

## CHAPTER-II

### 2. Performance Audit relating to Government company

#### Assam Electricity Grid Corporation Limited

### Performance Audit on the working of Assam Electricity Grid Corporation Limited

#### *Executive Summary*

Assam Electricity Grid Corporation Limited (Company) incorporated on 22 October 2003 under the Companies Act 1956 was mandated to provide an efficient, adequate and properly co-ordinated transmission of energy. As on 31 March 2012, the Company had 48 substations (SSs) with installed capacity of 3,549.30 Mega Volt Ampere (MVA) and transmission lines of 4,633.36 Circuit Kilometers (CKM). The present performance audit was conducted to assess the economy, efficiency and effectiveness of the Company in operations as well as execution of its projects during the period from 2007-08 to 2011-12.

#### *Capacity addition*

Against the targeted capacity addition of SSs (2990 MVA) and TLs (1635.92 CKM) under 11<sup>th</sup> Five Year Plan (2007-12), the Company added SSs (1341 MVA) and TLs (456.25 CKM) during the plan period. However, the entire capacity addition excepting augmentation of two SSs (43 MVA) was made by completing the spillover works of previous five year plans. As the execution of transmission projects was undertaken without synchronization with actual progress of execution of generating plans of generating companies, facilities so created remained underutilized.

#### *Project Management*

While implementing the projects, Company took excessive time in completing the preparatory works and other pre-award activities. Even after award of works, the execution of projects delayed due to various reasons like, changes in scope of work, drawings/designs, Right of Way problems, slow progress of works by contractors, etc.

As a result, the projects were completed with significant delays as against the scheduled dates of completion. Instances of mismatch were observed in creation of the infrastructure relating to SSs and TLs resulting in blockage of funds.

#### *Performance of transmission system*

The Company provided 30 capacitor banks having reactive energy of 205 MVAR at its 17 Grid SSs. During the period from April to May 2012, the State received ₹ 9.83 lakh as reactive energy compensation charges from the north-eastern pool of reactive energy accounts for maintaining the voltage stability. The Company was yet to establish any Hot Line Division/procure thermo-vision cameras for timely and effective maintenance of transmission system.

The transmission losses of the Company exceeded the norms prescribed by Assam Electricity Regulatory Commission (AERC) in all five years thereby causing aggregate energy loss of 121.64 MUs during 2007-08 to 2011-2012.

#### *Grid management*

As the functioning of the Remote Terminal Unit (RTU) system in providing the real time data was not satisfactory, State Load Dispatch Centre of the Company failed to exercise control function at the desired level to effectively maintain Grid discipline. North Eastern Regional Load Dispatch Centre imposed Unscheduled Interchange (UI) charges of ₹ 41.74 crore on state power distribution

company during April 2010 to February 2012 due to drawal of power at low frequency level (below 49.50 Hz) in violation of grid discipline. This was also indicative of Company's failure in maintaining effective Grid management system.

#### **Financial management**

Increase in revenue of the Company was not commensurate with the increase in its expenditure resulting in losses per unit of energy transmitted in all the five years except in 2008-09 causing adverse impact on its financial position. The Company delayed filing of Annual Revenue Requirement for tariff revision. As a result, the effective date applicable for tariff hike was also delayed. The Company also did not claim the entitled incentives for providing weighted annual system availability as well as delayed payment surcharge from the power distribution company. This was indicative of lack of prudence in financial management.

#### **Material Management**

The Company had not formulated any procurement policy and inventory control mechanism for economical procurement and efficient control over inventory. Neither any system of ABC analysis nor the levels of

minimum, reordering and maximum stock holdings were fixed.

#### **Energy accounting and audit**

In the absence of proper metering at the feeder ends, energy accounting as well as transmission loss data were unreliable. Though 309 interface boundary metering points were provided with Availability Based Tariff (ABT) meters for correct and accurate assessment of energy consumption, the ABT meters so installed were not functioning in 8 out of 15 test checked SSs. This was indicative of improper accounting of transmission loss.

#### **Monitoring and Control**

The functioning of RTUs/ABT systems installed for online data transfer to SLDC for monitoring of activities of SSs was not satisfactory. The flow of information under MIS introduced for effective monitoring of the SSs was also not regular and accurate. Besides, there was lack of proper follow up action on the discrepancies reported under MIS reports. Thus, the monitoring and control system of the Company needs to be strengthened.

## **Introduction**

**2.1** With a view to supply reliable and quality power to all by 2012, the Government of India (GoI) prepared the National Electricity Policy (NEP) in February 2005 which stated that *the transmission system required adequate and timely investment besides efficient and coordinated action to develop a robust and integrated power system for the country*. It also, *inter-alia* recognised the need for development of National and State Grid with the co-ordination of Central/State Transmission Utilities (CTUs/STUs). Transmission of electricity and Grid operations in Assam are managed and controlled by Assam Electricity Grid Corporation Limited (Company) which is mandated to provide an efficient, adequate and properly coordinated Grid management and transmission of energy. Prior to October 2003, the activities of generation, transmission and distribution were carried out by Assam State Electricity Board (ASEB). However, after incorporation (22 October 2003) of the Company the activities relating to transmission of power were entrusted to it.

**2.1.1** The Management of the Company is vested with a Board of Directors comprising not less than six members and not more than nine members appointed by the Government of Assam (GoA). The day-to-day operations are carried out by the Managing Director (MD) who is the Chief Executive of the

Company with the assistance of Chief General Manager (CGM), Transformation and Transmission (T&T), CGM, State Load Despatch Centre (SLDC), CGM (Finance & Accounts) and Company Secretary.

During 2007-08, 3,970 million units (MUs) of energy were transmitted by the Company which increased to 5,747.69 MUs in 2011-12, *i.e.* an increase of 44.78 *per cent* during 2007-12. As on 31 March 2012, the Company had transmission lines (TLs) network of 4,633.36 circuit kilometres (Ckm) and 48 sub-stations (SSs) with installed capacity of 3,549.30 Mega Volt Ampere (MVA), capable of annually transmitting 17,195.05 MUs<sup>1</sup> at 132 Kilo Voltage (kV) and 66 kV. The turnover of the Company was ₹ 391.14 crore in 2011-12, which was equal to 0.34 *per cent* State Gross Domestic Product (₹ 1,15,408 crore). It employed 1841 employees as on 31 March 2012.

### Scope of Audit

2.2 The present Performance Audit conducted during January to June 2012 covers performance of the Company during 2007-08 to 2011-12. Audit examination involved scrutiny of records of different wings at the Company's head office, SLDC and 15 out of 48 Grid SSs as well as 34 TLs (out of 97 TLs) relating to these SSs under the seven T&T circles headed by Deputy General Managers. These T&T circles were grouped under two Zones (Upper Assam and Lower Assam zone), headed by General Managers. The sample selection for assessing the operational performance of the Company was made after considering the geographic location as well as the load handled by each SS.

Further, Company completed projects relating to 19 new SSs (capacity: 631 MVA), 13 new TLs (456.25 Ckm) and capacity augmentation of existing 25 SSs (710 MVA) under various schemes during 2007-12. Out of the above mentioned works, projects relating to construction of 15 new SSs (517 MVA), 12 new TLs (429.83 Ckm) and augmentation of 16 existing SSs (558.50 MVA) were selected for examining the project management related issues. The sample selection was made based on the contract value of the projects.

### Audit Objectives

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

- ❖ Perspective Plan was prepared in accordance with the guidelines of the National Electricity Policy/Plan and State Electricity Regulatory Commission and assessment of impact of failure to plan, if any;
- ❖ The transmission system was developed and commissioned in an economical, efficient and effective manner;
- ❖ Operation and maintenance of transmission system was carried out in an economical, efficient and effective manner;

<sup>1</sup>  $2309.30 \times 0.85 \times 24 \times 365 = 17195.05$  MUs

- ❖ Effective failure analysis system was set up;
- ❖ Disaster Management System was set up to safeguard Company's operations against unforeseen disruptions;
- ❖ Effective and efficient Financial Management system existed with emphasis on timely raising and collection of bills and filing of Annual Revenue Requirement (ARR) for tariff revision in time;
- ❖ Efficient and effective system of procurement of material and inventory control mechanism were in place;
- ❖ Efficient and effective energy conservation measures were undertaken in line with the NEP and establishment of Energy Audit System; and
- ❖ There is a monitoring system in place to review completed/ongoing projects, take corrective measures to overcome deficiencies identified and respond promptly and adequately to Audit/Internal Audit observations.

<b>Audit Criteria</b>
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**2.4** The audit criteria for assessing the achievement of the audit objectives were derived from the following sources:

- ❖ Provisions of NEP/Plan and National Tariff Policy;
- ❖ Perspective Plan and Project Reports of the Company;
- ❖ Standard procedures for award of contracts with reference to principles of economy, efficiency, effectiveness, equity and ethics;
- ❖ ARR filed with AERC for tariff fixation, Circulars, Manuals and MIS reports;
- ❖ Manual of Transmission Planning Criteria (MTPC);
- ❖ Code of Technical Interface (CTI)/Grid Code consisting of planning, operation, connection codes;
- ❖ Directions from Government of Assam (GoA)/Ministry of Power (MoP);
- ❖ Norms/Guidelines issued by AERC/CEA;
- ❖ Report of the Committee constituted by the MoP recommending the "Best Practices in Transmission";
- ❖ Report of the Task force constituted by the MoP to analyse critical elements in transmission project implementation; and
- ❖ Reports of North-Eastern Regional Power Committee (NERPC)/North-Eastern Regional Load Dispatch Centre (NERLDC).

## Audit Methodology

2.5 Audit followed the following mix of methodologies:

- ❖ Review of Agenda notes and minutes of Company/Board, annual reports, accounts and regional energy accounts (REA);
- ❖ Scrutiny of loan files, physical and financial progress reports;
- ❖ Analysis of data from annual budgets and physical as well as financial progress with completion reports;
- ❖ Scrutiny of records relating to project execution, procurement receipt of funds and expenditure; and
- ❖ Interaction with the Management during entry and exit conferences.

The above methodology was adopted for attaining audit objectives with reference to audit criteria consisted of explaining audit objectives to top management, scrutiny of records at Company's head office and selected units, interaction with the personnel of the audited entity, analysis of data with reference to audit criteria, raising of audit queries, discussion of audit findings with the Management and issue of draft report to the Management/GoA for comments.

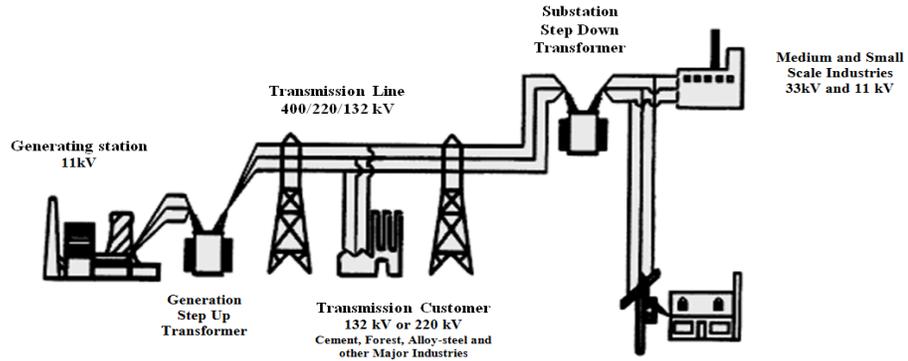
## Brief description of transmission process

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 voltages in power plants is stepped-up to high voltage power before it is transmitted so as to reduce the loss in transmission and to increase efficiency in the Grid. Sub-stations (SSs) are the 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 SSs at the generating stations use transformers to increase the voltages for transmission over long distances.

Transmission Lines (TLs) carry high voltage electric power. The step-down transmission SSs thereafter decrease voltages to sub-transmission voltage levels for distribution to consumers. The distribution system includes lines, poles, transformers and other equipment 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 for effective Grid management to ensure balancing of power generation closely with demand. A pictorial representation of the transmission process is given in the *Diagram 1*.

Diagram-1



### Audit Findings

2.7 Audit objectives were explained to the Company during an ‘Entry Conference’ held on 3 February 2012. Subsequently, audit findings were reported (August 2012) to the Company and GoA and were also discussed in an ‘Exit Conference’ held on 14 September 2012. The Exit Conference was attended by the Secretary, Power Department, Government of Assam and Chief General Manager (T&T) of the Company. The Company/GoA, however, were yet to provide written replies to audit findings (November 2012). The views of the GoA and the Management expressed in the Exit Conference have been taken into consideration while finalising the performance audit. The audit findings are discussed in succeeding paragraphs.

### Planning and Development

#### *National Electricity Policy/Plan*

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

**STU is responsible for planning and development of intra-state transmission system.**

Similarly, STU is responsible for planning and development of the intra-state transmission system. Assessment of demand is an important pre-requisite for planning capacity addition. The transmission network of the Company at the beginning of 2007-08 consisted of 29 Extra High

Tension (EHT) SSs with a transmission capacity of 2,208.30 MVA and 4,177.11 Ckm of EHT TLs. The transmission network as on 31 March 2012 consisted of 48 EHT SSs with a transformation<sup>2</sup> capacity of 3,549.30 MVA<sup>3</sup> and 4,633.36 Ckm of EHT TLs.

The Company prepared 11<sup>th</sup> Five Year Project Plan for the years from 2007-08 to 2011-12 based on the future load growth as anticipated after studying the load demand conditions, as well as the 16<sup>th</sup> and 17<sup>th</sup> Electric Power Survey Reports prepared by CEA and the power generation potentiality of the North Eastern Region. Under the 11<sup>th</sup> Five Year Plan, Company proposed construction of 26 new TLs and 17 new SSs along with augmentation of four existing SSs. The Company proposed to execute these projects phase-wise on yearly basis considering the urgency involved for each project. Accordingly, the required project costs were incorporated in the annual budget of the corresponding year for GoA's approval.

As on May 2007 the total power flow from Assam Power Generation Corporation Limited (APGCL) and GoA's share from the Central Generating stations (CGS) was 788.95 MW. The Company had assessed the net power availability from APGCL and CGS of 2,426.15 MW (788.95 + 1637.20 MW) by the end of March 2012 taking into consideration the completion schedule of the power generation projects as given in *Table 1*.

Table 1

Sl. No	Name of the Project	Power generation potential (MW)	Status of completion	Implementing Agency
1.	Karbi Langpi Hydro Electric Project	100	Completed in 2007-08	APGCL
2.	LTPS Waste Heat Recovery Project	37.20	Completed in January 2012	APGCL
3.	OTPC Palatana	100	Commissioned in September 2012.	OTPC
4.	Bongaigaon Thermal Power Project	200	Original Target July 2011, Revised target March 2013	NTPC
5.	Kamang Hydro Electric Project	300	NA	NEEPCO
6.	Amguri CCGT	100	To be completed by 12 <sup>th</sup> Five Year Plan	APGCL
7.	Subansiri Hydro Electric Project	600	To be completed by December 2016	NHPC
8.	Namrup Thermal Power Project	200	1 <sup>st</sup> Phase of 100 MW scheduled to be completed by August 2012 is still in progress.	APGCL
<b>Total</b>		<b>1637.20</b>		

<sup>2</sup> It is the capacity of a substation to step up/step down the voltage level of power

<sup>3</sup> Includes transformation capacity in respect of 220 kV transformers (1,240 MVA) as well as 132 kV and 66 kV transformers (2,309.30 MVA)

Audit scrutiny revealed that as against total eight projects of 1637.20 MW considered by the Company to assess the net power availability at the end of 11<sup>th</sup> Five Year Plan, only two<sup>4</sup> generation projects of 137.2 MW capacity were completed/commissioned at the end of March 2012. It was further observed that out of six incomplete generation projects, two projects<sup>5</sup> (700 MW) were scheduled to be commissioned by the end of 12<sup>th</sup> Five Year Plan only.

**The Company had transformation capacity of 1962.91 MW against actual requirement of 1204 MW as on March 2012.**

During the 11<sup>th</sup> Five Year Plan period (2007-12), the Company added 1,341 MVA (1,139.85 MW) transformation capacity against the overall actual requirement of 1,204 MW<sup>6</sup>. Thus, the Company had a transformation capacity of 1,962.91<sup>7</sup> MW at the end of March 2012 indicating an excess of 758.91 MW (1,962.91 – 1,204 MW) of handling capacity.

The Company did not revise infrastructure development plans to match the rescheduled dates of commissioning of the related generation plants resulting in under-utilisation of the transmission infrastructure.

### **Transmission network and its growth**

**2.8.1** The transmission capacity of the Company at EHT level during 2007-08 to 2011-12 is given in **Table 2**.

**Table 2**

Sl. No	Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
<b>A. Number of Sub-stations (Numbers)</b>							
1	At the beginning of the year	29	29	34	43	44	-
2	Additions planned for the year	-	-	9	-	8	17
3	Added during the year	0	5	9	1	4	19
4	At the end of the year (1+3)	29	34	43	44	48	-
5	Shortfall in additions (2-3)	-	-	-	-	4	-
<b>B. Transformers capacity (MVA)</b>							
1	Capacity at the beginning of the year	2208.30	2306.30	2692.80	3188.30	3337.30	-
2	Additions/ augmentation planned for the year	-	91.00	723.00	-	2176.00	2990.00
3	Capacity added during the year	98.00	386.50	495.50	149.00	212.00	1341.00 <sup>8</sup>
4	Capacity at the end of the year (1+3)	2306.30	2692.80	3188.30	3337.30	3549.30	-
5	Shortfall in additions/ augmentation (2-3)	-	-	227.50	-	1964.00	-
<b>C. Transmission lines (CKM)</b>							
1	At the beginning of the year	4177.11	4178.13	4298.71	4625.50	4633.36	-
2	Additions planned for the year	-	131.50	251.00	-	1253.42	1635.92 <sup>9</sup>
3	Added during the year	1.02	120.58	326.79	7.86	-	456.25
4	At the end of the year (1+3)	4178.13	4298.71	4625.50	4633.36	4633.36	-
5	Shortfall in additions (2-3)	-	10.92	-	-	1253.42	-

<sup>4</sup> Sl. No. 1 and 2 of Table-1

<sup>5</sup> Sl. Nos. 6 and 7 of Table-1

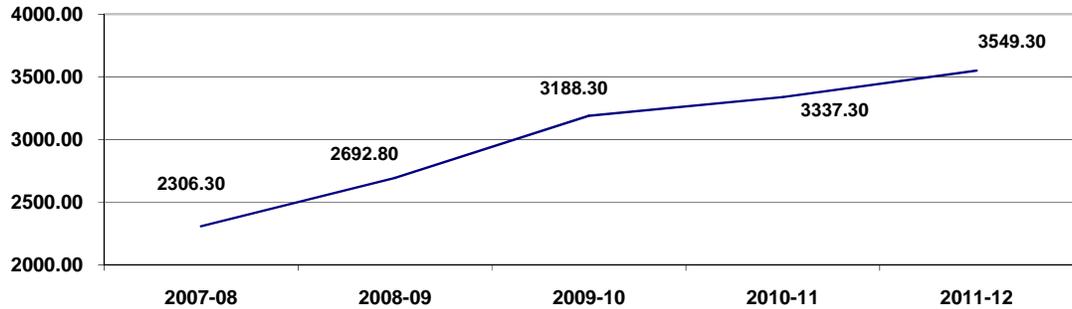
<sup>6</sup> 926.15 MW (788.95 MW + 137.20 MW) + 30 per cent of 926.15 MW towards margin = 1204 MW.

<sup>7</sup> For calculation of transformation capacity only substations of 132 kV and 66 kV have been considered i.e 0.85 of 2309.30 MVA.

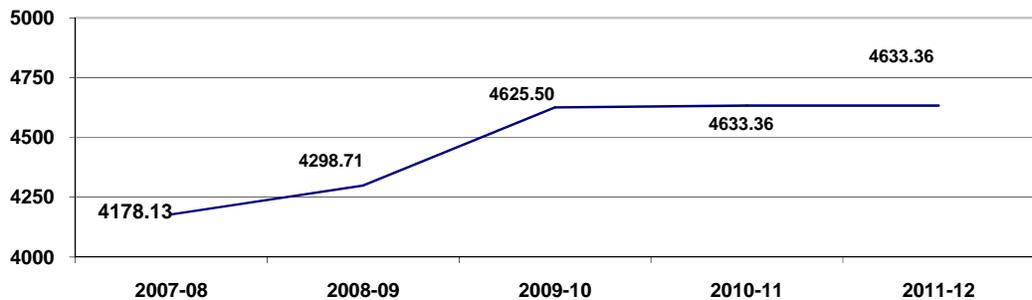
<sup>8</sup> All additions pertain to spill over works of previous five year plans excepting augmentation of two SSs of 43 MVA

<sup>9</sup> All additions pertain to spill over works of previous five year plans

**Graph I: Trend in addition of transformation capacity in MVA**



**Graph-II: Trend in addition of lines in Ckm.**



**Barring augmentation of two SSs, entire capacity addition completed during 2007-12 pertained to spill over works of earlier five year plans.**

As could be noticed from *Table 2*, the Company targeted construction of 17 EHT SSs (2899 MVA), augmentation of 4 SSs (91 MVA) and laying of 1,635.92 Ckm of EHT lines under the 11<sup>th</sup> Five Year Plan. As against this, the Company constructed 19 EHT SSs (631 MVA), augmented 25 SSs (710 MVA) and laid 456.25 Ckm EHT lines during 2007-12. The entire capacity addition was, however, pertained to the spill over works of earlier Five Year Plans except augmentation of two SSs<sup>10</sup>, which were under 11<sup>th</sup> Five Year Plan.

Thus, works pending execution under 11<sup>th</sup> Five Year Plan (2007-12) would correspondingly be spilled over for execution in subsequent five year plan periods necessitating the time and cost overrun in execution of works besides deferment of intended objectives of these projects.

The particulars of voltage-wise capacity additions planned, actual additions, shortfall in capacity additions, etc., during the period covered in audit are given in *Annexure 7*. The broad reasons for non-achievement of targets as observed in audit were delay in completion of projects on account on non-commencement of preparatory activities in advance/parallel to project appraisal stage, increase in volume/scope of works due to change in design/drawings, delays in resolving Right of Way (RoW) issues and delays in

<sup>10</sup> Jorhat SS 25 MVA (ADB funded) and Panchgram SS 18 MVA (other than ADB funded).

obtaining statutory clearances, besides slow progress of work on part of the contractors. The case study on the project management has been presented under *paras 2.9.1 to 2.9.2.2.*

### **Project management of transmission system**

**2.9** A transmission project involves various activities from conceptualisation to commissioning. Major activities involved in a transmission project are (i) Project formulation, appraisal and approval phase and (ii) Project execution phase. For reduction in project implementation period, MoP, GoI constituted a Task Force on transmission projects (February 2005) with a view to:

- ❖ analyse the critical elements in transmission project implementation;
- ❖ implement the best practices of CTUs and STUs; and
- ❖ suggest a model transmission project schedule for 24 months' duration.

The Task Force 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 TLs Project sanction/approval is received;
- ❖ Break-down the transmission projects into clearly defined packages in such a manner that the packages can be procured and implemented requiring least coordination and interfacing and at the same time attracting competition to facilitate cost effective procurement; and
- ❖ Standardise designs of tower fabrication, so that 6-12 months are saved in project execution.

**Due to non-adherence to the recommendations of the Task Force, works could not be completed within stipulated time thereby causing time and cost overrun.**

The project management related aspects were test checked in the performance audit in respect of 43 projects (15 new SSs, 12 new TLs and augmentation of 16 SSs) out of total 57 projects (19 new SSs, 13 new TLs and augmentation of 25 SSs) completed during 2007-12. It was observed that the Company was not able to adhere to the detailed steps recommended by the Task Force for speedy and timely completion of the projects right from project formulation to implementation. None of the works were completed within the stipulated time mentioned in the work orders as delays occurred at various stages resulting in time and cost overrun as well as blockade of funds due to mismatch in creation of related facilities. Besides, there was deferment of intended benefits of the projects on account of these delays as discussed in succeeding paragraphs.

The Company undertook projects under different schemes to enhance its transformation and transmission capacity. These projects were taken up under the following funding mechanisms:

(i) Assam Power Sector Development Programme (APSDP) under Asian Development Bank (ADB) funding; and

(ii) Other schemes viz., North Eastern Council (NEC), Non-Lapsable Central Pool of Resources (NLCPR), Assam Bikash Yojna (ABY) and Assam Priority Sector.

**Projects under Assam Power Sector Development Programme (ADB funded)**

**2.9.1** Assam Power Sector Development Programme (APSDP) was introduced by GoA with the objectives to improve transmission capacity, efficiencies and improvement of transmission and distribution system, increase in availability of electricity in rural areas. For financial arrangements to implement the APSDP, tripartite agreements were entered (December 2003, February 2010 and January 2011) between GoA, erstwhile ASEB and ADB. Accordingly, ADB agreed to provide a loan of 250 million US Dollars for implementing the APSDP through Government of India (GoI) in the form of loans. GoI, on the other hand, provided the project funds to the GoA in the form of loan (10 per cent) and grants (90 per cent) with stipulation that GoA will pass on the said funds to erstwhile ASEB<sup>11</sup> in the same proportion. The loan component (10 per cent) was repayable in 20 years along with interest of 10.5 per cent per annum. The project costs in excess of the amount approved by ADB were to be borne by GoA.

**Against ₹ 684.40 crore received (2005-10) from ADB, the Company could utilise only ₹ 603.30 crore.**

During 2005-10, funds amounting to ₹ 684.40 crore (₹ 428 crore from ADB and ₹ 256.40 crore from GoA) were sanctioned for APSDP works. As against this, an amount of ₹ 603.30 crore was incurred on projects leaving an unspent amount of ₹ 81.10 crore (11.85 per cent) at the end of March 2012. This unspent balance could not be utilised mainly due to delay in completion of the projects against respective schedules.

During January 2011 to November 2012, funds amounting to ₹ 120.53 crore were further sanctioned (₹ 43.89 crore from ADB and ₹ 76.64 from GoA) for implementing the APSDP projects. The Company could, however, utilise only ₹ 60.22 crore (49.96 per cent) on these projects so far (October 2012).

**Implementation of projects (ADB Funded) under 10<sup>th</sup> and earlier plans**

**2.9.1.1** To ensure completion of project works within the targeted period, it is essential that all preparatory activities like, surveys, design, testing, processing for forest and other clearances, and tendering activities, etc are taken up in advance/parallel to project appraisal/approval stage and the work orders are issued well in time after the approval of Detailed Project Reports (DPRs). For timely completion of above activities, necessary mechanism was

<sup>11</sup>After unbundling of ASEB in 2003, the activities relating to transmission of power in the State were carried out by the Company incorporated on 23 October 2003.

required to be evolved by fixing completion time for the pre award activities. The Company however, had not formulated any policy in this regard.

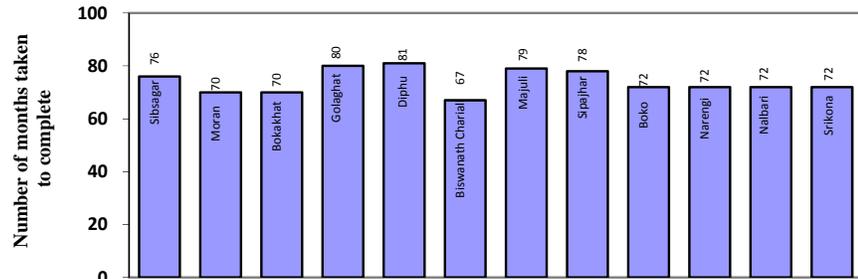
**Out of construction of 20 TLs, 19 SSs and augmentation of 18 SSs undertaken during 2007-12 under previous plans, the Company could complete only 12 TLs, 12 SSs and augmentation of 18 SSs upto March 2012.**

During 2007-12 the Company undertook construction of 20 TLs, 19 SSs and augmentation of 18 SSs pertaining to previous plans. The Company completed works of 12 TLs, 12 SSs and augmentation of 18 SSs under the 10<sup>th</sup> Plan period. For the remaining eight TLs and seven SSs, orders were placed during September-December 2012 and the

works were at different stages of execution.

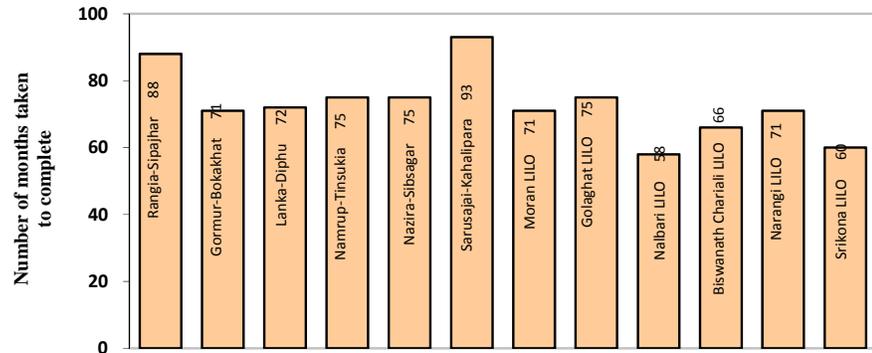
The details of overall time taken from the date of preparation of DPR to the date of commissioning of 12 new SSs and 12 new TLs are depicted in **Graph IV and V** respectively.

**Graph IV**



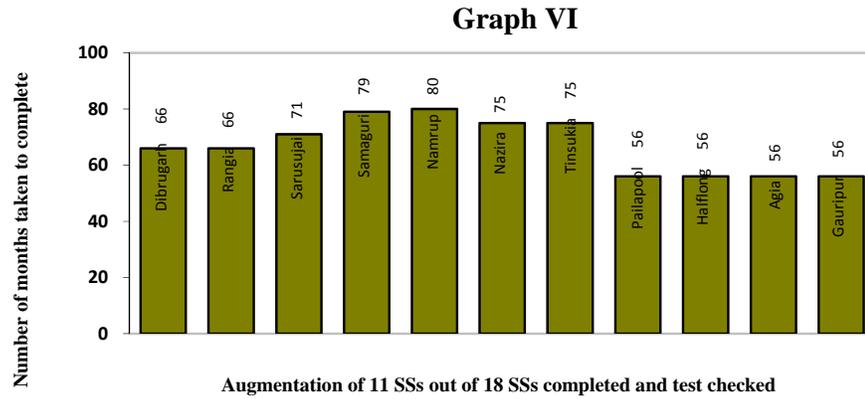
Construction of 12 New SSs completed during 2007-12

**Graph V**



Construction of 12 New TLs completed during 2007-12

Similarly the details of overall time taken by the Company in completing the augmentation of 11 out of 18 SSs test checked from the date of preparation of DPRs are depicted in **Graph VI**.



It may be observed from *Graph IV* and *V* that the Company took overall time ranging from 67 months to 81 months and from 58 months to 93 months, in completing 12 SSs (*Graph IV*) and 12 TLs (*Graph V*) respectively.

Similarly, as depicted in *Graph VI*, the Company took a period ranging from 56 months to 80 months in completing the augmentation work of 11 SSs out of 18 SSs selected for examination.

The stage wise analysis of reasons attributable for the delays in completion of above projects is given in succeeding paragraphs.

**Delay in award of works**

**2.9.1.2** Stage wise details of time taken in pre and post work award activities of the projects relating to 12 new SSs, 12 new TLs and augmentation of 11 SSs completed during 2007-12 and test checked in audit are tabulated in **Table-3**.

**Table 3**

Sl. No.	Name of the Project	Date of preparation of DPR	Date of sanction of DPR	Total no. of packages	Date of Notice Inviting Tenders (NIT)	Date of work order	Schedule date of completion	Actual date of completion
1	Construction of 12 new SSs	February 2003	December 2003	5	February 2005	March 2006	September 2007	September 2008- November 2009.
2	Constructions of 12 new Transmission Lines	February 2003	December 2003	4	January 2005	June 2006	December 2007	December 2007 <sup>12</sup> - November 2010
3	Augmentation of 11 SSs <sup>13</sup>	February 2003	December 2003	2	February 2005	March 2006	September 2007	October 2007- October 2009

As can be noticed from **Table 3**, the Company took 10 months in obtaining approval of DPRs for all 35 projects. The delay in approval of DPRs was mainly due to the time lost in submission of satisfactory clarifications on the

<sup>12</sup> One TL namely, LILO for Nalbari SS was commissioned within scheduled completion date.

<sup>13</sup> Out of augmentation works of 18 SSs completed during 2007-12, works relating to 11 SSs were test checked in audit.

doubts and queries raised by the approving authority. However, the major portion of time consumed in completion of projects, viz. to the extent of 27 months in case of 12 SSs and 30 months in case of 12 TLs and 27 months in case of augmentation of 11 SSs, were taken in issuing the work orders by the Company from the date of approval of DPRs. These delays were mainly due to excessive time taken (13 to 14 months) in issuing Notice Inviting Tenders (NIT) on account of abnormal time taken in the preparation of tender documents and finalisation of tenders. The issue of the work orders after NITs was further delayed (13 to 17 months) due to delays in finalisation of resettlements plans and completion of the census of the affected population.

The delays at various stages in release of award letters for the works as stated above, had correspondingly pushed back the scheduled dates of project completion.

### **Execution of new projects**

**2.9.1.3** With a view to accelerate the works relating to transmission infrastructure projects, the Task Force constituted by MoP had suggested (July 2005) several remedial actions, which include taking up the preparatory activities in advance/parallel to project appraisal phase, awarding the work after splitting the projects into clearly defined packages, standardising the design of tower fabrication etc. It was observed that the Company failed to comply with the suggestions while executing the new transmission projects. Resultantly, out of total 24 projects (12 new SSs and 12 new TLs) completed during 2007-12, 23 projects (12 SSs and 11 TLs) were delayed considerably leading to significant cost overrun as detailed in **Table 4** below:

**Table 4**

Capacity in kV	Total Constructed (Numbers)		Delay in construction (Numbers)		Time overrun (range in months)		Cost overrun (₹ in crore)	
	SSs	Lines	SSs	Lines	SSs	Lines	SSs	Lines
400								
220	-	1	-	1		24	22.30	16.32
132	12	11	12	10	12-26	8-35		
<b>Total</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>11</b>			<b>22.30</b>	<b>16.32</b>

**There was delay in completion of SSs and TLs by 12 to 26 months and 18 to 35 months respectively.**

It may be noticed that against the time of 18 months (*i.e.* by September 2007 for SS and December 2007 for TLs) stipulated for completing the projects from the date of the work orders, there was delay in completion of all the 12 new SSs and 11 new TLs by 12 to 26 months and 8 to 35 months respectively.

The main bottlenecks in timely completion of works were increase in the volume of works, change in design and drawings, 'Right of Way' (RoW) problems due to inadequate initial survey, delays in acquisition of land, delays in finalising resettlement plans and payment of compensation to the affected people, delay in obtaining clearance from the forest department, *etc.* The

delays in project execution were occurred due to Company's failure in initiating the above mentioned preparatory activities in advance/parallel to project appraisal/approval stage contrary to the recommendations of the Task Force. Besides, slow progress of works on the part of contractors had also contributed towards delays in project completion.

**Impact of delay**

**2.9.1.4** According to the financial arrangements for ADB funded projects, the ADB loans received by GoI were to be transferred to GoA to the extent of the projects costs approved by ADB, in the form of grants (90 per cent) and loans (10 per cent). The project costs in excess of the amount approved by ADB, if any, were to be borne by the GoA. Details of the financial burden passed on to the GoA due to Company's failure to restrict the project costs within the costs approved by ADB are given in **Table 5**.

**Table 5**

(₹ in crore)

Project	Original contract cost	Revised Cost	Price escalation	Completed cost	Expenditure approved by ADB	Additional financial burden on the GoA
Construction of transmission lines	69.00	96.79	12.50	109.29	89.10	20.19
Construction of SSs	101.12	103.46	30.10	134.16	111.86	22.30
<b>Total</b>	<b>170.12</b>	<b>200.25</b>	<b>42.60</b>	<b>243.45</b>	<b>200.96</b>	<b>42.49</b>

It can be observed from the above that the GoA had to bear additional costs of ₹ 42.49 crore in respect of new SSs and TLs projects on account of the project costs incurred in excess of the expenditure approved by the ADB. This was mainly on account of the cost overrun caused due to delays in completion of the said projects as detailed in the **Table 4** under **para 2.9.1.3 supra**.

**2.9.1.5** Case study of delayed projects further revealed that most of the projects were delayed on account of not taking up the preparatory activities in advance/parallel to the project appraisal stage. This led to land acquisition/RoW problems, non-finalisation of resettlement plans, changes in the scope of work due to frequent revision of designs and drawings, etc, which ultimately caused significant variations in the originally approved project cost as well as non-achievement of intended benefits as summarised in **Table 6** in respect of four such individual cases.

Table-6

Sl. No	Name of Project	Original contract value (₹ in crore)	Final contract value (₹ in crore)	Scheduled date of completion (Actual date of completion)	Delay in months	Major reasons for delay	Impact of delay	
							Variation in contract value (₹ in crore)	Physical impacts.
1	132 kV Nazira – Sivsagar TL	1.86	2.53	December 2007 (May 2009.)	17	Delays in taking up the preparatory activities; significant changes in the scope of works due to land acquisition problems, delay in finalisation of resettlement plans and resolving RoW issues etc. This led to significant changes in design layout, height and alignment of the towers in the later stage of execution.	0.67	Non achievement of targets of reduction of line loss, failure to cope up with the increased demand of power during the period of delay and loss of potential revenue there against.
2.	2x16 MVA Sivasagar SS	7.12	9.77	September 2007 (June 2009)	21		2.65	
3	2x25 MVA 132/33 kV Srikona and Narengi SSs.	21.52	26.39	September 2007 (February 2009)	17		4.87	Non creation of additional capacity to cope up with the increasing demand of Silchar town and adjoining areas by 17 months.
4	132/33 kV Gormur-Bokakhat TL.	16.08	23.06	December 2007 (January 2009)	13		6.98	Failure to reduce line loss and improve the voltage profile for 17 months. Non-reduction of distance between grid SSs for reduction of line loss and to meet the increasing load demand of Bokakhat area for delayed period.

### **Mismatch in creation of transmission infrastructure**

**2.9.1.6** The Company planned (February 2003) for creation of new TLs as

**Due to lack of synchronisation in execution of inter-dependent projects, the SSs were completed well before completion of connecting TLs and vice versa.**

well as SSs to cope up with the growing load demand as well as to reduce transmission losses. To avoid any mismatch in creation of the transmission infrastructure, it is essential that the transmission projects (*viz.* TLs and SSs projects), which are inter-dependent are planned and executed in a synchronised

manner. It was observed that due to lack of synchronization in issue of award letters as well as in execution of works of inter-dependent projects, SSs were completed well before completion of connecting lines and *vice versa*. The major cases of mismatch in construction of new SSs and the corresponding TLs by the Company are discussed below.

### **132 kV Rangia – Sipajhar – Rowta – Depota TL and 132 kV Sipajhar SS**

**2.9.1.7** With a view to reduce the line losses and increase reliability and quality of power supply, the Company proposed (February 2003) to construct the 132 kV Rangia-Sipajhar-Rowta-Depota TL against ADB funding for replacement of old overloaded line. The Company simultaneously proposed (February 2003) to construct 132 kV Sipajhar SS to be connected with the new

line. The construction of Sipajhar SS was completed by the Company in August 2009 at a cost of ₹ 13.01 crore.

The work of construction of TL was awarded (June 2006) at ₹ 23 crore with scheduled completion period of 18 months (December 2007). The Company took 17 months in issue of award letter from the date of issue of NIT (January 2005) due to abnormal time taken in finalizing the tenders. As execution of works was taken up based on the field survey report of 2004, which was prepared prior to commencement (2007) of check survey, progress of work suffered due to numerous RoW problems resulting in increase in quantity, change in scope and design of works. The TL could finally be completed at a cost of ₹ 36.59 crore only in June 2010 viz. after 10 months of completing (August 2009) the construction of corresponding new SS.

Thus, due to mismatch in execution of two transmission projects by the Company, the intended benefits of the projects could not be availed for 10 months besides blocking of funds (₹ 13.01 crore) incurred on construction of new SS for said period.

#### ***132 kV Lanka – Diphu TL and 2x16 132/33 kV Diphu SS.***

**2.9.1.8** NIT for design, engineering supply and erection, testing and commissioning of the 132 kV Lanka-Diphu TL was issued in January 2005. The work was completed in March 2009 at a cost of ₹ 22.43 crore.

The work related to design, engineering, supply, erection, testing and commissioning of related 132 kV SS with provision of 2x16 MVA transformer was, however, awarded in March 2006 at estimated cost of ₹ 6.96 crore to be completed within 18 months from the date of allotment of works. The allotment of works of the SS was delayed due to non finalisation of resettlement plans, payment of compensation to the affected people and obtaining clearance from forest department etc. SS could be completed only in November 2009 i.e. eight months after the completion (March 2009) of the related TL. Thus, mismatch in creation of the transmission facilities caused delay of eight months in the delivery of intended benefits of the projects besides blocking of huge investment of ₹ 22.43 crore incurred on construction of TL for the said period.

#### ***Mismatch between Generation capacity and Transmission facilities***

**2.9.1.9** NEP envisaged augmenting transmission capacity taking into

**Failure to provide transmission facilities as per the generation plans resulted in loss of generation.**

account the plans for new generation capacities so as to avoid mismatch between generation capacity and transmission facilities. It was observed in one case that the Company was not able to provide transmission facilities to match the generation plan of the generating company. Resultantly, the additional power generated against the augmented generating capacity had to be evacuated through existing overloaded TLs of the Company thereby causing evacuation problems and loss of generation as discussed in next page.

Assam Power Generation Corporation Limited (APGCL) had planned to enhance the capacity of Lakwa Thermal Power Station (LTPS) from 120 MW to 157.2 MW by installing Lakwa Waste Heat Recovery Project (LWHRP) of 37.2 MW. APGCL completed the augmentation of LTPS by commissioning the LWHRP in January 2012.

Evacuation of power from the LTPS was done through four 132 kV and three 33 kV feeders belonging to the Company. As existing feeders were already overloaded, the Company decided (September 2008) to construct one 132/33 kV SS with two transformers of 40 MVA at Sonari and one 132/33 kV TL from Nazira to Gormur along with one 132/33 SS at Nazira to ease power evacuation problems of LTPS.

It was however noticed that against the targeted works of construction of the above two SSs (at Sonari and Nazira) and one TL (from Nazira to Gormur) Company could complete only one SS at Nazira (January 2011) before commissioning (January 2012) of LWHRP. The works relating to SS at Sonari and TL from Nazira to Gormur were yet to be completed (October 2012). The reasons for delay in completion of these two works have been analysed as under.

#### **SS at Sonari**

The work order for construction of Sonari SS under ADB funding at a cost of ₹ 10.95 crore was placed (January 2011) by the Company after abnormal delay of 13 months from the date of issuing (December 2009) the NIT. The delay was caused mainly due to excessive time taken in bid evaluation process and in obtaining approval of ADB. The works were still pending for completion (October 2012) against the scheduled completion date of August 2012.

#### **132/33 kV TL from Nazira to Gormur**

The NIT for the construction of 63.2 KM 132/33 kV Nazira–Gormur TL was originally called on September 2008. However the NIT was cancelled (August 2009) for technical reasons. After calling (August 2009) the fresh NIT the work order was finally issued (January 2010) at a cost of ₹ 13.75 crore. The execution of the project suffered on account of RoW problems, revisions in scope of works and designs of the project besides inclusion of new items. Resultantly, the deadline to complete the work (December 2010) lapsed long back and the project was still pending for completion (October 2012). The awarded cost had already been revised to ₹ 21.08 crore (October 2012) on account of the delay in completion of work.

**Generation unit was kept under forced shut down due to evacuation constraint resulting in loss of generation aggregating 243.73 MUs.**

Thus, the evacuation problem of LTPS could not be eased due to Company's failure in providing the required transmission infrastructure in time mainly on account of excessive time taken in completing the tendering process, obtaining ADB's approval, and completing preparatory activities, which could have been avoided with better planning and co-ordination. Because of constraints in evacuation

system, LTPS had to limit its operations and place its units under forced shut down by rotation leading to avoidable loss of generation aggregating 243.73<sup>14</sup> MUs during the period of commissioning (January 2012) of LTPS till October 2012.

***Execution of new SSs projects without assessing load requirements***

**2.9.1.10** Anticipated load growth and probable increase in future demand along with permissible limit of voltage regulations are required to be considered before taking up new SS projects so as to avoid creation of excess transformation capacity. The load forecast for the proposed transmission projects should also consider the anticipated physical and financial benefits to be derived against the new projects.

Based on the load flow analysis done in February 2003, the Company constructed 12 132/33 kV new SSs under first phase of ADB funded APSPD during 2008-10 at an aggregate cost of ₹ 134.16 crore.

Installed capacity of newly constructed SSs, their utilisation compared to load demand and investments made in construction of SSs and connected TLs are given in ***Annexure 8***.

It would be observed that 9 out of 12 new SSs were not utilised as per their respective installed capacities, which shows that the load flow analysis carried out by the Company in February 2003 was not realistic. After considering 30 *per cent* redundancy of load capacity, the percentage of underutilisation of the said nine SSs ranged between 2.52 and 92.12 *per cent*. Further, as average load demand was much lower than the peak demand, capacity utilisation during normal conditions would be much less. On the other hand, the load pressure at remaining three SSs exceeded the transformer capacity ranging from 7.01 to 32.77 *per cent* which was indicative of deficient planning in creation of new SSs without properly assessing actual load requirements.

***Execution of augmentation projects (ADB Funded) under previous plans***

**2.9.1.11** During the period 2007-08 to 2011-12, 18 SSs pertaining to 10<sup>th</sup> and previous plans were augmented under ADB funded schemes. The work order for augmentation was issued in March 2006 to NEECON (contractor) on single tender basis. There was delay ranging from 1 to 25 months in augmentation of the SSs compared to the stipulated period of completion (September 2007). Test check of 11 out of 18 augmented SSs revealed that though four SSs were completed with marginal delay of one month, the delay in remaining seven SSs ranged between 11 and 25 months. The reason analysis in respect of delays is given in ***Table 7***.

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<sup>14</sup> (37.2 MW x 24 hrs x 273 days)

Table 7

Sl. No.	Substation Name	Scheduled Completion date	Completion date	Delay in months	Major Reasons for delay
1	Dibrugarh SS	September 2007	August 2008	11 months	Four months time taken by the contractor to rectify the defective valves of the transformer supplied.
2	Rangia SS	September 2007	August 2008	11 months	The trailers carrying the transformers were stranded for one month due to delay in taking up bridge strengthening matter with PWD .
3	Sarusujai SS	September 2007	January 2009	16 months	Four months taken in fixing the rate of earth filling, not in the original scope of the contractor.
4	Samaguri SS	September 2007	September 2009	24 months	Delay of four months in overhauling old transformer at Sarusujai GSS and transporting it to Samaguri GSS.
5	Namrup SS	September 2007	October 2009	25 months	Due to belated taking up of road construction and other preliminary work, there was delay in finalisation of design. The contractor did not commence work till one year, from the date of award.
6	Nazira SS	September 2007	May 2009	20 months	
7	Tinsukia SSs	September 2007	May 2009	20 months	

Apart from the above reasons, the execution of works also suffered considerably due to slow progress of work by the contractor. The contractor attributed the slow progress and delay in completion of work on uncontrollable reasons like hampering of construction activities for eight months due to monsoon season, bandhs and acute law and order problems in the region. The reasons given for the delay were not convincing as project works relating to 4 out of 11 SSs test checked in audit were completed by the contractor with a marginal delay of one month only despite the above constraints.

The Company, however, could not verify the claims of the contractor as no registers were maintained for recording the reasons of delays in completion of works on regular basis. Thus, in absence of complete documentation of the reasons for delay for each work, the Company had no other option but to accept the claims of the Contractor.

Due to delay in completion of augmentation works intended benefits of the projects could not be availed besides, the cost of works also increased by ₹ 11.73 crore. As ADB had accepted to reimburse the works costs only to the extent of approved project costs, an amount of ₹ 15.79 crore (including taxes other than excise duties) incurred in excess of the approved costs turned out to be an additional financial burden on GoA.

### ***Implementation of projects (ADB funded) planned under 11<sup>th</sup> Plan***

**2.9.1.12** During 11<sup>th</sup> Five Year Plan, the Company planned 18 projects (seven new SSs, eight TLs and three SSs augmentation) for execution. As

against this only one project<sup>15</sup> was completed during the period 2007-12. The status of completion of the remaining 17 projects is tabulated below:

Table 8

Particulars	No. of projects	Date of sanction of DPR	Date of Work Order	Scheduled date of completion	Status (as of October 2012)
New SSs	7	March 2009	December 2010 to September 2012	October 2012 to March 2014	Three projects were at initial stages. Completion of balance four projects ranged from 62 to 78 per cent.
TLs	8	-do-	November 2010 to August 2011	January to November 2013	Erection of towers was at initial stages.
SSs (Augmentation)	2	-do-	September 2012	March 2014	Works at initial stages.

**Implementation of projects under other schemes (other than ADB funding)**

2.9.2 Apart from the projects financed by the ADB, the Company also executed projects financed by North Eastern Council (NEC), Non Lapsable Central Pool of Resource (NLCPR) and schemes of GoA such as under Assam Bikash Yojna (ABY) and other State Priority schemes.

During 11<sup>th</sup> Five year plan, the Company planned to take up 29 projects under other than ADB funded projects. During 2007-12, the Company took up 26 projects (including 10 projects of 11<sup>th</sup> Five Year Plan and 16 projects under previous plans) for execution under various schemes. Out of 16 projects belonging to previous plans, the Company could complete only 13 projects (seven SSs, one TL and augmentation of five SSs) while the works relating to remaining three projects were in progress. As regards execution of 10 projects under 11<sup>th</sup> plan, Company could complete only one project<sup>16</sup> and works relating to remaining nine projects were at different stages of execution. The

Against total fund of ₹ 455.96 crore received for projects under other than ADB funding, the Company could utilise only ₹ 172.24 crore.

details of nine projects<sup>17</sup> completed during 2007-12 and 12 projects under execution (including 3 projects<sup>18</sup> belonging to previous plans) are summarised in **Annexure 9**. The cost of these 21 projects (other than five completed projects for which details not available) was to be funded by NLCPR, NEC and GoA. Out of total fund of ₹ 455.96 crore received under this schemes, an aggregate amount of ₹ 172.24 crore (38 per cent) was utilised on nine

<sup>15</sup> Jorhat (Gormur) SS

<sup>16</sup> augmentation of SS (Panchgram 18 MVA)

<sup>17</sup> Complete details in respect of five projects (220 kV Balipara-Depota TL, Bokajan SS, Dispur SS, 220 kV Boko SS augmentation, BTPS 132 KV SS) completed under previous plans not available.

<sup>18</sup> SI No.14, 16 and 18 of **Annexure-9**

completed projects (₹ 53.23 crore) and 12 ongoing projects (₹ 119.01 crore) (July 2012) as detailed in **Annexure 9**.

Further, out of remaining 19 projects planned under 11<sup>th</sup> Five year plan, two projects were handed over to Power Grid Corporation of India (PGCIL) for execution while four projects were dropped. The remaining 13 projects (four SSs and nine TLs) were yet to be taken up by the Company. (October 2012) The delays in taking up these projects were mainly because of non-settlement of RoW issues and delay in arrangements of funds.

An overview of works revealed that except in three<sup>19</sup> out of nine projects completed during 2007-12, delays ranging from 2 to 12 months were noticed in completion of works. As regards 12 ongoing works, it may be noticed that delays ranging from 6 to 22 months had already occurred (October 2012).

Broad reasons for time overrun may be further categorised as:

- delay in providing technical clarifications and obtaining approval on DPRs from competent authorities (2 to 19 months);
- excessive time taken in floating and processing tender papers, negotiating with bidders and obtaining approval of appropriate authorities (4 to 19 months from the date of NIT); and
- delay in execution due to land acquisition problem, change in scope and design of works, RoW problems, delayed delivery of materials and slow progress of construction

The issues relating to project implementation by the Company were test checked in 6 out of 9 completed projects and 4 out of 12 ongoing projects. The adverse impact of delays noticed in terms of the utilisation of the facilities created, funds invested and matching of interdependent infrastructure in two cases are reported below.

### ***Stringing of 220 kV Second Circuit BTPS–Agia–Sarusajai (GoA)***

**2.9.2.1** GoA accorded sanction of ₹ 13.41 crore (February 2010) against the estimated cost of ₹ 14.69 crore, for completion of the left over works of restoration and re-stringing of 220 kV Second Circuit BTPS-Agia-Sarusajai together with enhancing the transmission capacity by around 200 MW (1036 MU).

The works were divided in two packages viz. (i) Package-A: BTPS-Agia section and (ii) Package-B: Agia-Boko section and repairing a part of Sarusajai-Boko section. The execution of works under two packages was awarded (August 2010) at a firm price of ₹ 10.82 crore with stipulated completion time of eight months (April 2011).

Scrutiny of records revealed that the execution of work suffered due to delayed manufacture and supply of material and delays in replacing the sub-standard quality of insulators supplied by the contractor. Though the Company granted extension upto March 2012, the contractor could complete only 90 per

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<sup>19</sup> Sl. No. 1,3 and 6 of **Annexure 9**

cent of the works of Package B, while the works of Package-A were yet to be taken up (October 2012). It was observed that though the delay in completion of the work was attributable to the contractor, no penal action was initiated so far against the contractor for the delay (October 2012).

Thus, the project remained incomplete even after a lapse of one and half years from the original scheduled date of completion (April 2011) because of the lapses on part of the contractor. Consequently, the Company was not able to achieve the intended benefits of the scheme.

#### ***400/220 kV Kukurmara SS and LILO from 400 kV Palatana–Bongaigaon TL***

**2.9.2.2** In order to draw Assam's share of 240 MW out of 726 MW of electricity to be generated from the upcoming gas based power generation project of ONGC-Tripura Power Company (OTPC) at Palatana, Tripura, a DPR was prepared (September 2006) by the Company for construction of Kukurmara SS and LILO from Palatana-Bongaigaon. DPR envisaged that power from OTPC project would reduce the precarious power situation of the State. A modified DPR, with estimated cost of ₹ 199.53 crore and completion period by December 2011, matching the target date of completion of 1<sup>st</sup> Phase of OTPC project, was submitted (2008) by the Company to the State Government. The scheme was to be implemented under Assam Bikash Yojna (ABY).

The date of planned completion month of the project was extended from December 2011 to December 2013 due to delayed handing over (December 2010) of required land by District Commissioner, Kamrup which correspondingly delayed the issue of NIT (December 2010) for different components and works related to SS items.

Execution of the project suffered due to excessive time taken in issuing (August 2011) the work order for supply of material and completing other developmental activities. The work order for LILO works was also issued (October 2011) belatedly, which necessitated deferment of scheduled date of completion of the project from December 2011 to December 2013.

An expenditure of ₹ 24.47 crore had been incurred upto July 2012 on the project against ₹ 200 crore received for the project.

The first phase of the 726 MW OTPC Power Plant is already completed and the inter-state transmission line had been charged upto 400/220 kV Silchar SS, whereas the Company had deferred completion of its evacuation project to December 2013. Thus, delay in taking up project implementation activities may prevent the Company from drawing State's share of 240 MW immediately on commissioning of OTPC's Plants.

### **Performance of transmission system**

**2.10** The performance of the Company 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 Company with regard to O&M of the system is discussed in the succeeding paragraphs.

### Transmission capacity

**2.10.1** The Company constructs TLs and SSs at different EHT voltages in order to evacuate the power from the Generating Stations and to meet the load growth in different areas of the State. A Transformer converts AC voltage and current to a different voltage and enables supply of current at a very high efficiency. The voltage levels can be stepped up or down to obtain an increase and decrease of AC voltage with minimum loss in process. The evacuation in Assam is done by 220 kV/132 kV/66 kV SSs. Details of transmission capacity (66kV and 132 kV) created vis-à-vis the transmitted capacity (peak demand met) at the end of each year, by the Company, during five years ending March 2012 are given in **Table 9**.

**Table 9**

Year	Installed <sup>20</sup> (MVA)	After leaving 30 per cent towards margin(MW)	Peak demand including non- coincident demand (MW)	Excess/ (shortage) (MW)
I	II	III (II× 0.70×0.85 <sup>21</sup> )	IV	V (III-IV)
2007-08	1396.30	830.80	868.9	(-38.10)
2008-09	1700.80	1011.98	892.6	119.38
2009-10	2078.30	1236.59	984.1	252.49
2010-11	2227.30	1325.24	1065.5	259.74
2011-12	2309.30	1374.03	1134.8	239.23

**In comparison to the peak demand, the transmission capacity was in excess by 239.23 MW at the end of March 2012.**

From the table, it is evident that the overall transmission capacity created was in excess of the requirement except in 2007-08. Existing transmission capacity, excluding 30 per cent towards redundancy, was in excess by 239.23 MW (281.45 MVA) at the end of March 2012

compared to peak demand. The investment on this account worked out to ₹ 38.00 crore (₹ 1.35 crore per 10 MVA power transformer) which was a burden passed on to consumers in the form of depreciation on the capital assets included in the cost of wheeling charges.

### Sub-stations

#### Adequacy of Sub-stations

**2.10.2** Manual on Transmission Planning Criteria (MTPC) of the CEA stipulates the permissible maximum capacity for different SSs i.e., 320 MVA for 220 kV SSs and 150 MVA for 132 kV SSs. Every SS of capacity 132 kV and above should have at least two transformers. Scrutiny of records revealed

<sup>20</sup> For calculation the capacity of only 132 kV and 66 kV system has been considered as the power from 220 kV SSs ultimately enters the 132 kV level transformers.

<sup>21</sup> 0.85 has been assumed as the power factor upto which a transformer can be loaded.

that none of the SSs of the Company had exceeded the maximum capacity as stipulated in MTPC and all the SSs had been equipped with at least two power transformers.

### ***Voltage management***

**2.10.3** 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, STUs should maintain voltage ranges between 380-420 kV (in 400 kV line), 198-245 kV (in 220 kV line) and 119-145 kV (in 132 kV line) so that reliable power is supplied to consumers by the State power distribution company (*i.e.* APDCL). Scrutiny of records of 220 kV bus voltages in four out of nine<sup>22</sup> SSs of two Zones test checked for the period March 2010 to March 2012 revealed that in all four 220 kV SSs, voltage recorded ranged between 206.4 and 237.9 kV while in 11 out of the 37 132 kV SSs test checked, voltage ranged between 124.1 kV and 138 kV indicating adequate voltage management by the Company.

It was, further, observed that the Company provided 30 capacitor banks having reactive energy<sup>23</sup> of 205 MVAR at its 17 Grid SSs. During the period April to May 2012, the State received ₹ 9.83 lakh as reactive energy compensation charges from the north-eastern pool of reactive energy accounts for maintaining the voltage stability.

### **Lines**

#### ***EHT lines***

**2.10.4** As per MTPC, permissible line loading cannot normally be more than the Thermal Loading Limit (TLL). TLL limits the temperature attained by energized conductors and restricts sag and loss of tensile strength of the lines. TLL also limits the maximum power flow of the lines. As per MTPC, TLL of 132 kV line with ACSR<sup>24</sup> Panther 210 sq. mm. conductor was 366 amps. Loading of the lines beyond capacity resulted in voltage fluctuations, higher transmission losses and frequent interruptions/breakdowns. Scrutiny of the line loadings on the 23 out of 70 132 kV feeders test checked, however, revealed that only one TL<sup>25</sup> was loaded above 366 amps. The forced shut down in this feeder during four years from 2008-09 to 2011-12 had been 137 hours, 85 hours, 76 hours, 87 hours respectively as against the average annual forced outage of 43.48 hours.

#### ***Bus Bar Protection Panel (BBPP)***

**2.10.5** Bus bar is used as an application for inter-connection of the incoming and outgoing TLs and transformers at SSs. BBPP limits the impact of the bus bar faults on the entire power network which prevents unnecessary tripping and restricting trips only to those breakers as 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 SSs to maintain system stability during Grid disturbances and to provide faster clearance of faults on 220 kV buses.

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<sup>22</sup> Agia, Balipara, Boko, Mariani, Namrup, Salakhati, Samaguri, Sarusujai and Tinsukia Grid SS

<sup>23</sup> Reactive energy is required to maintain the steady voltage level

<sup>24</sup> Aluminum conductor steel-reinforced

<sup>25</sup> Lakwa-Mariani feeder line in Upper Assam Zone

On test check of five out of nine SSs of 220 kV, it was observed that the Company had provided double bus bars (main bus and transfer bus) without bus bar protection panel on those buses. The protection of the buses was being ensured only through circuit breaker and bus coupler protection.

### Maintenance

#### Performance of Current transformers (CT)

**2.10.6** CTs are one of the most important and cost-intensive components of electrical energy supply networks. Thus, it is of special interest to prolong their life while reducing maintenance expenditure. In order to gather detailed information about the operational conditions of CTs and to prevent outages due to insulation failure, various kinds of oil analysis like standard oil, Dissolved Gas Analysis (DGA) tests are generally conducted. The Maintenance Manual of SSs adopted (May 2005) by the Company specified that test of oil samples, including DGA test, was required in every two years. It also specified such oil test as an important post monsoon maintenance procedure. **Table 10** below indicates the sub-station wise details of various checks conducted, numbers of CTs failed and causes of failure of the CTs during 2007-12 in 11 out of 15 SSs selected for test check.

Table 10

SL No.	Name of the Grid SS	Total No. of CT	Whether DGA Tests conducted	Whether maintenance done and recorded in maintenance registers	If there is a system of regular formal inspections of CTs	Total No of CT failure during the period 2007-08 and 2011-12	Reasons for failure
1.	Sarusujai	17	No	Yes	Yes	3	Insulation failure
2.	Rangia	54	No	Yes	Yes	1	-do-
3.	Kahilipara	44	No	Yes	No	2	-do-
4.	Dibrugarh	27	No	Yes	No	1	-do-
5.	Gormur	36	No	Yes	No	3	-do-
6.	Mariani	75	No	Yes	Yes	2	NA
7.	Chandrapur	20	No	Yes	No	1	Insulation Failure
8.	Sisugram	54	No	Yes	No	1	NA
9.	Panchgram	45	No	Not Updated	No	3	NA
10.	Pailapool	16	No	Yes	Yes	1	Insulation failure
11.	Bokajan	21	No	Yes	No	1	-do-

It may be noticed from the above table that DGA test was not conducted in any of the test checked SSs during the last five years although the test was a prerequisite of the oil analysis to be done regularly in every two years as per the Maintenance Manual of the Company. Even, the formal regular inspections of oil level and proper recording thereof were not done in 7 out of 11 SSs during 2007-12. Compliance to the prescribed maintenance schedule

could have prevented insulation failure in 13 CTs and saved an expenditure of ₹ 20.73 lakh<sup>26</sup> incurred on replacing the damaged CTs.

**Working of hot lines division/sub-divisions**

**2.10.7** Regular and periodic maintenance of transmission system is of utmost importance for its un-interrupted operation. Apart from scheduled patrolling of lines, application of ‘hot line technique’ was also recommended in the Report of the Committee constituted by CEA in November 2001, for bridging the gap between best practices and average industry practices in both Government and private sectors. The technique envisaged detecting ‘hot spots’ in SSs and TLs by using thermo-vision cameras, which was otherwise not possible with naked eyes and attending maintenance works like tightening of nuts and bolts, replacing of insulation, etc., without switching off the system. The technique enables to take preventive maintenance works before the ‘hot spots’ cause damage to the equipment and also leading to loss of energy.

CEA, in its Regulation (June 2010) had prescribed once a year thermo-vision scanning of all overhead TLs and SSs equipment, at voltage level of 220 kV and above, which was essential to identify ‘hot spots’ in time.

It was noticed that the Company was yet to establish any Hot Line Division or procure thermo-vision cameras though an incident had occurred at Sarusajai SS resulting in outage of 100 MVA, 220 kV transformer for three days. As the Company had not evolved any system to record hours of shutdown on account of ‘hot spots’, it could not effectively monitor the adverse impact in terms of loss of energy or damage of equipment.

**Transmission losses**

**2.10.8** While energy is carried from the generating station to 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 power distribution companies. The details of transmission losses from 2007-08 to 2011-12 are given in **Table 11**.

**Table 11**

Particulars	Unit	2007-08	2008-09	2009-10	2010-11	2011-12
Power received for transmission	MUs	3970.00	4270.32	4678.84	5354.96	5747.69
Net power transmitted	MUs	3654.00	4016.31	4383.19	5097.52	5501.36
Actual Transmission loss	MUs	316.00	254.01	295.65	257.44	246.33
	Percentage	7.96	5.95	6.32	4.81	4.29
Target Transmission loss as per the CEA norm	Percentage	4.00	4.00	4.00	4.00	4.00
Target Transmission loss as per AERC norms	Percentage	6.10	5.82	5.81	4.50	4.25
Transmission loss in excess of AERC norm (Valued at realisation per unit as at <b>Table 13</b> )	MUs	73.83	5.48	23.81	16.47	2.05
	Rate per unit in ₹	0.59	0.84	0.69	0.67	0.71
	₹ in crore	4.36	0.46	1.64	1.10	0.15
Transmission loss in excess of CEA norm	MUs	157.20	83.20	108.50	43.24	16.42
	In crore	9.27	6.99	7.49	2.90	1.17

<sup>26</sup> ₹ 159448 x 13 = ₹ 2072824

Though the transmission losses showed decreasing trend during 2007-12 (except during 2009-10), these losses exceeded CEA as well as AERC norms, in all the five years. The aggregate transmission losses suffered by the Company in excess of the norm fixed by AERC for the period 2007-08 to 2011-12, were to the extent of 121.64 MUs valued at ₹ 7.71 crore. The DPR for ADB funded projects envisaged reduction in transmission losses by 81.67 MUs for the first two years (*i.e.* 32.70 MUs and 48.97 MUs) after the completion of the project. Though 30 of the 43 projects were completed in 2008-09, the actual reduction in transmission loss during 2010-11 and 2011-12 with reference to the losses of 2009-10 was only 49.32 MUs indicating achievement of the envisaged objectives to the extent of 60.39 *per cent* only.

**Transmission loss was in excess by 121.64 MUs valuing ₹ 7.71 crore compared to the AERC norms.**

## **Grid Management**

### ***Maintenance of Grid and performance of SLDC***

**2.11** Transmission and Grid Management are essential functions for smooth evacuation of power from generating stations to the power distribution companies/consumers. Grid Management ensures moment-to-moment power balance in the inter-connected 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. SLDC, Assam, a constituent of North Eastern Regional Load Dispatch Centre (NERLDC), Shillong ensures integrated operation of power system in the State. The GoA notified (August 2005) that SLDC shall be operated by the Company.

### ***Infrastructure for load monitoring***

**2.11.1** 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 SSs. It was observed that out of total 48 SSs of the Company and three<sup>27</sup> generating stations of Assam Power Generation Corporation Limited (APGCL), RTUs for real time data for effective energy management system were installed in 44 SSs (92 *per cent*) and in all the generating stations.

### ***Grid discipline by frequency management***

**2.11.2** As per Grid Code, the transmission utilities are required to maintain Grid discipline for efficient functioning of the Grid. All the constituent members of the Grid are expected to maintain a system frequency between 49 and 50.5 Hertz (Hz) (49.2 and 50.3 Hz with effect from April 2010). To enforce Grid discipline, NERLDC issues three types of violation messages (A, B and C). Message-A is issued when the frequency is less than 49.2 Hz and overdrawal is more than 50 MW or 10 *per cent* of schedule whichever is less.

<sup>27</sup> Namrup Thermal Power Station (NTPS), Lakwa Thermal Power Station (LTPS), Karbi Langpi Hydro Electric Power Station (KLHEP)

Message-B is issued when frequency is less than 49.2 Hz and overdrawal 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 overdrawal is more than 100 MW or 10 *per cent* of the schedule whichever is less. It was observed that 91 'B Messages' were received in 2010-11 which decreased to 26 in 2011-12. SLDC did not receive any 'C' messages during 2009-12<sup>28</sup>.

### ***Grid discipline***

**2.11.3** For maintenance of Grid discipline, CERC takes up *suo motu* petition on overdrawal of power from the Grid at a lower frequency thus putting the Grid to the risk. Such overdrawal from the Grid beyond the scheduled demand of power as specified by SLDC at low frequency {which is known as Unscheduled Interchange (UI)}, may lead to the collapse of the entire Grid. To maintain Grid discipline, CERC vide its notification<sup>29</sup> dated 28 April 2010 had notified penal rates for overdrawal of power during low frequency 49.5 to 49.2 Hz and additional charges for overdrawal of power below 49.2 Hz. Protection of Grid by maintaining grid discipline is the responsibility of SLDC. SLDC discharged this function by issuing adequate and timely instructions to downstream SSs. It was observed that on account of failure of SLDC to exercise adequate control on the downstream SSs, the State power distribution company drew excess power at low frequency level (below 49.20 Hz) in violation of Grid discipline. No penalty was, however, levied by CERC on the Company as there was no violation in the nature of 'C' Messages.

The main reasons for uncontrolled drawal of power were delay in installation and mal/non-functioning of the newly installed communication system as discussed below.

### ***Revamping of the Communication System***

**2.11.4** In order to have a better operational efficiency the Company revamped the communication system with funding from ADB. This would improve monitoring and control of inter-regional power exchange including management of Unscheduled Interchange (UI) by installing Remote Terminal Units (RTUs) for transmitting data directly from SSs to SCADA<sup>30</sup> at SLDC.

The works for installation 51 RTUs along with Power Lines Communication Cables (PLCC) were awarded (November 2007) to AREVA T&D Systems Limited at a cost of ₹ 22.30 crore with the scheduled completion date as December 2008. The Company also engaged (2004) SMEC as consultant for monitoring the execution of the project till December 2008.

Test check of records revealed that the contractor could complete installation of PLCC in April 2011 and installation of 47 out of 51 RTUs in January 2012 as against the scheduled date of completion of projects by December 2008. The broad reasons for delay in completion of works were late submission of

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<sup>28</sup> Data prior to 2009-10 was not available

<sup>29</sup> number L-I (I)/2009-CERC

<sup>30</sup> Supervisory Control and Data Acquisition Apparatus

drawings/documents, delay in dispatch of RTUs and slow pace of work on the part of the contractor. The balance four RTUs were, however, still pending (October 2012) for installation due to non-commissioning of control room in related four SSs<sup>31</sup> by the Company.

Scrutiny of records further revealed that 14 out of total 47 RTUs supplied and installed, were not providing the real time data to SCADA since installation. The functioning of PLCC and reporting of remaining 33 RTUs were also found unsatisfactory due to poor and slow data reporting process. This resulted in partial reporting of real time data to the SCADA causing adverse impact on the flow of precise information, which was essential to monitor and maintain grid discipline. Thus, due to unsatisfactory performance of the RTUs SLDC could not exercise the control function at the desired level to effectively maintain the grid discipline leading to drawal of power at low frequency by the power distribution company as discussed in *para 2.11.6 infra*.

***Backing Down Instructions (BDI)***

**2.11.5** When the frequency exceeds the ideal limits i.e. 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 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 SLDC’s instructions would constitute violation of the grid code. The SLDC issued 16 BDIs for 1,547 MUs for compliance which were complied by the generators.

***Planning for power procurement***

**2.11.6** The Company draws long term supply plan taking into account the contracted generation capacity, allocation from Central sector and future committed projects and evolves net additional requirement of power in consultation with power distribution companies. It also draws “day ahead plan” for assessing its ‘day-to-day’ power requirement. The details of total requirement of the State, total power supplied and shortage of power for the period 2007-08 to 2011-12 are given in **Table 12**.

**Table 12**

**(Figures in MUs)**

Sl. No.	Details	2007-08	2008-09	2009-10	2010-11	2011-12
1	Total power requirement	4858	5,166	5,466	5,967	6,513
2	Total power supplied <sup>32</sup>	3,654.00	4,016.31	4,383.19	5,097.52	5,501.36
3	Power short supplied	1,204.00	1,149.69	1082.81	869.48	1,011.64
4	Percentage of shortage	24.78	22.25	19.81	14.57	15.53

The percentage of shortage of power showed a decreasing trend i.e., from 24.78 *per cent* in 2007-08 to 14.57 *per cent* by 2010-11 which marginally increased to 15.53 in 2011-12.

<sup>31</sup> Chandrapur SS, Old Diphu SS, Lanka SS and Panchgram Old SS

<sup>32</sup> Including generation, short and long term purchases and drawal from Central Generating Stations.

The gap in demand and supply position also leads to variation between actual generation (or actual drawal) and scheduled generation or scheduled drawal which is accounted through UI charges, worked out by NERLDC 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. Hence, it reflects the marginal value of energy at the time of supply. The levying of UI charges acts as a commercial deterrent to curb drawal of power from CGS<sup>33</sup> during low frequency conditions.

Audit scrutiny revealed that unscheduled charges of ₹ 41.74 crore was imposed by NERLDC on State power distribution company during the April 2010 to February 2012 as shown in *Annexure 10* on account of drawal (63,290 MUs) of energy by power distribution company at low frequency below the permissible limit of 49.50 Hz. Out of the said drawal, 11011.13 MU

**UI charges of ₹ 41.74 crore were imposed on the power distribution company by NERLDC due to drawal of power at low frequency.**

was drawn at frequency below than 49.2 Hz for which UI charges of ₹ 9.33 crore and additional charge of ₹ 4.28 crore was levied. This indicated that the SCADA system of the Company was not fully effective in providing the real time data for maintaining

grid discipline as discussed in *para 2.11.4 supra*.

## **Disaster Management**

**2.12** 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 equipment besides skilled and specialised manpower.

DM Centre, National Load Dispatch Centre, New Delhi acts as a Central Control Room in case of disasters. As a part of DM programme, mock drill for starting up generating stations during black start<sup>34</sup> operations is done every week by APGCL. This mock drill exercise includes checking the health of the diesel generators, cable breakers, auxiliary power transformers, etc. However, no mock drill exercise for restoration of the transmission system was carried out at the SSs of the Company.

### ***Inadequate facilities for DM***

**2.12.1** SLDC identified three major generating stations<sup>35</sup> in the State belonging to APGCL out of which black start facilities were available only in two generating stations.

Diesel generating (DG) sets and synchroscopes<sup>36</sup> form part of DM facilities at EHT SSs connecting major generating stations. During test check of five out

<sup>33</sup> Central Generating Stations

<sup>34</sup> The procedure necessary to recover from partial or a total black out.

<sup>35</sup> Lakwa Thermal Power Station (LTPS) Namrup Thermal Power Station (NTPS), Karbi Langpi Hydro Electric Project (KLHEP)

of nine 220 kV SSs<sup>37</sup>, it was observed that DG sets were available only in one SS<sup>38</sup> while synchrosopes were available only in three 220 kV<sup>39</sup> SSs. Further, the Company did not identify vulnerable installations for providing metal detectors and handing over the security of the sites to the Security Force to meet crisis arising due to terrorist attacks, sabotage and bomb threats. The Company, however, maintained fire extinguishers at all its 15 grid SSs test checked to combat loss on account of fire.

### Financial Management

**2.13** One of the major objectives of the NEP 2005 was to ensure financial turnaround and commercial viability of Power Sector. The financial position of the Company for the five years period ending 2011-12 is given in **Table 13**.

Table 13

(₹ in crore)

Particulars	2007-08	2008-09	2009-10	2010-11	2011-12
<b>A. Liabilities</b>					
Paid up Capital	99.93	99.93	99.93	99.93	99.93
Reserves & Surplus(including Capital Grants)	338.96	441.71	446.39	557.14	801.75
Deferred Tax	-	-	-	-	-
Borrowings (Loan Funds) <sup>40</sup>	268.72	292.46	401.08	443.07	462.12
Current Liabilities & Provisions (CL)	346.36	398.92	432.85	505.28	543.19
<b>Total</b>	<b>1053.97</b>	<b>1233.02</b>	<b>1380.25</b>	<b>1605.42</b>	<b>1906.99</b>
<b>B. Assets</b>					
Gross Block	640.13	647.17	713.57	1057.74	1180.20
Less: Depreciation	541.90	572.18	590.65	638.11	712.44
Net Fixed Assets	98.23	74.99	122.92	419.63	467.76
Capital Works-in-Progress (CWIP)	324.48	449.71	428.13	137.34	211.56
Investments	54.96	NIL	35.46	45.56	25.01
Current Assets, Loans and Advances (CA)	459.45	612.32	655.23	795.85	928.12
Assets not in use	0.03	0.02	0.01	0.3	0.18
Profit and Loss Account	116.82	95.98	138.5	206.74	274.36
<b>Total</b>	<b>1053.97</b>	<b>1233.02</b>	<b>1380.25</b>	<b>1605.42</b>	<b>1906.99</b>
<b>Profit/ Loss before Tax</b>	(63.55)	19.64	(27.09)	(54.11)	(67.57)
<b>Interest (net of IDC<sup>41</sup> capitalised)</b>	24.52	28.08	29.84	28.10	24.15
<b>Total return</b>	(39.03)	47.72	2.75	(26.01)	(43.42)
<b>Capital Employed (NFA + CWIP+CA-CL)</b>	535.80	738.10	773.43	847.54	1064.25
<b>% Return on Capital Employed</b>	(7.28)	6.47	0.36	(3.07)	(4.08)

NB: Figures in Bracket represent negative figures

Loss before tax of the Company increased by six *per cent* from ₹ 63.55 crore in 2007-08 to ₹ 67.57 crore in 2011-12. This was primarily due to the increase of

<sup>36</sup> In an AC electrical power system it is a device that indicates the degree to which two systems (generators or power networks) are synchronised with each other.

<sup>37</sup> Agia, Balipara, Boko, Mariani, Namrup, Salakhati, Samaguri, Sarusujai and Tinsukia Grid SS

<sup>38</sup> Boko SS

<sup>39</sup> Boko, Mariani and Tinsukia Grid SSs

<sup>40</sup> Loan funds include long term liabilities against General Provident Fund and Pension Trust

<sup>41</sup> Interest during construction

only ₹ 206.98 crore in the revenue during 2007-08 to 2011-12 which was not commensurate with increase of ₹ 211.00 crore in the total expenditure during the said period. Negative Return on Capital Employed of (-) 7.28 per cent in 2007-08 improved to 6.47 per cent in 2008-09 which again gradually deteriorated to (-) 4.08 per cent in 2011-12. The Company earned profit in 2008-09 while the losses gradually increased during 2009-10 to 2011-12.

**2.13.1** The major variations in the financial position of the Company during 2007-12 are analysed below:

- ❖ The Company earned profit in 2008-09 mainly due to approval of transmission charge of ₹ 335.43 crore by AERC against total expenditure of ₹ 328.96 crore.
- ❖ There was an increase of ₹ 193.40 crore in borrowings from ₹ 268.72 crore (2007-08) to ₹ 462.12 crore (2011-12) which was mainly due to increase of loans from GoA from ₹ 146.89 crore (2007-08) to ₹ 212.75 crore (2011-12) received for implementation of projects.
- ❖ Current Assets increased from ₹ 459.45 crore in 2007-08 to ₹ 928.12 crore in 2011-12 mainly due to increase in fixed deposits by ₹ 324.92 crore made out of grants and loans received from GoA during the period.

**2.13.2** Details of working results like revenue realisation, net surplus/loss and earnings and cost per unit of transmission are given in **Table 14**.

Table 14

(₹ in crore)

Sl.No	Description	2007-08	2008-09	2009-10	2010-11	2011-12
<b>1</b>	<b>Income :</b>					
(i)	Revenue	216.15	335.43	301.47	341.21	391.14
(ii)	Other income including interest /subsidy	6.06	13.17	13.62	7.02	38.05
	<b>Total Income (i) + (ii)</b>	<b>222.21</b>	<b>348.60</b>	<b>315.09</b>	<b>348.23</b>	<b>429.19</b>
<b>2</b>	<b>Transmission :</b>					
(i)	Installed capacity (MVA)	2306.30	2660.80	3188.30	3337.30	3549.30
(ii)	Power received from generation units (MUs)	1510.64	1635.23	1659.85	1644.60	1742.27
(iii)	Power purchased (MUs)	2459.36	2635.09	3019.00	3710.36	4005.42
	<b>Total units at AEGCL periphery (ii)+(iii)</b>	<b>3970.00</b>	<b>4270.32</b>	<b>4678.85</b>	<b>5354.96</b>	<b>5747.69</b>
(iv)	Loss in transmission (MUs)	316.00	254.01	295.65	257.44	246.33
	<b>Net power transmitted (ii)+(iii)-(iv) in MUs</b>	<b>3654.00</b>	<b>4016.31</b>	<b>4383.20</b>	<b>5097.52</b>	<b>5501.36</b>
<b>3</b>	<b>Expenditure :</b>					
<b>(a)</b>	<b>Fixed cost :</b>					
(i)	Employees cost	47.43	92.13	64.45	81.42	100.82
(ii)	Administrative and General Expenses	2.18	5.24	4.80	3.69	1.10
(iii)	Depreciation	33.30	33.44	16.66	30.33	60.25
(iv)	Interest and Finance charges (net after capitalisation)	24.52	28.08	29.84	28.10	24.15
	<b>Total fixed cost</b>	<b>107.43</b>	<b>158.89</b>	<b>115.75</b>	<b>143.54</b>	<b>186.32</b>
<b>(b)</b>	<b>Variable cost :</b>					
(i)	Repairs & Maintenance	12.85	8.72	7.90	7.35	18.72
(ii)	Transmission Charges to PGCIL	126.32	116.16	170.16	178.34	209.58
(iii)	Bulk Supply tariff	38.76	45.13	48.26	72.92	82.14
(iv)	Other Debits	0.40	0.06	0.11	0.19	Nil

Total variable cost		178.33	170.07	226.43	258.8	310.44
(c)	<b>Total cost 3 (a) + (b)</b>	<b>285.76</b>	<b>328.96</b>	<b>342.18</b>	<b>402.34</b>	<b>496.76</b>
4	Realisation (₹ per unit)	0.59	0.84	0.69	0.67	0.71
5	Fixed cost (₹ per unit)	0.29	0.4	0.26	0.28	0.34
6	Variable cost (₹ per unit)	0.49	0.42	0.52	0.51	0.56
7	Total cost (₹ per unit) (5+6)	0.78	0.82	0.78	0.79	0.90
8	Contribution (₹ per unit) (4-6)	0.10	0.42	0.17	0.16	0.15
9	<b>Profit (+)/Loss(-) (4-7) (₹ per unit)</b>	<b>-0.19</b>	<b>0.02</b>	<b>-0.09</b>	<b>-0.12</b>	<b>-0.19</b>

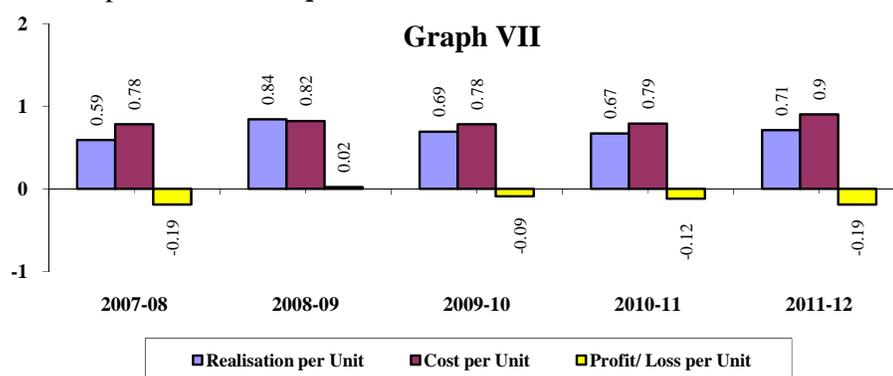
The realisation per unit increased from ₹ 0.59 in 2007-08 to ₹ 0.71 (20.34 per cent) resulting increase of contribution by 50 per cent from ₹ 0.10 (2007-08) to ₹ 0.15 (2011-12) despite increase in per unit variable cost from ₹ 0.49 (2007-08) to ₹ 0.56 (2011-12). As, however, the Cost per unit also correspondingly increased by 15.38 per cent during the period from ₹ 0.78 (2007-08) to ₹ 0.90 (2011-12), the overall per unit loss of ₹ 0.19 (2007-08) remained unchanged during 2011-12.

The major cost elements for the year 2011-12 include transmission charges (TC) (₹ 209.58 crore), employees cost (₹ 100.82 crore) and bulk supply tariff, (₹ 82.14 crore) representing 42 per cent, 20 per cent and 17 per cent of the total cost for the year. There was a significant increase of more than 112 per cent in the employee costs during five years period from ₹ 47.43 crore (2007-08) to ₹ 100.82 crore (2011-12) mainly due to revision of pay and allowances of staff during 2008-09.

On the other hand, the transmission charges (₹ 391.14 crore) of the Company was the major element of revenue during 2011-12 representing 91 per cent of the total revenue for the year.

### Recovery of cost of operations

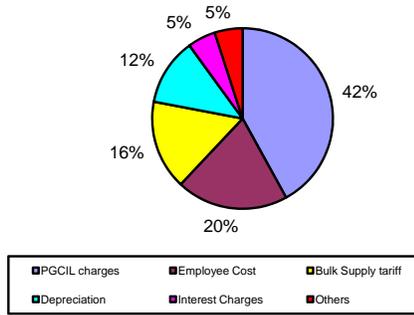
2.13.3 Details of profit/loss per unit during the last five years ending 2011-12 are depicted in the **Graph VII**



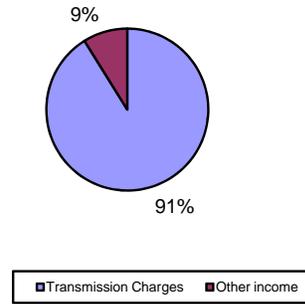
### Elements of Cost and revenue

2.13.4 Component-wise major elements of costs as well as revenue for 2011-12 were as given in **Graph VIII and IX**.

**Graph-VIII**  
(Elements of cost)



**Graph-IX**  
(Elements of revenue)



**Non-claiming of surcharge from power distribution company**

**2.13.5** As per clause 96 and 97 of terms and condition for determination of tariff regulation of AERC, 2006 monthly transmission charges (TC) bills

**The Company did not claim delayed payment surcharge amounting to ₹ 32.45 crore despite enabling provisions in the tariff regulations.**

required to be raised by the company to power distribution companies. As per the terms and conditions/clause of tariff regulations, a late payment surcharge at the rate of 1.25 per cent per month shall be levied in case the payment of dues is made

with a delay beyond one month from the date of bill. Records revealed that the State power distribution company was very irregular in payment of dues and at the end of every year there remained a huge outstanding amount ranging between ₹ 53.22 crore and ₹ 242.43 crore during 2007-08 to 2011-12. Scrutiny of records relating to 2011-12 revealed that the Company did not claim delayed payment surcharge amounting to ₹ 32.45 crore despite the existence of the enabling clause in the tariff regulation in this regard.

**Non-Claiming of incentive**

**2.13.6** As per clause 86, read with clause 95 of AERC’s Terms and Conditions of Determination of Tariff Regulation 2006, a transmission licensee was entitled to get incentive on achieving weighted annual availability of the transmission system ranging between 98 and 99.75 per cent.

**The Company did not claim incentive of ₹ 13.84 crore despite the enabling clause stipulated in the tariff regulation.**

Scrutiny of records revealed that during 2007-12 the Company was entitled to get incentive of ₹ 13.84 crore according to the said rule as it made the transmission system available within the stipulated range. However, no claim was lodged on power distribution company to recover the incentive amount without any recorded reasons.

**Management of surplus fund**

**2.13.7** Constant and close monitoring of funds is necessary to avoid idling of funds without yielding any return. Further, investment of surplus fund in most profitable and risk-free ventures after proper assessment of requirement of funds is an integral part of sound financial management system. Before

arriving at the decision to invest in short-term deposits (STDs) in banks, thorough comparison of rates offered by the different banks should be made.

Scrutiny of records revealed that the decision to invest in STDs of various banks were neither taken by the Board of Directors nor the authority was delegated to group of directors in violation of guidelines of Department of Public Enterprises, GoI (DPE). It was observed that investments in STDs were made in different banks without comparison of interest rates. As a result, investment in banks, at times were fetching lower interest in comparison to the higher rates offered by other banks. This imprudent practice of *ad hoc* investment decisions highlights lack of transparent and effective investment policy in the Company, besides foregoing the interest income of ₹ 1.10 crore during 2009-12 on this account.

**2.13.8** The Company had also not specified maximum balance to be kept in Current Accounts (CA) without any returns. It was observed that average monthly balance in CA of Lower Assam T&T Circle, Narengi ranged between ₹ 57.73 lakh and ₹ 361.03 lakh during 2009-12 against actual monthly average expenditure of ₹ 14.59 lakh to ₹ 23.70 lakh. Similarly, average monthly balance in CA of LDC, Kahilipara and Tezpur T&T division was ₹ 17.40 lakh (2009-10) and ₹ 27.90 lakh (2010-11) against average monthly expenditure of ₹ 10.06 lakh and ₹ 9.69 lakh respectively. Parking of fund in excess of requirement in the absence of fixation of any limit had rendered loss of interest income of ₹ 33.39 lakh to the Company by not investing the amount in STDs.

#### ***Non-assessment of fund position before opting for loan***

**2.13.9** For renovation and restoration of 220 kV Langpi-Sarusajai TL, the Company obtained loan of ₹ 20.30 crore (₹ 12.39 crore disbursed in August 2006 and ₹ 7.91 crore in March 2007) from Power Finance Corporation Limited (PFCL). The project works were taken up (October 2005) and completed in March 2007.

To repay the outstanding PFC loan amount of ₹ 16.35 crore, the Company applied (October 2009) further loan of equivalent amount from SBI at annual interest rate of 10.75 *per cent* despite having ₹ 42.49 crore in Fixed Deposits (between April 2009 and June 2010) as well as bank balances of ₹ 167 crore as on 31<sup>st</sup> March 2010. It was, further, observed that before disbursement of loan of ₹ 16.27 crore by SBI (₹ 5 crore in Feb 2010 and ₹ 11.27 crore in March 2010), the Company had already repaid (October 2009) the PFC loan of ₹ 16.35 crore along with interest of ₹ 1.40 crore out of own resources. Out of ₹ 16.35 crore loan received from SBI, ₹ 15.30 crore was invested (February 2010 / April 2010) in short-term deposits at annual interest rates ranging from 6 to 6.50 *per cent*. The Company paid off principal loan (SBI) amounting to ₹ 16.35 crore along with interest of ₹ 1.78 crore during the period April 2010 to March 2011.

**The Company paid interest of ₹ 0.79 crore because of imprudent decision to avail bank loan.**

It transpired from the above facts that there was no need to obtain loan from SBI since PFC loan amount was already repaid from its own fund and also the

Company had huge amount of surplus funds at banks. Parking the loan amount of SBI in fixed deposit established the fact further.

Thus, the imprudent decision of the Company to avail bank loan without assessing its own fund position resulted in net avoidable expenditure of ₹ 0.79 crore<sup>42</sup> towards payment of interest on loan.

### **Tariff Fixation**

**2.13.10** The financial viability of the Company 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. Revenue collection is the main source of generation of funds for the Company. The issues relating to tariff are discussed hereunder.

The tariff structure of the Company is subject to revision approved by the AERC after the objections, if any, received against ARR petition filed by them within the stipulated date. The Company was required to file ARR for each year 120 days before commencement of the respective financial year *i.e.* 1<sup>st</sup> December of preceding year. AERC accepts the application filed by the Company with such modifications/conditions as may be deemed just and appropriate and after considering all suggestions and objections from public and other stakeholders. The **Table 15** shows the due date of filing ARR, actual date of filing, date of approval of tariff petition and the effective date of the revised tariff.

**Table 15**

Year	Due date of filing	Initial date of filing	Date of admittance	Delay in days	Date of approval	Effective date
2007-08	1/12/2006	22/02/2007	11/05/2007	83	12/09/2007	20/09/2007
2008-09	1/12/2007	17/10/2008	15/12/2008	321	24/07/2009	01/08/2009
2009-10						
2010-11	1/12/2009	15/02/2010	21/08/2010	76	16/05/2011	24/05/2011
2011-12						

It is seen from the **Table 15** that delay ranging from 76 to 321 days took place in filing ARR petition and as a result effective date applicable for tariff also got correspondingly deferred.

**2.13.11** As per the clause 78 of Regulations of terms and conditions for determination of tariff for transmission activity 2006, the Company files ARR with AERC for the revenue required to meet the cost pertaining to the transmission business for each financial year which would be permitted to be recovered by way of tariffs and charges after approval by AERC. Thus, the main source of revenue of the Company is the transmission and SLDC charges.

ARR proposals made by the Company and approved by AERC are given in **Table 16**.

<sup>42</sup> Interest paid on loan ₹ 1.78 crore - ₹ 0.99 crore of interest earned for fixed deposit

Table 16

Transmission Tariff						
Year	Proposal by the Company			Approved by AERC		
	Total transmission Capacity (MW)	Annual Revenue Requirement (₹ in crore)	Tariff, ₹/kW/ Month	Total transmission Capacity (MW)	Annual Revenue Requirement (₹ in crore)	Tariff, ₹/kW/ Month
2007-08	1396.30	302.39	180.47	1396.30	209.4	124.94
2008-09	1700.80	507.12	248.47	1700.80	333.61	163.46
2009-10	2078.30	546.05	218.95	2078.30	299.21	119.97
2010-11	2227.30	418.72	156.66	2227.30	341.21	127.66
2011-12	2309.30	525.53	150.53	2309.30	391.14	112.04

**Delayed capitalisation of commissioned assets led to non-claiming of depreciation of ₹ 12.55 crore in the ARR.**

Further, as per the Regulation, whenever there was a gain or loss (excess/short) in the controllable items (O&M, Return on capital employed, depreciation and non-tariff income) the Company was required to file the details of the said gain or loss before AERC. The AERC, after reviewing the said details as furnished by the Company was to make appropriate adjustments in the tariff wherever required.

On scrutiny it was noticed that the expenditure approved in ARR by AERC was less than the expenditure incurred. Instances of short claim of expenditure by the Company and disallowance of expenditures by AERC are analysed below:

**(i) Depreciation:** scrutiny of records revealed that the Company could not claim depreciation totalling ₹ 12.55 crore in ARR during 2007-11 due to delayed capitalisation of commissioned assets; and

**(ii) Repairs and maintenance :** AERC disallowed an actual expenditure of ₹ 6.21 crore on repairs and maintenance for the year 2007-08 as major portion of the expenditure pertained to repairs of roads & buildings and vehicles and AERC was of the view that these could have been controlled by the Company.

### **Material Management**

**2.14** The key functions in material management are laying down inventory control policy, procurement of materials and timely disposal of obsolete inventory. It was observed that the Company had not formulated any procurement policy and inventory control mechanism for economic procurement and efficient control over inventory. Further, the Company had neither devised any system of ABC analysis of stock for prioritising the stock items based on their value/specification nor had established the levels of minimum, re-ordering and maximum stock holdings for ensuring stock availability as per requirement and avoiding excess stock holding situations. As a result, year ending value of closing stock did not commensurate to the value of yearly consumption of stock.

The year-wise details of annual and monthly stock consumptions, opening and closing stock position and closing stock in terms of monthly consumption for preceding five years ending 2011-12 are given in **Table 17**.

**Table 17**

Year	Consumption per annum (₹ in Crore)	Consumption per month (₹ in Crore)	Net Closing Stock (as per Balance Sheet) (₹ in Crore)	Closing stock in terms of months of consumption.
2007-08	19.58	1.63	71.31	44
2008-09	9.75	0.81	74.76	92
2009-10	7.64	0.64	80.79	127
2010-11	2.25	0.19	113.31	597
2011-12	141.68	11.80	29.07	2

It would be evident from the **Table 17** that compared to monthly consumption of stores of ₹ 0.19 crore to ₹ 1.63 crore during 2007-11, value of stock holding of the Company during 2007-11 was sufficient to meet the requirements for the periods ranging from 44 months to 597 months which was indicative of huge investment in surplus stock. During 2011-12, however, the availability of closing stock drastically reduced to two months consumption due to sudden increase in annual consumption of stock from ₹ 2.25 crore (2010-11) to ₹ 141.68 crore (2011-12). This huge increase in stock consumption was mainly due to the unaccounted stores issued to field offices during previous six years (2005-06 to 2010-11), which were accounted during 2011-12. This indicated absence of efficient and effective material management system.

#### ***Non-conducting of physical verification of stocks in the stores***

**2.14.1** As per manual of the Company, a plan for periodical verification of stores covering all the items therein was to be prepared and periodical verification was to be conducted by counting the stocks physically available without reference to bin cards. On preparation of Physical Verification Reports (PVR), the same should be checked by a person not attached to the store.

There were 31 Area Stores under the control of the Company. On verification of records of field divisions/ SSs stores, it was found that annual PVR was prepared upto 2011-12. It was, however, noticed that the PVRs so prepared simply reflect the quantity and value of stores as mentioned in Price Store Ledgers (PSLs) without physical count/verification. On scrutiny of PSLs it was further observed that there were cases of double accounting of receipts as well as non-accounting of inter-unit transfer of stores. As such a difference of ₹ 80.35 crore was noticed in recording of materials in the PSLs compared to the amount shown in the annual accounts for the year 2010-11. This difference was, however, reconciled in 2011-12 by the Company. Thus, in the absence of effective procedure of physical verification of stores, authenticity of the figures reflected in the PVRs was doubtful.

### ***Inefficient Management of Store***

**2.14.2** Scrutiny of records relating to stores of grid SSs revealed that stores relating to SSs equipments (other than tools and plants) amounting to ₹ 1.99 crore were lying idle for a period ranging from 5 to 30 years in 6 out of 15 grid SSs selected for field visit. The Company did not assess whether balance stores are still in usable condition or got deteriorated in quality which would need to be declared as scrap. Thus, idle stock blocked the available storage space causing hurdle in store management. One instance of procurement of store items without considering the immediate requirement and the future planning of the Company was noticed, which contributed towards space constraints besides blocking of huge investments, as discussed below.

#### ***Case Study***

The Company procured (January 2007), 88 Current Transformers (CTs) and 24 Potential Transformers (PTs) costing ₹ 1.28 crore and issued the same to seven Grid SSs for use in 66 kV lines.

On test check of five out of seven such grid SSs, it was found that all CTs and PTs valuing ₹ 1.02 crore were lying unused in test checked SSs as there was no case of failure of CTs and PTs in these SSs for past 10 years. Further, the Company had already started discarding 66 kV system in a phased manner by replacing them with 220 and 132 kV systems rendering all the said CTs and PTs obsolete/surplus.

Thus, procurement of CTs and PTs by the Company without assessing the present need and potentialities of using in future remained unfruitful.

### **Energy Accounting and Audit**

**2.15** Energy accounting and audit are necessary to assess and reduce transmission losses, which are arrived at from readings of Meter Reading Instrument (MRI) obtained from Generation to Transmission (GT) and Transmission to Distribution (TD) boundary metering points. There were 309 interface boundary metering points between 282 TD and inter-transmission points and 27 GT points as on 31 March 2012. All the points were provided with 0.2 class accuracy trivector Availability Based Tariff (ABT) meters.

Analysis of data for the month of January to March 2012 of 16 out of 21 feeders (220/132/66 kV) indicated normal transmission loss<sup>43</sup> in one feeder, existence of high percentage of transmission loss in three feeders, non-availability of meters on either end of five feeders and negative or no losses due to defective meters in remaining seven feeders. Thus, absence of proper metering at feeders end rendered energy accounting and recording of transmission loss data unreliable.

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<sup>43</sup> Transmission loss below the norm prescribed by AERC

**Work of installation of ABT meters.**

**2.15.1** In order to enable the Company to accurately estimate transmission losses as well as effectively manage UI of electricity, AERC accorded (August 2005) approval to utilise an amount of ₹ 4.73 crore out of the AERC's development fund as per the provision of the tariff order for 2005-06 to install ABT meters at the interface of GT, TD and also inter-State energy exchange points. Accordingly, the Company identified (April 2007) requirement of 309 meters for 48 Grid SSs and 3 generating stations.

After cancellation of two Tenders on account of technical flaws in the tender document, Larsen & Turbo Limited (L&T) was awarded (technical bids opened in December 2006) the contract (April 2007) for supply and installation of 309 ABT meters at ₹ 2.90 crore. As per Program Evaluation and Review Technique (PERT) chart of L&T, entire work was scheduled to be completed by October 2007. However, due to delay by the Company in completion of pre-commissioning activities such as completion of civil works, bringing electrical panels of the SSs into working condition and providing Meter-Relay and Testing (MRT) team, there was time overrun ranging from 15 to 33 months in completion of installation of meters. ABT metering system was not synchronised with RTUs for "online data flow" as envisaged in the contract. The main reason for this was that RTUs were not ready, when ABT metering was completed. Later, when RTUs were installed, it was found that L&T had not installed the data concentrators properly which was an important component for storing the data of ABT meters. RTUs thus could not acquire the data from ABT meters for online transmission. Presently the data from ABT meters are downloaded through a Common Meter Reading Instrument (CMRI) and sent to the SLDC using a compact disc, thus, diluting the objective of the management of UI with ABT meters.

On test check of 15 out of 48 SSs including five SSs having inter-State interface for transfer of energy, it was noticed that in eight SSs including five inter-State interface where ABT metering was installed at a cost of ₹ 38.17 lakh were not working properly as detailed in *Annexure II*. This indicated that accounting of transmission loss and management of UI of energy was far from satisfactory.

<b>Monitoring and Control</b>
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**2.16** The performance of SSs and TLs of 400/220/132 kV on various parameters like maximum and minimum voltage levels, breakdown, voltage profiles should be recorded/maintained as per Grid Code standards. The Company, however, earlier did not introduce any system to get feedback from its SSs and lines on status of equipment and performances of SSs and lines. Besides, the functioning of the RTU and the ABT systems installed for online data transfer from different SSs to the SLDC for monitoring their activities was also not found to be satisfactory.

With the view to introduce effective monitoring system on the functions of the SSs, instructions were issued (December 2009) to all circles/Grid SSs to submit half-yearly status report of equipment along with their performance

and maintenance commencing from July 2009. It was found from records that excepting two SSs<sup>44</sup>, remaining 46 SSs did not adhere to the instructions and were not regular in sending the complete and accurate status reports of equipments/feeders.

It was further noticed that on receipt of feedback on defective equipments from different SSs in certain cases, no action were taken by the Corporate Office of the Company to timely repair/rectify the defective equipment. As a result, in three SSs<sup>45</sup> equipments like RTUs, ABT Meters, PLCC panels, etc., were lying in defective condition since the feedback given by SSs (October 2012).

### ***Internal Controls and Internal Audit (IA)***

**2.16.1** 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. The IA is designed to ensure proper functioning as well as effectiveness of the internal control system and timely detection of errors and frauds for appropriate remedial action.

### ***Non operation of Internal Audit***

**2.16.2** The Company had one IA wing headed by General Manager. However, neither the wing was properly manned nor any report of IA was made available to audit for verification. The Statutory Auditors in their reports on the annual accounts of the Company for the years 2007-08 to 2009-10 had repetitively commented that the IA system did not commensurate with the size and nature of the business of the Company. The aspect of not conducting any IA in 2010-11 was also pointed out (March 2012) by ADB Consultative Mission. The wing was reconstituted (October 2011) with one Assistant. Manager (Audit) , two Accounts Officers, one Deputy Accounts Officer, one Accounts Trainee and two Article Clerks headed by Deputy General Manager (Audit). Out of 31 accounting units, 27 units were audited (October 2012) by IA wing. As a normal practice, complete Internal Audit Reports were not placed in Audit Committee meeting for discussion but only cases involving heavy monetary value were placed. However, copies of reports were forwarded to Managing Director and Chief General Manager (Finance & Accounts) of the Company.

Further, it was observed that no Internal Audit reports were placed before the Board of Directors for discussion and necessary remedial action. Thus, in the absence of structured and well defined IA system, the important financial affairs and transactions of the Company mostly remained unverified and unchallenged.

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<sup>44</sup> Narengi and Panchgram (New) SSs

<sup>45</sup> Srikona. Durlavecherra and Pailapool SSs

### *Audit Committee*

**2.16.3** Pursuant to section 292 A of the Companies Act, 1956 an Audit Committee (committee) was constituted (June 2007) by the Company to hold periodical discussions on internal control system, to review the annual financial statements of the Company before submission to the Board and to ensure compliance of internal audit observations. The committee consists of five member directors with MD as Chairman and CGM (F & A) as special invitee. As per the terms of reference of the committee, it should meet minimum four times in a year. Thus, in a span of five years (2007-12), the committee should have met for minimum 20 times. It was, however, noticed that during 2007-12, committee had only one meeting in March 2012. Thus, due to not holding of the minimum number of meetings of the committee, the intended objectives could not be achieved. Consequently, the Company remained unaware about the deficiencies, if any, in its functioning and internal control system.

## **Conclusions and Recommendations**

### **Conclusions**

**Against capacity addition of substations (2990 MVA) and transmission lines (1635.92 CKM) planned under 11<sup>th</sup> Five year plan (2007-12) the Company could complete only two project (43 MVA) and rest of the capacity additions of substations (1298 MVA) and transmission lines (456.25 CKM) completed during 2007-12 pertained to spillover works of previous five year plans. As the execution of transmission projects was undertaken without synchronization with the actual progress of execution of generating plans of generating companies, facilities so created remained underutilised. Pre and post award activities of project implementation suffered with various deficiencies causing considerable delays in completing the projects.**

**Though the transmission losses during 2007-12 showed decreasing trend (excepting 2009-10), the Company could not achieve the AERC norms of transmission loss in any of the five years. The State power distribution company paid huge unscheduled interchange charges to NERLDC during April 2010 to February 2012 due to drawal of power at low frequency, which was indicative of Company's failure in maintaining the Grid discipline effectively. The financial management system of the Company was also deficient as it delayed filing Annual Revenue Requirement (ARR) for tariff revision and had foregone claiming delayed payment surcharges/incentives from State power distribution company causing adverse impact on its financial position.**

**No scientific system was in place for management of inventory. The Energy accounting and audit system of the Company was also unreliable in the absence of proper metering arrangements and authentic estimation of transmission loss. Monitoring mechanism in the Company was weak as implementation and following up of MIS was not satisfactory.**

***Recommendations***

- **Capacity additions should be planned and executed in synchronization with the plans as well as progress of execution of projects of generating companies.**
- **Company should overcome the deficiencies in pre and post award activities by adhering to the recommendations of the Task Force for speedy completion of works.**
- **Company should identify the factors responsible for high transmission losses through proper metering and effective energy accounting and take necessary corrective action to restrict the losses within AERC norms.**
- **The Company should ensure proper functioning of its communication system so as to maintain effective Grid discipline.**
- **An effective mechanism should be put in place for timely raising of bills for recovery of dues and for filing of ARR within due dates.**
- **A scientific system of Inventory Management needs to be put in place for proper accounting of stores. Specific instructions should be issued to field offices for regular submission of MIS reports and prompt remedial action should be taken by higher authorities on the discrepancies noticed.**