50 MVA and 14 transmission lines with 409.065 CKM) were examined. 33 KV transmission systems (SS and lines) under the administrative control of Transmission Circle of the Department were also covered as the same was left out of the purview of previous reviews on power sector.

Audit commenced with explanation of the audit objectives and criteria to the Department in presence of the Principal Secretary (Power) during an 'Entry Conference' held on 25 April 2012. This was followed by scrutiny of records at Head Office and four transmission divisions, interaction with the auditee personnel, analysis of data with reference to audit criteria and raising of audit queries. Audit findings were reported to the Department and the State Government in January 2013 and the same was discussed in an 'Exit Conference' held on 04 March 2013. The Exit Conference was attended by the Commissioner (Power), the Chief Engineer (Power) and 14 other Officers of the Department. The views expressed by the Department have been considered while finalising this Performance Audit.

Audit Objectives

3.2.4 The objectives of the performance audit were to assess whether:

- Preparation of State electricity plan was in accordance with the guidelines of the NEP, whether baseline studies were conducted and also if the growth in the State's transmission network was as envisaged in the NEP;
- Transmission system was developed and commissioned in an economical, efficient and effective manner;
- Operation and maintenance of transmission system was done in economical, efficient and effective manner;
- Disaster Management System was set up to safeguard operations against unforeseen disruptions;
- Efficient and effective energy conservation measures were undertaken in line with the NEP and establishment of Energy Audit System;
- Operations are financially viable and fixing of tariff is prudent;
- Efficient and effective system of procurement of material and inventory control mechanism existed; and
- There is a monitoring system in place to review existing/ ongoing projects, take corrective measures to overcome deficiencies identified, respond promptly and adequately to Audit/ Internal audit observations.

[15] Including 33 KV substations

Audit Criteria

3.2.5 The audit criteria adopted for assessing the achievement of the audit objectives were derived from the following sources:

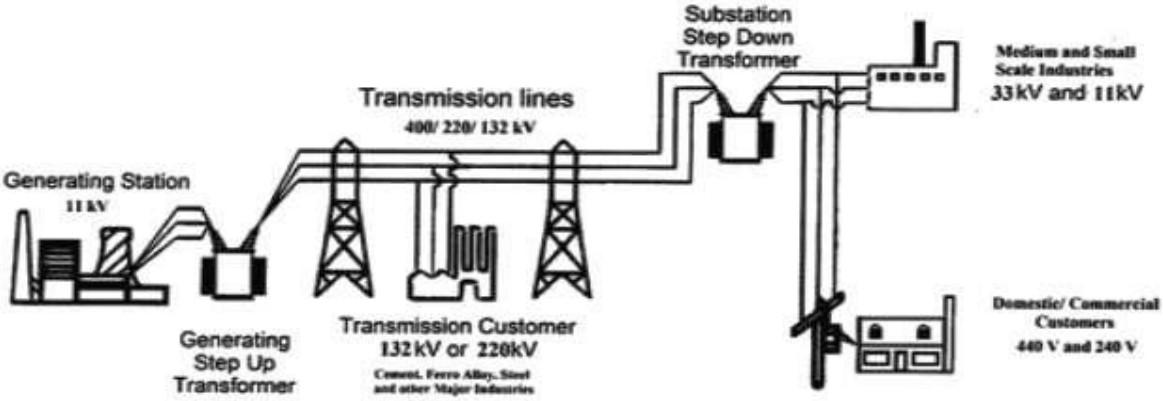
- Provisions of NEP;
- Perspective Plan and Project Reports of the Department;
- Standard procedures for award of contracts with reference to principles of economy, efficiency, effectiveness, equity and ethics;
- Manual of Transmission Planning Criteria (MTPC);
- Grid Code consisting of planning, operation, connection codes;
- Report of the Task force constituted by the Ministry of Power (MoP) to analyse critical elements in transmission project implementation; and
- Reports of Regional Power Committee (RPC)/ Regional Load Dispatch Centre (RLDC).

Brief description of transmission process

3.2.6 Transmission of electricity is defined as bulk transfer of power over long distances at high voltages, generally at 132 KV and above. Electric power generated at relatively low voltage in power plants is stepped up to high voltage before it is transmitted to reduce the loss in transmission and to increase efficiency in the Grid. Substations are facilities within the high voltage electric system used for stepping-up/ stepping down voltages from one level to another, connecting electric systems and switching equipment in and out of the system. The step up transmission Substations at the generating stations use transformers to increase the voltages for transmission over long distances.

Transmission lines carry high voltage electric power. The step down transmission Substation thereafter decreases voltages to sub transmission voltage levels for distribution to consumers. The distribution system includes lines, poles, transformers and other equipments needed to deliver electricity at specific voltages.

Electrical energy cannot be stored; hence generation must be matched to need. Therefore, every transmission system requires a sophisticated system of control called Grid management to ensure balancing of power generation closely with demand. A pictorial representation of the transmission process is given below:



Audit Findings

3.2.7 The audit findings are discussed in subsequent paragraphs.

Planning and Development

National Electricity Policy/Plan

3.2.8 The Central Transmission Utility (CTU) and State Transmission Utilities (STUs) have the key responsibility of network planning and development based on the National Electricity Plan (NEP) in coordination with all concerned agencies. At the end of 10th Plan (March 2007), the transmission system in the country at 765/HVDC/400/230/220/KV stood at 1.98 lakh Circuit Kilometres (Ckm) of transmission lines which was planned to be increased to 2.93 lakh Ckm by end of 11th Plan i.e. March 2012. The NEP assessed the total inter-regional transmission capacity at the end of 2006-07 as 14,100 MW and further planned to add 23,600 MW in 11th Plan bringing the total inter-regional capacity to 37,700 MW

The Department was responsible for making the five year plans in respect of intra state transmission infrastructure in the State as a part of State Electricity Plan (SEP). The Department had prepared Draft Eleventh Five Year Plan (2007-12) which envisaged construction of six new 132 KV substations and five Transmission lines. Against the plan, the Department completed construction/augmentation of two substations and one transmission line. Construction of one new substation and transmission line *viz.* 220/32 KV SS at Imphal and 15 Ckm of 220 KV double circuit (D/C) line was abandoned as the Department had decided (2008) to participate in construction of 400 KV D/C Plattana Bongaigaon trunk transmission network alongwith other North Eastern States. In addition to the aforementioned plan, the Department had undertaken spill-over works relating to six substations and five transmission lines.

Thus, the Department had not been able to complete the projects planned for 2007-12.

Joint Electricity Regulatory Commission (JERC) for the States of Manipur and Mizoram constituted in January 2005 had also not prepared any Electricity Plan for Manipur.

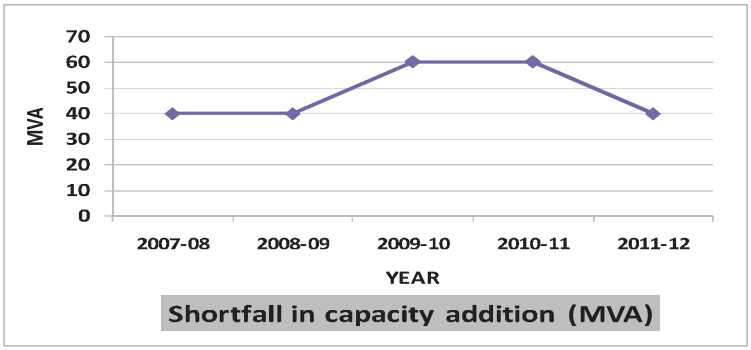
Transmission network and its growth

3.2.9 The transmission capacity addition of the Department at 132 KV level during 2007-08 to 2011-12 is given below:

(i). Number of Substation						
Sl No	**Description**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
1	At the beginning of the year	7	7	7	7	8
2	Additions planned for the year	-	-	1	3	2
3	Added during the year	-	-	-	1	1
4	Total Substation at the end of the year **(1+3)**	7	7	7	8	9
5	Shortfall in additions **(2-3)**	-	-	1	2	1
(ii). Transformer Capacity (MVA)						
Sl No	**Description**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
1	Capacity at the beginning of the year	191.30	211.30	211.30	211.30	263.80
2	Additions/ augmentation planned for the year	60.00	40.00	60	112.50	60.00
3	Capacity added during the year	20.00	-	-	52.50	20.00
4	Capacity at the end of the year **(1+3)**	211.30	211.3	211.30	263.80	283.80
5	Shortfall in additions/ augmentation**(2-3)**	40.00	40.00	60.00	60.00	40.00
(iii).Transmission Lines (CKM)						
Sl No	**Description**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
1	At the beginning of the year	376.21	376.21	376.21	376.21	383.21
2	Additions planned for the year	-	-	-	7.00	23.00
3	Added during the year	-	-	-	7.00	23.00
4	Total lines at the end of the year **(1+3)**	376.21	376.21	376.21	383.21	406.21
5	Shortfall in additions **(2-3)**	-	-	-	-	-

(Source: Departmental records)

During the five year period ending 2011-12, the Department could add 92.50 MVA of transformation capacity (an increase of 48.35 *per cent*); and only 30 Ckm line (an increase of 7.97 *per cent*) during 2010-11. Only two out of six targeted new substation were completed. No addition of substation was planned during 2007-09 while the additions planned for 2009-12 could not be achieved. There was shortfall in targeted addition of transformer capacity during each year covered by the review. During 2007-10, no addition of lines was planned. The shortfall in capacity addition of substations during 2007-12 is shown in the line graph given below:



Abnormal delays in execution and other major factors which resulted in shortfall in capacity addition and slippage in achieving the target by the Department are discussed in the subsequent paragraphs.

Adequacy of transmission network

3.2.10 Scrutiny of grid diagram and power map of the State revealed that the transmission network (substations and lines) at 132 KV and 33 KV levels are concentrated in the four valley districts only whereas the surrounding hill districts were underserved. Two hill districts *viz.*, Chandel and Ukhrul districts did not have 132 KV substation till date. Thus, the electricity supplied in the hill districts was of poor quality (low voltage).

The Department admitted (March 2013) Audit contention of poor quality of electricity supply and stated that provision for 33/11 KV substation in blocks which do not have one is incorporated in the RGGVY[16] for better voltage regulation.

Project management of Transmission System

3.2.11 A transmission project involves various activities from conceptualisation to commissioning. Major activities in a transmission project are (i) Project formulation, appraisal and approval phase and (ii) Project Execution Phase. For reduction in project implementation period, the Ministry of Power (MoP), Government of India (GoI) constituted a Task Force on transmission projects (February 2005) with a view to:

- ❖ Analyze the critical elements in transmission project implementation;
- ❖ Implementation from the best practices of Central Transmission Utilities (CTUs) and State Transmission Utilities (STUs); and
- ❖ Suggest a model transmission project schedule for 24 months' duration.

The task force suggested and recommended (July 2005) the following remedial actions to accelerate the completion of Transmission systems:

- ❖ Undertake various preparatory activities such as surveys, design and testing, processing for forest and other statutory clearances, tendering activities *etc.* in advance/parallel to project appraisal and approval phase and go ahead with construction activities once Transmission Line Project sanction/approval is received;
- ❖ Break-down the transmission projects into clearly defined packages such that the packages can be procured and implemented with lesser coordination and interfacing and at same time it attracts competition and facilitates cost effective procurement; and
- ❖ Standardize designs of tower fabrication so that 6-12 months can be saved in project execution.

3.2.12.1 Inordinate delay: Notwithstanding the elaborate guidelines given by the Task Force Committee for timely completion of the projects and the contract agreements clearly stipulating substations and transmission lines have to be commissioned within 20 months and 33 months respectively from the

[16] Rajiv Gandhi Grameen Vidyutikaran Yojana

date of sanctioning of the first installment of Mobilization Advance (MA), the Department failed to execute the substations and lines (including 33/11 KV substations & transmission lines) within the stipulated time-frame during 2007-12 as detailed in **Appendix-3.4.**

Capacity in KV	Total No. at various stages of construction		No. test checked by Audit		Delay in construction		Time overrun (range in months)		Cost overrun (₹ in crore)	
	Substation	Lines	Substation	Lines	Substation	Lines	Substation	Lines	Substation	Lines
132	11	10	8	10	8	7	5 – 91	1 - 53	18.73	14.84
33	33	24	11	10	9	7	12 - 58	8 - 58	0	11.63
Total	44	34	19	20	17	14	5 – 91	1 - 58	18.73	26.47
(Source: Departmental record)			(Source: Appendix 3.4)							

It was observed that:

- In 27 projects for construction of 132/33 and 33/11 KV substation/transmission line, the Department took 6 to 34 months to award projects after Notice Inviting Tender (NIT) was issued.
- In 10 cases, the contractor took between 9 to 23 months to start supply of equipments inspite of having received 17 - 55 *per cent* of the cost of equipments required for the project as mobilisation advance.
- In respect of 13 projects, erection of equipment worth ₹ 75.65 crore had not yet started and the same was lying idle for a period ranging between 27 months and 72 months **(Appendix-3.5).** In particular equipment worth ₹ 8.28 crore meant for 2x1MVA, 33/11KV substation at Thanlon and its associated line procured in September 2006 was still lying outdoors (given in pictures) at Yurembam and Lamphelpat and was yet to reach the work site (August 2012).

The delay had not only resulted in blocking of huge amount but also put these costly equipment at risk of being damaged/stolen before being put to use.

The Department attributed (March 2013) the delay in award of work to completion of codal formalities and long process of approval by the Tender

Committee. Execution was delayed mainly due to change of scope and design parameters to suit site condition, long process of approval of drawings and technical specifications coupled with adverse law and order problem which impacted the execution of work by the field staff of the contracting agency. The Department also stated that frequent bandhs and economic blockade and change in design of the equipment in some cases affected the delivery schedules.

The reply of the Department was not convincing as most of the reasons cited were controllable and the Department was aware of these constraints and, therefore, should have factored in these constraints at the planning stage itself.

3.2.12.2 Revision of scope: The contract agreements stipulated that the Department may vary the tentative quantities of each item in the order by plus/minus 10 *per cent* of the rates given in the price schedules and within three months from the date of receipt of the work order. It was noticed that in 13 projects, the revision took place after a period ranging between 22 months and 84 months from the stipulated date of completion as per the contract **(Appendix-3.4).** Revision after such huge gaps of time, indicated that the project(s) design and planning was not based on actual pre-project surveys, as envisaged in the Task Force recommendations.

The Department stated (March 2013) that generally projects were revised to suit the change of scope that arises due to specific site condition and other technical reasons.

The reply of the Department was not tenable as the frequent revisions indicated that the pre-project activities like survey and drawings were not conducted properly. Survey Reports, approved drawings working files were, however, not produced to audit.

3.2.12.3 Statutory clearances: The Department had not received clearances from the Forest Department in respect of 132 KV transmission line from Yurembam to Yaigangpokpi even after 18 months (till March 2013) of stipulated date of completion of the project. Forest clearances in respect of 132 KV S/S transmission line from Yaingangpokpi to Hundung and Kakching to Chandel were also pending even after a delay of four months and eight months respectively from the stipulated date of completion. Had the Department taken up work regarding forest clearances in advance or parallel to the project appraisals the delays could have been avoided.

The Department stated (March 2013) that the views of Audit were noted.

3.2.12.4 Procurement of sub-standard tower material

Towers utilized in the transmission lines should be of standard design and within prescribed norms to withstand adverse climatic conditions, for safety of the transmission network and to ensure continued power supply. The Department furnished (October 2012) the minimum norms of weight for each type of tower.

Test check of records revealed that the material for the towers worth ₹ 15.37 crore purchased by the Department for four transmission projects was not as per the above norms of the Department. On being pointed out, the Department submitted (March 2013) the revised norms for weight of material for towers. However, it was observed that the material for tower worth ₹ 4.45 crore **(Appendix-3.6)** was even below the revised minimum weight norms furnished by the Department. Since, the norms for weight of towers have been stipulated for safety of the transmission system, procuring of tower material below the norms of the Department was not justified.

Thus, the Department had ignored its own prescribed norms which may have an impact on the safety of the transmission system.

The Department stated (March 2013) that minimum weight fixed for each type of 132 KV towers submitted in October 2012 was wrong.

The reply of the Department was not acceptable as the Department had procured materials for tower even below the revised norms. Procurement of material for tower, below the standards fixed by the Department had an impact on the safety of the transmission system. Moreover, the Department had not provided consistent data regarding minimum weight standards for the towers. It is worthwhile to mention here that three towers on the 132 KV Ningthoukhong-Churachandpur line were reported to have fallen on 25 March 2013.

3.2.12.5 Lack of coordination and synchronization

The execution of substation component and associated transmission line(s) in a new transmission system needs to be coordinated and their commissioning synchronized. In the following instances, the lack of coordination and synchronization of the transmission system were noticed:

(i). The Department has not yet (March 2013) planned for second circuit between the 132/33 KV substations at Kakching and Churachandpur inspite of the fact that installation of new line bay equipments which started in August 2008 was nearing completion. Thus, installation of line bay equipments would not serve any fruitful purpose without stringing the second circuit between two substations.

(ii). Work on the second transmission circuit on 132 KV transmission circuit between 132/33 substation at Ningthoukhong and Churachandpur was completed in August 2009, whereas installation of the corresponding line bay equipment was pending till date (March 2013).

The Department stated (March 2013) that the time lag in taking up complementing/corresponding components of projects was due to paucity of fund and other technical reasons and further added that the project at (i) is being taken up in 2013 -14 under World Bank funding while the project at (ii) is expected to be completed within a few months. Further progress on the projects is yet to be intimated (March 2013).

Miscellaneous observations relating to Contract Management of Projects

3.2.12.6 Payment of inadmissible amount: Test check of records of the Department revealed that:

i) In two works for construction of 33 KV line for 2x1MVA, 33/11KV SS at Thingkeu and 132/33 KV sub-station at Rengpang, the Department had paid ₹ 16.81 crore against an admissible amount of ₹ 16.60 crore resulting in excess payment to the tune of ₹ 20.50 lakh.. The Department stated (March 2013) that recovery will be made in the next payment.

ii) The Department procured (upto September 2009) 25 KM of Aluminium Conductor Steel Reinforced (ACSR) (Panther) conductors at a cost of ₹ 40.31 lakh for 132 KV Loop In Loop Out at Rengpang. However, in March 2010, the contractor was again paid an additional ₹ 19.69 lakh for which no additional material was received resulting in excess expenditure to that extent as given in the table below:

Sl No	RA No	Qty (Km)	Rate(₹)	Amount (₹)	Date of measurement	Date of payment
1	I	9.78	1,15,000	11,24,700	08-07-04	26-08-04
2	II	5.97	1,15,000	6,86,550	14-12-04	14-12-04
3	XVI	9.25	2,40,000	22,20,000	18-09-09	07-10-09
Sub Total		**25.00**		**40,31,250**		
4	XVIII	-	-	19,68,750	26-03-10	26-03-10
Total		**25.00**		**60,00,000**		

(Source: Department records)

The Department stated (March 2013) that action for recovery of the excess payment was being taken up.

3.2.12.7 Undue benefit to contractors on Mobilization Advance (MA):

As per CPWD Works Manual[17], MA limited to 10 *per cent* of tendered amount at 10 per cent simple interest can be sanctioned to contractors against a Bank Guarantee of a Scheduled Bank for the full amount of advance in respect of certain specialized and capital intensive works costing not less than ₹ 2 crore. It was seen in audit that the Department granted interest free MA equal to 25 *per cent* of tendered value (without taxes) of work with the condition that interest at the rate of 12 *per cent* will be charged if work was not completed within scheduled time.

During the period 2002-03 to 2009-10, the Department had paid ₹ 45.43 crore, as MA to various contractors for 32 projects, against an admissible MA of ₹ 19.79 crore. This had resulted in excess payment of ₹ 25.64 crore. Moreover, the Department had recovered only ₹ 39.27 crore till date (August 2012) leaving an outstanding balance of ₹ 6.16 crore with the contractors. Though the projects had time over run of a period ranging between 4 to 91 months, interest of about ₹ 9.87 crore that had accrued was not recovered from the contractors. The Department stated (March 2013) that interest accrued on

[17] Section 31.6 (in WM 2003), 31.5 (in WM 2007) and 32.5 (in WM 2012)

MA as pointed out by audit would be recovered in the subsequent bills.

3.2.12.8 Excess payment of Freight and Insurance (F&I)

As per contract agreements, all the material shall be transported by road duly insured upto destination on freight paid basis. For the material dispatched uninsured, insurance charges at the rate of one *per cent* of the value of materials shall be deducted by the Department from the contractor's bill.

The Department's norms for freight was 5 (five) *per cent* of cost while the maximum premium for transit insurance for electrical equipment of the nature required in the various projects was of the order of 0.55 *per cent.* Transit insurance premium was based on the contractor's cost (being the declared value) which is of the order of 66 *per cent* of the contract price.

Test check of contracts of projects (132/33/11 KV) revealed that the contractors had not insured material worth ₹ 184.90 crore. Despite this, the Department had not recovered ₹ 1.85 crore as premium for transit insurance from the contractors bills which had resulted in excess payment of ₹ 1.85 crore to the contractors.

It was also observed that in eight projects, the Department had paid between 11.11 to 18.72 *per cent* of the cost of material towards F&I as against permissible F&I norms of 5.55 *per cent*[18] of the contractor's cost. Till September 2012, the Department had paid ₹ 6.30 crore towards F&I as against admissible amount of ₹ 1.52 crore[19] resulting in excess payment of ₹ 4.78 crore.

Thus, the Department incurred excess expenditure of ₹ 6.63 crore due to its failure to enforce contract provision and allowing rates higher than what are admissible.

The Department stated (March 2013) that reconciliation process has been initiated with the concerned turnkey firms and proper action will be taken as per relevant clause of the contract agreement.

Performance of Transmission System

3.2.13 The performance of the Department mainly depends on efficient maintenance of its EHT transmission network for supply of quality power with minimum interruptions. In the course of operation of sub-stations and lines, the supply-demand profile within the constituent sub-systems is identified and system improvement schemes are undertaken to reduce line losses and ensure reliability of power by improving voltage profile. These schemes are for augmentation of existing transformer capacity, installation of additional transformers, laying of additional lines and installation of capacitor banks. The performance of the Department with regard to Operation and Management (O&M) of the system is discussed in the succeeding paragraphs.

[18] Five *per cent* for freight and 0.55 *per cent* for transit insurance
[19] Calculated on 66 *per cent* of the contract price

Transmission Capacity

3.2.13.1 In order to evacuate the power from the Generating Stations and to meet the load growth in different areas of the State, the Department constructs lines and substations at different EHT voltages. A transformer converts AC voltage and current to a different voltage and current at a high efficiency. The voltage levels can be stepped up or down to obtain an increase or decrease of AC voltage with minimum loss in the process. The evacuation is normally done at 132 KV substations.

The transmission capacity (at 132 KV level) created vis-à-vis the transmitted capacity (peak demand met) at the end of each year by the Department during the five years ending March 2012 was as follows:

Transmission Capacity (in MVA)						
Year	**Installed Capacity**	**After leaving 30 *per cent* towards margin**	**Unrestricted system peak load**	**Excess(+)/ Shortage(-) (3-4)**	**Peak demand met**	**(6) as % of (4)**
1	**2**	**3**	**4**	**5**	**6**	**7**
2007-08	211.30	147.91	123.25	(+) 24.66	82.45	66.90%
2008-09	211.30	147.91	133.45	(+) 14.46	80.75	60.51%
2009-10	211.30	147.91	144.50	(+) 3.41	84.15	58.24%
2010-11	263.80	184.66	156.40	(+) 28.26	97.75	62.50%
2011-12	283.80	198.66	145.35	(+) 53.31	96.90	66.67%
			Average	**(+) 24.82**		**62.96%**

(Source: Department and NERLDC records)

From the above table, it can be seen that the overall transmission capacity was in excess of the unrestricted[20] system peak load, after excluding 30 *per cent* towards redundancy, during the period 2007-12. The transmission capacity as on March 2012 was in excess of 53.31 MVA *vis-à-vis* unrestricted system peak load.

Inspite of the excess capacity, the Department was able to meet only around 62.96 *per cent* of the system peak load. The Department admitted (August 2012) that except for a few important installations, power supply was restricted to 3-5 hours during day time and 5 hours on alternate nights throughout the State, attributing this to huge gap between demand and supply.

3.2.13.2 **Idle transmission lines:** During 2007-12, the State's allocated share of power from the North Eastern Grid (NEG) was drawn from two transmission lines[21] only. Thus, the quantum of power that could be supplied in the State depended on the carrying capacity of transmission lines. However, during scrutiny of records, it was noticed that the Department had not drawn power through two transmission lines *viz.*, (i) 132 KV Kohima-Karong interstate line which was kept idle and (ii) 132 KV Jiribam-Leimatak (State)

[20] System peak load when there is no load shedding

[21] (i) Dimapur – Imphal (PGCIL) 132 KV line and (ii) Leimatak – Ningthoukhong 132 KV line

line which was not restored even after 10 years of its break down (September 2002). Had these two lines been functioning and optimally utilized, the State would have been power surplus each year during 2007-12 as shown in the table below:

(All quantities in MVA)			Additional demand after leaving 30 *per cent* towards redundancy that can be met through		Total demand that could be met 3+4+5	Surplus 6 - 2
Year	Unrestricted system peak load	Peak demand already met	Kohima - Karong 132 KV line	Jiribam - Leimatak 132 KV State line		
1	2	3	4	5	6	7
2007-08	123.25	82.45	29.75	29.75	141.95	18.70
2008-09	133.45	80.75	29.75	29.75	140.25	6.80
2009-10	144.50	84.15	29.75	29.75	143.65	(-) 0.85
2010-11	156.40	97.75	29.75	29.75	157.75	0.85
2011-12	145.35	96.90	29.75	29.75	156.40	11.05

(Source: Department records)

The Department's lack of efforts to revive the 82 CKM 132 KV Jiribam – Leimatak (State) line was also obvious from the fact that estimates for restoration work was prepared in July 2006 i.e four years after the line broke down. Actual restringing work commenced in October 2008 after a further delay of over two years. Out of the 43 Ckm that was required to be restrung, the Department was able to complete only 14.56 Ckm till date of audit at an expenditure of ₹ 5.25 crore (against initial estimate of ₹ 1.71 crore).

The Department replied (March 2013) that restringing work on Jiribam – Leimatak 132 KV line is likely to be completed soon and the same can be used for drawing power from Pallatana Power Plant at Tripura (PPPT). It also stated that due to technical reasons, Kohima – Karong 132 KV line can only be used for restricted drawal in case of failure of 132KV S/C Dimapur – Kohima line.

Sub-stations

Adequacy of Sub-stations

3.2.14 Manual on Transmission Planning Criteria (MTPC) stipulates that 150 MVA is the permissible maximum capacity for 132 KV Substation and that every SS of capacity 132KV and above should have at least two transformers. It was observed that out of nine 132 KV substations in the State, three[22] substations had only one transformer. Therefore, in the event of outage of transformer in these substations, the area served would be deprived. In five substations, outage of a transformer would affect 50 *per cent* of the load while in one substation; outage of a transformer would affect 33.33 *per cent* of the load, assuming[23] that the connected load is shared equally amongst the transformers in the substation. Thus, the Department was unable to fulfill the Transmission Planning and Security Standards requirement that the size and number of transformers in a substation shall be planned in such a way that in the event of outage of any single transformer the remaining transformer(s) could still supply 80 *per cent* of the load.

[22] Rengpang (1X12.15 MVA), Jiribam (1X20 MVA) and Jiribam (PGCIL) (1X6.3 MVA)
[23] Details of connected load for each substation was not furnished.

The Department stated (March 2013) that the 132 KV Substation at Rengpang and Jiribam are being upgraded with the installation of one additional transformer of same capacity. No timeframe was, however, given.

Voltage Management

3.2.15 The licensees using intra-state transmission system should make all possible efforts to ensure that grid voltage always remain within limits. As per Indian Electricity Grid Code (IEGC) STUs should maintain voltage range between 119-145 KV in 132 KV line. A study of the monthly maximum/minimum bus voltage of six 132/33 substations[24] during the period from 2007 – 12 revealed that the voltages recorded ranged between 113 KV and 140 KV. It was observed that during 2007-12, the minimum bus voltage had fallen below the IEGC norms in all the substations. Thus, the department was not able to maintain bus voltage consistent with the IEGC norms, which in turn had an impact on the quality of power supplied.

The Department admitted the Audit observation and stated that (March 2013) due to long Interstate Transmission line voltage at 132 KV substations drops at high load and with the installation of one reactor at 132 KV PGCIL switching substation at Yurembam, voltage profile will improve considerably.

Transmission Lines

Extra High Tension (EHT) lines

3.2.16 As per MTPC permissible line loading cannot normally be more than the Thermal Loading Limit (TLL). The TLL limits the temperature attained by the energized conductors and restricts sag and loss of tensile strength of the lines. The TLL limits the maximum power flow of the lines. As per MTPC the TLL of 132 KV line with ACSR[25] Panther 210 sq. mm. conductor was 366 amperes.

Scrutiny of data relating to monthly maximum/minimum line loadings of six 132 KV feeders data during 2007 – 12 revealed that in all the six feeders, the minimum loading had dipped to 2 amperes or lower while the maximum loading never exceeded 250 amperes.

Reason for abysmally low loading of lines was not on record. The range of minimum loading however indicated that during 2007–12, the lines were either kept idle or charged at minimal load.

The Department stated (March 2013) that minimal loadings were for the time of the day when drawal of load was restricted due to either load shedding or on technical ground. It also stated that Yurembam – Loktak I line was to be kept open from November to March as a part of "Special Protection Scheme" of NERLDC.

[24] Located at Yurembam, Ningthoukhong, Churachandpur, Karong, Kakching and Yaingangpokpi

[25] Aluminium Conductor Steel Reinforced

Bus Bar Protection Panel (BBPP)

3.2.17 Bus bar is used as an application for interconnection of the incoming and outgoing transmission lines and transformers at an electrical substation. BBPP limits the impact of the bus bar faults on the entire power network which prevents unnecessary tripping and facilitates selective tripping of only those breakers necessary to clear the bus bar fault. As per Grid norms and Best Practices in Transmission System, BBPP is to be kept in service for all 220 KV substations to maintain system stability during Grid disturbances and to provide faster clearance of faults on 220 KV buses. The Department did not have any 220 KV substation.

Maintenance

Working of hot lines division/sub divisions

3.2.18 Regular and periodic maintenance of transmission system is of utmost importance for its un-interrupted operation. Apart from scheduled patrolling of lines, the following techniques are prescribed in the Report of the Committee for updating the Best practices of Transmission in the country for maintenance of lines:

- Hot Line Maintenance;
- Hot Line Washing;
- Hot line Puncture Detection of Insulators;
- Preventive Maintenance by using portable earthing hot line tools;
- Vibration Measurement of the line;
- Thermo-scanning; and
- Pollution Measurement of the equipment.

The hot line technique (HLT) envisages attending to maintenance works like hot spots, tightening of nut and bolts, damages to the conductor, replacement of insulators *etc.* of Substation and lines without switching off. This includes thermo-scanning of all the lines and Substation towards preventive maintenance. HLT was introduced in India in 1958.

The Department stated (August 2012) that thermo scanning facility was not available. In TCD-I and TCD-II the HLT maintenance was not relevant/not applicable, SCD – II had conducted one HLT maintenance of 132 KV SF6 circuit breakers at different substations each year and in SCD-I a team was stationed at 132/33 KV substation at Yurembam for emergency maintenance works. The Department stated that there was no specific maintenance team or facilities for HTL technique.

Transmission Losses

3.2.19 While energy is carried from the generating station to the consumers through the Transmission & Distribution (T&D) network, some energy is lost which is termed as T&D loss. Transmission loss is the difference between energy received from the generating station/Grid and energy sent to

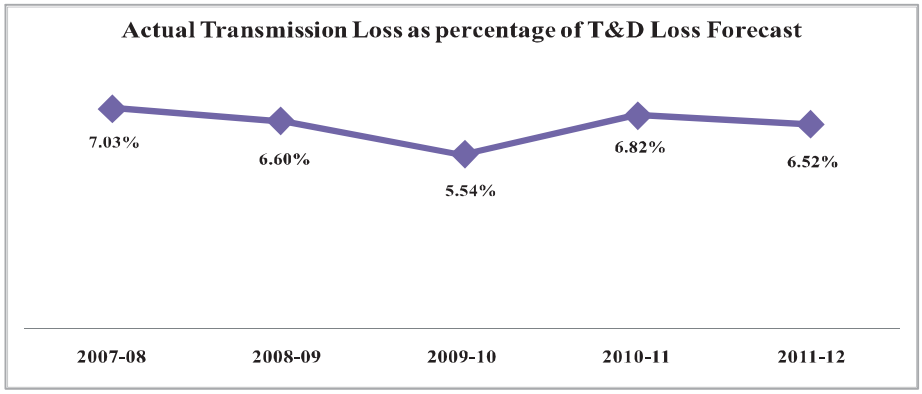
Distribution Companies (DISCOMs). The details of transmission losses from 2007-08 to 2011-12 are given below:

Particulars	Unit	Year					Total
		2007-08	2008-09	2009-10	2010-11	2011-12	
Power received for transmission	MUs	509.62	511.54	464.02	527.40	520.52	2,533.10
Net power transmitted	MUs	487.12	490.22	446.17	505.72	499.27	2,428.50
Actual Transmission loss	MUs	22.50	21.32	17.85	21.68	21.25	104.60
	percentage	4.4	4.2	3.8	4.1	4.1	
Target Transmission loss as per the CEA norm	percentage	3.5	3.5	3.5	3.5	3.5	
Target Transmission loss as per Joint Electricity Regulatory Commission (JERC) norms	percentage	3.5	3.5	3.5	3.5	3.5	
Transmission loss in excess of JERC norm (Valued at realization per unit)	MUs	4.66	3.42	1.61	3.22	3.03	15.94
	Rate per unit in ₹	1.97	2.47	2.31	2.66	2.9	
	Amount ₹ in lakh	91.80	84.47	37.19	85.68	87.87	387.01

(Source: Departmental records)

It can be seen from the above that the transmission losses fluctuated between 17.85 MUs to 22.50 MUs during the review period and exceeded the CEA and the JERC norm of 3.5 *per cent* in all the years. The value of transmission loss suffered by the Department in excess of the norm fixed by the JERC for the period 2007-08 to 2011-12 was 15.94 MU, valued at ₹ 3.87 crore.

Comparison of actual transmission loss as percentage of T & D loss forecast in the Report of the 17th Electric Power Survey report is shown in the chart below. Actual transmission loss had shown improving trend as compared to forecast in the first three years but deteriorated in the next two years.



Grid Management

Maintenance of Grid and performance of SLDC

3.2.20 Transmission and Grid Management are essential functions for smooth evacuation of power from generating stations to the DISCOMs/consumers. Grid Management ensures moment-to-moment power balance in the interconnected power system to take care of reliability, security, economy and efficiency of the power system. Grid management in India is carried out in accordance with the standards/directions given in the Grid Code issued by

CEA. National Grid consists of five regions viz., Northern, Eastern, Western, North Eastern and Southern Grids, each of these having a Regional Load Dispatch Centre (RLDC), an apex body to ensure integrated operation of the power system in the concerned region.

In Manipur there was no full-fledged SLDC. The functions of SLDC were operated in the form of Remote Console - SLDC under the supervision of Superintending Engineer, Transmission Circle (SE-TC). This Remote Console-SLDC works under the purview of North Eastern Regional Load Dispatch Centre at Shillong (NERLDC). During audit, it was seen that certain designated officers of the Department monitored the online real-time grid frequency and drawal by the State (from the north eastern grid) and gave command for loading or shutting down feeders over the phone as and when required. The Department would act according to the loading/shutdown directions given by NERLDC. Thus in the absence of a full-fledged SLDC, acquisition of data from the State Grid and supervisory control of 33 KV and 132 KV equipments was functioning in an adhoc manner.

The Department also stated that since no private licensees are involved in generation, intra-state transmission & distribution of power in the State, JERC had not specified any levies, fees and charges to be collected by SLDC.

Infrastructure for Load Monitoring

3.2.21 Remote Terminal Units/Sub-station Management Systems (RTUs/SMSs) are essential for monitoring the efficiency of the transmission system and the loads during emergency in load dispatch centres as per the Grid norms for all Substation. It was observed that that there was no RTUs in any of the substations. Thus the Department could not monitor and record the real time data for efficient Energy Management System. Further, since the SLDC was not functioning, there was no provision for data storing or back up facilities.

The Department stated (March 2013) that the facilities are envisaged in the proposed SLDC scheme.

Grid Discipline by Frequency Management

3.2.22 As per Grid Code, the transmission utilities are required to maintain Grid discipline for efficient functioning of the rid. All the constituent members of the Grid are expected to maintain a system frequency between 49 and 50.5 Hertz (Hz). Due to various reasons such as shortages in generating capacities, high demand, grid indiscipline in maintaining load generation balance, inadequate load monitoring and management, Grid frequency may go below or above the permitted frequency levels. To enforce the grid discipline, the SLDC issues three types of violation messages (A, B, C). Message A is issued when the frequency is less than 49.2 Hz and over-drawal is more than 50 MW or 10 *per cent* of schedule whichever is less. Violation B message is issued when frequency is less than 49.2 Hz and over-drawal is between 50 and 200 MWs for more than ten minutes or 200 MW for more than five minutes. Message C (serious nature) is issued 15 minutes after the issue of message B when frequency continues to be less than 49.2 Hz and over drawal is more than 100 MW or ten *per cent* of the schedule whichever is less.

The Department stated (July 2012) that there was no violation of Grid Discipline.

Grid Discipline

3.2.23 For maintenance of Grid discipline the Central Electricity Regulatory Commission (CERC) takes up *suo-motu* petition on over drawal of power from the Grid at a lower frequency thus putting the Grid to the risk. No instance of violation of grid discipline was observed during 2007-12.

Backing Down Instructions (BDI)

3.2.24 When the frequency exceeds the ideal limits *i.e.* in a situation where generation is more and drawal is less (at a frequency above 50 Hz) SLDC takes action by issuing Backing Down Instructions (BDI) to the Generators to reduce the generation for ensuring integrated Grid operations and for achieving maximum economy and efficiency in the operation of the power system in the State. Failure of the generators to follow the SLDC instructions would constitute violation of the Grid code and would entail levy of penalties.

The Department stated (March 2012) that BDI was not applicable for Manipur.

Planning for Power Procurement

3.2.25 NERLDC makes allocation of power to the state based on the scheduled generation of the generating stations connected to the North Eastern Grid (NEG). There was nothing on record to indicate that the Department had drawn long term supply plan or made any assessment of its day to day power requirement**.** The Department sold power through the UI route by under drawing its allocation from the NEG. The details of total requirement of power in the State, total power supplied and shortage of power for the five years 2007-08 to 2011-12 are given below:

(Figures in MUs)

Sl.No.	Details	2007-08	2008-09	2009-10	2010-11	2011-12
1	Total energy requirement forecast	641.00	702.00	766.00	838.00	932.00
2	Total energy supplied	487.85	487.29	446.17	506.83	496.90
3	Power short supplied	153.15	214.71	319.83	331.17	435.10
4	Percentage of shortage	23.89	30.59	41.75	39.52	46.68

(Source: Energy requirement are as per forecast of 17th Electric Power Survey of CEA. Energy supplied is as furnished by the Department)

It can be seen from the above that during the period 2007-12, the gap between energy required and energy supplied had increased from 23.89 *per cent* in 2007-08 to 46.68 *per cent* by 2011-12.

The gap in demand supply position also leads to variation between actual generation or actual drawal and scheduled generation or scheduled drawal which is accounted through Unscheduled Interchange (UI) charges, worked out by SLDC for each 15 minutes time block. UI charges are levied for the supply and consumption of energy in variation from the pre-committed daily schedule. This charge varies inversely with the system frequency prevailing at the time of supply/consumption. The levying of UI charges acts as a

commercial deterrent to curb over drawals from Central Generating Stations (CGS) during low frequency conditions.

It was observed that during 2007-12, the Department had under drawn power allocated to the State from the NEG on account of which the net UI receivable was ₹ 160.77 crore as detailed below:

(Figures in ₹ crore)

Year	UI Payable	Additional UI Payable	UI Receivable	Net UI Receivable
	(a)	(b)	(c)	(c) - (a + b)
2007-08	3.043		45.279	42.236
2008-09	5.626		65.604	59.978
2009-10	9.03	0.623	29.628	19.975
2010-11	5.651	0.416	27.391	21.324
2011-12	8.781	0.917	26.956	17.258
Total	**32.131**	**1.956**	**194.858**	**160.771**

(Source: NERLDC Annual Reports)

It is clear from the above that inspite of increasing trend of shortage of power supplied; also indicated by the heavy load shedding in the state, the Department resorted to under drawal of its power allocations.

The Department stated (March 2013) that apart from drawal of power in excess of scheduled allocation through UI, purchase of power from registered trading company during lean hydro period is being considered to mitigate the demand and supply gap. In the short term, additional power from Thermal Power Plants located at Pallatana (42 MW by June 2013) and Bongaigaon (40 MW during 2013-14) were expected. The Department further stated that in the long term, 66 MW from Loktak Down Hydro Electric Project, 300 MW from Tipaimukh Multipurpose Power Projects and Subansiri Project at Kameng in Arunachal Pradesh were also expected.

Disaster Management

3.2.26 Disaster Management (DM) aims at mitigating the impact of a major break-down on the system and restoring it in the shortest possible time. As per the Best Practices, DM should be set up by all power utilities for immediate restoration of transmission system in the event of a major failure. It is carried out by deploying Emergency Restoration System, DG sets, vehicles, fire fighting equipments, skilled and specialized manpower.

Disaster Management Centre, National Load Dispatch Centre, New Delhi will act as a Central Control Room in case of disasters. The four divisions reported that they have not conducted any mock drill as a part of DM programme for starting up generating stations during black start[26] operations.

The DM programme/system of the Department consisted of 28 items of General Instructions, 10 items of DOs and 17 items of DON'Ts as mentioned in the Safety Manual of CEA.

[26] The procedure necessary to recover from partial or a total black out.

Inadequate facilities for DM

3.2.27 The Department stated (July 2012 & March 2013) that for black start operations in 6x6 MW Heavy Fuel Base Power project at Leimakhong, one 150 KVA DG set was provided.

Diesel generating (DG) sets and synchroscopes[27] form part of DM facilities at EHT Substation connecting major generating stations. The Department stated (August 2012) that five 132/33 KV substations had synchroscopes but no DG sets.

Apart from deployment of security personnel in one EHT substation, there was no DM facility. The EHT substations were left vulnerable and the only power plant with black start facility would be able to meet only a small fraction of the demand in the State in the event of a black out. Thus there was an urgent need for the Department to create adequate DM facility at the EHT substations.

The Department stated (March 2013) that views of audit were noted for suitable action.

Energy Accounting and Audit

3.2.28 Energy accounting and audit is necessary to assess and reduce the transmission losses. The transmission losses are calculated from the Meter Reading Instrument (MRI) readings obtained from Generation to Transmission (GT) and Transmission to Distribution (TD) Boundary metering points. It was noticed that as on 31 March 2012 there were 57 interfaces Boundary metering points between TD out of which digital class meters were provided only at 47 TD points.

The Department stated (March 2013) that proper energy auditing and accounting in all feeders/ Distribution Terminals through high accuracy class electronics meters was being considered. Efforts were on to provide prepayment meters to all consumers in the State by 2014.

Tariff Fixation

3.2.29 The financial viability of the Department depends upon generation of surplus (including fair returns) from the operations to finance their operating needs and future capital expansion programmes by adopting prudent financial practices.

The Department stated (July 2012) that transmission tariff was not yet filed as no private licensees were involved.

Material Management

3.2.30 The key functions in material management are laying down inventory control policy, procurement of materials and disposal of obsolete inventory. In reply to audit's query on procurement policy and inventory control mechanism

[27] In an AC electrical power system, it is a device that indicates the degree to which two system generators or power networks are synchronised with each other.

for economical procurement and efficient control over inventory, the Department stated (July & August 2012) that spares and tools and plants (T & P) are generally supplied at the time of construction of projects which are awarded on turnkey basis and regular purchases were not made due to paucity of non-plan fund. Immediate requirement of spares were met from the plan works, which were recouped as and when imprest money was sanctioned. This indicated that the Department did not have a material management policy.

The Department accepted the Audit observation and stated (March 2013) that spares required were included in the upcoming Renovation & Modernization of most of old substations.

From the above it was clear that the Department had not fixed any standard minimum level or reorder level of their material requirement.

The Department did not offer comments (March 2013).

Monitoring and Control

3.2.31 The performance of the EHT substations and lines of on various parameters like Maximum and Minimum voltage levels, breakdowns, voltage profiles should be recorded /maintained as per the Grid code standards.

The Department did not produce relevant record for year-wise cumulative performance of the substations and annual evaluation thereof. The Department was yet to compile monthly MIS reports indicating the performance of the units as well as equipments installed.

Internal Controls and Internal Audit

3.2.32 Internal control is a process designed for providing reasonable assurance for efficiency of operations, reliability of financial reporting and compliance with applicable laws and statutes to ensure proper functioning as well as effectiveness of the internal control system and detection of errors and frauds.

Internal test check of accounts in the Department was limited to scrutinizing monthly accounts of the divisions by Financial Advisor of the Department who in turn briefs the CE from time to time.

Instances of lapses in internal control like not recording date of measurement/verification in respective MBs; preparation of bills and drawing cheques in anticipation of delivery of equipment, passing of bills based on printed invoice of another project; not maintaining transport documents, excess payment of advances and non-recovery thereof, inadmissible payments *etc.* were noticed during audit. All these were instances of weak internal control mechanism in the Department.

Audit Committee

3.2.33 The Department had not constituted the Audit Committee.

Conclusion

3.2.34 Based on evidences gathered, Audit concludes that the Department did not implement its five year plans. The projects were not managed in an efficient, effective and economical manner which resulted in huge wastage of time and resources. The Department had under-drawn power allotted to it from NEG inspite of the frequent load shedding in the State. Disaster Management/Monitoring and Internal controls were not adequate.

Recommendations

3.2.35 The Department may:

- Adhere to the properly laid five year plans and ensure achievement of the targeted goals within the time frame.
- Take up urgent measures to overcome the demand supply gap and idling of transmission lines with a view to insulating the consumers from acute power shortages in the State.
- Increase the capacity of 132 KV and 33 KV networks in the State so that quality power may be available irrespective of location.
- Strengthen the internal control mechanism.
- Draw up a comprehensive disaster management system and conduct mock drills at regular intervals.