

Chapter - III

3 Review relating to Statutory Corporation

Gujarat Electricity Board

Construction of power transmission lines and associated sub-stations

Highlights

Board's delayed/ non-completion of three transmission schemes resulted in its forgoing economic benefit of Rs.626.20 crore by way of conversion of transmission and distribution losses into potential revenue.

(Paragraph 3.12)

The Board failed to include the spill over works in its planning process for subsequent five-year plans, leading to mismatch in completion schedules of ancillary works.

(Paragraph 3.9)

The Board was unable to check transmission losses in excess of norms.

(Paragraph 3.8)

Consistent short allocation of funds resulted in schemes spilling over and depriving the Board of its benefits.

(Paragraph 3.10)

There were instances of idle investment of Rs.177 crore resulting in loss of interest of Rs.25.62 crore due to mismatch of completion schedules and infructuous expenditure of Rs.18.23 lakh on operation and maintenance charges.

(Paragraphs 3.13, 3.14, 3.15 and 3.17)

The Board did not recover liquidated damages of Rs.26.25 crore from Gujarat Mineral Development Corporation Limited for not putting to use the duly test charged power evacuation lines for want of synchronisation.

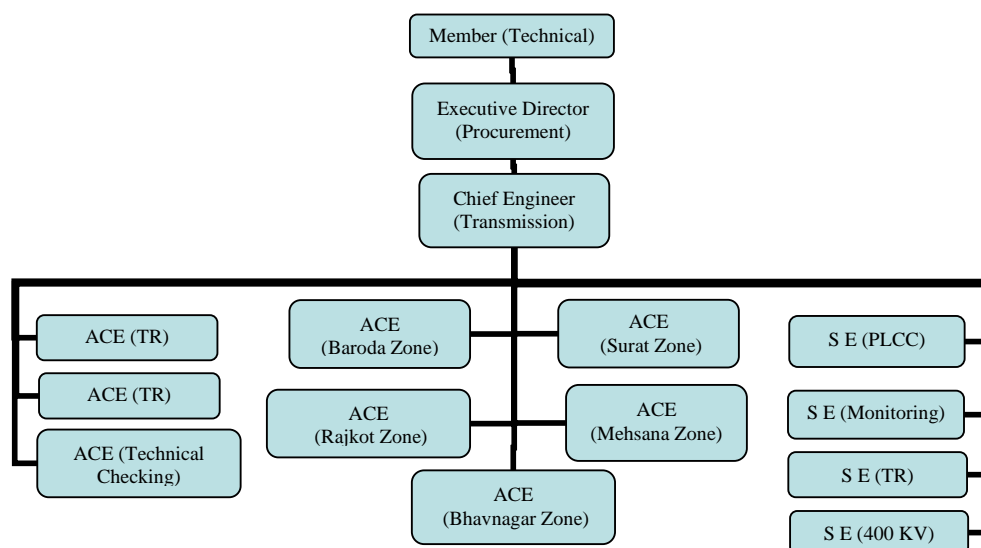
(Paragraph 3.13)

Introduction

3.1 The transmission system is an essential link between the power generating source/receiving source and the ultimate distribution point. The transmission system of the Gujarat Electricity Board (Board) comprises of a

network of 400 KV, 220 KV, 132 KV and 66 KV transmission lines. The Board had 767 sub-stations in the network of 32,680 Circuit Kilometres (CKM)^Y up to 66 KV transmission lines at the end of 31 March 2004.

To evacuate anticipated increase in Gujarat State's installed generation capacity of 8,752 MW during the tenth Five Year Plan (Plan), 2002-07, the Board envisaged construction of transmission lines of 8,252 CKM and associated 173 sub-stations at a total cost of Rs.1,472.99 crore. This included spill over works from ninth Plan in respect of 3,888 CKM of transmission lines and 48 sub-stations at the estimated cost of Rs.405.98 crore and Rs.270.54 crore, respectively. The organisation chart relating to construction of power transmission lines and associated sub-stations of the Board is as follows:



The activities relating to laying of power transmission lines and construction of associated sub-stations are managed through Additional Chief Engineers (ACE) from five zonal offices* and ten transmission circles[#] headed by Superintending Engineer (SE) having control over 53 transmission divisions and 12 construction divisions.

The Construction of power transmission lines and associated sub-stations of the Board was last reviewed in the Report of CAG of India for the year ended 31 March 1996 (Commercial)-Government of Gujarat. The Committee on Public Undertakings (COPU) examined the review in February 2000; their recommendations are awaited (August 2005).

Scope of Audit

3.2 The present review conducted during November 2004 to March 2005 covers all the schemes for transmission lines (above 66 KV) and associated sub-station works taken up for execution by the Board during 1999-2004,

^Y The route kilometers of revenue producing circuits in service.

* Surat, Mehsana, Rajkot, Bhavnagar and Vadodara.

[#] Asoj, Navsari, Jambuva, Nadiad, Mehsana, Palanpur, Gondal, Amreli, Anjar and Bharuch.

including the spill over works of eighth Plan and new schemes of ninth and tenth Plan up to 220 KV.

Audit objectives

3.3 The audit objectives of the review were to ascertain whether:

- the Board could complete the transmission schemes within the scheduled completion periods of respective scheme;
- the Board could mobilise adequate funds from the State Government or from alternate sources of finance;
- the Board executed transmission schemes (transmission lines and sub-stations) in an effective, efficient and economical manner;
- there was optimum utilisation and synchronisation of the construction/commissioning of the power transmission lines and the associated sub-stations;
- the system improvement schemes generated the targeted benefits; and
- the management was sensitive to the risks of delays and undertook measures to prevent possible revenue loss due to delays.

Audit criteria

3.4 The following audit criteria were adopted:

- targets fixed for completion of transmission schemes and the envisaged benefits;
- norms of Central Electricity Authority (CEA) regarding transmission losses; and
- synchronous completion of sub-station and their associated transmission lines within the scheduled completion period.

Audit methodology

3.5 The following methodology was adopted:

- analysis of basic data on transmission system;
- analysis of transmission schemes and their progress reports; analysis of time overrun *vis-a-vis* loss of anticipated benefit due to non/delayed implementation of the schemes; and
- review of agenda and minutes of Board meetings, Internal Audit Reports and previous Inspection Reports.

Control mechanism

3.6 Audit of control mechanism with regard to planning, allocation of resources, execution, coordinating and supervising various schemes of construction of transmission lines and associated sub-stations was carried out to ascertain whether:

- the system of periodical approval of the schemes was developed and put in place by the Board;
- the Board regularly monitored the progress of the schemes through Management Information System (MIS); and
- the Board introduced parameters such as Key Performance Index to ensure reduction in T&D loss as envisaged in the Project Report besides improvement in the stability and reliability of power on completion/commissioning of the schemes.

Audit findings

The audit findings were reported to Government/ Board in May 2005 and discussed at a meeting of the Audit Review Committee for State Public Sector Enterprises (ARCPSE) held on 25 July 2005 with the officials of the State Government and the Board. Their views were considered while finalising the review.

The audit findings are discussed in the succeeding paragraphs:

Transmission network

3.7 Apart from its own generation, major portion of power is purchased by the Board from central pool and other sources such as private Independent Power Producers (IPPs). The power so received through its network is transmitted for distribution to the consumers.

Growth of transmission network

3.8 The transmission department of the Board is entrusted with the function of coping up with the increase in the demand for stable and reliable power supply from various regions of the State. The Board has to accordingly plan the construction of new transmission lines and associated sub-stations or augmentation of existing infrastructure and creating the network of the transmission lines of optimum length considering the cost aspect and achievable reduction in T&D loss.

The table below indicates the transmission system built up *vis-à-vis* power purchased/generated by the Board during 1999-2004:

Sl. No.	Particulars	1999-2000	2000-01	2001-02	2002-03	2003-04
1.	Installed capacity (MW) [#]	4,540	4,540	4,507	4,333	4,333
2.	Total power purchased/ generated (MU) ^φ	39,788	41,104	40,627	44,872	43,633
3.	Total power available for distribution(MU)	38,469	39,340	38,824	42,923	41,709
4.	Transmission loss (2-3) (MU)	1,319	1,764	1,803	1,949	1,924
5.	Transmission loss in excess of norms of 4 per cent (MU)	-	120	178	154	179
6.	Average rate of realisation (in rupees)	-	2.27	2.56	2.79	3.01
7.	Monetary loss (Rs. in crore)	-	27.24	45.57	42.97	53.88
8.	Transmission lines (Circuit KM) and sub-stations (Nos)					
	400 KV Lines	1,764	1,764	1,764	1,764	1,776
	400 KV Sub-stations	9	9	9	9	9
	220 KV Lines	9,672	9,886	10,177	10,390	10,940
	220 KV Sub-stations	59	59	61	61	64
	132 KV Lines	4,354	4,354	4,414	4,483	4,542
	132 KV Sub-stations	47	47	47	49	49
	66 KV Lines	13,596	14,113	14,507	14,950	15,422
	66 KV Sub-stations	570	586	607	620	645
9.	Transformation capacity (MVA) [♦]	55,822	57,517	60,308	62,135	64,099

The installed capacity had reduced due to decommissioning of power plants (27 MW at Dhuvaran and 6 MW at Utran) during 2001-02 and decommissioning (39 MW at Utran) and transfer (135 MW Utran) of power plant to Gujarat State Electricity Corporation Limited during 2002-03. The power available for distribution during 2002-03 showed an uneven trend of increase over the years 1999-2004. The transmission losses as against the power available exceeded the norms during 2000-2004 by 631 MUs. During 1999-2004, the growth in 400 KV, 220 KV, 132 KV and 66 KV transmission network was 12 CKM, 1,268 CKM, 188 CKM and 1,826 CKM respectively against the growth of 3,845 MUs in the power purchased/generated by the Board.

Board lost Rs.169.66 crore in transmission loss in excess of norms.

The Board did not lay down norms for system losses at various stages of transmission. The transmission losses during 2000-04 ranged between 1,764 MUs and 1,949 MUs. The Board suffered loss of Rs.169.66 crore in these years due to energy loss of 631 MUs in excess of the norms.

Planning

3.9 The Board planned the growth of transmission network on the basis of industrial development leading to demand for stable power supply in the respective regions of the State.

Targets and achievements

The table below indicates the targeted transmission schemes comprising of 400 KV, 220 KV, 132 KV and 66 KV sub-stations and associated transmission lines and the achievement thereagainst during ninth and tenth Plans.

[#] Mega Watt.

^φ Million Units.

[♦] Mega Volt Ampere.

Lines/ Sub-stations	Ninth Five Year Plan (1997-2002)			Tenth Five Year Plan (2002-07) (Up to March 2004)	
	Projected	Achievement	Shortfall	Projected	Achievement
	Lines in CKM				
400 KV	2,665	406	2,259	636	12
220 KV	5,264	1,736	3,528	3,010	763
132 KV	369	211	158	280	128
66 KV	3,446	2,309	1,137	4,326	915
	Sub-stations in numbers				
400 KV	4	2	2	2	0
220 KV	21	14	7	9	3
132 KV	4	4	0	2	1
66 KV	140	113	27	160	40

Non-consideration of back log of spill over works of ninth PLAN resulted in mismatching of completion of ancillary works.

It was noticed in Audit that the Board did not incorporate all the shortfalls that accrued during the ninth Plan in construction of the transmission lines in the targets for tenth Plan. This indicated deficient planning on the part of the Board. The targets set for tenth Plan comprised the shortfall of 286, 2,093, 72 and 1,437 CKM of transmission lines of ninth Plan as against the actual shortfall of 2,259, 3,528, 158 and 1,137 CKM, respectively. Non-consideration of the entire backlog of the spill over works of the ninth Plan resulted not only in the mismatching of the completion schedules of ancillary works but also in the loss of interest/revenue due to blockage of the cost of ancillary works remaining idle as discussed in the succeeding paragraphs. This also indicated the failure of the Board in according priority in planning the execution of spill over works of the ninth Plan during tenth Plan.

During tenth Plan with regard to 400 KV sub-stations, the spill over work of two sub-stations of ninth Plan was completed while the construction of two sub-stations was in progress. Similarly, in respect of 220 KV sub-stations, 16 sub-stations of ninth Plan were completed including spill over works of 12 sub-stations of eighth Plan.

Two sub-stations of 220 KV (Olpad and Sevalia) planned for construction during the ninth Plan at a cost of Rs.21.50 crore and associated line of 40 CKM valuing Rs.8.80 crore had not been taken up so far (February 2005), reasons for which were not available on record.

The table below indicates the estimated lines and sub-stations to be constructed and actual achievement there against during 1999-2004.

Year	Planned/ actual lines/sub- stations	Particulars	400 KV	220 KV	132 KV	66 KV	Total
1999- 2000	Planned	Lines (CKM)	260	370	25	800	1,455
		Sub-stations (Nos).	--	5	1	30	36
	Actual	Lines (CKM)	259	305	23	616	1,203
		Sub-stations (Nos).	--	4	1	37	42
2000-01	Planned	Lines (CKM)	15	500	50	735	1,300
		Sub-stations (Nos).	--	3	1	31	35
	Actual	Lines (CKM)	--	214	--	517	731
		Sub-stations (Nos).	--	--	--	16	16
2001-02	Planned	Lines (CKM)	15	500	100	600	1,215
		Sub-stations (Nos).	--	4	1	30	35
	Actual	Lines (CKM)	--	291	60	394	745
		Sub-stations (Nos).	--	2	1	22	25
2002-03	Planned	Lines (CKM)	16	311	74	450	851
		Sub-stations (Nos).	--	3	--	25	28
	Actual	Lines (CKM)	--	213	69	443	725
		Sub-stations (Nos).	--	--	1	13	14
2003-04	Planned	Lines (CKM)	10	90	--	200	300
		Sub-stations (Nos).	--	1	--	10	11
	Actual	Lines (CKM)	12	550	59	472	1,093
		Sub-stations (Nos).	--	3	--	26	29
Grand Total	Planned	Lines (CKM)	316	1,771	249	2,785	5,121
		Sub-stations (Nos).	--	16	3	126	145
	Actual	Lines (CKM)	271	1,573	211	2,442	4,497
		Sub-stations (Nos).	--	9	3	114	126

Out of the targeted construction of 5,121 CKM of lines during 1999-2004, the Board could construct 4,497 CKM lines. Audit scrutiny of 220 KV lines and the sub-stations planned for construction during 1999-2004 revealed that the Board constructed 1,573 CKM lines (88.82 per cent) against the planned 1,771 CKM lines and only nine sub-stations (56.25 per cent) against planned 16 new sub-stations.

Construction of associated transmission lines without matching construction of sub-stations resulted in non/belated commissioning of the schemes and consequential idle investment of the Board's funds.

Financial outlay

3.10 During the ninth Plan, as against the Board's proposal for outlay of Rs.3,051.98 crore including Rs.579.46 crore of spill over work for construction of 3,505 CKM transmission lines and 169 sub-stations, the funds allocation by the State Government was Rs.1,381.32 crore. Similarly, against the tenth Plan proposal for outlay of Rs.2,343.03 crore including Rs.676.52 crore of spill over work for construction of 8,252 CKM transmission lines and 173 sub-stations, the State Government allocated Rs.341.60 crore up to March 2005.

It was noticed in Audit that the Board failed to raise the requisite funds from sources other than Government funding which resulted in the ancillary works remaining incomplete. This adversely affected the synchronous completion of

schemes resulting in the interest/revenue loss on the cost of partial construction of ancillary works remaining idle.

Construction of transmission schemes

3.11 The transmission schemes projected by the Board during the respective five-year plans aimed to yield returns by way of savings in transmission losses, subject to their completion within the time frame as envisaged in the respective project reports. The activities pertaining to construction of new schemes and augmentation of existing ones planned by the Board during 1999-2004 were adversely affected on various accounts. The instances of incomplete ancillary works noticed during the test check are broadly classified under the following categories:

Land acquisition

3.12 The Board neither initiated timely action for the acquisition of land required nor did it take up the matter with the Revenue Authorities for transfer of land required for civil works. This caused delay in completion of ancillary works of 400KV sub-stations (Ranchhodpura and Hadala) and 220 KV sub-stations (Shivlakha and Halvad). Resultantly, the Board sustained revenue loss of Rs.626.20 crore (up to March 2005) due to non/belated commissioning of the sub-stations. This included revenue loss of Rs.12.12 crore *per annum* for two years in respect of 400 KV Ranchhodpura sub-station, based on estimated saving of 16.104 MW in T & D loss. The cost of construction in respect of 220 KV Halvad sub-station also escalated by Rs.11.21 crore due to delay in shifting of the sub-station. The works of 400 KV sub-stations at Ranchhodpura and Hadala had not been completed so far (March 2005).

The Board sustained revenue loss of Rs.626.20 crore due to non/belated commissioning of the sub-stations.

The management/ Government stated (July/ August/November 2005) that the delay was due to belated transfer of land to the Board. The reply is not tenable as timely and synchronised planning could have avoided these delays. As regards the revenue loss of 400 KV Ranchhodpura sub-station, the Board stated (August 2005) that the earlier computation of revenue loss of 16.104 MW was based on maximum load forecast of 24 hours per day. In the absence of the anticipated demand for maximum power flow for only 6-8 hours per day, however, the reduction in T&D loss would be 7 MW. An analysis made in audit revealed that the reduction of T&D loss of 7 MW would result in additional revenue of only Rs.5.27 crore as against the projected revenue of Rs.12.12 crore *per annum*. This would render the project financially unviable and would result in a negative return of Rs.6.49 crore[∞] *per annum* against projected net saving of Rs.36 lakh *per annum*.

Non-completion of ancillary works

3.13 The Board failed to ensure the completion of the works of erection of transmission lines with commissioning of sub-stations or *vice versa* in the following eight cases:

[∞] Projected revenue of Rs.12.12 crore based on 16.10 MW less Rs.5.27 crore based on 7MW less projected net saving of Rs.0.36 crore.

- construction of 400 KV sub-stations at Zerda and Amreli;
- construction of 220 KV sub-stations at Mahuva, Mathasur and Mitha;
- erection of 220 KV transmission lines viz., Chhatral-Viramgam, Akrimota-Nakhatrana and Akrimota-Panandhro.

Belated commissioning of ancillary works resulted in interest loss of Rs.16.97 crore on the blocked funds of Rs.141.65 crore.

As a result, an investment of Rs.141.65 crore had remained unfruitful. Consequently, the Board suffered interest loss of Rs.16.97 crore (computed at the minimum borrowing rate of 11 *per cent per annum*) on the blocked funds of Rs.141.65 crore for the period ranging between seven and 38 months during 1999-2005. As the Board did not prepare individual project reports for the above works, audit was unable to evaluate the Board's efficiency in management/ execution of these works.

Gujarat Mineral Development Corporation Limited (GMDC) was to synchronise its power plant with 220 KV Akrimota-Nakhatrana transmission line to be erected by the Board. The agreement with GMDC provided recovery of liquidated damages for belated synchronisation of the line. The Board erected and kept the line ready by 28 February 2004 for evacuation of power from Akrimota-Nakhatrana power plant of GMDC whereas the GMDC synchronised the plant only on 31 March 2005. The Board had not recovered liquidated damages of Rs.26.25 crore (up to March 2005) from the GMDC so far (August 2005).

The management/ Government stated (July/ August/November 2005) that the ancillary works had been delayed due to various reasons such as land strata requiring change in foundation design, the mistake in allotment of land and change in the route of the line. The reply is not tenable as these aspects should have been considered at the time of planning.

Regarding 220 KV Akrimota-Nakhatrana, the Board/ Government stated (July/ August 2005) that the liquidated damages would be recovered from GMDC after the commencement of commercial operation of the power plant.

Clearance/ approval of other State Government organisations

3.14 The Boards' ignorance with regard to the land reserved for mining purposes coupled with its failure to identify and intimate its land requirements to mines authority resulted in decay in clearances/approvals in respect of 220 KV Mobha sub-station constructed in March 2000 for Rs.11.87 crore. This resulted in delayed execution of the ancillary work of 220 KV Kasor-Mobha line and consequential loss of interest of Rs.2.83 crore computed at the rate of 11 *per cent* for the period from April 2000 to May 2002.

Delay in making commercial use

3.15 The Board could commission the Rs.21.87 crore transmission schemes at 220 KV sub-stations of Radhanpur and Mota due to its failure to post

Non commissioning of two 220 KV sub-stations for want of posting of operational staff resulted in interest loss of Rs.5.82 crore on blocked funds.

operating staff which resulted in interest loss of Rs.5.82 crore^Σ for the period from June 2001 to May 2004 on blocked funds.

The management/ Government stated (July/ August/November 2005) that the said sub-stations could not be put to commercial use for want of operational staff. This established the inefficiency on the part of the Board to derive the projected economic benefits immediately on completion of the scheme.

Avoidable expenditure

3.16 The construction of 132 KV Double Circuit Sikka-Bhatia line envisaged providing second source of power supply to Khambhalia, Bhatia and Sikka besides evacuation of power from Sikka thermal power station. The Board had awarded (April 1994) the erection contract of the said line to Construction Management Group for Rs.47.58 lakh with stipulated completion within ten months from April 1996. On finding the said work unprofitable (June 1998), the contractor abandoned the balance work valuing Rs.21.83 lakh. The Board got completed (October 2002) the said work through another agency Jyoti Engineering Limited, at a cost of Rs.34.23 lakh. Resultantly, the Board was put to an additional expenditure of Rs.19 lakh towards price escalation (Rs.3.26 lakh), risk and cost amount (Rs.12.40 lakh), material shortage (Rs.1.16 lakh) and penalty for delay (Rs.2.18 lakh) for which no action was taken by the Board against the defaulting contractor.

Wasteful payment of operation and maintenance charges to NTPC

3.17 The Board got constructed (December 1999) two 220 KV Ichhapore bays at Kawas switchyard of National Thermal Power Corporation (NTPC) at a cost of Rs.1.61 crore for evacuation of power from NTPC Kawas Power Station. The bays were commissioned in December 1999 and were maintained by NTPC. As per a separate agreement (October 2000) the Board was to pay operation and maintenance (O&M) charges from 24 December 1999 to NTPC.

Audit noticed that the bays were never utilised and the investment of Rs.1.61 crore remained unfruitful besides incurring wasteful expenditure of Rs.18.23 lakh as O&M charges during December 1999 to March 2004.

The Board/ Government stated (July/ August/November 2005) that though it was not in a position to utilise the bays for power evacuation from Kawas Project to 220 KV Ichhapore sub-station due to way leave problems in erection of line from NTPC Kawas to the said sub-station, the same would be put to use only after construction of 220 KV LILO[∇] at Ichhapore sub-station from GSEC-Kim line planned for 2005-06. The fact is that the investment of Rs.1.61 crore remained unfruitful and the Board incurred wasteful expenditure of Rs.18.23 lakh as O & M charges.

Board incurred imprudent expenditure of Rs.1.61 crore on a 220 KV sub-station during 1999-2004.

^Σ Computed at the minimum prevalent bank rate of 11 per cent per annum.

[∇] Line in Line out.

Non recovery of O&M charges due to adoption of incorrect formula

3.18 Power Grid Corporation of India Limited (PGCIL), Western Region, had commissioned power transmission lines from time to time in order to evacuate power from NTPC power projects in the State for which there were 16 bays in Board's sub-stations.

While the maintenance of the above lines was planned to be carried out by PGCIL, the operation and maintenance of the terminal equipments in the Board sub-stations was to be done by the Board for which O&M charges at the rate of one *per cent* of the cost of equipments were recoverable by the Board as per the Memorandum of Understanding (MOU). Audit analysis revealed that on expiry of the MOU for 220 KV bays on 31 March 1997, instead of making a fresh agreement for five years up to 31 March 2002, the terms and conditions of the MOU for 400 KV bays were made applicable (October 2001) for 220 KV bays also with effect from 1 April 1997. PGCIL did not agree with these terms and conditions. Thus injudicious application of common rates for computation of O&M charges for 220 KV bays resulted in non recovery of Board's dues of Rs.50.54 lakh from PGCIL.

The management/ Government stated (July/ August/November 2005) that for maintaining PGCIL bays at the Board's sub-stations, fresh agreement had been entered into with PGCIL and the same was in effect. Since PGCIL was to pay from the date of expiry of previous agreement, no recovery would be due from PGCIL. A copy of the fresh agreement called for, was not made available (September 2005) to audit to ascertain the period covered under the fresh agreement and the status of the past dues of the Board.

Non maintenance of records

3.19 Non production of ten project reports of the schemes above 66 KV by the Board was brought to the notice of the Chairman of the Board. The Board in the ARCPSE meeting stated (July 2005) that the detailed project reports of all the schemes were not prepared individually and hence the same were not produced. In the absence of the project reports, Audit could not assess efficient and effective monitoring of the execution of the schemes.

Conclusion

In its endeavour to keep pace with the increase in the generation capacity, both immediate as well as anticipated, the efforts put in by the Board for matching increase in the transmission network fell short of projections for want of adequate monetary support from the State Government and Board's failure to raise funds from other sources. The Board failed to adhere to implementation plans for synchronous construction of sub-stations and their respective associated transmission lines, which resulted in idle investments of the Board's scarce resources.

All this had an adverse effect on the improvements in the minimisation of chronic transmission losses, which deprived the Board of the projected economic benefits accruing from the implementation of the schemes.

Recommendations

- **The Board should improve its planning regime for simultaneous completion of the transmission lines and associated sub-stations to avoid blockage of funds.**
- **The Board should concentrate on reducing transmission losses and convert the energy thus saved into revenue by strengthening the transmission system.**
- **Besides Government funding, other resources may be utilised for strengthening the transmission system.**