

CHAPTER II

Performance reviews relating to Statutory Corporations

Himachal Pradesh State Electricity Board

2.1 Power Generation Activities

Executive Summary

Power is an essential requirement for all facets of life and has been recognised as a basic human need. In view of phenomenal growth in the demand of power since 2005-06, capacity addition was not adequate to meet the requirement leaving a deficit of 122.61 MW at the end of 2009-10. Out of total requirement of 8500.87MUs for the State during the year 2009-10 the Board generated only 20.06 per cent, IPP 20.47 per cent and the balance 59.47 per cent was contributed by CPSUs. The performance audit of the Board for the period 2005-06 to 2009-10 was conducted to assess the efficiency in operation, ability to meet growing demand of energy, achievement of targets for capacity addition, execution of projects and effectiveness of the top management in monitoring the affairs of the Board.

Planning and Project Management

The total installed capacity of the State increased from 1034.17 MW as on 1 April 2005 to 1285.49 MW as on 31 March 2010. During 2005-10, actual capacity addition was 251.32 MW. Time overrun of 125, 54, 41 and 36 months were noticed in implementation of Larji, Bhaba Augmentation Project (BAP), Khauli and Ghanvi Phase II Projects respectively. There was cost overrun of ₹ 1209.16 crore in case of two completed (Larji and Khauli) and one ongoing project (BAP) due to lack of coordination, delay in taking up of project, change in designs, preparation of DPR on unrealistic data, award of works at higher rates and booking of excessive inputs/IDC, besides mismatch of construction activities of civil and electro mechanical works. Due to delay in completion of projects and less availability

of power, the State had to purchase power under unscheduled interchange ranging between 4.15 MUs and 262.95 MUs which was costly as compared to own generation cost. Further, power cuts ranging between 27.01 MUs and 178.63 MUs were also imposed.

Manpower Management

Board had not fixed norms for deployment of manpower for the operation of its power houses. Deployment of manpower over and above the CEA norms resulted in extra expenditure of ₹ 111.51 crore, resultantly per unit employee cost of ten power house was above 50 per cent of per unit generation cost.

Achievement of generation targets

The Board has not fixed generation targets as per the designed potentials of its projects. As against the designed potential of 10,983.39 MUs the actual generation during the review period was 8508.99 MUs due to low plant load factor ranging between 42.55 and 50.73 per cent as against the norms of 85 per cent fixed by the CERC, but was higher in comparison with the national average. Further, the planned and forced outages had shown an increasing trend. Against the CEA norms of 10 per cent, the forced outages increased from 40.71 per cent in 2005-06 to 43.32 per cent in 2009-10.

Renovation and modernisation

Renovation scheme sanctioned for the modernisation, up-gradation and life extension of Bassi Power House had not been completed so far due to delay in arranging funds and excessive time taken for finalisation of tenders. This had resulted in cost overrun of ₹ 77.61 crore

besides generation loss of 17.52 MUs per annum.

Tariff fixation

Due to non/short capitalisation of expenditure and failure of the Board to justify the higher cost of various projects before the HPERC, the Board failed to recover ₹ 44.06 crore through tariff during review period.

Environmental issues

The Board did not take any initiative for registration of its five plants which commenced commercial operation after 1 January 2000 with designated National Authority to sell the Carbon Emission Reduction (CER) credits available for these projects.

Inadequate monitoring

The Board did not develop a system to predict water availability, availability of operational hours of plants and plant outages to set the generation targets. There exists no mechanism to review the operational performance and efficiency of each generating unit so as to take timely action to improve the efficiency of the projects.

Conclusion and recommendations

The projects of the Board were not completed in time resulting in time and cost overruns. Most of the Plants are being operated at low PLF and low capacity. Delay in receipt of subsidy claims from Government of India resulted in non-utilisation of available financial resources to the optimum level.

Proper MIS did not exist in the Board to evaluate the execution and operational performance of power houses.

Timely completion of ongoing projects should be ensured to avoid time and cost overruns. Reasons for low plant load factor and low availability of machines need to be addressed immediately. Further development of MIS to compile and collate data on crucial parameters needs attention.

Introduction

2.1.1 Power is an essential requirement for all facets of life and has been recognized as a basic human need. The availability of reliable and quality power at competitive rates is very crucial to sustain growth of all sectors of the economy. The Electricity Act, 2003 provides a framework conducive to development of the Power Sector, promote transparency and competition and protect the interest of the consumers. In compliance with Section 3 of the *ibid* Act, the Government of India (GOI) prepared the National Electricity Policy (NEP) in February 2005 in consultation with the State Governments and Central Electricity Authority (CEA) for development of the Power Sector based on optimal utilisation of resources like coal, gas, nuclear material, hydro and renewable sources of energy. The Policy, *inter alia*, aims at laying guidelines for accelerated development of the Power Sector. It also requires CEA to frame National Electricity Plan once in five years. The Plan would be short term framework of five years and give a 15 years' perspective.

For 2005-06, electricity requirement in Himachal Pradesh (State) was assessed as 6302.34 Million Units (MUs) of which only 6242.16 MUs were available leaving a shortfall of 60.18 MUs* (0.95 *per cent*). The total installed power generation capacity of the State was 1034.17 Mega Watt (MW) and effective available capacity† was 827.34 MW against the peak demand of 768 MW. As on 31 March 2010 the comparative figures of requirement and availability of power were 8500.87 Million Units (MUs) and 7877.66 MUs with deficit of 623.21 MUs (7.33 *per cent*), whereas the installed capacity was 1285.49 MW (Own capacity: 466.95 MW; share from Central Public Sector Undertakings (CPSU): 531.66 MW and Independent Power Producers (IPP): 286.88 MW) and effective available capacity was 1028.39 MW against the peak demand of 1151 MW leaving a deficit of 122.61 MW (10.65 *per cent*). Thus, there was a growth in peak demand of 383 MW during 2005-10, whereas the capacity addition was only 251.32 MW.

In the state, generation of power is presently being carried out by Himachal Pradesh State Electricity Board (Board), which was incorporated on 1st September 1971 in accordance with the Electricity Supply Act, 1948. The Management of the Board is vested with five Whole Time Members of the Board appointed by the State Government. The day-to-day operations are carried out by the Chairman (Now designated as Special Officer), who is the Chief Executive of the Board with the assistance of Member (Technical) and Member (Operations) who head Generation and Operation Wings of the Board. The Board had 20 power generating stations with the installed capacity of 466.95 MW. Out of total available power for the State during the year 2009-10 the Board generated only 20.06 *per cent*, IPP 20.47 *per cent* and the balance 59.47 *per cent* was contributed by CPSUs. The turnover of the Board was ₹ 2978.35♦ crore in 2009-2010, which was equal to 64.16 *per cent* and 7.04 *per*

* The shortfall in availability was due to operation of power houses at low PLF.

† 80 *per cent* of installed capacity as per CEA norms for PLF.

♦ Provisional.

cent of the State PSUs turnover and State Gross Domestic Product, respectively. The revenue from generating activities of the Board was ₹ 201.66 crore in the year 2009-10. It employed 21,460 employees as on 31 March 2010 of which 1,883 employees were engaged in generating activities. The Board has been converted into a Company with effect from 15 June 2010. In addition to the Board, there are two State owned companies namely Himachal Pradesh Power Corporation Limited (established in December 2006) and Beas Valley power Corporation (established March 2003) which have been entrusted the work of three Hydro Electric Projects with installed capacity of 277 MW (Sawra Kuddu 111 MW, Kashang 66 MW and Uhl III 100 MW). These projects are due for completion during 11th plan (2007-2012) as per National Electricity Plan.

A review on the implementation of Larji Power Generating Station (126 MW) by the Board was included in the Report of the Comptroller and Auditor General of India (Commercial) for the year 2003-04. The report was discussed by COPU in November 2009 and recommendations were finalised *vide* its 30th Report presented before the State Legislature on 11 March 2010. Further, a long para on operation, repair and maintenance of Hydro Electric Projects (HEPs) of the Board was included in the Report of the Comptroller and Auditor General of India (Commercial) for the year 2008-09 which was presented in the State Legislature in April 2010 and is yet to be discussed by COPU.

Scope and Methodology of Audit

2.1.2 The present review conducted during March to May 2010 covers the performance of the Board during the period from 2005-06 to 2009-10. The review mainly deals with Planning, Project Management, Financial Management, Operational Performance, Environmental Issues and Monitoring by Top Management. The audit examination involved scrutiny of records at the Head Office and 11* generating stations having installed capacity of 421 MW out of 20 generating stations with installed capacity of 466.95 MW.

The methodology adopted for attaining the audit objectives with reference to audit criteria consisted of explaining audit objectives to top management, scrutiny of records at Head Office and selected units, interaction with the auditee personnel, analysis of data with reference to audit criteria, raising of audit queries, discussion of audit findings with the Management and issue of draft review to the Management for comments.

Audit Objectives

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

Planning and Project Management

- Capacity addition programme taken up/planned was in line with the National Policy of “Power for all by 2012”;

* Selected on the basis of balanced mix of high cost/unviable generating stations and stations operating at par or above the designed potential.

- A plan of action was in place for optimisation of generation from the existing capacity;
- The contracts were awarded with due regard to economy and in transparent manner;
- The execution of projects was managed economically, effectively and efficiently; and
- Power Generating Stations were planned and formulated after considering the optimum design to get the maximum power, dam design and safety aspects.

Financial Management

- The projections for funding the new projects and upgradation of existing generating units were realistic including the identification and optimal utilisation for intended purpose;
- All claims including energy bills and subsidy claims were properly raised and recovered in an efficient manner; and
- Financial health of the Board was sound.

Operational Performance

- The power plants were operated efficiently and preventive maintenance as prescribed was carried out minimising the forced outages;
- The manpower requirement was realistic and its utilisation optimal; and
- The life extension (renovation and modernisation) programmes were ascertained and carried out in an economic, effective and efficient manner.

Monitoring and Evaluation

- Adequate MIS existed in the entity to monitor and assess the impact and utilise the feedback for preparation of future schemes.

Audit Criteria

2.1.4 The audit criteria adopted for assessing the achievement of the audit objectives were:

- National Electricity Plan, norms/guidelines of Central Electricity Authority (CEA) regarding planning and implementation of the projects;
- standard procedures for award of contracts with reference to principles of economy, efficiency and effectiveness;
- targets fixed for generation of power ;
- parameters fixed for plant availability, Plant Load Factor (PLF), *etc.*;
- comparison with best performers in the regions/all India averages;
- prescribed norms for planned outages; and
- Acts relating to Environmental laws.

Financial Position and Working Results

2.1.5 The financial position of the Board for the five years ending 2009-10 is given below:

Particulars	2005-06	2006-07	2007-08	2008-09	2009-10 (Provisional)
(₹ in crore)					
A. Liabilities					
Paid up Capital	282.11	282.11	334.00	372.23	971.77
Reserve & Surplus (including Capital Grants but excluding Depreciation Reserve)	1126.11	1261.36	1333.86	1530.08	1775.69
Borrowings (Loan Funds)					
Secured	146.97	115.44	198.13	233.88	321.15
Unsecured	2508.09	2002.99	2102.14	1706.51	1913.11
Current Liabilities & Provisions	1497.17	2341.99	2423.12	3049.60	3391.69
Total	5560.45	6003.89	6391.25	6892.30	8373.41
B. Assets					
Gross Block	2322.34	3556.07	3564.76	4271.34	4644.54
Less: Depreciation	408.07	464.98	552.91	649.56	754.91
Net Fixed Assets	1914.27	3091.09	3011.85	3621.78	3889.63
Capital works-in-progress (including cost of chassis)	2070.20	1108.16	1098.53	997.78	1040.28
Investments	416.75	695.18	815.66	1121.04	1907.56
Current Assets, Loans and Advances and Assets not in use <i>etc.</i>	920.06	872.18	1202.54	921.34	1152.76
Accumulated losses	239.17	237.28	262.67	230.36	383.18
Total	5560.45	6003.89	6391.25	6892.30	8373.41

From the above table it could be seen that the Current Liabilities & Provisions had increased from ₹ 1497.17 crore in 2005-06 to ₹ 3391.69 crore during 2009-10 due to increased interest burden and purchase of additional power to meet the increased demand in the State. The debt equity ratio which was 9.41:1 in 2005-06 decreased to 2.30:1 at the end of 2009-10.

2.1.6 Working results

The working results of generation activity of the Board for the five years ending 2009-10 are given below:

(₹ in crore)						
Sl.No	Description	2005-06	2006-07	2007-08	2008-09	2009-10 (Provisional)
1.	Income					
	Generation Revenue	108.02	135.13	210.47	195.49	201.66
	Other income including interest/subsidy	-	-	-	-	-
	Total Income	108.02	135.13	210.47	195.49	201.66
2.	Generation					
	Total generation (In MUs)	1332.34	1432.38	1864.97	2075.16	1804.14
	Less: Auxiliary consumption (In MUs)	5.02	6.08	5.94	6.07	5.59
	Net Generation (In MUs)	1327.32	1426.30	1859.03	2069.09	1798.55
	Less Govt. share (In MUs)	-	35.58	95.57	102.06	92.65
	Total power available for Transmission and Distribution (In MUs)	1327.32	1390.72	1763.46	1967.03	1705.90
3.	Expenditure					
(a)	Fixed cost					
(i)	Employees cost	30.89	32.30	38.51	53.04	57.49
(ii)	Depreciation	22.05	22.09	57.48	55.62	59.08
(iii)	Interest and finance charges	88.29	91.44	86.25	76.33	53.86
(iv)	Repair & Maintenance	7.14	10.45	12.22	14.29	13.17
(v)	Others	12.60	9.47	16.63	17.42	18.14
	Total fixed cost	160.97	165.75	211.09	216.70	201.74
(b)	Variable cost					
(i)	Purchase of Power (including arrear)	-	-	-	-	-
	Total variable cost	-	-	-	-	-
C.	Total cost 3(a) + (b)	160.97	165.75	211.09	216.70	201.74
4.	Realisation (per unit) (₹)	0.81	0.97	1.20	1.17	1.18
5.	Fixed cost (per unit) (₹)	1.21	1.19	1.20	1.10	1.18
6.	Variable cost (per unit)	-	-	-	-	-
7.	Total cost per unit (5+6) (₹)	1.21	1.19	1.20	1.10	1.18
8.	Contribution (4-7) (per unit) (₹)	(-) 0.40	(-) 0.22	-	0.07	-
9.	Profit (+)/Loss(-) (2x8) (₹ in crore)	(-)53.09	(-) 30.60	-	13.77	-

We observed that the gap in revenue during 2005-06 & 2006-07 was due to:

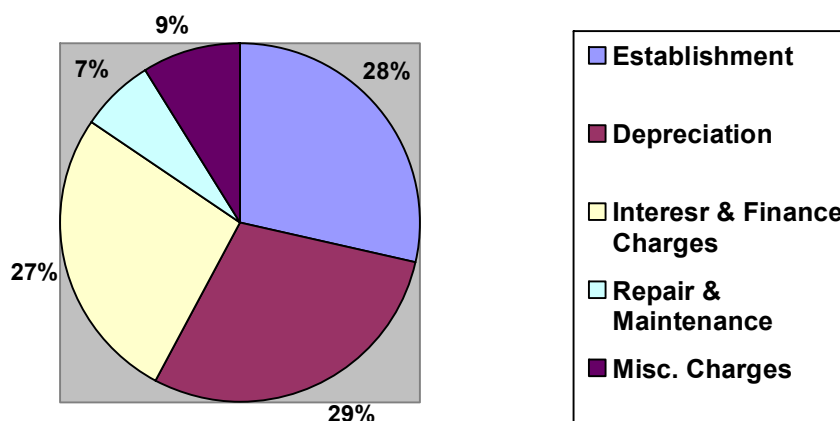
- higher manpower cost as compared to subsequent period;
- excessive booking of interest in respect of Larji Power Generating Station;
- generation loss of 120 MUs valued at ₹ 14.42 crore during 2005-06 due to higher forced outages as a result of poor maintenance; and

- lower revenue realisation as a result of disallowance of fixed cost element by Himachal Pradesh Electricity Regulatory Commission (HPERC).

Elements of Cost

2.1.7 Establishment, depreciation and interest and finance charges constitute major elements of cost in generation activity. The percentage break-up of costs for 2009-10 is given below in the pie-chart:

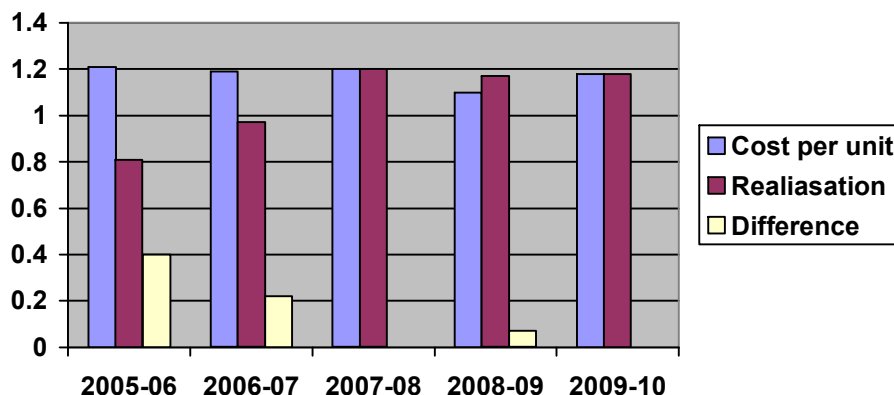
Components of various elements of cost



Recovery of cost of operations

2.1.8 The Board was not able to recover its cost of generation during 2005-06 & 2006-07 as given in the graph below:

(In ₹ per unit)



Had the total revenue earned by the Board been sufficient to cover the cost during review period an additional amount of ₹ 69.92 crore could have been available for capacity addition/life extension programmes, etc. The main reasons for high cost of generation had been poor capacity utilisation corroding the system performance, high level of auxiliary consumption, operation of economically un-viable projects and maintenance of unproductive assets. Besides, over staffing, higher interest cost and purchase of power at higher rates also contributed towards higher cost of generation.

Audit Findings

2.1.9 Audit explained the audit objectives to the Board during an ‘entry conference’ held on 22 January 2010. Subsequently, audit findings were reported to the Board and the State Government in June 2010 and discussed in an ‘exit conference’ held on 12 August 2010 which was attended by the Chairman *cum* Managing Director of the Company. The Board/Government also replied to audit findings in September 2010. The views expressed by them have been considered while finalising this review. The audit findings are discussed below.

Operational Performance

2.1.10 The operational performance of the generating activity of the Board for the five years ending 2009-10 is given in **Annexure 7** and was evaluated on various operational parameters as described below. It was also seen whether the Board was able to maintain pace in terms of capacity addition with the growing demand for power in the State. Audit findings in this regard are discussed in the subsequent paragraphs. These audit findings show that the losses were controllable and there was scope for improvement in performance.

Planning

2.1.11 National Electricity Policy aims to provide availability of over 1,000 units of per capita electricity by 2012, for which it was estimated that need based capacity addition of more than 1,00,000 MW would be required during 2002-2012 in the country. The Government has laid emphasis on the full development of hydro potential being cheaper source of energy as compared to thermal. The Central Government would support the State Government for expeditious development of hydro power projects by offering the services of Central Public Sector Undertakings like NHPC, NTPC and NEEPCO. The requirement of generation as *per* NEP was 1.38 BUs requiring generation growth of 9.5 and 7.5 *per cent per annum* during 10th Plan – (2002-2007) and 11th Plan (2007-2012) respectively. In order to fully meet both energy and peak demand by 2012, there is need to create adequate reserve capacity margin. In addition to enhancing the overall availability of installed capacity to 85 *per cent*,

a spinning reserve of at least five *per cent* would need to be created. Besides, environmental concerns would have to be suitably addressed through appropriate advance actions.

Output Efficiency

2.1.12 During the period 2005-10, the actual generation of Board was substantially less than the peak as well as average demand as shown below:

Year	Generation (MW)	Peak Demand (MW)	Average Demand (MW)	Percentage of actual generation to Average Demand	Percentage of actual generation to Peak Demand
2005-06	161	768	688	23.40	20.96
2006-07	162	873	782	20.72	18.56
2007-08	153	1061	828	18.48	14.42
2008-09	172	1055	929	18.51	16.30
2009-10	195	1151	995	19.60	16.94

(Source: Figures as furnished by the Board)

It would be seen from the above that the percentage of actual generation ranged between 18.48 and 23.40 *per cent* of the average demand and 14.42 and 20.96 *per cent* of the peak demand.

To meet the peak demand, the Board had to import power as detailed below:

(Figures in MW)

Year	Peak Demand	Peak Demand met	Sources of meeting peak demand		Peak Deficit (Percentage of Peak Demand)
			Own	Import	
2005-06	768	768	161	607	Nil
2006-07	873	873	162	711	Nil
2007-08	1061	831	153	678	21.68
2008-09	1055	1055	172	883	Nil
2009-10	1151	1151	195	956	Nil

(Source: Figures as furnished by the Board)

State had to purchase power under unscheduled interchange ranging between 4.15 MUs and 262.95 MUs which was costly as compared to own generation cost.

There remained a shortfall of 230 MW during 2007-08 (about 21.68 *per cent* of the peak demand) even after import which was covered by rotational load shedding. In addition, power cuts of 545.44 MUs were imposed during normal hours during the last five years ending March 2010, as the Board could not meet average demand.

We observed that due to low plant load factor, shortfall in generation resulted in increased gap in demand and supply which was met by purchasing/overdrawl of power from Centre Sector Projects at much higher rates by paying unscheduled

interchange (UI) charges during the period under review as tabulated below:

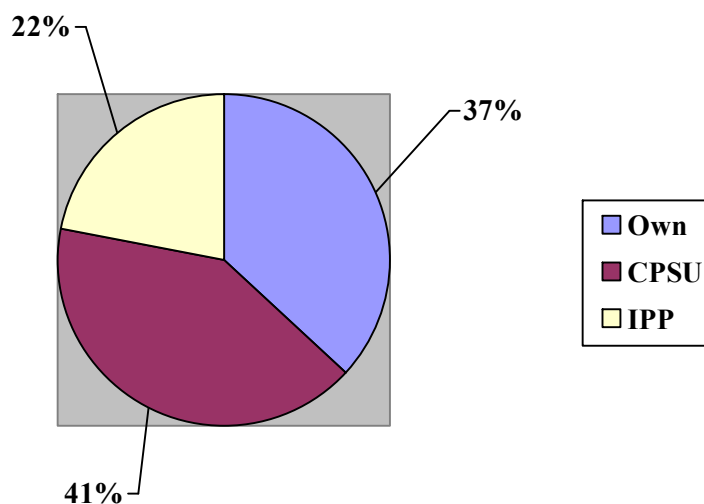
Sr. No.	Year	Power purchased under UI at higher rates (overdrawl) (MUs)	Average purchase Rate per unit (₹)	Average per unit Generation cost (₹)	Difference per unit (₹)	Amount (₹ in crore)
1.	2005-06	4.15	4.58	1.21	3.37	1.40
2.	2006-07	73.37	4.07	1.19	2.88	21.13
3.	2007-08	171.40	4.81	1.20	3.61	61.88
4.	2008-09	84.25	5.81	1.10	4.71	39.68
5.	2009-10	262.95	4.43	1.18	3.25	85.46
Total		596.12				209.55

From the above it would be seen that due to low PLF, excessive outages and low plant availability, the Board had to bear an additional financial burden of ₹ 209.55 crore on account of purchase/overdrawl of power at higher rates resulting in widening of revenue gap to this extent.

This section deals with capacity addition and optimal utilisation of existing facilities. Environmental aspects have been discussed in subsequent paragraphs at later stage.

Capacity Additions

2.1.13 The State had total installed capacity of 1034.17 MW hydro power projects at the beginning of 2005-06 which increased to 1285.49 MW at the end of 2009-10. The break up of generating capacities as on 31 March 2010 under own and state's share in CPSU/IPP is shown in the pie chart below:



To meet the energy generation requirement of 8500.87 MUs in the State, a capacity addition of about 404.58 MW was required during 2005-06 to 2009-10. During review period, four hydro projects of 402 MW were under construction, out of which one project with capacity of 126 MW* was commissioned during 2006-07.

The particulars of capacity addition, including share from CPSUs/IPPs, envisaged and actual addition at state level during review period are given below:

Sl.No	Description	2005-06	2006-07	2007-08	2008-09	2009-10	Total
1.	Capacity at the beginning of the year (MW)	1034.17	1034.17	1224.66	1238.74	1254.04	
2.	Additions planned by NEP/Board (MW)	26.50	118.49	14.08	15.30	31.45	205.82
3.	Actual additions (MW)	-	190.49*	14.08	15.30	31.45	251.32
4.	Capacity at the end of the year (MW) (1+3)	1034.17	1224.66	1238.74	1254.04	1285.49	
5.	Shortfall/surplus in capacity addition (MW)	(-)26.50	(+) 72.00	-	-	-	(+) 45.50

It would be seen from the above table that the installed capacity of generation of energy for the state of Himachal Pradesh increased from 1034.17 MW in the beginning of 2005-06 to 1285.49 MW at the end of the year 2009-10. Thus, there was net addition of 251.32 MW of which the Board added 138 MW during review period.

* Larji Project.

♥ This includes 126 MW spilled over from NEP for 2004-05 and 12 MW out of 26.50 MW planned during 2005-06 by the Board. In addition, 52.49 MW was added in the form of share from CPSUs.

Optimum Utilisation of existing facilities

2.1.14 To cope with the rising demand for power, not only the additional capacity need to be created as discussed above, the plan needs to be in place for optimal utilisation of existing facilities and also undertaking life extension programme/ replacement of the existing facilities which are near completion of their age besides timely repair/ maintenance. The details of the power generating units, which became due for Renovation and Modernisation/Life extension programmes (as per CEA norms) during the five years ending 2009-2010 vis-à-vis actually taken up are indicated in the Table below:

Sl.No.	Name of the Plant	Unit No.	Installed Capacity (MW)	Due Date (as per CEA norms)	Date when actually taken up
1.	Bassi	I to IV	4x15	November 2000	August 2007 (still under progress)
2.	Giri	I & II	2x30	1998	Scheme not yet sanctioned
3.	Rukti	I to III	3x0.500	2000	Not yet taken up
4.	Rongtong	I to IV	4x0.500	2007	Not yet taken up

Operation of Bassi Power House at low efficiency resulted in generation loss of 122.64 MUs.

From the above, it would be seen that against the 13 units due for Renovation and Modernisation/Life extension programmes, only four units of Bassi were actually taken up and the remaining nine units could not be taken up due to delay in according expenditure sanction and failure to arrange funds/loans in time from financial institutions. Even the renovation of Bassi power house was taken up after a delay of seven years from the date it became due for renovation as per CEA norms, resulting in generation loss of 122.64 MUs due to operation at low efficiency. The main reasons for delay were late sanctioning of the scheme, arranging funds and finalisation of award. In so far as Giri Power Generating Station is concerned the field unit had submitted the scheme but the same had not been sanctioned by the Board as of July 2010. Reasons for delay were not available on record. The status of remaining seven units is discussed below:

- Rongtong Power Generating Station was generating only at 33 per cent of its designed potential and consequently cost of generation was between ₹ 5.63 and ₹ 14.59 per unit. To increase its capacity and reduce

generation cost the Board got a study conducted in November 2006 for its renovation wherein it was envisaged that after incurring an expenditure of ₹ 7.38 crore on its renovation/modernisation additional generation of 6.97 MUs at the rate of ₹ 2.23 per unit would be achieved. However, instead of implementing the scheme, the Board opted for captive power by installing (September 2007) Diesel Generating (DG) sets of 1380 KVA at a cost of ₹ 2.14 crore to cater to the power demand of local area. However, no cost benefit analysis was conducted. During December 2007 to January 2009, 0.12 MUs of power were generated through these DG sets after incurring an expenditure of ₹ 63.81 lakh on their operation and maintenance. Per unit generation cost of power works out to ₹ 53.17 against the average realisation rate of ₹ 2.50. The Board thus suffered a loss of ₹ 60.80 lakh on the generation of 0.12 MUs of power through these DG sets.

The Government stated (September 2010) that DG sets were installed to provide power for the welfare of local inhabitants which can not be linked with per unit cost. The reply is not acceptable as the expenses were allowed by the HPERC in tariff on the basis of bench marked per unit cost of ₹ 2.50 only. Moreover, the Board being commercial organisation should not bear loss by extending welfare activities unless compensated by the State Government.

- Annual generation of power in Rukti Power Generating Station since its commissioning in 1979 was between 1.07 and 3.52 MUs against the designed potential of 9.18 MUs due to defective equipment and governors and non-synchronisation with the grid. Per unit cost was thus between ₹ 2.54 and ₹ 6.07 due to low capacity utilisation. To reduce the generation cost and achieve the design potential, the Board sanctioned (February 2007) a renovation scheme at a cost of ₹ 5.43 crore with anticipated per unit cost of ₹ 1.75. We observed that no action to implement the scheme had been taken up so far (March 2010) despite the fact that unit Nos. III and IV were inoperative since October 2007 and April 2006 respectively. This resulted in generation loss of 40.39 MUs (up to January 2010) valued at ₹ 10.10 crore during the last five years ended March 2010.

The Government stated (September 2010) that a scheme has now been prepared under border development scheme in which the machine would be repaired and Power House synchronised into the grid by strengthening 22 KV line from Rukti Power House to Karchham. Delay in taking up renovation scheme resulted in huge generation loss for which no justification exists on record.

- In addition to above, renovation and modernisation/refurbishment of Andhra, Bhaba and Chamba power houses would also become due during next five years. The Board had not initiated action for preparation of DPR and feasibility reports in respect of these projects so far (March 2010).

The Government stated (September 2010) that Residual Life Assessment (RLA) studies of these projects are under progress.

The detailed Audit observations relating to repair, maintenance and life extension programmes are discussed in the succeeding paragraphs.

Project Management

2.1.15 Preparation of an accurate and realistic Draft Project Report (DPR) after considering feasibility study, considering factors like creation of infrastructure facility, addressing bottlenecks likely to be encountered in various stages of project planning are critical activities in planning stage of the project.

Project management includes timely acquisition of land, effective action to resolve bottlenecks, obtain necessary clearances from Ministry of Forest and Environment and other authorities, rehabilitation of displaced families, proper scheduling of various activities using PERT/CPM technique, adequate budget provisions, *etc.* Monitoring of the project using the Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), *etc.*, are some of the controls commonly used for monitoring the progress of work. For execution of the project, consultants are also appointed for vigorous monitoring. The monitoring mechanism of the projects at pre implementation stage is generally not as vigorous as is in respect of 'Ongoing projects'. The Ministry of Power has devised control mechanism which would enable monitoring and follow up from feasibility to ordering stage. Notwithstanding, time and cost over runs were noticed due to absence of coordinating mechanism throughout the implementation of the projects during review period as discussed in succeeding paragraphs.

The following table indicates the scheduled and actual dates of completion of the power generating stations, date of commissioning of power generating stations and the time overrun.

Time overrun

Time overrun in completion of four projects resulted in generation loss of 6,606.42 MUs.

Sl.No.	Name of the Unit	Details	As per DPR	Actual time taken	Time overrun (In months)
1.	Larji	Date of completion of unit	March 1996	September 2006	125 (up to 8/06)
		Date of commercial operation/ commissioning of unit	March 1996	September 2006	125 (up to 8/06)
		Generation loss (MUs)			6112.70
2.	Khauli	Date of completion of unit	September 2003	March 2007	41 (up to 2/07)
		Date of commercial operation/ commissioning of unit	September 2003	March 2007	41 (up to 2/07)
		Generation loss (MUs)			205.00
3.	Bhaba Augmentation Project	Date of completion of unit	September 2005	In progress (March 2010)	54 (up to 3/10)
		Date of commercial operation/ commissioning of unit	September 2005	In progress (March 2010)	54 (up to 3/10)
		Generation loss (MUs)			119.83
4.	Ganvi Phase-II	Date of completion of unit	March 2007	In progress (March 2010)	36 (up to 3/10)
		Date of commercial operation/ commissioning of unit	March 2007	In progress (March 2010)	36 (up to 3/10)
		Generation loss (MUs)			168.89

It would be seen from above that out of four projects implemented during review period, none was completed in time and slippages in time schedule were avoidable at various stages of implementation as discussed below:

Cost overrun

(₹ in crore)

Sl.No.	Phase-wise name of the Unit	Estimated cost as per DPR	Awarded Cost	Actual expenditure as on 31 March 2010	Expenditure over and above estimate	Percentage increase as compared to DPR
	(1)	(2)	(3)	(4)	(5)	(6)
1.	Larji	168.85	342.97	1293.69	1124.84	666
2.	Khauli	66.08	29.82	134.99	68.91	104
3.	Bhaba Augmentation Project	35.60	24.27	51.01	15.41	43

Delay in completion of three projects resulted in cost overrun between 43 and 666 per cent of the estimated cost.

It would be seen from the above that cost overrun ranged between 43 and 666 per cent of the estimated cost of the projects. The main reasons for cost overrun, as analysed in audit, were as under:

Larji Power Generating Station

2.1.16 Larji Power Generating Station on river Beas with an installed capacity of 126 MW (3x42MW) was approved (March 1987) by Government of India (Planning Commission) at an estimated cost of ₹ 168.85 crore. According to construction schedule, the project was to be commissioned within five years. Board took up the project for execution during 1990-91 with completion schedule up to March 1996. Envisaged per unit and per MW generation cost was 24.47 paisa and ₹ 1.34 crore respectively. The project was however, commissioned during September/October 2006 at a cost of ₹ 1293.69 crore. Thus, due to time and cost overrun per unit, per MW cost increased to ₹ 2.40 and ₹ 10.27 crore respectively. The time and cost overrun was mainly due to late taking up of construction work, change in designs, non-inclusion of some items in the awards/DPR, award of works at higher rates and overpayments to contractors. These aspects have already been discussed in detail in the Report of the Comptroller and Auditor General of India (Commercial) for the year ended 31 March 2004. Some of the major audit findings and recommendations of the COPU (January 2010) thereon are discussed below:

- In respect of Para 2.1.12 COPU recommended to initiate action against the officers besides recovery of interest on ₹ 5.83 crore over paid to the contractor.
- COPU in respect of para 2.1.22 recommended to initiate action against the concerned officers responsible for the omission for which the Board had to pay the penalty of ₹ 1.54 crore.

We further observed that action on COPU's recommendations was not taken (September 2010).

Khauli Power Generating Station

2.1.17 Board approved DPR of Khauli Power Generating Station (12MW) at a cost of ₹ 66.08 crore during April 1996 with completion period of four years. Approval for execution was accorded in May 1998 without obtaining the environmental clearance which was actually obtained during January 1999. The works of the project were however, commenced during September 1999 and the works for civil components were awarded during August 2002. The work for the Electro-Mechanical portion was awarded (March 2003) to M/s VA TECH & consortium. In terms of clause 10.1 of the agreement both the machines were to be commissioned within 19 months (November 2004) and 22 months (February 2005) from the date of notification of award i.e. March 2003.

Audit observed that the firm started the supply of Electro-Mechanical equipment during March 2005 and continued up to January 2006. Consequently, its installation could be completed during June 2006. Liquidated damages of ₹ 92.62 lakh were recovered from the firm for delay in supply of material.

Further, civil components of the project were also delayed and the water conductor system was made available in November 2006. Both the machines were spun during November 2006 and the project was commissioned on 18 April 2007. Thus, there was a total delay of 24 months in the completion of the project with consequential generation loss of 86 MUs (as per targets fixed by CEA).

The Government stated (September 2010) that the main reasons for time and cost overrun were adverse geological conditions and delay in acquisition of land. The reply is not acceptable as the actual reasons for delay were late supply of electromechanical equipment and delay in completion of water conductor system.

Bhaba Augmentation Project

2.1.18 A huge land slide occurred (11 May 2002) above the power house location of Bhaba Augmentation Project. The entire power house and switch yard were buried under the debris. To rehabilitate the project, the Board prepared/cleared (September 2002) a revised DPR (4.5 MW) at a cost of ₹ 35.60 crore with completion period of three years (September 2005). The DPR envisaged annual generation of 26.63 MUs at a cost of ₹ 2.14 per unit. The project was however, still incomplete (July 2010). The delay was mainly due to improper planning as the work for construction of power house and tailrace channel was awarded in December 2005 *i.e.* after a delay of 38 months. As the layout drawings had not been finalised by the Board, the agreement could not be entered into till April 2008 resulting in further delay of 28 months. The construction work could be started in November 2008 (after delay of seven months), after acquisition (September 2008) of private land. The project is now scheduled for completion in October 2010 at a cost of ₹ 71.37 crore with cost overrun of ₹ 35.77 crore. This would result in increase in per unit and per MW cost from ₹ 2.14 and ₹ 7.91 crore to ₹ 4.29 and ₹ 15.86 crore respectively.

The Government admitted (September 2010) that the main reason for delay was non-availability of land.

Ghanvi Phase-II project

2.1.19 Techno Economic Clearance for the construction of the Project (10 MW) was accorded (March 2004) by the Board for ₹ 49.49 crore with completion period of three years and anticipated annual generation of not less than 56.30 MUs. The project, proposed for completion in March 2007 was still (March 2010) incomplete after incurring an expenditure of ₹ 44.77 crore and is now expected to be completed in August 2011. We observed that the works of different civil components were awarded between January 2005 and September 2006 and were due for completion in March 2008. The order for the supply of electro-mechanical equipment was, however, placed in July 2008 with completion date of July 2010 *i.e.* after three months of scheduled date of

completion of civil components. Evidently, various construction activities of civil and electrical works were not synchronised.

Further, the civil and mechanical works were divided into five components. The component-wise detail of works, financial progress, present status, *etc.* is given in **Annexure 8**. It would be seen from there that the works which were due for completion between June 2005 and March 2008 were still (March 2010) incomplete. The physical achievement was to the extent of 54 *per cent* against the financial achievement of 90 *per cent*. The agreement for the construction of intake structure was rescinded during October 2008 due to stoppage of work by the contractor. The contractor was served with a notice (October 2008) to carry out the left-out work worth ₹ 5.90 crore at his risk and cost. The work has now been awarded (November 2009) to M.S. Hydro with additional cost of ₹ 2.18 crore with completion period up to May 2011.

Thus, the project proposed for completion within three years at a cost of ₹ 49.49 crore is now likely to be completed at a cost of ₹ 81 crore. This would increase per unit and per MW cost from ₹ 1.40 and ₹ 4.95 crore to ₹ 2.29 and ₹ 8.10 crore respectively.

The Government stated (September 2010) that the main reasons for time and cost overrun were adverse geological conditions, inclement weather and strike by the labour. The reply is not acceptable as aspects relating to geological conditions & inclement weather were considered while fixing the completion schedule of the project and labour strike happened after scheduled completion date.

Excess booking of employee cost - ₹ 5.87 crore

2.1.20 Establishment cost included in the project cost is of utmost importance as the higher establishment cost results in increase in per MW and per unit cost thereby rendering the entire project economically un-viable. The Central Electricity Authority (CEA) has fixed per MW norm of 10 persons for execution of hydro power projects. We noticed that in respect of Bhaba Augmentation Project (4.5 MW) and Ghanvi Phase-II (10 MW) the Board had sanctioned the man power much in excess of the norms *ibid*. Further, actual deployment of manpower was also in excess of the sanctioned strength. This resulted in excess booking of establishment cost to the projects during the last five years amounting to ₹ 7.52 crore and ₹ 5.87 crore as compared to the sanctioned strength and norms of the CEA respectively. The Board could have utilised this amount for capacity addition by one MW (on CEA rates).

The Government stated (September 2010) that being hilly terrain the working conditions in the State are much difficult and as such CEA norms can not be adopted. The reply is not based on facts as most of the HEPs are in the hilly states and CEA which is a project approving authority has fixed the norms after considering the conditions prevailing in the Hills.

Execution of additional items

2.1.21 Preparation of DPR is the base for determination of cost and viability of the Project. Therefore, it is necessary that the DPR should be prepared with

due care and based on realistic data after thorough investigation. We noticed that in case of intake works of Ghanvi Phase-II, Head Race Tunnel of Larji and Khauli projects expenditure of ₹ 2.89 crore, ₹ 59.34 crore and ₹ 8.37 crore respectively was incurred on execution of additional items due to preparation of DPR on un-realistic data and improper geological explorations. Non-inclusion of the additional items/works in the DPR and execution of the same subsequently at higher rates had resulted in time and cost overrun. In case of Larji project the investigation report of the committee of experts has been handed over to the Chairman of the Board (May 2009) action on same was awaited (July 2010) and in case of Khauli project the extra/higher cost of project was disallowed by the HPERC while fixing generation tariff. Similarly, extra items amounting to ₹ 11.86 lakh was proposed for execution of penstock of Ghanvi II for which there was no provision in the original DPR.

The Government stated (September 2010) that the changes in the items of work and deviation in quantities were mainly due to geological surprises encountered during execution which can not be predicted. The reply points out towards the deficiencies in preparation of DPR and inadequate geological exploration.

Interest During Construction

2.1.22 Revised DPR for Bhaba Augmentation Project (4.5 MW) was cleared by the Board during September 2002 for ₹ 35.60 crore. There was a provision of ₹ 1.52 crore for Interest During Construction (IDC) in the approved DPR. We noticed that the field unit booked an amount of ₹ 14.56 crore IDC up to 2008-09 as per the directions of the Board. Thus, there was excess booking of IDC of ₹ 13.04 crore as compared to the DPR. The excess booking as analysed in audit was mainly due to non-capitalisation of cost of tunnel amounting to ₹ 14.03 crore being used for increasing water availability of Bhaba Power Generating Station (120 MW) during lean period, non-writing off the assets worth ₹ 5.44 crore in respect of buried Power Generating Station & switch yard booked in the work in progress (WIP) and delay in completion of the project.

The Government stated (September 2010) that the expenditure incurred on the construction of tunnel is being capitalised and action to write off the loss of assets has now been initiated.

Contract Management

2.1.23 Contract management is the process of efficiently managing contract (including inviting bids and award of work) and execution of work in an effective and economic manner. The works are generally awarded on turn key (Composite) basis to a single party involving civil construction, supplies of machinery and ancillary works.

During review period 13 contracts valuing ₹ 151.97 crore related to civil works, supply of equipment and other miscellaneous works were executed. Of these, contracts valuing ₹ 21.14 crore relating to civil works and ₹ 117.44 crore pertaining to supply of material were scrutinised during audit. Irregularities

noticed in execution of four agreements in two projects undertaken during review period are given below.

Non-recovery of steel from contractor

2.1.24 As per clause 10 (F) of contract agreement entered into (November 2005) with the contractor for construction of intake of Ghanvi Phase II project, difference of quantity of steel actually issued to the contractor and theoretical consumption including authorised variation, if not returned by the contractor was to be recovered at four times the stipulated issue rate including storage charges. We noticed that recovery of ₹ 93.67 lakh was not made from the contractor on account of the following:

Non-recovery of steel valuing ₹ 72.94 lakh (54.856 MTs) out of 339.062 MTs from the contractor on rescinding work in October 2008.

6.937 MTs steel was shown utilised twice for chair and supports resulting in short recovery of ₹ 14.50 lakh from the contractor.

Steel weighing 6.953 MTs was stated to have been used by the contractor for infrastructure works i.e. stock yard, workshop, labour colony, etc. (without any entry in the measurement book), which were to be constructed by the contractor at his own cost as per (Chapter VIII 8.4 of General Condition) agreement. The Board adjusted 6.953 MT steel at issue rate of ₹ 29,000 per MT instead of applicable four time rate resulting in short recovery of ₹ 6.23 lakh.

The Government stated (September 2010) that the matter is *sub judice* and as such no action could be taken to recover the shortage of material. The reply is not based on facts as the *sub judice* matter relates only to recovery of ₹ 72.94 lakh and no action was taken for the recovery of ₹ 20.73 lakh as pointed out above.

Cost of steel found short, excess/ unauthorisedly used was not recovered from the contractor.

Operational Performance

2.1.25 Operation of Generating Stations is dependent on input efficiency consisting of material and manpower and output efficiency in connection with Plant Load Factor, plant availability, capacity utilisation, outages and auxiliary consumption. These aspects have been discussed below.

Manpower Management

2.1.26 The Board has not fixed norms for working out the manpower required for the operation of power generating stations. However, CEA had recommended 1.79 person per MW of the installed capacity. The position of actual manpower deployed, sanctioned strength & manpower required as per

CEA recommendation for power generating stations is given below:

Sl. No.	Particulars.	2005-06	2006-07	2007-08	2008-09	2009-10
1	Sanctioned strength	2262	2319	2278	2222	2085
2	Manpower as per the CEA recommendations	589	836	836	836	836
3	Actual manpower	1824	1858	1806	1852	1883
4	Expenditure on salaries (₹ in crore)	28.60	30.15	36.75	50.52	50.55
5	Extra expenditure with reference to CEA norms (₹ in crore) [(4/3) x (3-2)]	19.36	16.58	19.74	27.72	28.11

Employee cost in respect of ten projects alone contributed to more than 50 per cent of per unit generation cost.

Above table shows that actual manpower under generation wing operating 13 projects was more than the norms of CEA during the years 2005-06 to 2009-10. Further, in spite of reduction in sanctioned strength from 2,262 in 2005-06 to 2,085 in 2009-10 the actual manpower increased from 1,824 to 1,883 during the same period. This resulted in extra expenditure of ₹ 111.51 crore on excess manpower. We observed that during 2009-10 the element of employee cost alone in respect of ten projects was more than 50 per cent of per unit generation cost as shown in the **Annexure 9**. Overtime was regularly paid to the staff. Our analysis revealed that yearly overtime paid ranged between 2,860 and 53,576 hours which was equivalent to the duty hours of one to 22 employees during 2005-10. The overtime paid by generating stations during the period of review works out to ₹ 2.04 crore. No action was taken by the Board to rationalise its staff strength. We further observed that in three power houses (Ghanvi, Nogli and Khaul) the manpower ranging between seven and 14 was deployed in excess of the sanctioned strength resulting in extra expenditure of ₹ 64 lakh. In addition, in two small power houses (Rukti and Rongtong) under Operation wing of the Board 20 and 21 employees respectively were deployed in excess of the CEA norms resulting in extra expenditure of ₹ 2.90 crore during the review period.

The HPERC in its tariff orders issued from time to time had objected to the high employee cost. The Board admitted before the Commission that the deployment of manpower needed to be rationalised based on the requirements.

The Government while admitting (September 2010) that no norms were fixed for deployment of manpower required for operation of power houses stated that CEA norms can not be applied for small power houses located in remote and tribal areas. The reply is not acceptable as even after operating for more than 38 years the Board failed to fix its own manpower norms. Further, despite assurance given to the HPERC to rationalise manpower deployment so as to reduce employee cost no action was taken so far (September 2010).

Shortfall in generation

2.1.27 The targets for generation of power for each year are fixed by the Board and approved by the CEA. It was observed that the Board was able to

generate 8,508.99 MUs of power during 2005-06 to 2009-2010 against the fixed targets of 8,980.20 MUs. This resulted in a net shortfall of 471.21 MUs as tabulated below:

(Figures in MUs)

Year	Target	Actual	Shortfall(-)/Excess (+)
2005-06	1323.65	1332.34	(+) 8.69
2006-07	1939.31	1432.38	(-) 506.93
2007-08	1929.58	1864.97	(-) 64.61
2008-09	1821.77	2075.16	(+) 253.39
2009-10	1965.89	1804.14	(-) 161.75
	8980.20	8508.99	(-) 471.21

The Government attributed (September 2010) the shortfall in generation to late commissioning of Larji and Khauli Power Generating Stations, capital maintenance, heavy floods/ less rains.

The year-wise details of energy to be generated as per design, actual generation, PLF as per design and actual PLF in respect of the projects commissioned up to March 2010 are given in **Annexure 10**.

The details in the Annexure indicate that:

- The actual generation and actual PLF achieved were far below the energy to be generated and PLF as per design in most of the plants during the five years ending March 2010.
- As against the total designed generation of 10983.39 MUs of energy during the five years ending March 2010 the actual generation was 8508.99 MUs leading to a shortfall of 2474.40 MUs.
- As the PLF had been designed considering the availability of inputs the loss of generation (total 2474.40 MUs) during the period 2005-2006 to 2009-2010 indicated that resources and capacity were not being utilised to the optimum level due to design deficiencies, frequent breakdown of units and delay in rectification of defects as discussed in succeeding paragraphs:

Non-achievement of designed potential

2.1.28 The installed capacity of a Power Generating Station is determined on the basis of availability of water discharge and designed head. Availability of water depends upon the size of catchment area and water source, such as snow covering area while the head is worked out with reference to the gradient of the available fall, *etc.* The power generating equipment of the power house is accordingly designed taking into account the discharge and head. A scheme for Baner Power Generating Station was first approved (1981) by the CWC/CEA for 6 MW only in which the catchment area was calculated 33.28 Km² with available discharge of 1.33 Cumecs at 90 *per cent* dependable year and 212 Mtrs. head. This scheme could not be taken up for execution due to financial

constraints. In 1984, a land slide occurred near diversion point and the point was shifted 800 Mtrs. upstream. Due to this shifting, the head increased to 329 Mtrs. Accordingly, the installed capacity of the project was revised from 6 MW to 12 MW without visualising the impact of reduction in catchment area. The capacity of the project was increased considering increase in area and discharge of the order of 3.66 Km² and 0.25 Cumecs respectively without recording any reason. Not only this, the power generating equipments were also designed for 341 Mtrs. head against actual availability of 329 Mtrs.

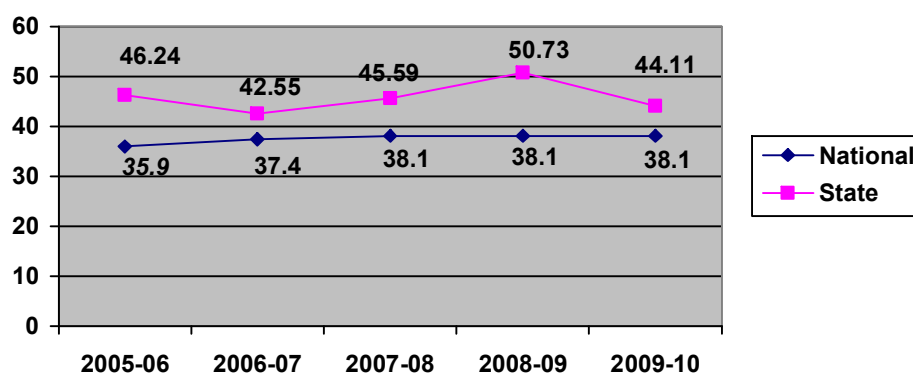
It was further observed that the designed potential of 60 MUs was never achieved since the commissioning of the project (1996). The generation was between 33.09 and 47.23 MUs. The reason for non-achievement of designed potential was that the recorded pressure of 32 Kg/Cm² corresponds to net head of 320 Mtrs against the designed head of 341 Mtrs. During the last five years ending March 2010 against the designed potential of 300 MUs the Board fixed generation target of 202 MUs against which actual generation was 201.59 MUs. This indicates that the targets were fixed much below the designed potential (300 MUs).

The Government admitted (September 2010) the fact that the re-assessment of designed potential of Baner Power Generating Station is required.

Low Plant Load Factor

2.1.29 PLF refers to the ratio between the actual generation and the maximum possible generation at installed capacity. According to norms fixed by Central Electricity Regulatory Commission (CERC), the PLF for hydro power generating stations should be 85 *per cent*, against which the national average as per performance report of the CEA was between 35.90 and 38.10* *per cent*.

The PLF of Power Generating Stations of the Board was much below the norms fixed by the CERC. However, it was much above the national average PLF for the five years ending March 2010 as shown below in the line graph:



* In the absence of data, PLF of 38.10 *per cent* has been considered for the years 2008-09 & 2009-10.

The details of average realisation *vis a vis* average cost per unit, PLF achieved, average realisation at national PLF, PLF at which average cost would have been recovered and the difference of PLF in *per cent* are given in the following table:

Sl.No.	Description	2005-06	2006-07	2007-08	2008-09	2009-10
1.	Average Realisation (₹ per Unit)	0.81	0.97	1.20	1.17	1.18
2.	Average Cost (₹ per Unit)	1.21	1.19	1.20	1.10	1.18
3.	Actual PLF (<i>Per cent</i>)	46.24	42.55	45.59	50.73	44.11
4.	Average Realisation at CERC norms (85% PLF) (₹ per Unit)	1.49	1.94	2.24	1.96	2.27
5.	PLF at which average cost stands recovered (<i>Per cent</i>) (2/1 X 3)	69.07	52.20	45.59	47.69	44.11
6.	Difference (<i>per cent</i>) (5 – 3)	22.83	9.65	-	(+) 3.04	-

It would be seen from the above table that with marginal increase in the PLF and realisation during 2007-08 and 2009-10, the Board was in a position to achieve the break even level. During 2008-09 with significant improvement in PLF Board earned a profit of ₹ 13.77 crore on generation activities. The estimated shortfall in generation works out to 1360.83 MUs due to non-achievement of break even level during 2005-06 & 2006-07 resulting in loss of contribution amounting to ₹ 163.30 crore.

The details of maximum possible generation at installed capacity, actual generation and corresponding PLF achieved in respect of each generating unit for the five years up to 2009-2010 are given in **Annexure 10**. The main reasons for low PLF, as observed in audit were:

- Low plant availability
- Low capacity utilisation
- Major shut downs and delays in repairs and maintenance.

These are discussed in the following paragraphs:

Low plant availability

2.1.30 Plant availability means the ratio of actual hours operated to maximum possible hours available during certain period. As against the CERC norm of 80 *per cent* plant availability during 2004–2009 and 85 *per cent* during 2010-2014, the average plant availability of power generating stations of the Board was 53.56 *per cent* during the five years up to 2009-10.

Average plant availability of power stations was 53.56 *per cent* against CERC norms of 85 *per cent*.

The details of total hours available, total hours operated, planned outages, forced outages and overall plant availability in respect of power projects of the Board as a whole are shown below:

Sl.No.	Particulars	2005-06	2006-07	2007-08	2008-09	2009-10
1.	Total hours available	306600	316200	351288	350400	350400
2.	Operated hours	158986	172551	210118	188732	167155
3.	Planned outages (in hours)	22790	27078	21413	29749	31467
4.	Forced outages (in hours)	124824	116571	119757	131919	151778
5.	Plant availability (per cent)	51.85	54.57	59.81	53.86	47.70

It is evident from the above table that the plant availability in power generating stations ranged between 47.70 and 59.81 *per cent* which was less than the All India Average of 92 *per cent* (2007-08). The low availability was due to longer duration of outages caused by inordinate delays in repair and maintenance, routine maintenance during peak season, non availability of auxiliary power, excessive tripping due to improper maintenance, ineffective trash rack, *etc.* (Refer para no.3.11.4 of C&AG's Report - Commercial for the year 2008-09) and non-availability of required quantity of water. This resulted in generation loss of 151.53 MUs valuing ₹ 45.17 crore.

The Government stated (September 2010) that the plant availability ranged between 61 and 82 *per cent* which is quite reasonable. The reply is not based on facts as the Board worked out the availability on the basis of available discharge and not on total number of machines.

We evaluated the generation data of Bassi Power Generating Station (60 MW) which is a tailrace development of 110 MW Shanan Power Generating Station of PSEB which utilises water from the River Uhl. In case of shut down of Shanan Power Generating Station the power generation of Bassi Power Generating Station is also affected due to non-availability of water. Evaluation of data for the period from April 2005 to March 2010 revealed that Bassi Power Generating Station remained under shutdown for 2457 hours due to non-availability of water from Shanan tail race resulting in generation loss of 36.86 MUs valued at ₹ 4.35 crore. The Board had taken no action to explore the possibility of utilising the spilled water since the commissioning of the project (1970-71) to avoid the generation loss.

The Government admitted (September 2010) the fact that generation of Bassi Power Generating Station is regulated as per discharge available in the tail race of Shanan Power Generating Station and stated that tapping from existing pen stock is not possible. However, the facts remain that the Board failed to explore any possibility to utilise the spilled water in case the Shanan Power Generating Station remains shut down.

Low Capacity Utilisation

2.1.31 Capacity utilisation means the ratio of actual generation to possible generation during actual hours of operation. The capacity utilisation of power generating stations of the Board decreased from 48.94 *per cent* in 2005-06 to 41.76 *per cent* in 2009-10.

Main reasons for the low utilisation of available capacity during 2005-10, as analysed in audit were due to the machines remaining off the bar for various reasons as discussed below:

- One machine (5.65 MW) of Andhra Power Generating Station for 1,129 hours due to grid failure during 2007-08.
- Ghanvi (22.5MW) and Baner (12MW) Power Generating Stations for 191 hours and 234 hours respectively due to excessive trippings of evacuation system during 2005-2010.
- One machine (5.65 MW) of Andhra Power Generating Station for 1,519 hours due to problem in Automatic Voltage Regulator during 2006-07.
- Three units of Bhaba Power Generating Station (120 MW) were under forced shut down for 121 hours for want of repair of Main Inlet Valve during 2006-07.
- Unit No. II of Bhaba Power Generating Station (40 MW) for 743 hours due to sudden application of Pneumatic Breaks.
- Reduced generating capacity of Bassi Power Generating Station from 60 MW to 58 MW due to capacity constraints in water conductor system.

The Government stated (September 2010) that 22 KV combined Ghanvi feeder has now been converted into dedicated feeder to avoid tripping. It was further added that there was no major decline in generation in old generating units. The reply is not based on facts as the Bassi Power Generating Station was operating at reduced capacity of 58 MW. However, no justification was furnished in respect of Andhra, Bhaba, and Baner Power Generating Station.

Outages

2.1.32 Outages refer to the period for which the plant remained closed for attending planned/forced maintenance. We observed following deficiencies in planned and forced outages:

- The total number of hours lost due to planned outages increased from the 22,790 in 2005-06 to 31,467 in 2009-10 i.e. from 7.44 to 8.98 *per cent* of the total available hours in the respective years. The planned outages were more than the All India Average of 5.66 *per cent* (2007-08). Out of above, 4,704 hours were lost due to delay in award of work and completion of capital maintenance of turbines.
- The forced outages in power generating stations increased from 1,24,824 hours in 2005-06 to 1,51,778 hours in 2009-10 i.e. from 40.71 to 43.32 *per cent* of the total available hours in the respective years.

Forced outages over and above the CEA norms resulted in generation loss of 2425.23 MUs.

The forced outages remained more than the norm of 10 *per cent* fixed by CEA in all the five years ending 31 March 2010. Compliance of the CEA norms would have entailed availability of plant for additional 4,77,360 operational hours with consequent generation of 2425.23 MUs valued at ₹ 286.18 crore.

Auxiliary consumption of power

2.1.33 Energy consumed by power stations themselves for running their equipment and common services is called Auxiliary Consumption. HPERC allowed (June 2003) 0.20 to 0.70 *per cent* of the power generated to be used as auxiliary consumption based on design of machines and location of the powerhouse (under ground/surface). However, the actual consumption of 11 power stations of the Board ranged between 0.30 and 8.06 *per cent* resulting in excess consumption of 5.19 MUs valuing ₹ 0.61 crore as detailed in **Annexure 11**, which was sufficient to meet the energy requirement of 1,730 below poverty line households at an average consumption of 50 units per month.

The Government stated (September 2010) that the average auxiliary consumption of all power houses was within the permissible limit. The reply is not based on fact as 11 Power Generating Stations out of 20 were consuming auxiliary power in excess of the admissible limit.

Repairs & Maintenance

2.1.34 To ensure long term sustainable levels of performance, it is important to adhere to periodic maintenance schedules. The efficiency and availability of equipment is dependent on the strict adherence to annual maintenance and equipment overhauling schedules. Non-adherence to maintenance schedule carries a risk of forced outages which necessitate undertaking repair and maintenance works. These factors lead to increase in the cost of power generation due to reduced availability of equipment which affect the total power generated. Board had suffered generation loss of 123.29 MUs due to maintenance of plants during peak seasons, non-availability of auxiliary power, excessive tripping, non/improper maintenance, delay in repair/maintenance, delay in taking decision for repair, *etc.*, as pointed out in the C&AG's Audit Report (Commercial) for the year ending March 2009 (*Refer paragraph 3.11.6*). We further observed that failure of the Board to carry out repair and maintenance of machines in time had resulted in generation loss of 65.29 MUs as discussed below:

Gumma Power Generating Station

2.1.35 Both the units of the Power Generating Station were taking almost half an hour to stop at their own since its commissioning (September 2000) as no braking system was provided on the machines causing frequent damage to thrust pads. Machine No. II broke down (June 2007) and order for spares was placed (March 2008) with BHEL (manufacturer) at a cost of ₹ 82.51 lakh. We observed that the order for maintenance of the machine was placed (October 2009) after receipt of material (September 2009) with completion period of 60

days. The firm actually started the work during February 2010 and which remains incomplete till March 2010. This resulted in generation loss of 24.90 MUs valued at ₹ 2.94 crore. The Board could not recover the generation loss from the supplier as there was no clause in the award letter for imposition of liquidated damages for delay.

We further observed that the water conductor system was not charged since 22 June 2009 due to excessive leakage of water from power channel. As the concreting of power channel constructed at a cost of ₹ 2.37 crore and put to use in August 2000 was not done as per specifications/design. The thickness of concrete in chamfer portion and bottom of channel was between 12 and 14 cms against the designed thickness of 25 cms consequently the concrete eroded in just nine years against the life span of 35 years and the second unit of the Power Generating Station was also inoperative since then, resulting in generation loss of 9.55 MUs valued at ₹ 1.13 crore.

The Government stated (September 2010) that the matter was taken up with BHEL for exploring the provision of braking system. However, no comments were offered in respect of premature failure of water conductor system.

Renovation & Modernisation

2.1.36 Renovation & Modernisation (R&M) and refurbishment activities involve identification of problems of unit, preparation of techno economic viability reports, preparation of DPR to lay down benefits to be achieved from these works.

R&M activities are aimed at overcoming problems in operating units caused due to generic defects, design deficiency and ageing by re-equipping, modifying, augmenting them with latest technology/systems. R&M activities are undertaken in projects operating at PLF of 40 *per cent* and below after assessing the performance and requirement of the units.

Refurbishment activities are aimed at extending economic life of the units by 15 to 20 years which have served for more than 20 years or operating at PLF below 40 *per cent*. Necessary permission and clearance for R&M and Refurbishment activities from State Electricity Regulatory Commission (SERC)/CEA/State Government are obtained. Residual Life Assessment (RLA) studies are also conducted for all Refurbishment activities and in major R&M works. For Refurbishment and R&M activities Power Finance Corporation (PFC) sanctions loan equal to 70 *per cent* of the estimated cost of the activity against guarantee furnished by the State Government and rest of the funds are met from internal sources or loan from the State Government. Out of four plant due (Refer to para 2.1.14 *supra*) only one plant as discussed below has been undertaken for R&M activities.

Bassi Power Generating Station

2.1.37 During the period covered under review the Board had taken up the renovation, life extension and uprating of Bassi Power Generating Station.

Deficiencies noticed in implementation of the scheme are discussed below:

Delay in taking up the renovation scheme resulted in cost overrun of ₹ 77.61 crore.

- Four units of 15 MW each of the project were in operation since 1981. The Board had not been able to utilise optimum capacity of the Power Generating Station as envisaged in the sanctioned (November 2000) renovation scheme due to capacity constraints in the water conductors system as tail race system could not discharge full generation draft from the turbines. We observed that due to low efficiency of the turbines, discharge from each of them was on higher side in the order of 6.1 cumecs against the rated full load discharge of 5.37 cumecs. This resulted in obstruction of water in tail race due to excess flow. Resultantly, level of water touched the runners thereby, reducing the effective head and limiting the generation to 58 MW as against designed capacity of 60 MW. This resulted in annual generation loss of 17.52 MUs. This fact was also confirmed by Tata Consulting Engineers (June 2000) in their diagnostic study got conducted by the Board.
- Further, the water available from Shanan Power Generating Station to Bassi Power Generating Station could not be fully utilised due to above mentioned capacity constraints in the water conductor system. Since the commissioning of the Power Generating Station, generation up to the designed potential of 346 MUs (except 1989-90) could not be achieved. The shortfall in generation during April 2005 to March 2010 was of 488* MUs valued at ₹ 57.58 crore. To overcome the above constraints, a renovation scheme proposed to be completed in April 2002 was sanctioned (November 2000). The scheme was still incomplete (March 2010) due to delay in arranging funds (31 months) and excessive time consumed in finalisation of tenders (43 months). This resulted in cost overrun of ₹ 77.61 crore, besides the benefit of capacity addition of six MW (48 MUs *per annum*) could not be achieved.

The Government stated (September 2010) that unit No. 4 was commissioned during March 2010 and the remaining work will be completed during 2011-12.

Operation & Maintenance

2.1.38 The operation and maintenance (O&M) cost includes expenditure on the employees, repair & maintenance including stores and consumables, consumption of capital spares not part of capital cost, security expenses, administrative expenses, *etc.*, of the Power Generating Stations besides corporate expenses apportioned to each generating station, *etc.*

HPERC in its tariff orders issued during the period from July 2005 to 2009-10 had allowed O&M expenses to the extent of ₹ 824.92 crore (exclusive of return on equity and actual expenditure for the year 2005-06 and 2006-07 trued up in the multi year tariff 2008-11). Against this, the Board incurred total expenditure of ₹ 956.25 crore. We observed that O&M expenses were higher by ₹ 131.33 crore than the expenses allowed by HPERC due to high employee cost,

* Including the annual generation loss of 17.52 MUs mentioned in the preceding sub-para.

operation of unviable projects and unproductive assets such as schools and hospitals, etc. (Refer para 3.11.9 of the C&AG's Report- Comml for the year 2008-09). Consequently, expenses amounting to ₹ 131.33 crore incurred over and above the expenses allowed by the HPERC during the review period added to the loss of the Board.

The Government stated (September 2010) that the HPERC had determined the O&M expenses as per the methodology based on the last five year data. Where such data was not available, the Commission escalated the average expenses by four *per cent*. The reply is not relevant to our observation wherein it has been pointed that the Board incurred higher expenses on O&M as compared to the expenses allowed by the HPERC in the tariff orders.

Financial Management

2.1.39 Efficient fund management is need of the hour in any organisation. This also serves as a tool for decision making, for optimum utilisation of available resources and borrowings at favourable terms at appropriate time.

The Board should, therefore, streamline their systems and procedures to ensure that:

- Outstanding advances are adjusted/recovered promptly,
- Funds are not borrowed in advance of actual need, and

The main sources of funds were realisations from sale of power, subsidy from State/Central Governments, loans from State Government/Banks/Financial Institutions (FI), etc. These funds were mainly utilised to meet payment of power purchase bills, debt servicing, employee and administrative costs, and system improvement works.

Details of sources and utilisation of resources on actual basis by the Board for the review period are given below:

(₹ in crore)						
SL.No.	Particulars	2005-06	2006-07	2007-08	2008-09	2009-10 (Provisional)
Sources						
1.	Net Profit/(loss)	20.48	1.88	(25.38)	32.31	(152.82)
2.	Add: adjustments	54.13	58.14	88.42	97.20	106.50
3.	Funds from operations (1+2)	74.61	60.02	63.04	129.51	(46.32)
4.	Cash deficit (9-3)	241.61	-	159.44	-	360.83
5.	Total (3+4)	316.22	60.02	222.48	129.51	314.51
Utilisation						
6.	Capital expenditure	469.35	271.69	(-)0.94	605.83	415.70
7.	Increase in working capital	(-)153.13	(-)254.60	223.42	(-)831.58	(-) 101.19
8.	Cash surplus (3-(6+7))	-	42.93	-	355.26	-
9.	Total	316.22	60.02	222.48	129.51	314.51

Dependence on borrowed funds increased the operational cost by ₹ 784.64 crore during 2005-10.

The cash deficit was overcome mainly by increased borrowings in the form of cash credit/loans from commercial banks/financial institutions. Main reasons for cash deficit identified by audit were poor/delays in recovery of power supply bills, heavy interest commitment on loans, locking up of funds in inventory not required immediately and heavy capital expenditure without adequate returns. It was observed in audit that dependence on borrowed funds increased to ₹ 2234.26 crore during 2009-10 as compared to ₹ 1940.39 crore during 2008-09. This entailed interest burden of ₹ 784.64 crore during review period ultimately increasing the operating cost of the Board. Therefore, there is an urgent need to optimise internal resource generation by enhancing the PLF to national level and vigorous pursuance of outstanding dues relating to subsidy. This would have enabled increased availability of funds to the extent of ₹ 174.21 crore.

As per the Generation Regulations issued by the HPERC, power generating stations have to maintain spares equivalent to 40 *per cent* of one month repair and maintenance expenses. Accordingly, the value of spares to be maintained by the Board worked out to ₹ 0.22 crore, against which the Generation Wing held a stock of spares valuing ₹ 2.51 crore at the end of March 2010 resulting in holding of spares in excess of norms by ₹ 2.29 crore. This further resulted in locking up of borrowed funds and corresponding loss of interest (at 12 *per cent*) of ₹ 0.27 crore for one year alone.

The Government stated (September 2010) that the spares include mandatory spares provided by the original manufacturers. The reply is not correct as the mandatory spares stand already capitalized and are not included in the above mentioned stock.

Avoidable interest burden

2.1.40 A loan of ₹ 20 crore was got sanctioned (June 2003) from the PFC for the renovation of Bassi Power Generating Station. As per condition No.10 of the sanction, interest was to be paid at the rate prevailing on the date of each disbursement. The completion date of work was December 2005 and closing date of drawal of loan was June 2006. The rate of interest in the sanction was quoted at 10 *per cent per annum*. The Board awarded the work in August 2007 and on its request (December 2007), the PFC extended (February 2008) the date of drawal of loan with interest rate of 10.9 *per cent*. The Board actually availed (February 2008 onwards) the loan of ₹ 12.85 crore at varying rates of interest ranging between 11.5 and 13.75 *per cent*. This would result in extra payment of interest of ₹ 1.18 crore during the moratorium and loan repayment period of 10 years.

The Government stated (September 2010) that due to inflation and additional scope of items, the expenditure for execution of scheme has exceeded the financial limit. The reply does not address the issue of the extra payment of interest due to delay in award of work.

2.1.41 The REC sanctioned (January 2004) a loan of ₹ 32.15 crore for the construction of Ghanvi Phase II project at interest rate of 10.5 *per cent per annum*. Rebate of 0.5 *per cent* was available on successful completion of the

scheme within the time schedule (three years). We observed that due to delay of one year in award of works after sanction of loan, slow progress of civil works and further delay in award of work for electro-mechanical equipment resulted in non-completion of the project within the agreed time schedule for drawal of loan (January 2008). Thus, the Board was deprived of the benefit of rebate of ₹ 0.69 crore on interest during moratorium and loan repayment period of 10 years.

Due to slow pace of work, the Board could avail a loan of ₹ 20.81 crore up to March 2009 which included ₹ 5.29 crore availed after the proposed date (March 2008) of completion. Because of variable rate of interest, REC charged interest at the rate of 14.5 *per cent* on this amount instead of at the highest rate of 12.25 *per cent* applicable during the stipulated completion period. Thus, there would be extra payment of interest of ₹ 0.55 crore till the repayment of loan in 10 years.

The Government stated (September 2010) that the delay in completion was mainly due to flash floods during July 2005, strike by the labour (May, June 2008 and September 2008 to March 2009) for non release of wages by contractor and agitation by the local villagers demanding compensation for damages to their houses due to blasting. The reply is not based on facts as most of the works were awarded after the flash floods and the strike took place much after the scheduled period for the drawal of loan (January 2008). Moreover, the Board was not liable to pay compensation to the villagers for damages done by the contractor.

Short availing of subsidy

2.1.42 The GOI, Ministry of Non-conventional Energy Sources, formulated (1993) an incentive policy to encourage the hydro power generation as a non-conventional energy source. As per policy, subsidy was available from the GOI to the Board for this purpose. The subsidy sanctioned by the GOI and amount of subsidy actually received by the Board for the execution of its various projects up to March 2010 are given in **Annexure 12**.

Scrutiny of records revealed that the Board had not claimed the balance subsidy of ₹ 10.91 crore from the GOI so far (March 2010). According to the Finance and Accounts wing of the Board, the execution of Bhaba Augmentation project (revised scheme for 4.5MW) was not considered due to financial crisis but the Project wing of the Board got the project approved on the grounds that as per new policy additional subsidy of ₹ 4.75 crore would be available. The Board had, however, not taken any action to get the subsidy enhanced from GOI. This was indicative of lack of monitoring at Board's level.

The Government stated (September 2010) that the subsidy in respect of Ghanvi Phase-II amounting to ₹ 8.44 crore was received, subsidy claims in respect of Bhaba and Khauli stand submitted to the GOI and subsidy claim in respect of Gumma is being submitted. However, Board was unable to produce any detail in support of receipt of subsidy of ₹ 8.44 crore for Ghanvi Phase-II project.

Tariff Fixation

2.1.43 The Board is required to file the application for approval of Tariff for each year 120 days before the commencement of the respective year or such other date as may be directed by the HPERC. The Commission accepts the application filed by the Board with such modifications /conditions as may be deemed just and appropriate after considering all suggestions and objections from public and other stakeholders, issue an order containing targets for controllable items and tariffs for the year within 120 days of the receipt of the application. The Commission also issued directives to improve the efficiency of generating units, reduce the generation cost, optimum utilisation of design potential, dispense with the operation of unproductive assets and un-viable projects, *etc.* Any financial loss on account of underperformance is not passed on to be recovered through tariffs.

We noticed that due to non/short capitalisation of expenditure and failure of the Board to justify the higher cost of various projects the Board failed to recover ₹ 44.06 crore through tariff during review period as discussed in the succeeding paragraphs:

Non/short claims

2.1.43.1 As per Generation Regulations issued by the CERC (March 2004) and HPERC (October 2007) for filing of tariff petition depreciation shall be chargeable from the first year of operation. In case of operation of the asset for part of the year, depreciation shall be charged on *pro rata* basis. We observed that the 1st unit of the Larji power generating station was commissioned during September 2006. The civil and mechanical components costing ₹ 768 crore were put to use for generation of 177.85 MUs during 2006-07. Board while filing tariff petition for the year 2007-08 had not claimed *pro rata* depreciation amounting ₹ 9.87 crore as true-up expenses for the year 2006-07. The same has not been claimed by the Board so far (March 2010).

2.1.43.2 Bhaba Augmentation Scheme, envisaged to increase the water availability for Bhaba project (120 MW) during the lean period by diverting the water of Shango khad, through a tunnel. The tunnel was completed in May 2002 at a cost of ₹ 14.03 crore and was put to use. However, this expenditure has not been capitalised so far. As such, depreciation to the extent of ₹ 1.80 crore up to March 2010 could not be claimed through the tariff during the period covered under review. The Board agreed (September 2010) to capitalise the same now.

2.1.43.3 In the following cases, benefit of depreciation of ₹ 32.39 crore could not be availed through tariff either due to capital cost disallowed by HPERC or expenses non/short claimed by the Board:

(₹ in crore)

Sl. No.	Name of project	Amount of depreciation	Capital cost disallowed/expenses short claimed
1	Larji	21.09	Capital cost of ₹ 273.60 crore was not allowed by the HPERC in the absence of documentary evidence in support thereof.
2	Khauli	4.38	Cost of ₹ 56.99 crore was disallowed by HPERC.
3	Bhaba and Ghanvi Phase-I	0.91	Expenditure of ₹ 11.86 crore on capital maintenance not claimed through tariff petitions.
4	Bassi	1.70	Renovation expenses of ₹ 33.02 crore were short claimed.
5	Six projects [♣]	4.31	Capital cost of ₹ 83.93 crore disallowed by HPERC due to difference in cost in the books of generation and accounts wing.
	Total	32.39	

The Government stated (September 2010) that the cost of renovation work of Power Generating Station at Bassi amounting to ₹ 109.98 crore consists of electromechanical works of ₹ 71.38 crore exclusive of taxes, civil works employee cost, IDC and misc. expenses. Therefore, question of short claim amounting to ₹ 33.02 crore does not arise. In respect of Sr. No. 5, the Board stated that no such depreciation amounting to ₹ 4.31 crore was disallowed by the HPERC. The reply is not convincing as all the expenses excluded from the claim in respect of Sr. No. 4 are of capital nature. Reply in respect of Sr. No. 5 is also not based on facts as the HPERC in its tariff order directed the Board not to capitalise this difference of cost in future.

Non-recovery of interest during construction (IDC) through tariff

2.1.43.4 Regulation 28 of the Generation Tariff Regulations (October 2007) formulated by the HPERC provides that in case of non-commissioning of project as set out in the first approval of the State Government or the techno-economic clearance of the authority, as applicable, IDC for the period of delay shall not be allowed to be capitalised for determination of tariff, unless the delay is on account of natural calamities or geological surprises. We observed that in case of Ghanvi Ph-II and Bhaba Augmentation projects (BAP), the delay in execution was due to ill planning and non-synchronisation of construction activities. As such, an amount of ₹ 17.03 crore on account of IDC for 2005-10 (Ghanvi 2007-08 onwards and BAP 2005-06 onwards) did not qualify for tariff determination and is likely to be excluded from the capital cost by the HPERC.

♣ Giri, Bhaba, Thiro, Gaj, Baner and Ghanvi Ph-I.

The reasons for delay in completion of projects were indicative of deficient monitoring by the Board.

The Government stated (September 2010) that the delay was due to natural calamities and geological surprises. The reply is not based on facts as no such reason in respect of Ghanvi Ph-II was mentioned in the reply furnished against para 2.1.41 *supra* and reasons for delay in BAP were delay in award of work and execution of agreement (Refer para 2.1.18 *supra*)

Environment Issues

The Board failed to register its five projects of 166.50 MW capacity for sale of CER credits.

2.1.44 To minimise the adverse impact on the environment, the GOI had enacted various Acts and statutes. At the State level, Himachal Pradesh State Pollution Control Board (SPCB) is the regulating agency to ensure compliance with the provisions of these Acts and statutes. Ministry of Environment and Forests (MoE&F), GOI and Central Pollution Control Board (CPCB) are also vested with powers under various statutes.

Audit scrutiny relating to compliance with the provisions of various environmental statutes/instructions revealed the following:

Kyoto protocol was signed by the developed and developing countries to save the environment and to curtail the emission of green house gases. Hydro Power is a non-polluting renewable source of energy and by generating through hydro projects pollution can be reduced which otherwise had to be generated through Thermal and Nuclear power projects. As per provisions contained in Kyoto Protocol the owner of the Hydro Project is entitled to sell the Carbon Emission Reduction (CER) Credits. Since the CER credits are invisible and intangible, their existence needs to be established and verified by Clean Development Mechanism (CDM) Board. Once quantified CER credits have their financial value and can be sold to generate finances for the owner of the project. For sale of CER, registration of the project is required as a CDM project with United Nations Framework Convention on Climate Change (UNFCCC). The power plants that commenced operations on or after 1 January 2000 are eligible for registration by submitting the request with Designated National Authority (DNA), which is the MoE&F. We observed that the Board did not take any initiative for registration of its five plants having installed capacity of 166.50 MW, which commenced operation after the cut off date i.e. after 1.1.2000 for sale of CER credits. The Government stated (September 2010) that necessary agreement was executed with Energy Infratec, Gurgaon for availing the consultancy services for carbon credits in respect of Ghanvi Ph-II and BAP.

MIS data and monitoring of service parameters

2.1.45 Board plays an important role in the economy of the State. For such a big organisation to succeed in operating economically, efficiently and effectively, there should be documented management system of operations,

service standards and targets. Further, there has to be a Management Information System (MIS) to report on achievement of targets and norms. The achievements need to be reviewed to address deficiencies and also to set targets for subsequent years. The targets should generally be such the achievement of which would make an organisation self-reliant. Review of the system existing in this regard revealed the following:

- The Board set the targets for generation but the basis for the same were not available on record.
- The Board did not develop a system with the help of specialised organisations to predict water availability in forthcoming seasons to ensure fixation of realistic targets.
- The Board had not developed an MIS system to compile data in respect of total hours available, operated hours, planned outage and plant availability in respect of small hydro projects.
- The Board did not develop any system to periodically review the overall performance of project generation and related problems, monitoring of plant-wise availability factor for peak and lean seasons separately and to re-assess the power potential of various projects despite the HPERC direction of November 2008.
- The tariff petition was filed incomplete and belatedly by Board with the HPERC.
- There exists no mechanism to review the operational performance of each generating unit from time to time at Board's level so as to initiate timely action to improve efficiency of the projects.

The Government stated (September 2010) that the Standard of performance regulations devised by the HPERC is already implemented. Further, under the restructured APDRP, a centralized system is being implemented at central level at data centre, centralized data will be managed and MIS will be available at all level after implementation. As regards the review of overall performance of generation projects and related problems the Board stated that a high level committee had been constituted and two meetings had already been held.

Conclusion

The projects of the Board were not completed in time resulting in time and cost overrun. Most of the Power Generating Station were operated at low PLF and low capacity utilisation. Delay in receipt of subsidy claims from Govt. agencies was noticed resulting in non-utilisation of available financial resources to the optimum level. Filing of Tariff Petitions on unrealistic and incomplete data also resulted in widening of revenue gap. Proper MIS did not exist in the Board to evaluate the execution of projects and operational performance of power houses.

Recommendations

- **Timely completion of the ongoing projects should be ensured to avoid time and cost overruns.**
- **Reasons for low plant load factor and low availability of machines need to be addressed immediately when noticed.**
- **Generation targets are required to be fixed on the basis of realistic data.**
- **Optimum utilisation of available resources through efficient funds management needs to be ensured.**
- **Complete filing of Tariff Petitions is required to be ensured to avoid accumulation of revenue gap.**
- **Development of MIS to compile and collate data on crucial parameters needs attention.**

2.2 Information Technology Audit of Loan Monitoring System in Himachal Pradesh Financial Corporation

Executive Summary

Himachal Pradesh Financial Corporation provides term loans to small and medium scale industries. The Corporation has sanctioned loan of ₹727 crore to 4,518 units since its inception up to 31 March 2010. The Information Technology review was conducted to assess the performance of the Computerised Loan Accounting System implemented in the Corporation.

Objectives of computerisation

The integrated system was developed for facilitating automatic flow of transaction data from financial accounting system to loan accounting system, generation of loan ledgers and related reports.

Non-achievement of Objectives

System is not being used for generating loan accounting ledgers and other related reports as these outputs does not depict correct balances. Besides the system is not able to calculate interest automatically. Resultantly, the loan ledgers have to be maintained manually.

General Controls

The Corporation has not framed any IT policy for IT security, passwords, segregation of duties, etc. which lead to inadequate physical access and environmental controls, inadequate network security controls and inadequate logical access controls. There is no system for online backups.

Application Controls Accounts Module

The system is redundant with inadequate input and processing controls leading to

incomplete and vague data.

Voucher Module

The system does not assign voucher number in seriatim for the complete financial year. Further, there is no provision to generate receipts by the system. Hence, receipts are being issued manually. Inadequate controls have led to acceptance of duplicate receipt numbers.

Output controls

Management Information System missing

The computers installed at management level, are not linked with loan monitoring system.

Conclusion and recommendations

The utility of application is restricted to calculate interest and generation of demand notices only. The inaccurate, incomplete and erroneous data has rendered the system useless for generation of annual returns and for effective MIS. The Corporation should get the lacunae in the system removed to facilitate generation of loan accounting ledgers. The data may be captured fully so that reports produced by the system are useful for MIS, for reports annexed to Balance Sheet and for other reporting. To ensure business continuity, online backup system should be in place. As per quality policy, the Corporation may provide online information to the customers, whereby customers can know their loan status on web.

Introduction

2.2.1 Himachal Pradesh Financial Corporation (Corporation) was established in April 1967 with the main objective of promoting industrial growth in the State by providing term loans to small and medium scale industries. The affairs of the Corporation are managed by the Board of Directors consisting of nine Directors including the Chairman and the Managing Director. The Corporation's headquarters is in Shimla and branch offices at Nahan,

Dharamshala, Mandi and Jharmajri. The Corporation has sanctioned loan of ₹ 727 crore to 4,518 units since its inception up to 31 March 2010.

The Information Technology (IT) activities in the Corporation commenced in 1989 with installation of 10 computers and development of a loan accounting software in 1992. It was finally implemented in January 1996 on a server with 16 nodes. For complete computerization, client server technology with relational data base software was got developed in 2003 with Oracle as backend and Visual Basic as frontend. For its implementation, the Corporation purchased off the shelf software and hardware in April 2004 at a total cost of ₹ 9.72 lakh. The Corporation has incurred an expenditure of ₹ 14.50 lakh on re-writing of software and purchase of hardware between June 1999 and implementation of the application in 2007, against the approved expenditure of ₹ 28.00 lakh. At present the Corporation has IT assets of ₹ 20.57 lakh which comprise of 41 computer systems, out of which 9 systems are being used for loan accounting system.

Scope and Methodology of Audit

2.2.2 The integrated system comprises of Financial Accounting, Loan Accounting and Pay Roll. The present IT review conducted during June to August 2010 covers the performance of the Loan Accounting System. The review mainly deals with Planning, Implementation of the Project, Financial Management, Operational Performance, and Monitoring by Top Management. The audit examination involved analysis of output by the system, scrutiny of complete data and scrutiny of data relating to select cases (by random selection) with reference to manual records maintained at the Head Office.

The methodology adopted for attaining the audit objectives consisted of explaining audit objectives to management, scrutiny of data, interaction with the auditee personnel, analysis of data with reference to audit criteria, raising of audit queries, discussions of audit findings with the management and issue of draft review to the management for comments.

The database as at the end of June 2010 was analysed using Computer Aided Audit Tools – Interactive Data Extraction and Analysis (IDEA) for examining the completeness, availability and integrity of the data. The existence and adequacy of general IT controls was also assessed. Further, findings in respect of cases selected through statistical sampling were cross checked with source documents/ manual records.

Audit objectives

2.2.3 The objectives of the information technology audit were to assess whether:

- ◆ the implementation of the system was preceded by a systematic planning and adequate assessment of operational requirements and needs;

- ◆ proper input, validation and process control existed in the system to ensure that the data captured was authentic, reliable, complete and accurate;
- ◆ data generated follows the business rules of the Corporation; and
- ◆ the system resources viz. hardware and software are procured timely and in a cost effective manner and utilised optimally.

Audit criteria

2.2.4 The audit criteria adopted for accessing the achievement of the objectives stated above were:

- ◆ standard procedures regarding planning and implementation of IT projects;
- ◆ procurement of hardware and software with reference to actual implementation of the computerised system;
- ◆ generation of outputs in consonance with business rules of the Corporation and the guidelines of Government and Small Industries Development Bank of India (SIDBI);
- ◆ existence of adequate validation controls in the system and security policy of the Corporation;
- ◆ internal audit procedures and Management Information System (MIS) requirements.

Objectives of development of the system

2.2.5 The new multi-user integrated financial and loan accounting system with relational data base on window platform was designed to replace the financial loan accounting package on Cobol platform, payroll package and loan accounting package developed in dBase IV on Unix platform. The new system was to be developed in such a manner as to facilitate future integration of data and software package. User requirements identified by the Corporation for Loan Accounting System were as under:

- ◆ Calculation and posting of interest as per schedule of repayments;
- ◆ Generation of demand notices on the basis of mercantile basis/ freezed accounts depending upon the nature of case and generation of calculation details;
- ◆ Generation of loan ledger from time to time;
- ◆ To take transaction data from financial accounting package on day to day basis;

- ◆ Generation of transaction receipts and maintenance of shadow accounts i.e. mercantile accounts, freezed accounts, accounts on different rates, simple as well as compounding basis, etc.;
- ◆ Generation of receipt list, due list and default list as per requirement;
- ◆ Generation of list/grouping of loan balances for balance sheet/ annual closing depending upon the classification of loan accounts and generation of standard certificates such as interest charged, etc.;
- ◆ Accounts statements from day to day basis; and
- ◆ Audit trail/ security of accounts/reconciliation statements.

Audit findings

2.2.6 The audit findings are given in the succeeding paragraphs.

Absence of Corporate Policy on implementation of IT

2.2.7 The Corporation has not formulated and documented an IT Policy so far. Policy has also not been framed for IT security, passwords, segregation of duties, etc. This has led to serious shortcomings as discussed in succeeding paragraphs.

Undue delay in implementation

2.2.8 The Board of Directors approved the proposal for purchase of additional hardware and to develop multi-user integrated packages for computerisation of financial and loan accounting in 1999 with total cost of approximately ₹ 28.00 lakh. The work was awarded (September 2003) to M/s OST Electronics Limited, Chandigarh on the basis of the lowest bid of ₹ 1.48 lakh. As per work order, software was to be implemented from April 2004. First payment of 10 per cent of contract value amounting to ₹ 14,800 was made in November 2003 and final payment was released to the firm in October 2007. It was found in audit that final implementation report was submitted by the firm in July 2007. Thus, there was considerable delay of 39 months in implementation of the project.

There was considerable delay of 39 months in implementation of the multi-user integrated packages.

Completeness of the system

Non-achievement of objectives

2.2.9 It was noticed in audit that the objectives of development of the system could not be achieved. Following shortcomings were noticed in the desired output of the system *vis-a-vis* planning.

- ◆ The system is not able to calculate and post interest automatically. For generating each demand notice, opening balance is to be fed in the computer, taking the figure from ledgers maintained manually.

- ◆ The loan ledgers generated by the system does not depict correct balances. Resultantly, the loan ledgers have to be maintained manually. As such basic purpose of computerisation of loan accounting was defeated.
- ◆ Though the system generates receipt list, due list and default list, it is not generating correct figures.
- ◆ It is mandatory for State Financial Corporations to classify the accounts as per Guidelines on Asset Classification and Provisioning issued by SIDBI. The system is unable to generate correct reports for list/grouping of loan balances.
- ◆ System is able to generate statement of account, party-wise, district-wise, however, generated figures are not correct and do not match with manual record.
- ◆ Statistical reports viz. Constitution wise report, Arrear report, *etc.* generated by the system do not depict correct figures.

Thus, the Management could not utilise the developed system to its full extent, as it failed to get the flaws in the system removed for its proper functioning.

System Integrity

General Controls

Review of general controls revealed the following:

Physical Access and Environmental Controls

2.2.10 The server is kept in a room which is occupied by a non-IT Manager. There is no security to restrict physical access to the server. The room is paneled with fire susceptible materials and the server is not protected in fire proof cabinet. Fire extinguishing devices have also not been provided in the room. Further, only one server is installed which may result in disruption of business on crash of the system.

Inadequate Network Security Controls

2.2.11 The Loan Accounting System is installed on a server with eight terminals interconnected through a Local Area Network (LAN). It was noticed that terminals have no firewall and their USB ports were not disabled. A program for installation of various security patches issued by the makers of the operating system was not established. No Anti-Virus has been installed making the system vulnerable to attack of viruses/malicious programs. The system went down at least once during the currency of audit due to virus attack. Since logs regarding mal-functioning of the system has not been maintained, number of failures of the system could not be vouched in audit.

Logical Access Controls

2.2.12 Logical access controls protect the programmes and data files from unauthorized access, modification, copying and deletion. There is no documented and approved policy statement comprehensively covering all aspects of logical security. The users module of the application has provision to capture information like, user ID, Login ID, user name, designation, office address, home address, e-mail address, phone numbers, etc. Login IDs of 18 users were on record. Following shortcomings were noticed:

There is no documented and approved policy statement comprehensively covering all aspects of logical security so as to protect the programmes and data files from unauthorised access.

- ◆ Complete details were not captured in all the records except one.
- ◆ During currency of audit, it was found that two officials, not having own login IDs, were operating the system using others IDs.
- ◆ Six users had never worked in the Corporation and four users had left the Corporation. One user had been internally transferred to other unit. Thus, 11 unauthorised users having access to the system were detected. It was further noticed that these users enjoyed most of the rights to add, modify or delete data.
- ◆ One ID is of ADMIN, but in segregation of duties as to who shall use this ID has not been documented.
- ◆ The rights to create or remove users have not been defined.

Thus, security aspects have not been properly attended to while implementing the system. The Management in its reply stated (September 2010) that there exists login IDs of developers and testers and that their passwords stand expired automatically with the passage of time. On being pointed out in Audit the Corporation got the rights amended from the system developer.

Audit trail not provided

2.2.13 Adequate audit trails are required to be incorporated in the IT system for detecting security violations and tracing the flow of transactions and analysis of all incidents. It was noticed in audit that no such module was incorporated in the system whereby an administrator could trace the flow of transactions.

There is no system in place for taking online backups or mirror imaging in the server so as to avoid disruption of business due to crash of the system.

Business continuity and Disaster Recovery Plan

2.2.14 The Corporation does not have a documented business continuity and disaster recovery plan. Weekly back ups on CDs are kept in a bank locker. Since it is a mission critical system, crash of the system would result in disruption of business and consequent loss to the Corporation.

Application controls

Input and processing controls

2.2.15 A review of input and processing controls in various modules revealed the following:

Accounts modules

2.2.16 The Accounts Modules in the application deal with input of Accounts in the System. It has provision for capturing the name of the employee adding and approving the record and date and time of addition and approval as per ID of the employee logged in. Also, there is provision for capturing two addresses, post office, city, tehsil, district code and station of the accountee. Audit analysis revealed the following deficiencies:

Incomplete and vague data

2.2.17 It was noticed that there were no controls in the system to ensure that all the mandatory data is captured as substantiated by the following findings:

Lack of controls in the system to ensure that all the mandatory data is captured.

- ◆ Out of a total 32,742 records, in 28,530 cases the name of employee entering the record was not captured resulting in absence of audit trail as to who had entered the data into the account. It was further seen that information in fields like approved by, approved on date, *etc.*, were not captured by the system which shows applications deficiency to that extent. In 8,572 records date of adding the record was blank.
- ◆ No provision has been made for capturing vital information like telephone numbers and e-mail addresses of the accounts holder.
- ◆ In 14,500 records the addresses were not captured and in 4,746 cases out of 18,242 records where these were captured, they contained “-“ i.e. dashes, in 105 cases it contained “..” and in 16 cases it contained ‘,’ i.e. comma. Similarly, the details of Station (16,851 records), post office (9,981 records) and City details (10,200 records) had not been captured.

Since addresses of loanees have not been captured properly, computerised record will be of no help in case of loss of manual record due to any disaster. Also, segregation/ compilation of data with reference to city, tehsil, post office, station, *etc.*, is not possible for MIS.

Further, non-incorporation of fields for telephone number, fax number, pin code and e-mail addresses of the loanees, is a serious shortcoming in the application. Due to non-capturing of these data the computerised information is of no use for serving of recovery notices, recovery and follow-up process.

Further, capturing whole addresses in one column only is indicative of the fact that necessary validation checks have not been incorporated in the application relating to filling of data, resulting in inputting of unorganised data.

2.2.18 At feeding stage, “Loan Account Detail screen” is unable to generate figures for the opening amount of principal, interest, miscellaneous, total amount and credit or debit position.

The Management in its reply stated (September 2010) that the records showing no audit trails might be in respect of the records which were added to system during development and is not application deficiency. Reply is not tenable as the data pertained to the year 2003 and thereafter.

Voucher modules

2.2.19 The voucher capturing modules in the application deals with input of vouchers in the System, which again has provision for capturing the names of the employee adding, approving and modifying the record, date and time of addition, approval or modification as per ID of the employee logged in. There were 97,519 records pertaining to voucher feeding. Audit analysis revealed the following deficiencies:

Inadequate audit trail

2.2.20 System creates two types of voucher numbers i.e. temporary number and permanent number. While printing voucher for approval, a temporary voucher number is generated by the system. The voucher is then sent for approval to AGM Accounts. On approval the system generates a permanent voucher number which does not appear on the voucher and voucher numbers are assigned manually by the Accounts wing which is different from the number generated by the system. Thus, the very purpose of generating the number by the system was defeated and audit trail was not possible.

Inability to generate unique voucher number

2.2.21 The system does not assign voucher number in *seriatim* for the complete financial year. The same voucher number is generated for each day. A test check revealed that in May 2010 voucher number five was generated twenty times.

2.2.22 Application deficiencies

- ◆ Since same voucher number is repeated each day hence it is not possible to retrieve a voucher through application by voucher number alone. One has to feed the voucher date to retrieve particular voucher.
- ◆ System was unable to capture voucher feeding time, though a provision was made in the system to capture the same.
- ◆ There is no provision to generate receipts by the system. Hence, receipts are being issued manually.

2.2.23 Deficiency in system for approval of vouchers

In most of the cases ID of the persons adding, approving or modifying the data were either missing or inoperative.

- ◆ In 17,592 records entered between March 2004 and October 2006, details of persons adding, approving or modifying the data were missing. This indicates that either the data was captured at backend, or the controls in capturing the ID of persons entering the data were not operative.
- ◆ In 96,933 records i.e. 99.39 per cent of the total records, the details of dates and officials adding data were not captured. Out of these records, the details of person approving the voucher were captured in 79,341 records. Thus, it is evident that the system accepts the data at approval levels also. Further, it was also noticed that out of these 79,341 vouchers, a total of 66,867 vouchers were approved by cashiers only, either with their own ID or with the ID of ADMIN.

Absence of controls and data validation

2.2.24 It was noticed that there were no controls in the system to ensure that all the mandatory data is captured and validated at feeding stage. This led to accumulation of incomplete and inconsistent data, as would be evident from the following:

Out of 50,945 records cheque number and cheque dates were also not captured in 36,899 records involving total transaction of ₹ 1740.35 crore.

- ◆ In 459 records involving ₹ 34.32 crore, vouchers were prepared and credit given to the loanees even when cheques were of subsequent dates ranging between 1 and 751 days. Similarly, in 219 records of ₹ 57.63 lakh, cash receipts were shown issued after the date of voucher. The difference in dates ranged between 1 and 61 days. This is indicative of the fact that post dated cheques are being accepted and the cash receipts are being issued in advance.
- ◆ In 10,694 records, the receipt dates were available but receipt numbers were not captured. In absence of receipt numbers these transactions could not be vouched in audit.
- ◆ In 44 cases the narration contains the wording “By Cash”, for which receipt numbers and dates, were missing.
- ◆ The module has a provision for capturing details like cheque number and date, cheque time, issue branch, drawee branch, whether cheque or demand draft, issue station, drawee station, etc. In 50,945 records where payments were received by cheques or demand drafts, the details of banks were not available except in one record. Out of above in 36,899 records, for total transaction of ₹ 1740.35 crore, cheque number and cheque dates were also not captured.

- ◆ There were cases of non-capturing of complete narrations of the parties (55 records), voucher drawing time though a field has been created for this purpose,
- ◆ Receipt number were also found entered as “0”, “12328 TO 1”, “12,335,336”; “13070/71”, “13624-25”, “17494” and “0.017598”. Similarly, Cheque numbers were found entered like 093150.00, 188297-089, and 987968-7-.
- ◆ In 110 records, same person modified the vouchers who had added the voucher.

In 38 records/vouchers having total transactions of ₹ 10.76 lakh, same receipt numbers were captured with different dates which may result in misappropriation of revenue.

Duplicate receipt numbers on different dates

2.2.25 On receipt of cash, a cash receipt is issued manually which should have a unique number. Receipt number is supposed to be fed in each voucher. In 38 records/vouchers having total transactions of ₹ 10.76 lakh, same receipt numbers were captured with different dates. With the existence of same receipt numbers of different dates, misappropriation of revenue cannot be ruled out.

Missing receipt numbers

2.2.26 An analysis of data revealed that 1,557 receipts of different numbers were missing in data. A test check carried out to ascertain the reasons for missing receipt numbers, revealed that money was actually accounted for in cash book maintained manually and the receipts numbers were not fed in the system. Allowing accounting of cash without receipt number may lead to leakage of revenue and misappropriation of funds.

Same cheque numbers were having different cheque issue dates in 1,049 records involving transactions of ₹ 40.94 crore.

Duplicate cheque numbers having different issue dates

2.2.27 In 1,049 records involving transactions of ₹ 40.94 crore same cheque numbers were having different cheque issue dates. With the existence of same cheque numbers with different dates misappropriation of revenue cannot be ruled out.

Borrowers & Security Modules

2.2.28 The Borrowers and Security Modules in the application deals with input of details regarding Borrowers and related security obtained. Following shortcomings were noticed:

Gaps in data

2.2.29 The system is supposed to generate serial number for each borrower. It was noticed that there is gap in generation/ existence of this number at 96 places. It indicates that either the serial numbers are not being generated systematically by the application, or deletion is allowed from the master data which is not acceptable.

2.2.30 There is provision for capturing Designation in the Module which has no details in any of the records. Thus, planning and designing of module was not effective leading to existence of vague fields in the files.

2.2.31 Security module has just 945 records against 2,767 recorded loan cases in Borrowers Module. It indicates that details of securities regarding all the loanees is not captured which may lead to loss to the Corporation if at any time it has to rely only on computerised data. It was also noticed that, in 22 records, nature of security was not mentioned, while address of security, Guarantor was missing in all the cases. Against, name of guarantor, records contained particulars like vehicle or building. Thus, data captured is vague.

Insurance Module

2.2.32 The Insurance Module deals with input of insurance details in respect of taken over assets. It was noticed that there were no controls in the system to ensure completeness and validation, as substantiated by the following findings:

- ◆ There is no provision to guide the data entry operator regarding figures in which insurance amount is to be filled in. In 125 records figures for insurance amount captured is less than four digits (e.g. 1,636), that is presumably in lakhs or crores, while in 45 records figures are in 8 digits, presumably in rupees.
- ◆ In 9 records the date of insurance was after the date of downloading of data.
- ◆ Though insurance is a time specific matter, in none of the records, insurance time was captured.
- ◆ There is no provision for capturing policy number.
- ◆ In 65 cases day on which insurance was made happened to be Sunday which is a closed holiday.

Since Insurance Master file is not complete and contains vague data, it cannot be used for effective MIS and can lead to loss to the Corporation as timely steps to get insurance cannot be taken.

Loan and segmentation modules

2.2.33 The loan module facilitates capturing of details regarding amount of loan, sanctioning authority, type of repayment viz. half yearly, quarterly, *etc.*, date and time of agreement, sanctioning, decree, suite filling, *etc.* There is also provision for capturing segmentation details regarding sector type viz. tiny, *etc.*; constitution type viz. cooperatives, partnership firm, *etc.*; client type viz. service, SSI, *etc.*; loan purpose viz. diversification, modernisation, *etc.*;

industry segment viz. Chemicals, Food Manufacturing, *etc.* The data analysis revealed the following:

Incomplete and inconsistent data

2.2.34 It was noticed that there were no control in the system to ensure that all the mandatory data is captured and validated at feeding stage, as substantiated by the following findings:

There were no control in the system to ensure that all the mandatory data is captured and validated at feeding stage.

- ◆ In two records agreement dates were 10-01-9197, 21-09-9200 which shows there were no input validations checks.
- ◆ Logically date of sanction cannot be after date of agreement. In 287 records date of sanction was after date of agreement, the difference ranging from 1 day to 8,633 days.
- ◆ Against sanctioning authority, the data contained dates, absurd alphabets or figures.
- ◆ In just six records dates regarding decree, suit filing, *etc.* were captured. Out of these in two records, date of agreement was same as date of decree and date of filling suite which is not logically possible.
- ◆ All the segmentation modules contained a vague code 0 which stood for “Not to Del”. Out of 3,952 records in data, 0 code was captured in 2,569 records against sector code, in 2,550 records against constitution code, in 2,570 records against client code, in 3,445 records against loan purpose code, in 1,933 records against industry segment. Thus, segmentation details were missing in data, resulting in inability of the system to produce reliable desired reports.

Incorrect data

2.2.35 Segmentation details of loanees viz. client type, loan purpose code, *etc.* in the data did not tally with manual records in number of cases test checked.

Interest Modules

2.2.36 The modules for interest rates, repayment schedules, *etc.* has provision for capturing name of the employee adding, approving or modifying the record, interest rates, date of effectiveness of particular rate, repayment schedule, *etc.* Data analysis of a total of 4,312 records revealed the following:

Systems inability to capture login IDs

2.2.37 The system fails to capture the name of official adding, approving or modifying the record.

Incomplete and vague data

2.2.38 It was noticed that there were no controls in the system to ensure that all the mandatory data is captured and validated as substantiated by the following findings:

- ◆ In 131 records rate of interest were 0. Data contained logically incorrect date of effectiveness of rate of interest such as 1/11/1900, 10/3/2024, 31/12/9999 and in 5 records rates of interest were vague such as 0.1,0.5,1.03,1.3.
- ◆ While capturing repayment schedule same person added approved and modified the record.
- ◆ A test check of selected cases with respect to manual record revealed that in two cases penal interest and in one case rebate rate did not match.
- ◆ Balance figures in repayment schedule modules did not match with manual record.
- ◆ Interest tax was withdrawn w.e.f. 1st April, 2000. However, in 37 records where date of effectiveness of interest rate was after this date, interest tax rate was captured in the range between 0.5 and 9 per cent.

Output controls

Management Information System missing

2.2.39 The computers installed with management level, are not linked with loan monitoring system. The system is not installed at branch offices and hence not linked with head office. Thus, the Corporation has failed to develop the MIS features in the system.

Non-fulfillment of quality policy of the organisation

2.2.40 As per quality policy issued in July 2007, the Corporation shall strive to achieve excellence in all its operations by improving the systems and their effectiveness, developing and upgrading human resources, utilising efficiencies of Information Technology, adopting a proactive approach in anticipating customer needs and expectations and providing higher degree of customer satisfaction. The Corporation could not fulfill the following objectives of the quality policy:

- ◆ it has failed to maintain computerised loan accounting ledgers so as to avoid human errors in computation and posting, and
- ◆ it has failed to provide facility for online information of loan status on web to its customers.

Conclusion

Multi user integrated package for computerisation was installed for complete computerisation of the organisation. However, the utility of application is restricted to calculate interest and generation of demand notices only. Most of the records relating to loan accounting are maintained manually. Lack of input validation controls resulted in various irregularities such as acceptance of incorrect, incomplete, inaccurate and unreliable data. In the absence of logical access controls, unauthorised alteration of data could not be ruled out. The inaccurate, incomplete and erroneous data has rendered the system useless for generation of annual returns and for effective MIS. Disaster Recovery System is not adequate as backups are taken in a week's gap.

Recommendations

- ◆ **Though the Corporation is effectively using the system for financial accounting, yet loan accounting part is not fully functional. The Corporation should get the lacunae in the system removed so that the system is able to generate loanee accounting ledgers.**
- ◆ **The data may be captured fully so that reports produced by the system are useful for MIS and for reports annexed in Balance Sheet and for other reporting.**
- ◆ **The Corporation should ensure adequate logical access controls so that the safety and security of data is not compromised. Besides, adequate validation checks should be embedded in the software systems to avoid data manipulations and erroneous data entries.**
- ◆ **To ensure business continuity the Corporation should strengthen the Disaster Recovery System with online backups.**
- ◆ **As per quality policy, the Corporation may provide online information to the customers, whereby customers can know their loan status on web.**