CHAPTER-II

Performance Audit relating to Statutory corporation

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2. Performance Audit relating to Statutory corporation

Performance Audit of Power Transmission Activity of Jharkhand State Electricity Board

Executive Summary

Introduction

In Jharkhand, generation, transmission and distribution of power is carried out by the Jharkhand State Electricity Board (Board) except for the Damodar Valley Corporation (DVC) command area where transmission is done by DVC while distribution is done by the Board. The Board was created in March 2001 as a result of the Bihar Re-organisation Act, 2000. The Board transmitted 7,412 MUs of energy including 2,777 MUs transmitted by DVC and West Bengal State Electricity Board (WBSEB) to the Board at 33kV during 2007-08 which increased by 29 per cent to 9,560 MUs including 3,114 MUs transmitted by DVC and WBSEB during 2011-12. The turnover of the Board was ₹2,011 crore in 2010-11, which was equal to 1.86 per cent of the State Gross Domestic Product. The Board had 465 employees on its rolls as on 31 March 2012 who were engaged in transmission activity.

Transmission Network Planning

The Board had prepared a plan for the Eleventh Plan period for additions to the transmission network and upkeep of the existing network. The Board had no internal resources and was dependent on the Rural Electrification Corporation (REC)/Government of Jharkhand (GoJ) for funding of capital expenditure. Against the requirement of ₹ 6,275.59 crore as per the work programme for the period 2007-08 to 2011-12, REC/GoJ released funds amounting to ₹ 463.24 crore only. The Board was unable to utilise the amount and the unspent balance as on 31 March 2012 was ₹89.50 crore. The Board had planned for addition of 48 Grid Sub-stations (GSSs) and associated transmission lines including 10 ongoing GSSs and 10 associated transmission lines at an estimated cost of ₹6,275.59 crore against which 10 ongoing GSSs and five associated transmission lines were completed while five transmission lines could not be completed.

In respect of 14 GSSs and associated transmission lines, the work could not be completed due to frequent changes in planning, while for 24 GSSs and associated transmission lines preparation of Detailed Project Report and other works was yet to be commenced.

Project Management

The construction of GSSs at Dumka, Daltonganj, Japla, Lohardaga, Latehar, Pakur, Sahebganj and Kanke and transmission lines at Deoghar-Dumka, Dumka-Lalmatia, Lalmatia-Sahebganj, Dumka-Pakur were completed after a delay of 12 to 51 months due to delay in land acquisition, forest and railway crossing clearances, approval of drawing and quantity amendment, dispatch instruction, issue of road permit, inspection of material and payment by the Board. GSS at Simdega and transmission lines at Simdega-Gumla, Lohardaga-Gumla, Lohardaga-Latehar and Latehar-Daltonganj could not be completed even after lapse of 27 to 36 months from the scheduled completion period. GSSs at Latehar, Daltonganj and Kanke had not been energised for a period of 35 months to 61 months due to non-completion of connecting transmission lines resulting in blocking of funds of ₹49.14 crore.

Contract Management

The Board changed the terms of Notice Inviting Tenders (NIT) for construction of GSSs at Dumka and Dumka-Deoghar (Package-A), Dumka-Lalmatia-Sahebganj (Package B) and Dumka-Pakur (Package-C) transmission lines and allowed the

base date for IEEMA price variation index as one month prior to date of opening of tender instead of one month prior to the date of negotiation which resulted in excess payment of price variation amounting to ₹10.38 crore.

Performance of Transmission System

The gap in transformation capacity of 220/132 kV had increased from 623 MVA in 2007-08 to 1,348 MVA in 2011-12 whereas the gap in 132/33 kV had increased from 1,277 MVA in 2007-08 to 1,408 MVA in 2011-12. Due to lack of its own transmission system in the DVC command area, the Board had to purchase power at higher cost thereby, incurring additional expenditure of ₹299.53 crore in 2011-12. Transmission losses increased from 5.04 per cent in 2008-09 to 5.50 per cent in 2011-12. The transmission losses during 2008-09 to 2011-12 were above the norms fixed by Jharkhand State Electricity Regulatory Commission (JSERC) and Central Electricity Authority resulting in loss of ₹38.71 crore.

The Board had to incur extra expenditure of ₹102.41 crore during the period 2007-08 to 2011-12 on purchase of 603.38 MUs power from other sources at higher rates due to non-charging of TTPS-PTPS and TTPS-Biharsharif lines at 400 kV.

Grid Management

The Board maintained Grid discipline in respect of over-drawal as per the requirement of the Grid Code.

Disaster Management

The Emergeny Restoration System purchased (October 2009) at a cost of ₹ 7.61 crore was lying idle at Hatia-II GSS, inspite of collapse of five towers during May 2010 to April 2012. The Board took five to 23 days for erecting the tower without using the ERS resulting in disruption of power up to 12 days till alternative arrangement were made.

Energy Accounting and Audit

The energy accounting and audit had not been done as at Jadugora GSS the feeders were unmetered, while in seven GSSs the meters were defective and not changed for more than five years and meters were also not calibrated for the last 24 years. Out of 13 GSSs test checked, in eight GSSs export of energy was more than import of energy implying that the meters were defective.

Material Management

The closing stock in terms of number of month's consumption was 19 months during 2007-08 which decreased to four months in 2009-10 but again increased to 18 months in 2010-11. The physical verification of stock had not been conducted during the period covered by the performance audit.

Conclusion and Recommendations

The Board did not have sufficient funds to execute projects and was dependent on GoJ/REC. Even the funds allotted by GoJ and released by REC were not fully utilised during the plan period. The Board did not follow the recommendations of the Task Force on transmission projects constituted by the Government of India which resulted in time overrun. Projects were not completed in an economical and efficient manner. In awarding contracts, the terms and conditions of the NIT/CVC guidelines were not adhered to. Only breakdown maintenance was being done as the Board had not prepared an Operation and Maintenance manual. The Emergency Restoration System purchased to mitigate the impact of a major disaster was not put to use. The Board did not meter all its GSSs and Feeders. The Board had not formulated any procurement policy and inventory control mechanism.

The audit recommendations include immediate completion of the Transmission schemes so as to ensure that the full benefits of the schemes are passed on to eligible beneficiaries, proper metering of all GSSs and feeders and replacement of the defective meters, establishment of transmission lines in the DVC command area and concentrating on areas with high transmission losses to bring down the same within the permissible JSERC norms.

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. The NEP laid emphasis on the requirement for adequate and timely investment in the transmission system besides efficient and coordinated action to develop a robust and integrated power system for the country. It also recognised the need for development of National and State Grids with the coordination of Central/ State Transmission Utilities. In Jharkhand, generation, transmission and distribution of power is carried out by the Jharkhand State Electricity Board (Board) except for the Damodar Valley Corporation (DVC) command area[1] where transmission is done by DVC while distribution is done by the Board. The Board was created in March 2001 as a result of the Bihar Re-organisation Act, 2000.

Organisational setup

2.2 The Management of the Board is vested in a Governing Body comprising six members appointed by the Government of Jharkhand (GoJ). The day-to-day operations of the Board are carried out by the Chairman, who is the Chief Executive of the Board. The other members are Member (Finance), Member (Distribution and Transmission), Member (Technical) Principal Secretary, Energy Department and Secretary Finance. The Chairman, with the assistance of Chief Engineers at the Board Headquarters and three General Managers-cum-Chief Engineers in Zonal offices, supervises various functions relating to transmission of power and operation and maintenance of the transmission system. The organisational chart is indicated in ***Annexure -7***.

Area of operation and transmission network

2.3 For smooth functioning and to carry out its operations efficiently, the Board has distributed its area of operations into three[2] transmission zones each headed by a GM cum Chief Engineer, five[3] transmission circles and 11[4] transmission divisions (as on March 2012).

2.4 During 2007-08, 7,412 Million Units (MUs) of energy was transmitted (including 2,777 MUs transmitted by DVC and West Bengal State Electricity Board (WBSEB) to the Board at 33 Kilo Volts (kV)) which increased to 9,560 MUs (including 3,114 MUs transmitted by DVC and WBSEB) in 2011-12, *i.e.* an increase of 29 *per cent* during the period 2007-12. The Board constructed ten[5] Grid Sub-Stations (GSSs) of 1,060 Mega Volt Ampere (MVA) capacity

[1] Whole Dhanbad & Bokaro, parts of Hazaribagh, Ramgarh, Koderma, Giridih, Chatra, Palamu, Ranchi, Lohardaga and Dumka.
[2] Ranchi, Jamshedpur and Dumka at Deoghar.
[3] Ranchi, Jamshedpur, Chaibasa, Deoghar and Dumka.
[4] Ranchi, Daltongunj, Gumla, Adityapur, Chandil, Golmuri, Chaibasa, Deoghar-I, Deoghar-II, Lalmatia and Dumka.
[5] 220/132 kV at Hatia-II and 132/33 kV at Dumka, Chakradharpur, Daltonganj, Japla, Sahebganj, Pakur, Kanke, Lohardaga and Lathehar.

and five lines[6] of 402 Circuit Kilometre (Ckm) as well as augmented the existing transformation capacity by 120 MVA during the period 2007-12. As on 31 March 2012, the Board had a transmission network of 2,524 (Ckm) and 29 (GSSs) with installed capacity of 3,268 (MVA), capable of annually transmitting 5,887 MUs at 220 kV.

Financial Position and Manpower

2.5 The turnover of the Board was ₹ 2,011 crore in 2010-11, which was equal to 1.86 *per cent* of the State Gross Domestic Product. As per the accounts for the year 2010-11, the loss for the year and accumulated losses as on 31 March 2011 were ₹ 723 crore and ₹ 6,079 crore respectively. The Board had 465 employees on its rolls as on 31 March 2012 who were engaged in transmission activity as against the sanctioned strength of 771 employees.

Scope of Audit

2.6 The Performance Audit conducted during March 2012 to June 2012 covered the performance of the Board in relation to transmission activities for the period 2007-08 to 2011-12. Audit examination involved scrutiny of records of different wings at the Head Office (Ranchi), State Load Dispatch Centre (SLDC), two[7] out of three[8] zones, two circles[9] under the selected zones, all generating stations transmitting power to Ranchi circle and all the three 220/132 kV GSSs located under Ranchi and Jamshedpur circles. Deoghar circle was also selected as the two 132/33 kV GSSs at Deoghar and Jamtara were overloaded. Eight GSSs[10] (capacity: 740 MVA), four lines[11] (capacity: 282 Ckm) and augmentation of existing transformation capacity by 100 MVA out of ten GSSs, five lines and augmentation of the existing transformation capacity by 120 MVA constructed during the period 2007-12 were selected for detailed examination.

Audit Objectives

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

Planning and Development

- A Perspective Plan was prepared in accordance with the guidelines of the National Electricity Policy/ Plan and Jharkhand State Electricity Regulatory Commission's (JSERC) directions and assessment of impact of failure to plan, if any;

- the transmission system was developed and commissioned in an economical, efficient and effective manner;

[6] 132 kV Dumka – Lalmatia, Lamatia – Sahebganj, Dumka –Deoghar, Dumka – Pakur and 220 kV Hatia - Lohardaga.
[7] Ranchi, Jamshepur.
[8] Ranchi, Jamshedpur and Dumka at Deoghar.
[9] Ranchi, Jamshedpur.
[10] Dumka, Daltonganj, Japla, Sahebganj, Pakur, Kanke, Lohardaga and Latehar.
[11] Dumka – Lalmatia, Lamatia – Sahebganj, Dumka –Deoghar and Dumka – Pakur.

Operation and Maintenance of Transmission System

- the operation and maintenance of the transmission system was carried out in an economical, efficient and effective manner;
- a Disaster Management System was set up to safeguard operations against unforeseen disruptions;
- an effective failure analysis system was set up;
- an effective and efficient Energy Audit system was set up;

Material Management

- there was an efficient, economic and effective system of procurement of material and an inventory control mechanism was set up;
- there was an effective system of stock management and disposal of obsolete stores;

Monitoring and Control

- there was an efficient and effective monitoring system and internal control framework in place.

Audit Criteria

2.8 The sources of audit criteria were the following:-

- Provisions of the National Electricity Policy / Plan;
- Standard procedures for award of contracts with reference to principles of economy, efficiency, effectiveness, equity and ethics;
- Manual of Transmission Planning Criteria (MTPC) issued by the Ministry of Power (MoP) issued in June 1994;
- Grid Code consisting of planning, operation, connection codes;
- Directions from the Government of Jharkhand(GoJ)/MoP;
- Norms/guidelines issued by Jharkhand State Electricity Regulatory Commission (JSERC)/Central Electricity Authority (CEA);
- Report of the Committee for Updating the Best Practices in Transmission system in the Country (January 2002) for maintenance of lines by the Board; and
- Report of the Task Force on transmission projects constituted by the Ministry of Power in July 2005.

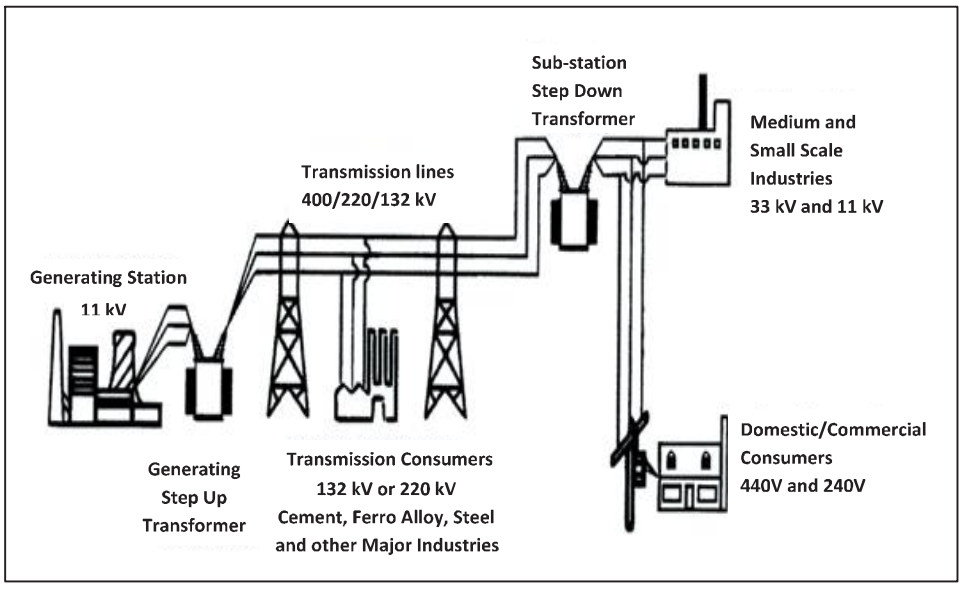
2.9 We explained the audit objectives to the Board during an 'Entry Conference' held on 28 March 2012. Subsequently, audit findings were reported to the Board and the State Government on 16 July 2012. The observations in the draft report along with the reply were discussed with the Chairman of the Board and Special Secretary Energy Department, GoJ in an 'Exit Conference' held on 30 October 2012. The State Government replied (January 2013) to the audit findings. The replies have been considered while finalising the Performance Audit Report. The audit findings are discussed in subsequent paragraphs.

Brief description of the transmission process

2.10 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 to reduce the loss in transmission and to increase efficiency in the Grid. GSSs are facilities within the high voltage electric system used for stepping-up/ stepping down voltages from one level to another, connecting electric systems and switching equipment in and out of the system. The step up GSSs at the generating stations use transformers to increase the voltages for transmission over long distances.

Transmission lines carry high voltage electric power. The step down GSSs 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 called Grid management to ensure balancing of power generation closely with demand. A pictorial representation of the transmission process is given in the following diagram:



Audit Findings

Planning and Development

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

Transmission network and its growth

2.12 The Board's transmission network at the beginning of 2007-08 consisted of 19 GSSs with a transmission capacity of 2,088 MVA and 2,122 Ckm of transmission lines. The transmission network increased to 29 GSSs with a transformation capacity of 3,268 MVA and 2,524 Ckm of transmission lines at the end of March 2012.

The Board is responsible for planning and development of the intra-state transmission system and upkeep of the existing network. Assessment of demand is an important pre-requisite for planning capacity addition.

For upkeep of the existing network and additions to the transmission network, the Board prepared (October 2006) a plan for the Eleventh Plan period (2007-08 to 2011-12) for construction of 23 new GSSs (capacity 3,900 MVA), augmentation of 480 MVA and its associated transmission lines (2,495 Ckm) and completion of ten ongoing GSSs (1,060 MVA) and associated transmission lines (870 Ckm). The financial outlay of the plan was ₹ 2,073 crore. Subsequently construction of 12 more GSSs (capacity 3,650 MVA), augmentation of 510 MVA and associated transmission lines (3,224 Ckm) were approved (November 2008) in view of the future transmission requirements so as to evacuate power from power producers and the financial outlay was revised to ₹ 5,818.52 crore under the State plan including ₹ 406 crore funded by Rural Electrification Corporation (REC). However, the annual plans (2007-12) were prepared for ₹ 5,687.99 crore. The Board planned for construction of three more GSSs (capacity 1,230 MVA) and associated transmission line (246 Ckm) during 2011-12 at an estimated cost of ₹ 587.60 crore. The Board did not have internal resources of its own to meet the expenditure during the Plan period and was dependent on funds received from REC and GoJ.

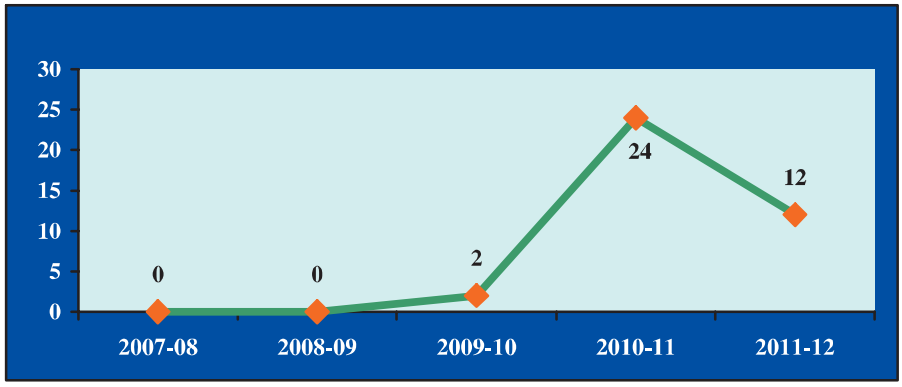
The details of the transmission capacity of the Board at Extra High Tension (EHT) level during 2007-08 to 2011-12 is given below:-

Sl. No.	Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
A. Number of Sub-stations (Numbers)							
1	At the beginning of the year	19	21	25	29	29	19
2	Additions planned for the year	2	4	6	24	12	48[12]
3	Added during the year	2	4	4	0	0	10
4	Total sub stations at the end of the year **(1+3)**	21	25	29	29	29	29
5	Shortfall in additions **(2-3)**	0	0	2	24	12	38
B. Transformers capacity (MVA)							
1	Capacity at the beginning of the year	2088	2488	2878	3248	3258	2088
2	Additions/ augmentation planned for the year	400	390	770	4340	4450	10350
3	Capacity added during the year	400	390	370	10	10	1180
4	Capacity at the end of the year **(1+3)**	2488	2878	3248	3258	3268	3268
5	Shortfall in additions/ augmentation	0	0	400	4330	4440	9170
C. Transmission lines (Ckm)							
1	Capacity at the beginning of the year	2122	2335	2384	2384	2524	2122
2	Additions/ augmentation planned for the year	213	135	537	3800	2150	6835
3	Capacity added during the year	213	49	0	140	0	402
4	Capacity at the end of the year **(1+3)**	2335	2384	2384	2524	2524	2524
5	Shortfall in additions/ augmentation	0	86	537	3660	2150	6433

(Source: Compiled from the records of the Board)

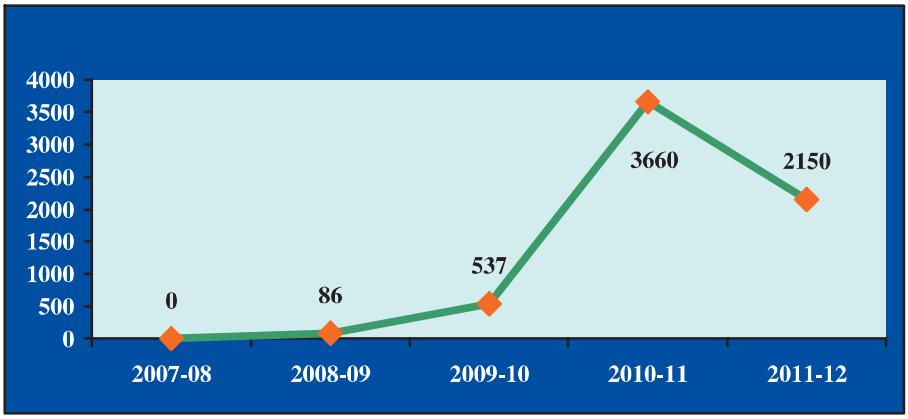
Against the targeted additions/augmentation of 48 GSSs with a capacity of 10,350 MVA, and laying of 6,835 Ckm of transmission lines during the period 2007-08 to 2011-12, the Board could complete construction/augmentation of only ten GSSs with 1,180 MVA transformer capacities and 402 Ckm transmission lines. Out of the ten GSSs constructed, three GSSs at Kanke, Latehar and Daltonganj with transformer capacity of 100 MVA each had not been energised for 35 months to 61 months due to non completion of the connecting transmission lines[13] as on November 2012.

Line Graph: Shortfall in addition of Grid sub-stations in numbers



[12] Including ten ongoing GSSs carried forward to the Eleventh Plan period.
[13] 132 kV Hatia-Kanke, Lohardaga-Latehar, Latehar-Daltonganj and Daltonganj-Japla.

Line Graph: Shortfall in addition/augumentation of lines in Circuit Kilometres



The particulars of voltage-wise capacity additions planned, actual additions, shortfall in capacity *etc.* during the period 2007-08 to 2011-12 are given in the ***Annexure-8.*** The main reasons for shortfall in capacity additions were indecision of the Board and GoJ and non availability of funds as discussed in the following paragraphs:

The details of Annual Plans for transmission projects, receipt of funds from REC and GoJ and the actual expenditure thereagainst during the years 2007-08 to 2011-12 are given in the following table:

(₹ in crore)

Year	Estimated value of the work programme	No. of GSSs/ transmission lines (Ckm)	Opening balance	Funds sanctioned by GoJ	Funds received		Total funds received	Actual expenditure	Closing balance
					REC	GoJ			
1.	2.	3.	4.	5.	6.	7.	8.	9.	(4+8-9)=10
2007-08	260.19	2/213	6.86	-	197.99	-	197.99	79.49	125.36
2008-09	433.60	4/135	125.36	-	30.73	-	30.73	155.76	0.33
2009-10	2933.11	6/537	0.33	90.77	104.83	-	104.83	31.66	73.50
2010-11	1735.54	24/3800	73.50	338.50	52.00	75.00	127.00	51.89	148.61
2011-12	913.15	12/2150	148.61	150.00	-	2.69	2.69	61.80	89.50
Total	**6275.59**	**48/6835**		**579.27**	**385.55**	**77.69**	**463.24**	**380.60**	

(Source: Information furnished by the Board)

We observed that against the requirement of ₹ 6,275.59 crore as per the work programme during 2007-08 to 2011-12, GoJ sanctioned ₹ 579.27 crore and released ₹ 77.69 crore. REC released ₹ 385.55 crore during the same period. The Board was unable to utilise the amount and the unspent balance as on 31 March 2012 was ₹ 89.50 crore. Thus, against the requirement of ₹ 6,275.59 crore the Board received only ₹ 463.24 crore out of which it could utilise only ₹ 380.60 crore during the period 2007-08 to 2011-12. This led to non-achievement of the planned additions in the transmission network as discussed in the following paragraphs.

❖ ***Status of ongoing projects planned for completion in the Eleventh Plan period***

As mentioned in paragraph 2.12, the Board planned to complete 10 ongoing GSSs and associated transmission lines during the Eleventh Plan period (2007-2012). Out of these, eight GSSs[14], six[15] transmission lines and one Line-in-Line-Out (LILO) at Rihand-Sonenagar were to be constructed from loans obtained from REC and two[16] GSSs and four[17] transmission lines were to be constructed from loans from the GoJ.

We observed that both the GSSs and four transmission lines planned to be constructed from GoJ loan were completed.

We further observed that out of the loan of ₹ 385.55 crore obtained from REC:

- ❖ All the eight GSSs planned for construction were completed.
- ❖ One transmission line (Hatia-Lohardaga) out of six lines planned for construction was completed. LILO at Rihand-Sonenagar was also completed.
- ❖ Construction of two[18] transmission lines had not been completed (November 2012).
- ❖ Notice inviting tender (NITs) for the remaining three[19] transmission lines were issued in December 2011 after a delay of 59 months from the date of sanction of the loans. However, the tenders were not finalised (July 2012).

Non-completion of five transmission lines during the Eleventh Plan period affected the quality of power supplied to the consumers.

Thus, out of 10 GSSs, 10 transmission lines and one LILO planned for completion during the Eleventh Plan period, five transmission lines could not be completed by March 2012. Non-completion of these lines would impact the quality of power supplied to the consumers as it would result in low voltage and unstable power supply as discussed subsequently in Paras 2.14.1 and 2.14.3.

❖ ***Status of new projects planned for completion in the Eleventh Plan period***

For upkeep of the existing network and additions to the transmission network, the Board prepared (October 2006) a plan for the Eleventh Plan period (2007-08 to 2011-12) for construction of 23 new GSSs[20] and its associated

[14] 220/132 kV GSS at Hatia and 132/33 kV GSSs at Lohardaga, Latehar, Japla, Kanke, Pakur, Sahebganj and Daltonganj.
[15] 220 kV Hatia-Lohardaga, Lohardaga-Latehar, Latehar-Daltangonj and Daltangonj-Garhwa, 132 kV Hatia-Kanke and Garhwa-Japla.
[16] Chakradharpur and Dumka.
[17] Deoghar-Dumka, Dumka- Lalmatia, Lalmatia-Sahebganj and Dumka-Pakur.
[18] Lohardaga-Latehar and Latehar-Daltonganj.
[19] Hatia – Kanke, Daltonganj – Garhwa and Garhwa – Japla.
[20] 400/220 kV GSSs- Patratu, Chandil ; 220/132 kV GSSs - Dumka, Chaibasa,Govindpur ; 132/33 kV GSSs - Chaibasa, Govindpur , Madhupur, Simdega, Mango, Ramchanderpur, Khunti, Bundu, Giridih, Ramgarh, Ratu road, Godda, Hazaribagh, Chaibasa, Chatra, Govindpur – II, Garwha and Manoharpur.

transmission lines which was approved by GoJ. Subsequently construction of 12[21] more GSSs and associated transmission lines were approved (November 2008). The Board further planned for construction of three[22] more GSSs and associated transmission lines during 2011-12. However the Board did not have internal resources of its own to meet the expenditure during the Plan period and was dependent on funds received from REC and GoJ.

We observed that:

- REC sanctioned (February 2009) loan of ₹ 984.87 crore for construction of ten[23] GSSs and associated transmission lines on the condition that GoJ was to provide unconditional guarantee for repayment of the loan**.**

- The Board (March 2009) and Energy Department (July 2010) agreed to the conditions laid down by REC, but Finance Department did not agree (August 2010 and March 2011) to provide unconditional guarantee as the financial position of the Board was not sound.

- The Board and Energy Department proposed to award the work to Power Grid Corporation of India Limited (PGCIL) on nomination basis (December 2010). However, the Finance Department was of the view (March 2011) that the Board should go in for tendering rather than award the work on nomination basis.

- In the meantime, due to urgent requirement of the transmission network in areas where network was not available, GoJ sanctioned (October 2009 and March 2010) the construction of two[24] GSSs and associated transmission lines under the State Plan. Of these, one GSS at Simdega was initially proposed for execution under REC loan. Subsequently (September 2011), GoJ included three[25] more GSSs and associated transmission lines to be financed by REC.

- GoJ accorded technical approval (January 2012) and administrative approval (July 2012) to appoint PGCIL as a consultant on nomination basis for construction of the 12 GSSs and associated transmission lines to be financed by REC.

- GoJ released (September 2012) ₹ 147 crore from the State Plan and requested REC to release the sanctioned amount of ₹ 984.87 crore as loan to the State Government.

[21] 400/220 kV GSSs- Chaibasa, Jasidih, Torpa; 220/132 kV GSSs- Hazaribagh, Jasidih, Chatra, Sikarapara; 132/33 kV GSSs -Hazaribagh, Chatra, Chakardharpur, Jamma and Amrapara.
[22] 400/220 kV GSS at Latehar, 220/132 kV GSSs at Latehar and Lohardaga.
[23] 220/132 kV GSSs at Govindpur, Chaibasa and Dumka, 132/33 kV GSSs at Manoharpur, Simdega, Mango, Ramchanderpur, Madhupur, Govindpur and Chaibasa.
[24] Simdega and Chatra.
[25] 400/220 kV GSS at Latehar, 220/132 kV GSSs at Latehar and Lohardaga.

Thus, frequent changes in planning resulted in non execution of 14 GSSs and associated transmission lines planned for completion with GoJ/REC funding in the Eleventh Plan period. As regards the remaining 24 GSSs and associated transmission lines which were planned in the Eleventh Plan, preparation of Detailed Project Reports (DPRs) and other related works for its execution are yet to be commenced (November 2012).

The Government accepted (January 2013) the audit observation and stated that projects could not be implemented due to frequent changes in the post of the Chairman of the Board. The work awarded to PGCIL has now been planned under the Twelfth Plan. PGCIL has floated the tender for GSSs and transmission lines.

Project management of transmission system

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

- ❖ analyse the critical elements in transmission project implementation,
- ❖ recommend ways to curtail delays in transmission projects,
- ❖ implement according to the best practices of CTU and STUs, and
- ❖ suggest a model transmission project schedule for 24 months' duration.

The Task Force suggested and recommended (July 2005) the following remedial actions to accelerate the completion of transmission systems:

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

2.14 We noticed that the Board did not follow the recommendations of the Task Force which would have helped in timely completion of projects. It failed to undertake various preparatory activities such as survey, design and testing, processing for forest and other statutory clearances, tendering

activities *etc.* which were essential for timely completion of the project in advance/parallel to the project appraisal and approval phase as recommended by the Task Force Committee. Further, though transmission projects were broken down into packages, the Board did not finalise the tenders on time which culminated in abnormal delays in execution of the projects. Thus, notwithstanding the elaborate guidelines given by the Task Force Committee for timely completion of the projects, the Board did not follow the time schedule for completion of GSSs and lines resulting in time overrun as detailed in the following table:

Sl. No.	Name of project	Awarded Cost / (₹ crore)/ LOI Month	Due date of completion (Month)	Actual date of completion (Month)	Time over run (Months)	Reasons
1	132/33 kv GSS at Dumka and 132 kv Deoghar-Dumka transmission line (Package A)	35.89 December 2004	June 2006	January 2009 (GSS) and September 2010 (transmission line)	31(GSS) 51(transmission line)	Delays in forest clearance, Railway clearance, Right of Way issues and delay in making payments.
	Dumka-Lalmatia and Lalmatia-Sahebganj transmission lines (Package B)	58.49 December 2004	June 2006	June 2007 December 2008	12 30	
	Dumka-Pakur transmission line (Package C)	19.39 April 2005	October 2006	January 2011	51	
2	GSSs at Daltonganj and Japla	32.06 August 2005	February 2007	October 2007 (Daltonganj) September 2008 (Japla)	8 (Daltonganj) 19 (Japla)	Delay in approval of drawing and quantity amendment, dispatch instruction and road permit, inspection of materials and delay in making payments.
3	220 kV Lohardaga-Latehar (Package A) and Latehar-Daltonganj (Package B) transmission lines	34.06 (Package A) 34.80 (Package B) May 2008	November 2009	Not completed (as on November 2012)	36	Delay in forest and railway crossing clearance.
4	GSSs at Lohardaga, Latehar (PackageA), Pakur, Sahebganj and Kanke (Package B)	45.51 (package A) 69.74 (Package B) September 2006	March 2008	November 2008 (Lohardaga), January 2009 (Latehar), December 2009 (Package B)	8 (Lohardaga), 10 (Latehar) 21 (Package B)	Delay in land acquisition, approval of drawings, quantity amendment, issue of dispatch instruction and road permit, inspection of material and in making payments.
5	GSS at Simdega and Simdega-Gumla and Lohardaga-Gumla transmission lines	101.35 February 2009	August 2010	Not completed (as on November 2012)	27	Delay in land acquisition, forest and railway crossing clearances.
6	GSS at Chatra and Chatra-Latehar and PTPS-Chatra transmission lines	Not awarded	-	-	-	-

(Source: Compiled from the records of the Board)

The reasons for delay in implementation of the above projects as analysed in audit were as under:-

2.14.1 GSS at Dumka, Deoghar-Dumka, Dumka-Lalmatia, Lalmatia-Sahebganj and Dumka-Pakur transmission lines

The Board was supplying power to Dumka, Pakur and Sahebganj Districts at 33kV lines due to non-availability of transmission network from Deoghar GSS, by purchasing power from WBSEB and Lalmatia GSS respectively. This caused low voltage and unstable power supply besides purchase of power from WBSEB at a higher cost than the average cost of power purchased from other sources[26]. Hence, the Board issued (December 2004/April 2005) LOI for the construction of GSS at Dumka, Deoghar-Dumka, Dumka-Lalmatia, Lalmatia-Sahebganj and Dumka-Pakur transmission lines.

The transmission lines were completed after a delay of 12 to 51 months due to delay of four to 54 months in initiating the process of obtaining statutory clearances.

We observed that the Board initiated the process of getting statutory clearances after a delay of four to 54 months from the date of issue of Letter of Intent (LOI). All the transmission lines were completed after a delay of 12 to 51 months. It was further observed that for the Dumka-Pakur transmission line the Forest Department claimed (November 2008) ₹ 76.05 lakh towards Net Present Value of the forest land to be utilised for the scheme and also for compensatory afforestation scheme. No work could be done on this line for 16 months between November 2008 and April 2010 till the payment was made by the Board in April 2010. The Board proceeded to construct the line in anticipation of the forest clearance and the work was finally completed (January 2011) without forest clearance.

The Government accepted (January 2013) the audit observation and stated that the scheme was to be funded under the State Plan, but as the funds flow was deficient, the Board paid the amount out of their own funds.

The fact remains that the Board had not made any provision for the amount payable for forest clearance in the estimate submitted to the GoJ. It took considerable time of 12 months in making the request (November 2009) to the GoJ for the funds after receipt of the demand from the Forest Department.

2.14.2 GSSs at Daltonganj and Japla

Power to Daltonganj Division and Japla Sub-division was fed through 33 kV lines from the remotely situated grid sub-stations at Garhwa Road and Sonenagar (Bihar) respectively resulting in inadequate and unstable supply with frequent interruptions. Hence, the Board issued (August 2005) LOI for the construction of GSSs at Daltonganj and Japla.

We observed that there was delay in releasing mobilisation advance and running account payments, approval of drawings, amendment in quantity of the order, issue of dispatch instructions and road permits, inspection of materials *etc.* ranging between 483 and 663 days. GSSs at Daltonganj and

[26] Damodar Valley Corporation, National Thermal Power Corporation Ltd., Tenughat Vidyut Nigam Ltd., National Hydro Power Corporation Ltd. and Power Trading Corporation Ltd.

Japla were constructed in October 2007 and September 2008 after time overrun of eight and 19 months respectively. The Board had paid ₹ 22.02 crore (May 2012) for the construction of GSSs at Daltonganj and Japla. While the GSS at Japla was energised, the GSS at Daltonganj had not been energised (November 2012) for 61 months from the date of completion due to non-completion of the Latehar-Daltonganj and Daltonganj-Garhwa transmission line.

Non-energising of GSS at Daltonganj resulted in blocking of ₹ 11.01 crore.

Thus, due to non-charging of the GSS, the objective of the scheme could not be met and power continues to be supplied from the remotely situated GSSs resulting in unstable supply at Daltonganj and blocking of ₹ 11.01 crore[27].

The Government accepted (January 2013) the audit observation and stated that GSS at Daltonganj will be charged shortly.

2.14.3 Lohardaga- Latehar and Latehar- Daltonganj transmission lines

A Notice Inviting Tender (NIT) was issued in January 2005 for the construction of the transmission line and LOI was issued (July 2005) to the lowest bidder, Ramjee Power Construction Limited (RPCL). However, in its 38th Board meeting, the Board decided (September 2005) not to issue the work order as the contractor had submitted forged Bank Guarantee (BG) for ₹ 19.70 crore in rural electrification works. A subsequent NIT issued during 2005-06 was cancelled due to non-participation of adequate number of tenderers. The Board again issued (October 2006) an NIT in which IVRCL Infrastructure and Project Limited (IVRCL) was the lowest tenderer. We observed that the Board did not follow the recommendation of the Task Force and initiated action for forest clearance (May 2009) and railway crossing permission (July 2010) after a delay of 12 and 26 months respectively from the date of issue of LOI (May 2008). Permission for railway crossing was granted in December 2010. However, forest clearance was still awaited (May 2012). Thus, the work had not been completed and uninterrupted and quality power to the consumers had been denied even after 36 months of the scheduled completion period (November 2012).

The transmission lines work could not be completed (November 2012) due to delay of 12 to 26 months in initiating the process of obtaining statutory clearances.

The Government replied (January 2013) that the proposals for forest and railway clearance require extensive documentation such as check survey of route, route finalisation, tree enumeration *etc*.

The reply does not address the issue regarding non-consideration of the recommendation of the Task Force to undertake various preparatory activities such as surveys and processing for forest and other statutory clearances in advance/parallel to project appraisal and approval phase.

2.14.4 GSSs at Latehar, Lohardaga, Pakur, Sahebganj and Kanke

Power to Latehar, Lohardaga, Pakur and Sahebganj was fed through 33 kV lines from the remotely situated Daltonganj Power Sub-Station (PSS), Mander PSS and GSS at Dhulian (WBSEB) bordering Pakur and Lalmatia respectively

[27] ₹ 22.02 crore (for two GSSs)/2 = ₹ 11.01 crore for one GSS.

resulting in inadequate and unstable supply with frequent interruptions. The existing 132/33 kV GSS at Ranchi was not capable of catering to the full power requirement of Kanke. Hence, the Board issued (September 2006) LOI for the construction of GSSs at Latehar, Lohardaga, Pakur, Sahebganj and Kanke.

We observed that the Board did not follow the recommendations of the Task Force on action to be taken to accelerate the completion of the projects and there were delays ranging between 558 to 1257 days in acquisition of land, releasing mobilisation advance and payments, approval of drawing and quantity amendment, issue of dispatch instructions and road permits and inspection of materials for construction of the above GSSs. The GSSs were completed after delay of eight to 21 months from due date of completion (March 2008). The GSSs at Lohardaga and Sahebganj were energised on completion**.** However, the GSS at Pakur was energised (January 2011) after a delay of 13 months from the date of completion (December 2009) due to delayed construction of the Dumka-Pakur transmission line. The Board had paid ₹ 93.74 crore (May 2012) for the construction of above GSSs. Moreover, the GSSs at Kanke and Latehar had not been energised (November 2012) even after 35 and 46 months respectively from their completion due to non-completion of the Lohardaga-Latehar, Latehar-Daltonganj and Hatia-Kanke transmission lines. As a result, consumers were deprived of quality power and ₹ 38.13 crore[28] paid to the contractors for the GSSs remained blocked.

Non-energising of GSS at Kanke and Latehar resulted in blocking of ₹ 38.13 crore.

2.14.5 GSS at Simdega and Simdega-Gumla and Lohardaga-Gumla transmission lines

As a GSS was not available at Simdega, the Board was supplying power at 33kV from Kamdara GSS. The Board issued LOI (February 2009) to Genus Power Infrastructure Ltd. for construction of a GSS at Simdega and associated transmission lines to be completed by August 2010. We observed that GoJ accorded administrative approval (October 2009) for ₹ 90.77 crore and released loan of ₹ 40 crore (August 2010). The Board did not follow the recommendations of the Task Force and initiated steps for obtaining forest clearance and railway crossing clearance after a delay of 26 and 12 months respectively from the date of issue of LOI. The land was acquired (February 2010) and railway crossing clearance was received (March 2011), whereas forest clearance was still awaited (June 2012). The GSS and associated transmission lines are yet to be completed (November 2012).

The GSS and associated transmission lines were not completed (November 2012) due to delay of 12 to 26 months in initiating process of obtaining statutory clearances.

The Government accepted (January 2013) the audit observation and admitted the delay in initiation of forest and railway crossing clearances.

2.14.6 GSS at Chatra and Chatra-Latehar and PTPS-Chatra transmission lines

Administrative approval of ₹ 193.50 crore was granted (March 2010) by the GoJ for construction of a GSS at Chatra and Chatra-Latehar and PTPS-Chatra transmission lines. We observed that the Board had availed (March 2011) a

[28] ₹ 52.47 crore for three GSSs/3 + ₹ 41.27 crore for two GSSs/2 = ₹ 38.13 crore.

Loan of ₹ 30 crore obtained from GOJ remain unutilised for a period of 15 months till June 2012 due to non-intiation of any action for implementation of the work.

loan of ₹ 30 crore from the GoJ which was kept in the Personal Ledger Account of the Board and remained unutilised till June 2012 for a period of 15 months on which interest liability of ₹ 4.88 crore[29] had already accrued. The Board had not initiated (June 2012) any action for implementation of the work. The interest liability could have been avoided had the loan drawal been synchronised with actual execution of the works.

The Government replied (January 2013) that the Detailed Project Report has been prepared and tender evaluation was in progress. However, the reply was silent about the interest liability aspect.

Contract Management

2.15 During the period 2007-08 to 2011-12 the contracts awarded or executed by the Board were examined in audit and the following points on non-compliance to tender conditions and Central Vigilance Commission (CVC) guidelines were noticed:

- A Notice Inviting Tender (NIT) was issued (October 2003) for construction of 132 kV transmission line at Dumka-Deoghar and GSS at Dumka (Package-A), 132 kV Dumka–Lalmatia–Sahebganj (Package B) and 132 kV Dumka-Pakur (Package-C) transmission lines. The due date of opening of tender was November 2003. One of the tender conditions was that price variation as per Indian Electrical & Electronics Manufacturers' Association (IEEMA[30]) index would be allowed with base date as one month prior to the date of opening/date of submission of tender, and in case of negotiation one month prior to the date of negotiation. Negotiations were held with the bidders for packages A and B in October 2004 and for package C in December 2004. Based on the negotiations, the bidders reduced the prices. However, while issuing the purchase order/work order (PO/WO) (January 2005 to May 2005) the Board did not adhere to the terms of the NIT and allowed the base date for price variation as one month prior to the date of tender which worked out to 11 months for packages A & B and 13 months for package C prior to the date of negotiation. The Board paid (May 2012) ₹ 22.70 crore, ₹ 4.34 crore and ₹ 9.86 crore towards price variation for packages A, B & C respectively. As the Board had not subscribed to the IEEMA bulletin, it was dependent on the supplier for obtaining the IEEMA price indices. We calculated the price variation allowable adopting the base date as one month prior to the date of negotiation and found that excess payment of ₹ 5.53 crore, ₹ 2.26 crore and ₹ 2.51 crore for packages A, B & C respectively was made by the Board.

The Board paid excess price variation amounting to ₹ 10.38 crore due to change in terms of NIT.

- For construction of 132/33 kV GSSs at Lohardaga and Latehar (Package-A) and Pakur, Sahebganj and Kanke (Package - B) with due date of opening of tender (December 2005), the lowest bidder,

[29] ₹ 30 crore @ 13 *per cent* (for 15 months upto June 2012).

[30] IEEMA evolves and operates equitable and uniform price variation clause (PVC) by circulating applicable monthly raw material prices and indices.

M/s AREVA T & D, reduced the price by ₹ 77.19 lakh and ₹ 22.81 lakh for Packages A and B respectively on negotiation (July 2006). The Board paid (April 2012) ₹ 2.12 crore for package A. We calculated the price variation allowable adopting the base date as one month prior to the date of negotiation and found that excess payment of ₹ 8.34 lakh[31] was made by the Board. The Board had not made any payment towards price variation for package B (April 2012) and hence the impact, if any, for not adhering to the IEEMA index is not ascertainable.

The Government replied (January 2013) that the change of base dates had been done by the Governing Body of the Board.

The fact remains that non-adherence to the conditions of the contract was detrimental to the financial interest of the Board as the date of negotiation of price bids should have been the base date for determining the price variation.

❖ Due to non-payment of running account bill of ₹ 4.68 crore for 9-12 months and delayed approval of material test report, quantity schedule and delay in arranging road permit, land acquisition, forest and railway clearances by the Board, the work of construction of GSS at Dumka and 132 kV Dumka-Deoghar (Package-A) and Dumka-Pakur (Package-C) transmission line was not completed as scheduled (June 2006) for Package-A and (October 2006) for Package-C by the contractor, RPCL. RPCL made a representation (January 2007) for appointment of an arbitrator. The arbitrator delivered the award (February 2008) in favour of RPCL and directed the Board to pay ₹11 crore as compensation. The Board paid ₹ 11 crore to the contractor (May 2008). As per Section 34(3) of the Arbitration & Conciliation Act, 1996, an application for setting aside any award may not be made after four months from the date of award. However, the Board challenged (January 2011) the award of arbitration in the court of the Sub-judge, Ranchi after a considerable delay of three years, reasons for which were not on record.

Delay in approval of material test report, quantity schedule, land acquisition, forest clearance *etc.* by the Board led to arbitration resulting to avoidable payment of ₹ 11 crore.

The Government replied (January 2013) that the matter of challenging the arbitration was deliberated, legal opinion was taken and accordingly the decision for challenging the arbitration was taken by the Board (January 2011).

However, the fact remains that the Board challenged the arbitration after three years against the period of four months laid down in the Arbitration & Conciliation Act.

Besides, due to delay in completion of GSS at Dumka and transmission lines at Dumka-Deoghar and Dumka-Pakur the Board had to procure power from WBSEB at higher rates to meet its requirements which

[31] Price variation is worked out on payment of ₹ 13.15 lakh only, as IEEMA price indices to this extent was available with the Board.

The Board incurred extra expenditure of ₹ 53.58 crore on purchase of power from WBSEB due to delay in completion of Dumka-Pakur line.

resulted in extra expenditure of ₹ 53.58 crore[32] compared to the cost of purchase of power from other sources.

- As per Central Vigilance Commission (CVC) guidelines (November 2002), once the offer is found to be technically and financially acceptable, the work should be awarded without any loss of time. It was observed that for construction of 220 kV transmission lines at Lohardaga-Latehar (Package - A) and Latehar-Daltonganj (Package - B), the NIT was published with due date of opening of tender as November 2006. Against this, only two tenderers participated in the bid. It was seen that the Board took nine months to disqualify one of the tenderers (August 2007), due to deficiencies in the technical details furnished by him. Though the negotiated (November 2007) price of ₹ 34.06 crore and ₹ 34.80 crore of the single tenderer, IVRCL Infrastructures and Projects Limited, was below the estimated price of ₹ 35.48 crore and ₹ 35.67 crore for packages A and B respectively, the Board did not issue the LOI and instead requested (November 2007) PGCIL to prepare a cost estimate in order to compare the reasonability of the rates quoted by the bidder. The estimated price of PGCIL, quoted in January 2008, was ₹ 38.54 crore and ₹ 36.48 crore for packages A and B respectively which was more than the negotiated price. Finally the LOIs were issued (May 2008) to IVRCL after 15 months from the date of opening of the tender. Thus, award of the contract was unduly delayed in violation of CVC guidelines.

The Government accepted (January 2013) the audit observation and stated that due to the fact that there was a single bidder, the quoted price had been compared with the rate of PGCIL.

However, the fact remains that the Board took considerable time of six months to compare the bidder's rate with that of PGCIL.

Performance of the transmission system

2.16 The performance of the Board mainly depends on efficient maintenance of its 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 Board with regard to operation and maintenance (O&M) of the system is discussed in the succeeding paragraphs.

[32] (Average cost of power purchased from WBSEB – Average cost of power purchased by JSEB excluding WBSEB)* Total number of units purchased from WBSEB = (₹ 5.04 – ₹ 2.60)*219.57MUs.

Transformation capacity

2.17 The Board in order to evacuate the power from the generating stations and to meet the load growth in different areas of the State constructs lines and GSSs at different voltages. A substation houses transformers which convert AC voltage and current to a different voltage and current at a very high efficiency. The voltage levels can be stepped up or down to obtain an increase or decrease of AC voltage with minimum loss in the process. The evacuation of power is normally done at 220 kV GSS. The transformation capacity at 220 kV GSSs[33] created *vis-à-vis* the transformation capacity (peak demand met) at the end of each year by the Board during the five years ending March 2012 are as follows:

Transformation capacity (in MVA)				
Year	**Installed**	**After leaving 30 *per cent* towards margin[34]**	**Peak demand**	**Excess/ shortage**
1.	**2.**	**3=(70% of 2)**	**4.**	**5=(3-4)**
2007-08	1050	735	1606	(-)871
2008-09	1050	735	1698	(-)963
2009-10	1050	735	1774	(-)1039
2010-11	1050	735	1836	(-)1101
2011-12	1050	735	1885	(-)1150

(Source: Compiled from the records of the Board)

From the above table it was observed that the overall transformation capacity was much less than the requirement. In fact, the shortfall had increased from 871 MVA in 2007-08 to 1150 MVA in 2011-12. Thus, non-completion of the GSSs resulted in the inability of the Board to meet the peak demand.

2.18 Transformer is a static device installed for stepping up or stepping down voltage in transmission and distribution of electricity. The energy received at high voltage (220/132 kV) from the GSSs is transformed to a lower voltage (132/33 kV) and 132/33 kV GSSs to 33/11 kV PSS to make it available for distribution. In order to cater to the entire connected load, the transformation capacity should be adequate. The optimum tolerance of a transformer is 80 *per cent* of its rated capacity to prevent the transformer from burning/developing defects. The connected loads *vis-à-vis* transformation capacity in the Board at 80 *per cent* rating during the years 2007-08 to 2011-12 is given in the following table:

[33] 220 kV GSSs at Hatia (300 MVA), Chandil (300 MVA) and Ramchandarpur (450 MVA).
[34] Recommendation of the Working Group on Power – Eleventh Plan.

Year	220/132 kV Capacity (MVA)	132/33[35] kV Capacity (MVA)	33/11 kV Capacity (MVA)	220/132 kV Capacity required to match 132/33 kV GSS (MVA)	Shortage /Excess (MVA)	132/33 kV Capacity required to match 33/11 kV power substation (MVA)	Shortage/Ex-cess (MVA)
(1)	(2)	(3)	(4)	(5)=$\frac{100}{80}$ x (3)	(6=5-2)	(7)=$\frac{100}{80}$ x (4)	(8=7-3)
2007-08	1050	1338	2092	1673	(623)	2615	(1277)
2008-09	1050	1628	2182	2035	(985)	2728	(1100)
2009-10	1050	1898	2305	2373	(1323)	2881	(983)
2010-11	1050	1908	2491	2385	(1335)	3114	(1206)
2011-12	1050	1918	2661	2398	(1348)	3326	(1408)

(Source: Compiled from the records of the Board)

It can be seen from the above table that the gap in transformation capacity of 220/132 kV had increased from 623 MVA in 2007-08 to 1,348 MVA in 2011-12 whereas the gap in 132/33 kV had decreased from 1,277 MVA in 2007-08 to 983 MVA in 2009-10 and again increased to 1,408 MVA in 2011-12. Due to this mismatch in transformation capacity the Board was not able to fulfil the present load demand at Deoghar, Jamtara, Kharsawan, Jadugora and Kendposi GSSs. The mismatch in transformation capacity was mainly due to non availability of GSSs and transmission lines in the DVC command area.

As per the Electricity Act, 2003 the Board is allowed to construct transmission lines in DVC command area also. However, the Board did not set up its own transmission system and power for supply in the DVC command area is being drawn from DVC at 33 kV and supplied through the distribution system. We observed that the rate at which power was purchased from DVC was higher than the average cost of power purchased by the Board. As a result, the Board had to incur additional expenditure of ₹ 299.53 crore on power purchases during 2011-12 (excluding ₹ 1,325 crore already reported in the Audit Report 2010-11 on Distribution activity of the Board). This reflected unscientific planning in creation of transmission network in the DVC command area**.**

The Government replied (January 2013) that in their command area the transformation capacity was more than the peak demand, input of power in some GSSs is at 132 kV and in DVC command area input is even at 33 kV and effort was being made to augment and add GSSs.

However the fact remains that the Board had no transmission network in the DVC command area and five GSSs[36] in their command area were overloaded.

[35] Does not include GSSs at Daltonganj, Latehar and Kanke having capacity 100 MVA each constructed in October 2007, January 2009 and December 2009 respectively, but not charged so far (November 2012).

[36] Deoghar, Jamtara, Kharsawan, Jadugora and Kendposi.

Sub-stations

Adequacy of Sub-stations

2.19 The Manual on Transmission Planning Criteria (MTPC) stipulates the permissible maximum capacity for different GSSs *i.e.* 320 MVA for 220 kV and 150 MVA for 132 kV GSS.

Scrutiny of the maximum capacity levels of GSS revealed that 132 kV GSS at Adityapur exceeded the permitted level as the load was more than 150 MVA. It was also observed that every GSS of capacity 132 kV and above should have at least two transformers but the GSS at Chakradharpur had only one transformer of 20 MVA. Further, as per JSERC (State Grid Code) Regulation 2008 issued in January 2009 the size and number of transformers in the GSS shall be planned in such a way that in the event of outage of any single transformer it would not overload the remaining transformers or the system. Out of 20 GSSs[37] test checked, only Ramchanderpur and Lohardaga GSSs can transmit the load in the event of outage of any single transformer. The Board is not able to meet the growing load demand due to insufficient transformation capacity. Thus, immediate augmentation of transformation capacity is required.

The Government accepted (January 2013) the audit observation and replied that augmentation of transformer capacity was under active consideration.

Voltage management

2.20 The licensees using intra-state transmission system should make all possible efforts to ensure that grid voltage always remains within limits. As per the Indian Electricity Grid Code, STUs should maintain voltages ranges between 380-420 kV, 198-245 kV and 122-145 kV in 400 kV, 220 kV and 132 kV line respectively.

Scrutiny of the 220/132 kV bus voltages in 13 GSSs of five divisions of the two Zones during the period under audit scrutiny revealed that in 220 kV GSS at Hatia II the voltages recorded ranged between 212 kV and 247 kV while in six[38] 132 kV GSSs voltage recorded ranged between 112 kV and 145 kV. To provide quality power and reduce the transmission losses the Board should ensure that the maximum and minimum voltages are maintained as per the norms.

The Government accepted (January 2013) the audit observation and stated that as and when voltage exceeds the limit the GSSs are directed to keep the voltage within permissible limit.

[37] Deoghar, Jamtara, Garhwa, Japla, Hatia-II, Hatia-I, Namkum, Lohardaga, Goelkera, Kharsawan, Chakardharpur, Kendposi, Noamundi, Adityapur, Ramchanderpur, Chandil-I, Chandil-II, Golmuri, Jadugora and Dhalbhumgarh.

[38] Namkum, Chandil – II, Japla, Garhwa, Dhalbhumgarh and Golmuri.

Bus Bar Protection Panel (BBPP)

2.21 Bus Bar is used as an application for interconnection of the incoming and outgoing transmission lines and transformers at an electrical Sub-station. BBPP limits the impact of the Bus Bar faults on the entire power network which prevents unnecessary tripping and is selective to trip only those breakers necessary to clear the Bus Bar fault. As per Grid norms and Best Practices in Transmission System, BBPP is to be kept in service for all 220 kV GSSs to maintain system stability during Grid disturbances and to provide faster clearance of faults on 220 kV buses.

We observed that out of three numbers of 220 kV GSSs (one was double bus GSS and two were triple bus GSSs) where BBPP is required to be installed, the Board provided the BBPP at one GSS at Hatia and in the remaining two GSSs at Ramchanderpur and Chandil, BBPPs were not yet provided.

The Government accepted (January 2013) the audit observation and replied that work for installation of BBPP at Ramchanderpur and Chandil GSSs will be completed by February 2013.

Maintenance

Performance of Current transformers (CT) and Power Transformers (PT)

2.22 CT and PT at GSSs are one of the most important and cost-intensive components of electrical energy supply networks. Hence, it is of special interest to prolong their life duration while reducing their maintenance expenditure. In order to gather detailed information about the operation conditions of CTs and PTs, various kinds of oil analysis like the standard oil Dissolved Gas Analysis (DGA) tests are generally conducted. For CT and PT insulation a combination of an insulating liquid and a solid insulation impregnated therewith are used. For an evaluation of the actual condition of this insulating system usually a DGA test is used, as failures inside the CT and PT lead to a degradation of the liquid insulation in such a way that the compound of the gases enables an identification of the cause of the failure. DGA and insulating oil test for CT had not been conducted by the Board during the period 2007-2012. However, DGA and insulating oil test of 16 PTs of various GSSs conducted during the same period showed violation of acetylene (C_2H_2), acidity and resistivity value, traces of sludge and as a result reclamation/replacement of oil were required in nine PTs. Acidity and sludge would affect the age of the PT and reclamation/replacement of oil would increase the life of the transformers. However, the oil had not been reclaimed /replaced although five to 48 months had expired since conduct of the DGA and insulating oil tests.

DGA and insulating oil test was conducted on PTs but not on CTs during the period 2007-2012. In nine PTs violation of prescribed norms was noticed which required reclamation /replacement of oil which however had not been done for five to 48 months since conduct of the tests.

The Government accepted (January 2013) the audit observation and replied that efforts were made to improve the oil condition with filtration during overhauling/annual maintenance.

However, the fact remains that the oil had not been reclaimed/ replaced although five to 48 months have expired since conduct of DGA and insulating oil test.

Installation of transformer without augmenting the earth mesh and shielding wire resulted in avoidable expenditure of ₹ 1.13 crore on its repair.

During the period 2007-08 to 2011-12 four PTs failed out of the 48 PTs test checked. It was observed that three PTs were 23 years old and one PT of a 2X20 MVA at Hatia-I GSS was replaced by a 50 MVA PT (February 2005) without augmenting and strengthening the earth mesh and renovating minimum oil circuit breaker. The PT tripped (July 2008) due to the effects of lightning. It was also observed that maintenance of the PT, relay panels and calibration of relays were not being done and several gantry columns including the front plinth of the PT did not have shielding wire necessary to protect it against lightning. The PT was reinstalled (June 2011) by incurring an avoidable expenditure of ₹ 1.13 crore on its repair.

The Government accepted (January 2013) the audit observation and stated that the PT was reinstalled after augmenting and strengthening the earth mesh and installation of shielding wire.

Working of hot lines division/sub divisions

2.23 Regular and periodic maintenance of transmission system is of utmost importance for its un-interrupted operation. Apart from scheduled patrolling of lines following techniques are prescribed in the Report of the Committee for Updating the Best practices in Transmission System in the Country (January 2002) for maintenance of lines:

- Hot line maintenance
- Hot line washing
- Hot line puncture detection of insulators
- Preventive maintenance by using portable earthing hot line tools
- Vibration measurement of the line
- Thermo-scanning
- Pollution measurement of the equipment.

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

As on March 2012 the Board had no hotline divisions. The Board had not prepared an Operation and Maintenance manual and a schedule for preventive maintenance of GSSs. Only breakdown maintenance was being done.

The Government stated (January 2013) that the updated technology will be adopted in course of time.

Transmission losses

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

The details of transmission losses from 2007-08 to 2011-12 are given in the table below:

Sl. no.	Particulars	Unit	Year				
			2007-08	2008-09	2009-10	2010-11	2011-12
1.	Power received for transmission	MUs	7412	8122	8663	9344	9560
2.	Net power transmitted	MUs	NA	7713	8168	8742	9034
3.	Actual transmission loss (1-2)	MUs	NA	409	495	602	526
		Percentage	NA	5.04	5.71	6.44	5.50
4.	Target transmission loss as per the CEA norms	Percentage	4	4	4	4	4
5.	Target transmission loss as per JSERC norms	Percentage	NA	5	5	5	5
6.	Transmission loss in excess of JSERC norms (3-5% x 1)	MUs	NA	3	62	135	48
7.	Valued at realisation per unit	Rate per unit in (₹)	1.84	1.87	1.82	1.99	*[39]
8.	Total loss (7) x(6)	₹ in crore	NA	0.56	11.28	26.87	*

(Source: Information furnished by the Board)

It could be seen from the above that the transmission losses were on an increasing trend and exceeded the CEA norm of four *per cent* in all the four years as also the yearly norm fixed by the JSERC. The transmission losses suffered by the Board in excess of the norms fixed by the JSERC for the period 2008-09 to 2010-11 was 200 MUs valued at ₹ 38.71 crore.

The Government stated (January 2013) that losses include regional transmission losses and after excluding these, the transmission losses of the Board were within JSERC norms. The Government also stated that the transmission loss figures were approximate as all feeders are not metered and some meters are very old and defective. The Board was planning for 100 *per cent* metering.

However, the fact remains that the Board had neither maintained any data for regional transmission losses nor furnished the same in support of its reply.

[39] Accounts for 2011-12 are yet to be finalised.

Grid Management

Maintenance of Grid and performance of SLDC

2.25 Transmission and Grid Management are essential functions for smooth evacuation of power from generating stations to the Distribution Companies/consumers. Grid Management ensures moment to moment power balance in the interconnected power system to take care of reliability, security, economy and efficiency of the power system. Grid management in India is carried out in accordance with the standards/directions given in the Grid Code issued by CEA. National Grid consists of five regions *viz.,* Northern, Eastern, Western, North Eastern and Southern Grids, each of these having a Regional Load Dispatch Centre (RLDC), an apex body to ensure integrated operation of the power system in the concerned region. The Jharkhand State Load Dispatch Centre (SLDC), a constituent of Eastern Regional Load Dispatch Centre (ERLDC), Kolkata, ensures integrated operation of power system in the State.

As per Clause 31 of the Electricity Act, 2003

"(I) The State Government shall establish a centre to be known as the SLDC for the purpose of exercising the powers and discharging the functions under this part.

In violation of Clause 31 of the Electricity Act, 2003 the functions of SLDC is being carried out by the Board and State Government has not formally notified that the SLDC shall be operated by the Board.

(II) The SLDC shall be operated by a Government Company or any authority or corporation established or constituted by or under any State Act, as may be notified by the State Government.

(a) Provided that, until a Government Company or any authority or corporation is notified by the State Government, the State Transmission Utility shall operate the SLDC."

As the Board was not unbundled the functions of the SLDC are being performed by the Board, though the State Government has not formally notified that the SLDC shall be operated by the Board.

The Government accepted (January 2013) the audit observation and stated that the transfer of control of SLDC under State Government is under process.

Infrastructure for load monitoring

2.26 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 SLDC as per the Grid norms for all GSSs.

We observed that out of three 220 kV GSSs, 22 of 132 kV GSSs and three Power generating Plants, two (67 *per cent*) 220 kV and nine (41 *per cent*) 132 kV GSSs and all three (100 *per cent*) generators were provided with RTUs for recording real time data for efficient Energy Management System. However, eight RTUs of 220 & 132 kV GSSs were not operational for six months to nine years due to poor battery bank and disruption of

Eight Remote Terminal Units of 220 kV and 132 kV GSSs were not operational for six months to nine years due to poor battery bank and disruption of connectivity at three panels thus reducing the ability of SLDC to work as load monitoring centre.

connectivity at Jamtara, Deoghar and Garhwa panel. Non-functioning of RTUs reduces the ability of SLDC to work as a load monitoring centre. Further the SLDC has backup data facility only for one year.

The Government accepted (January 2013) the audit observation and stated that battery bank will be replaced shortly and the matter regarding restoration of connectivity had been taken up with PGCIL. However, the fact remains that eight out of 14 RTUs had not been functional for six months to nine years.

Grid discipline by frequency management

2.27 As per the 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 49.2 and 50.3 Hz. System frequency is not maintained due to shortages in generating capacities, high demand, Grid indiscipline in maintaining load generation balance, inadequate load monitoring and management. Thus, Grid frequency goes below or above the permitted frequency levels. To enforce Grid discipline, the SLDC issues three types of violation messages (A, B, C). Message A is issued when the frequency is less than 49.2 Hz and over-drawal is more than 50 MW or 10 *per cent* of the schedule, whichever is less. Violation B message is issued when frequency is less than 49.2 Hz and over-drawal is between 50 and 200 MWs for more than ten minutes or 200 MW for more than five minutes. Message C (serious nature) is issued 15 minutes after the issue of message B when frequency continues to be less than 49.2 Hz and over-drawal is more than 100 MW or ten *per cent* of the schedule, whichever is less.

We observed that the SLDC records hourly frequency. During October 2009 to March 2012 system frequency was below 49.2 Hz and above 50.3 Hz on 443 occasions spread over 227 days but over-drawal was below 50 MW. Thus the Board maintained the Grid discipline. Data for the period April 2007 to September 2009 was however not available with the SLDC.

Backing Down Instructions (BDI)

2.28 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 BDI to the generators to reduce the generation for ensuring integrated Grid operations and for achieving maximum economy and efficiency in the operation of the power system in the State. The State has three Energy Generating Power stations, one of 420 MW (210X2) *i.e.* Tenughat Thermal Power Station (TTPS) owned by Tenughat Vidyut Nigam Limited (TVNL), and two generating stations *viz.* Patratu Thermal Power Station (PTPS) of 770 MW (de-rated) and Swarnrekha Hydel Project (SRHP) of 130 MW owned by the Board. Energy generated at TTPS is being transmitted by two transmission lines to Bihar Sharif Grid of BSEB and to PTPS switchyard of the Board (single circuit of 400 kV). However, both the lines are operating at 220 kV capacities**.** Whenever breakdown happens in one line, TTPS has to back down its power generation as the demand and capacity of the conductors was only 250 MW in each line. Hence the total energy

generated at TTPS could not be evacuated due to non-availability of 400 kV GSS at the terminating end.

Avoidable expenditure of ₹ 102.41 crore on purchase of power at higher rate due to delay in interconnecting 400 kV single circuit TTPS – Bihar Sharif transmission line with a 400/220 kV GSS at Bihar Sharif.

During the period 2007-08 to 2011-12 SLDC had issued 77 BDI instructions to TTPS which had been complied with which resulted in generation loss of 603.38 MUs valuing ₹ 140.09 crore to TTPS. The total energy generated at TTPS was sold to the Board. Due to non availability of adequate evacuation capacity at TTPS, the Board had to incur extra expenditure of ₹ 102.41 crore during the period 2007-08 to 2011-12 on purchase of 603.38 MUs power from other sources at higher rates. To overcome this problem the Board issued (May 2008) a work order to PGCIL to interconnect 400 kV single circuit (S/C) TTPS – Bihar Sharif transmission line with a 400/220 kV GSS at Bihar Sharif on cost plus basis for ₹ 8.20 crore. PGCIL stopped the work as Board paid only the first Running account (RA) bill amounting to ₹ 2.94 crore and the remaining two RA bills amounting to ₹ 7.06 crore were not paid (June 2012) due to fund constraints.

Further, TTPS awarded the work for construction of five numbers of 400 kV bays in 400 kV switchyard in its premises to PGCIL (July 2010) on cost plus basis for ₹ 22.70 crore. The work, scheduled to be completed in 24 months, could not commence (May 2012) due to delay in finalisation of scope of work.

The Government accepted (January 2013) the audit observation and stated that the purpose was to maintain grid discipline and that no extra cost had been incurred on power purchase due to backing down of TTPS.

The Government's reply does not address the issue as the integration of both the lines to avoid the backing down problem should have been taken up on priority basis earlier. Due to backing down of TTPS, the Board had to purchase power at higher rates from other sources.

Disaster Management

2.29 Disaster Management (DM) aims at mitigating the impact of a major breakdown on the system and restoring it in the shortest possible time. As per the Report of the Committee for updating the Best practices in Transmission System in the Country (January 2002), DM should be set up by all power utilities for immediate restoration of the transmission system in the event of a major failure. It is carried out by deploying Emergency Restoration System (ERS), Diesel Generator sets (DGs), vehicles, fire fighting equipments and skilled and specialised manpower. Disaster Management Centre, National Load Dispatch Centre, New Delhi acts as the Central Control Room in case of a disaster.

Inadequate facilities for DM

- The SLDC identified two thermal generating stations TTPS, PTPS and one hydel generating station SRHP in the State out of which black start[40] facilities were available only in SRHP indicating inadequate

[40] The procedure necessary to recover from a partial or a total blackout.

preparedness for DM. Mock drill for starting up the generating station during black start was done (November 2011) only once during the period covered by the performance audit.

- Diesel generating (DG) sets and synchroscopes[41] form part of DM facilities at GSSs and generating units. We observed that out of the three generating units synchroscopes were not working at SRHP during the period 2007-08 to 2011-12 and diesel generators were not available at PTPS. Out of three numbers 220 kV GSSs, DG set was available only at Hatia-II GSS and the same was not working during 2011-12. Though synchroscopes were available at all 220 kV GSSs, they were not working in Chandil-I and Ramchanderpur for more than five years.

- The Board did not identify vulnerable installations for provision of metal detectors. Security in the GSS is being provided by Home Guard Jawans which is insufficient to handle any crisis which may arise in the future due to Naxal attacks, sabotage and bomb threats.

- The Board had procured ERS consisting of pylon type arrangement of light weight towers which are easily transportable and can be erected within 6 to 8 hours to restore the power supply, from M/s PCI Ltd. (October 2009) at a cost of ₹ 7.61 crore. The firm had imparted training (January 2010) to Board officials and 30 persons of six agencies[42] engaged in the patrolling of transmission lines, repairing of conductors and insulators, annual maintenance contract for GSSs *etc*. The ERS was lying idle (October 2009) at Hatia-II GSS. Inspite of collapse of five towers during May 2010 to April 2012 the Board took five to 23 days for erecting the towers without using the ERS resulting in disruption of power up to 12 days till alternative arrangements were made. As the ERS was not put to use so far (April 2012), the expenditure of ₹ 7.61 crore incurred on its purchase remained idle without deriving any benefits.

Emergency Restoration System procured for ₹ 7.61 crore was not used inspite of collapse of towers on five occasions during the period May 2010 to April 2012.

The Government accepted (January 2013) the audit observation and stated that the ERS has now been distributed to two Zones at Ranchi and Dumka and GM-cum-CE have been authorised to procure the accessories required to install the ERS. However, the fact remains that ERS had not been used since three years of its purchase and the Jamshedpur transmission Zone does not have an ERS.

Energy Accounting and Audit

2.30 Energy accounting and audit is a necessary and crucial step towards assessment and reduction of transmission losses. While energy accounting involves preparation of accounts of the energy flow to various segments and how it has been consumed out of the total available quantum over a specified

[41] 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.

[42] Trans Make, Sidhartha Power, R.S Electricals & Engineering, Ram Erection Works, Bharat Engineering Works and U.S Construction.

time period, energy audit involves analysis of energy accounting data in a meaningful manner to evolve measures to introduce checks and balances in the system to reduce leakages and losses and also to improve technical performance.

To achieve effective energy accounting and audit, it is imperative that correct and same class of meters are installed at all levels *i.e.* feeders, GSS and Power Sub-Station (PSS) and meter readings are taken regularly and reconciled so that pockets of leakage are identified and corrective measures taken. Energy accounting is not a one-time exercise but is to be done on a continuous basis.

We observed that energy accounting and audit had not been done during the period covered by the performance audit as at one GSS (Jadugora) the feeders were unmetered, while in seven GSSs[43], the meters were defective and not changed for more than five years and were also not calibrated for five to 24 years although required to be calibrated after every four years.

Out of 13 GSSs test checked, we found that in eight[44] GSSs export of energy was more than the energy imported implying that the meters were defective. Further, during scrutiny of records of Tenughat Thermal Power Station (TTPS) we observed that while transmitting energy to the PTPS switchyard, losses ranged between 7 to 21 *per cent* at the PTPS switchyard during January to March 2012. PTPS was transmitting energy to Hatia I & Hatia II GSSs incurring losses ranging between (-9) and 51 *per cent* during the period under audit scrutiny. The loss percentage at PTPS and GSSs showed higher transmission loss; indicating that the meters were defective.

The Government accepted (January 2013) the audit observation and stated that 100 *per cent* metering of transmission is in process.

Material Management

2.31 The key functions in material management are laying down an inventory control policy, procurement of materials and disposal of obsolete inventory. We noticed that the Board had not formulated any procurement policy and inventory control mechanism for economical procurement and efficient control over inventory.

2.32 The details of consumption and closing stock for the period from 2007-08 to 2010-11 are given in the following table:

[43] Adityapur, Chandil, Golmuri, Ramchandrapur, Garhwa Road, Hatia-I and Dhalbhumgarh.
[44] Adityapur, Chandil, Jadugora, Golmuri, Ramchandrapur, Garhwa Road, Hatia-I and Dhalbhumgarh.

(₹ in crore)

Year	Consumption (per annum)	Consumption (per month)	Net closing stock (as per Balance Sheet)	Closing stock in terms of months to consumption
1.	2.	3. =(2)/12	4.	5. = (4)/(3)
2007-08	3.98	0.33	6.42	19
2008-09	9.36	0.78	4.90	6
2009-10	21.32	1.78	6.59	4
2010-11	3.93	0.33	5.98	18

(Source: Compiled from the records of the Board)

It can be seen from the above table that the closing stock in terms of number of month's consumption was 19 months during 2007-08 which decreased to four months in 2009-10 but again increased to 18 months in 2010-11 indicating lack of an inventory control mechanism. The Board had neither done any ABC analysis nor fixed any standard maximum/minimum level or reorder level of their material requirement.

We further observed that the Board had procured 83 CTs (August 2009) and 40 Kilometre (KM) of ACSR Zebra conductor (September 2009) on urgent basis at a cost of ₹ 2.04 crore in spite of having stock of 17 CTs and 24 KM of Zebra conductor. However, only 11 CTs and 2.55 KM Zebra conductors were issued (March 2012) out of the old stock. Thus, purchases made on urgent basis were lying unutilised in the store.

The Government stated (January 2013) that CTs and Zebra conductors were purchased to keep them as necessary spares for operation and maintenance purposes.

However, the fact remains that though the Board had procured the material for urgent requirement it is yet to be issued for consumption.

Non-conducting of physical verification of stocks in the stores

2.33 There are three Area Stores under the control of the Board at Ranchi, Jamshedpur and Deoghar. Their Physical Verification (PV) had not been conducted during the period covered by the performance audit. The value of non-moving, surplus, obsolete, unserviceable and scrap material in Jamshedpur store was available for only 2010-11 and 2011-12 which had increased from ₹ 0.55 crore to ₹ 0.62 crore. The reconciliation of the stock could not be done as the PV of the stores were not being done. Deoghar store is locked since June 2012 after the retirement of the storekeeper (February 2012) whereas Ranchi store maintained quantitative details without giving any value for scrap materials (March 2012). The Board had not taken action to dispose of the scrap/obsolete material, which could have earned revenue and freed up space for storage of other materials.

The Government accepted (January 2013) the audit observation and stated that it has no policy in place for inventory control, procurement of material and disposal of obsolete inventory. It further stated that a consultant has been appointed to computerise the entire stores.

Monitoring and Control

2.34 The Board plays an important role in the State economy. For an organisation to operate economically, efficiently and effectively, there should be a well-documented management information system for operations, service standards and targets. Further, there has to be a Management Information System (MIS) to report on achievement of a standards targets and norms. The performance of the GSSs and lines of 400/220/132 kV on various parameters like Maximum and Minimum voltage levels, breakdowns, voltage profiles should be recorded /maintained as per the Grid Code standards.

In this connection we observed the following:-

- Year-wise cumulative performance of the GSSs and lines were neither being maintained nor consolidated at the Board level for evaluation of annual performance of the GSSs and lines. Though, the field Divisions of the Transmission units were compiling the monthly MIS reports indicating the performance of the units as well as equipments installed, these reports were however not being sent to the Board office, although required to be done, nor was their receipt being monitored at the Board level.

- Verification of MIS reports revealed that details regarding programmed overhauls of equipments like Circuit Breakers, due dates of next oil change, On Load Tap Changer operations, dates of maintenance works, performance of GSS batteries, performance of relays, cause-wise analysis of feeder breakdowns were not being reported. The Board, thus, instead of carrying out preventive maintenance carried out breakdown maintenance only.

- Though the Board had prepared a long term plan for creation of transmission infrastructure dividing it into five year annual plans, there was no monitoring mechanism for ensuring adherence to the annual plan schedule.

- A reliable and comprehensive MIS on the transmission network was not in existence to facilitate quick decision making at the apex level and the Board had to collect the data from the field units time and again.

- The Board did not monitor the energy assessment as export of energy was more than import.

Internal Audit

2.35 The Board has an internal audit wing (IAW), but the sanctioned strength for IAW was not made available to audit. However, IAW has seven men-in-position[45]. As per the Internal Audit Manual, IAW is required to

[45] One Director, one Deputy Director, two Accounts Officers, one Accountant, one Accounts Assistant and one Accounts Clerk (as on December 2012).

prepare a quarterly work programme. However, work programme for selection of units and deployment of manpower for internal audit had not been framed during the period covered by the performance audit. The Internal Audit Department is mainly entrusted with concurrent audit related to establishment matters like pay fixation, increments, pension *etc*. These officials were also liasoning with various wings of the Board in furnishing replies to the audit report of the CAG.

Conclusion

The Board did not have sufficient funds to execute projects and was dependent on GoJ/REC for funds, due to which they faced problems in execution of various GSSs and transmission lines. Despite this, funds allotted by GoJ and released by REC were not fully utilised during the Plan period. The Board did not adhere to the recommendations of Report of the Task Force on transmission projects which resulted in time overrun and projects not being completed in an economical and efficient manner. The terms and conditions of NIT/CVC guidelines were not adhered to while awarding the contracts/ work orders. The Board had not prepared an Operation and Maintenance manual and a schedule for preventive maintenance of GSSs, hence, only breakdown maintenance was being done. The Grid discipline was maintained in respect of over-drawal as per requirement of the Grid Code. The emergency restoration system purchased for disaster management was not put to use. Diesel Generators were not available in PTPS and were not working in GSSs. In the test checked GSSs, the feeders at one GSS were unmetered and meters were defective in seven GSSs, which resulted in transmission losses in excess of the norms prescribed by JSERC. This reflects an inadequate energy accounting system. The Board did not identify vulnerable installations for provision of metal detectors. The Board had not formulated any procurement policy and inventory control mechanism for economical procurement and efficient control over inventory. A reliable and comprehensive MIS on the transmission network was not in existence to facilitate quick decision making at the apex level. The size of the internal audit was not commensurate with the size and nature of the activity of the Board.

Recommendations

The Board may consider:

- **adhering to the time schedule for completion of the transmission schemes by following the recommendations of the Task Force so that funds could be utilised economically and efficiently and benefits could be passed on to the consumers;**

- **proper metering of all GSSs and feeders and replacement of the defective meters promptly;**

- **establishing transmission lines in the DVC command area so as to derive benefit of purchase of power at the lowest cost; and**

- **concentrating on areas with high transmission losses to bring down the same within the permissible JSERC norms.**