

BEFORE THE KERALA STATE ELECTRICITY REGULATORY COMMISSION

Filing No. /2006

Case No. _____

IN THE MATTER OF: Application for approval of the Aggregate Revenue Requirement and Expected revenue from charges for the year 2007-08

And

IN THE MATTER OF: Kerala State Electricity Board
Vydyuthi Bhavanam, Pattom,
Thiruvananthapuram – 695 004

The petitioner named above respectfully submits as under:

1. This application for approval of the Aggregate Revenue Requirement (ARR) and the Expected Revenue from Charges (ERC) for the year 2007-08 is filed before the Kerala State Electricity Regulatory Commission, (hereinafter referred as Commission), in accordance with the provisions of the Electricity Act, 2003 that came into effect from 10-06-2003.
2. This application has been prepared as per the terms and conditions for determination of tariff under Section 61 of the Electricity Act, 2003 and the terms and conditions of the Kerala State Electricity Commission (Tariff) Regulations issued by the Commission. The relevant provisions of Indian Electricity Act 1910, Electricity (Supply) Act, 1948 and Electricity Regulatory Commission Act, 1998 which are not contradictory to the Electricity Act 2003, were taken into consideration while preparing this petition.

Background

3. The Kerala State Electricity Board, constituted by the Government of Kerala, under the Electricity (Supply) Act, 1948 is in the business of Generation, Transmission and Distribution of electricity and striving to provide quality electricity at affordable cost to all classes of consumers in the state of Kerala.
4. As per section 172 (a) of the Electricity Act 2003, the Government of India and Government of Kerala mutually decided to continue the KSEB as transmission utility and Distribution Licensee for one more year with effect from 10-06-2004 vide GO No (P) No 13/2004/PD dated 10-06-2004. Vide the letter No. 25/11/2004- R&R of Ministry of Power, Government of India dated 08-06-2006 has allowed to continue the same arrangement up to 09-12-2006. Subsequently, Government of India as per letter No. 25/11/2004 - R&R dated 05-12-2006 of Ministry of Power has allowed for the continuation of KSEB as the State Transmission Utility and Distribution Licensee for a further period upto 09-06-2007.

5. Over the last forty-nine years, the Board has grown from a total installed capacity of 111.5 MW to an installed capacity of 2649 MW and created Transmission and Distribution networks of over 10178 and 249832 circuit kilometres respectively. At present, the Board caters to the needs of 83 lakh consumers spread over the urban and rural areas of the State.
6. This incremental growth in the power system brought several changes in the characteristics of the system. The input cost structure and revenue composition have undergone significant changes. Until the recent past, the hydroelectric plants owned by the Board supplied a major portion of the energy requirement of the state. However, after the promulgation of the Forest Conservation Act in 1980, the implementation of new hydroelectric projects had been seriously affected and more costly thermal energy had to be generated / purchased to meet the increasing demand.
7. A major factor affecting the power supply is the drastic variation in monsoon. The deficiency of rain in the catchment areas of the hydel stations during certain years as in 2002-03 and 2003-04 caused increase in generation and purchase of costly thermal energy to meet the demand. During drought years, the worst hit sector is the power sector. As against a hydro-thermal mix of 67:33 in normal rainfall years in the past, the reverse position, i.e., 66 percent thermal and 34 percent hydel energy prevailed in the drought years like 2002-03 and 2003-04 which necessitated the Board to spend additional amount on costly thermal power. But last two years (2004-05 and 2005-06) the State received normal rain fall and this year (2006-07) also the monsoon has been good.
8. Over the years, the consumption of heavily subsidised domestic sector has been increasing and now, it accounts for approximately 45% of the total energy consumed. As a consequence, the peak demand in the state has increased to almost twice the off-peak demand. This forced more investment in the power system to meet the peak demand and purchase of thermal energy from outside the State. But the system remains under-utilised during the off-peak periods.
9. The Board had been supplying electricity at lowest price in the country for several decades and increase in tariff made were lagging behind the cost increases in the past. The budgetary support and subsidies for supplying electricity below the cost of supply in the past was not received in cash from the Government. The Board had to resort to heavy borrowings to meet the expenses. But, at present the Board is able to contain the borrowing and the burden of interest payment.
10. Though the Board was statutorily enjoined to function as a commercial institution, it continued to function mainly with service orientation providing infrastructure facility, reliefs and concessions to other sectors like industry, agriculture and so on. Now it is called upon to perform strictly on commercial considerations.

11. As a combined effect of all the above factors, there was a significant increase in the Board's expenditure and with tariffs not keeping pace with the rising costs, the Board's financial situation had been declining .But now the Board is in the path of financial recovery due to effective steps taken in controlling the expenses and increasing the revenue.
12. The Board has identified the critical issues affecting the Power Sector in the State and has been taking several steps to further reduce the costs and improve the financial health. A brief account of the steps taken to improve the financial health of the Board and to offer better quality supply to the consumers are given in Chapter-2.

Aggregate Revenue Requirement for the year 2006-07 and 2007-08

13. The ARR for the year 2006-07 was submitted to the Commission on 30-11-2005, showing a revenue gap of Rs.302.78 Crore. But, the Commission vide order dated 30-3-2006 had approved a revenue surplus of 184.63 Crore by reducing various expenses and also by over estimating the revenue receipts. Taking into consideration of the progress of expenses, revenue and other activities made so far in the current year 2006-07, the estimates for 2006-07 have been revised and given in this petition for the approval of the Commission.
14. The Commission directed the Board vide letter No. KSERC/ ARR &ERC/ 07-08/06/ 590 dated 10th August 2006, to forward the ARR &ERC for 2007-08 by 30-11-2006.
15. The revised estimates for the year 2006-07 leave a revenue deficit of Rs.230.19 Crore and the estimate for the year 2007-08 accounts for a revenue deficit of Rs.430.11 Crore. The Commission had directed to submit the tariff proposals also along with the ARR. Proposals for bridging the revenue gap involves policy decisions at Government level which needs some more time. The Board is separately writing to the Government proposing /seeking ways to bridge the revenue gap for the year 2007-08. Therefore, the Board is constrained to submit only the ARR & ERC for the year 2007-08. Separate petition proposing ways to bridge the gap with concurrence of the State Government will be submitted to the Commission in due course.
16. Accordingly, the revised estimate of ARR & ERC for the year 2006-07 and estimate of ARR & ERC for the year 2007-08 are submitted as follows:

Revised Estimate for the year 2006-07

		Rs. in Crore
	Description	FY 2006-07
a	Aggregate Revenue Requirement	4268.96
b	Non-tariff Income	329.56
c	Revenue at Current Tariffs	3709.21
d = b + c	Total income	4038.77
e = a – d	Revenue Gap	230.19

Estimate for 2007-08

		Rs. Crore
	Description	FY 2007-08
a	Aggregate Revenue Requirement	4545.02
b	Non-tariff Income	361.84
c	Revenue at Current Tariffs	3753.07
d = b + c	Total income	4114.91
e = a – d	Revenue Gap	430.11

17. It may be noted that, as directed by the State Government and subsequent order of the KSERC dated 5-1-2006, KSEB has been collecting the tariff of domestic and commercial categories of consumers by allowing a rebate in energy charges at 20 paise from January 2006 onwards and the same is continuing. KSEB had a revenue shortfall of Rs.30 Crore during 2005-06 and the expected shortage is Rs.120 Crore during 2006-07. KSERC has directed the Government to pay the shortfall in revenue on account of the above through equal monthly installments. But Government has not released any amount on this account till date. The Commission may direct the Government to release the same or direct the State Government to treat the same as Government subsidy to avoid tariff revision.

Treatment of the Revenue Gap

18. As against the revenue surplus of Rs.184.63 Crore assessed by the Commission for the year 2006-07, the revised estimated revenue gap is Rs.230.19 Crore. It is requested that the Commission may approve the revised estimates and allow the Board to carry over this deficit as regulatory asset.
19. The projected revenue gap for the financial year 2007-08 is Rs.430.11 Crore. This is based on expected revenue of Rs. 4114.91 Crore from the existing tariffs and the aggregate revenue requirement (i.e. all expenses plus ROE) of Rs.4545.02 Crore. As mentioned above, the Board is writing to the Government suggesting ways to bridge the revenue gap for the year 2007-08. Hence the Board may be permitted to submit the proposal for adjustment of the revenue gap after getting the concurrence of the Government of Kerala.

Long Term Issues

20. The Board is in the transitory phase of implementing provisions of the Electricity Act 2003. Some of the future events/contingencies having major financial implications will necessitate revision of the estimates for 2007-08. In view of this, the Board hereby submit before the Commission to allow the following three proposals that affect the Board's financial health and its ability to serve its consumers over a longer period.
- a. Regulatory assets to cover the uncovered revenue gap, if any.
 - b. Year end truing up of costs and revenues of the Board and allowing any unrecovered costs in the subsequent years, thereby, protecting the commercial viability of the Board
 - c. Allow interim petition in the event of contingency.

Prayer

21. The Board requests the Commission that: -
- The accompanying ARR & ERC for 2007-08 containing the revised estimate for 2006-07 and estimate for 2007-08 be approved;
 - The Board be granted permission to submit proposal to bridge the revenue gap after obtaining the decisions of the State Government.
 - Direct the State Government to release the subsidy on account of shortfall in revenue of Rs.30 Crore for 2005-06 and Rs.80 Crore upto November-2006 during the current year on account of the reduction of tariff of 20 paise per unit as directed by the State Government.
 - To allow the revenue gap for 2006-07 as per the revised estimates for 2006-07 projected in this petition and decide the manner of bridging the deficit in excess of the deficit already assessed by the Commission for that year. It is prayed that the Commission may treat the additional deficit either as Regulatory Asset to be absorbed in future tariff or recommend to the Government to pay as subsidy so as to avoid tariff revision.
 - The Board has taken all possible care and caution in projecting the ARR for 2007-08. However, in view of the constraints mentioned above, the Board may be allowed to revise the projections in future, in the event of poor monsoon, abnormal increase in fuel prices and other contingencies that may crop up during the course of implementation of the Electricity Act 2003 and connected regulations.
 - The concept of truing up of Board's costs and revenues at the end of the financial year concerned be accepted and any revenue gap arising out of this truing up exercise be allowed to be recovered through tariffs etc. in the subsequent year and
 - The Board may be allowed to file interim petition in the event of contingency.
22. The Board has made every effort to provide detailed information for computation of the revenue requirement and expected revenue. The Board is continuously updating its management information system, which would enable it to provide improved data / information in the subsequent filings as may be required by the Commission.
23. This application for approval of ARR and ERC for 2007-08 contains the following parts:
- Affidavit verifying the application
 - Aggregate Revenue Requirement and Expected Revenue from Charges for the year 2007-08.
 - Annexures and Data forms.

**BEFORE THE KERALA STATE ELECTRICITY REGULATORY
COMMISSION**

at its office at C.V. Raman Pillai Road, Vellayambalam. Thiruvananthapuram.

FILING NO. /2006

CASE No.

IN THE MATTER OF:

Application for approval of the Aggregate Revenue Requirement (ARR) and approval of the Expected Revenue from Charges (ERC) for the year 2007-08 under section 64 of the Electricity Act 2003

AND

IN THE MATTER OF:

Kerala State Electricity Board, Vydyuthi Bhavanam, Pattom, Thiruvananthapuram

Applicant

Chairman
Kerala State Electricity Board

**AFFIDAVIT VERIFYING THE APPLICATION ACCOMPANYING FILING OF
PROPOSED ARR & ERC:**

I, T.M.Manoharan, S/o Thaniyath Makkunni aged 55 years, residing at Forest Quarters No.2, Vazhuthacaud, Thiruvananthapuram do solemnly affirm and state as follows:

I am the Chairman of the Kerala State Electricity Board, Vydyuthi Bhavanam, Pattom, Thiruvananthapuram, and the petitioner in the above matter and I am duly authorized by the Board to make this affidavit on its behalf. I solemnly affirm at Thiruvananthapuram on this the eleventh day of December 2006 that

- (i). the contents of the above petition are true to my information, knowledge and belief. I believe that no part of it is false and no material has been concealed there from.
- (ii). the statements made in paragraphs of the accompanying application now shown to me are true to my knowledge and are derived from the official records made available to me and are based on information and advice received which I believe to be true and correct.

Deponent

Chairman,
Kerala State Electricity Board,
Vydyuthi Bhavanam, Pattom
Thiruvananthapuram – 695 004

VERIFICATION

I, the above named deponent, solemnly affirm at Thiruvananthapuram on this, the eleventh day of December 2006 that the contents of the affidavit are true to my information, knowledge and belief, that no part of it is false and that no material has been concealed there from.

Deponent

Chairman
Kerala State Electricity Board
Vydyuthi Bhavanam, Pattom
Thiruvananthapuram – 695 004.

Solemnly affirmed and signed before me.

Advocate and Notary

TABLE OF CONTENTS

	Page
1 INTRODUCTION	11
2 PERFORMANCE OF THE BOARD	
2.1 Physical Performance	16
2.2 Efficiency in Power Purchase and Generation	18
2.3 Financial Performance	19
2.4 Measures taken to improve the Consumer Satisfaction	23
2.5 Capital Outlay for Special Schemes	25
3 CAPITAL INVESTMENTS	
3.1 Strategy For Capital Investment During 11 th Plan	26
3.2 Review of Capital Outlay of Projects proposed in 2006 – '07	29
3.3 Capital Outlay for 2007 – '08	31
4 ESTIMATE OF CONSUMPTION OF ENERGY	
4.1 Consumer Profile	35
4.2 Methodology of Assessment of Energy Consumption	37
4.3 Consumption of Energy in 2005 - '06	38
4.4 Consumption of Energy in 2006 – '07	39
4.5 Consumption of Energy in 2007 – '08	40
5 AGGREGATE TECHNICAL & COMMERCIAL (AT & C) Losses	
5.1 Introduction	42
5.2 Transmission and Distribution loss	42
5.3 AT & C Loss Reductions during 2001 – '02 to 2005 – '06	44
5.4 Target of Loss Reduction in 2005 – '06 and 2006 – '07	45
6 REVIEW OF GENERATION AND POWER PURCHASE MADE DURING THE YEAR 2006 – '07	
6.1 Review of Energy Consumption	48
6.2 Review of Hydel Generating Stations of KSEB	49
6.3 Hydel Generation	51
6.4 Power Purchase from Central Generating Stations	51
6.5 Availability of Energy and Variable Cost of Generation of CGS	52
6.6 Scheduling of Generation and Power Purchase in 2006 – 07	53
6.7 Availability of Surplus Power during the year 2006 – '07	53
6.8 Sale of the Surplus Power to other States	55

6.9	Generation and power purchase schedule for the remaining period of the year 2006 – ‘07	56
6.10	Benefit of Sale of Surplus Power	58
6.11	Revised Cost Estimate for 2006 – 07	58
7	AGGREGATE REVENUE REQUIREMENT	
7.1	Estimate of Cost of Generation and Power Purchase for the year 2007 – ‘08	59
7.1.1	Demand for Energy in 2007 – ‘08	59
7.1.2	New Hydel Capacity Addition Proposed in 2007 – ‘08	59
7.1.3	Cost of Generation	60
7.1.4	Cost of Power Purchase	65
7.1.5	Purchase from IPPs	68
7.1.6	Unscheduled Interchange and Optimization of Generation	70
7.1.7	General Strategy followed by KSEB in Scheduling of Generation and Power Purchase	71
7.1.8	Merit Order Stack	73
7.1.9	Transmission Charges payable to PGCIL	73
7.1.10	Other Charges Payable to CGS	74
7.1.11	Summary of Cost of Generation and Power Purchase	74
7.2	Interest and Finance Charges	75
7.2.1	Interest and Finance Charges for 2005 – ‘06	75
7.2.2	Revised Estimate of Interest on Outstanding Debts payable in 2006 – ‘07	78
7.2.3	Estimate of Interest on Outstanding Debts payable in 2007 – ‘08	82
7.2.4	Interest Payable on the Security Deposit of the Consumers	83
7.2.5	Interest on Borrowings for Working Capital	84
7.2.6	Rebate to Consumers for Advance Payment of Charges	85
7.2.7	Interest on Provident Fund Balance	85
7.2.8	Cost of Raising Finance	86

7.2.9	Guarantee Commission	86
7.2.10	Other Charges and Bank Charges	87
7.3	Depreciation	88
7.4	Employee Cost	89
7.5	Repairs and Maintenance Cost (R&M)	93
7.6	Administration and General Expenses	96
7.7	Other Expenses	99
7.7.1	Prior Period Expenses	99
7.7.2	Other Debits	100
7.8	Return on Equity	101
7.9	Summary of Aggregate Revenue Requirement (ARR)	102
8	EXPECTED REVENUE FROM CHARGES	
8.1	Revenue from Sale of Energy	103
8.2	Non Tariff Income	105
8.3	Total Expected Revenue from Charges	108
9	SUMMARY OF AGGREGATE REVENUE REQUIREMENT FOR THE FINANCIAL YEAR 2007 – '08	109
	Annexure - A Capital Projects proposed in the 11th Plan and Capital outlay for 2007-08	
	Annexure - B Revised Capital outlay for 2006-07	
	DATA FORMS	

CHAPTER 1

INTRODUCTION

Kerala State Electricity Board (KSEB) was constituted in 1957 as per Section 5 of the Electricity Supply Act 1948. Since its inception, the Board has been responsible for the generation, transmission and supply of electricity in the State of Kerala, with particular emphasis to provide electricity at affordable cost to the rural population and for agricultural purposes. The Board has set up adequate generation capacity and transmission network and Kerala is one of the few states in the country having availability of power to meet the demand. After the enactment of the Electricity Act 2003, there has been large scale reform process in power sector in the country including Kerala. As per section 172 (a) of the Electricity Act 2003, KSEB has been continuing as State Transmission Utility (STU) and Distribution Licensee and with the second proviso to same section, the Central Government and Government of Kerala mutually decided to continue the KSEB as State Transmission Utility and Distribution Licensee for one more year with effect from 10-6-2004 vide GO No (P) No 13/2004/PD dated 10-6-2004. Vide the letter No. 25/11/2004- R&R of Ministry of Power, Government of India dated 08-06-2006 has allowed to continue the same arrangement up to 09-12-2006. Subsequently, Government of India as per letter No. 25/11/2004 - R&R dated 05-12-2006 of Ministry of Power has allowed for the continuation of KSEB as the State Transmission Utility and Distribution Licensee for a further period upto 09-06-2007. Accordingly, the Board continues to be a composite body performing vital functions of generation, transmission and distribution. In its journey from 1957, it had ups and downs of power shortages and chronic financial problems. At present it is overcoming such problems and is in the path of recovery and turn around.

The growth of the power system in the State during the last 49 years is given below:

Table – 1
Growth of the Kerala Power System

Particulars	1957	1967	1977	1987	1997	2006
Installed Capacity (MW)	109	193	1012	1477	1509	2649
Annual Sales (MU)	363	750	3937	3716	7023	10906
Per Capita Consumption (kWh)	19	40	95	131	224	410
EHT Lines (ckm)	1600	2335	5099	5600	6275	10178
EHT Substations (Nos)	15	38	75	116	157	269
HT Lines (ckm)	3851	6570	12151	17531	26444	34680
LT lines (ckm)	4980	14189	37817	80309	132864	215152
Distribution Transformers (Nos)	1862	3930	9877	14015	25940	28193
Employee Strength (Nos)	5322	N. A.	22894	26487	N. A.	25700
Number of Consumers (Lakh)	1.06	3.25	10.27	26.1	49.43	83

During the past forty nine years, the Board had made tremendous growth and development. The consumer strength has increased from 1.06 lakh in 1957 to 83 lakh in 2005-06, and expected to increase to 88 lakh in 2006-07. The installed capacity in the State has increased from 106 MW in the year 1956 to 2649 MW in 2005-06. Till 1980, the energy requirement of the State was met from the Hydel projects developed by KSEB. However, after the promulgation of the Forest Conservation Act in 1980, the implementation of new hydroelectric projects to meet the increasing demands has been blocked and hence costlier thermal energy had to be generated and purchased to meet the increasing demand. Presently, about 50 % of the energy requirement is being met through purchase of thermal energy from the Central Generating Stations of NTPC, NLC, and NPC etc.

The Board's mission is to supply electricity at affordable cost on demand to the people in the State, endeavour to supply quality and uninterrupted power, improve the consumer satisfaction and to act as a catalyst for development of the State. The Board, though a State undertaking required to function on commercial principles, has to perform its social obligations to the public, in the midst of economic reform process underway in the country.

In November 2002, with a view to regulating the activities in the electricity sector in the State, the Government of Kerala, as per the Electricity Regulatory Commission Act, 1998 enacted by the Parliament, set up the Kerala State Electricity Regulatory Commission (KSERC). Since its inception, the Commission

is empowered to determine inter-alia the electricity tariff in the State. The Government of India, subsequently in 2003, enacted the Electricity Act 2003 replacing the previous legislations which governed the power sector. The Commission, as per the powers vested in the Electricity Act 2003, has formulated the Kerala State Electricity Regulatory Commission (Tariff) Regulations requiring the Board and other licensees in the State to submit to the Commission every year the details of “ the Aggregate Revenue Requirement and Expected Revenue from Charges” for the ensuing year. Accordingly, the Board submitted the petition on the Aggregate Revenue Requirement and Expected Revenue from Charges (ARR & ERC) for 2003-04 on 1st August, 2003, for the year 2004-05 on 15th December 2003, for the year 2005-06 on 15th November, 2004 and for the year 2006-07 on 30-11-2005. The Commission passed its orders on these petitions on 30th December 2003, 16th April, 2004, 23rd March, 2005 and 30th March 2006 respectively.

This present petition of the Board is the ARR & ERC for the year 2007-08 and is the fifth one in the series.

The Board has been passing through a transitional phase of reforms in the electricity sector. Though the new Electricity Act has been passed in 2003, regulations and guidelines are continued to be issued by the Governments and other authorities and are yet to be implemented in full form. Therefore, this petition has been formulated under the assumption that the procedures and practices being followed will continue to be followed until the new rules, regulations and procedures are fully implemented and the impact are assessed. If the regulations etc as envisaged in the Electricity Act 2003 are firmed up and come into operation in 2007-08, this petition might require revision as may be required. The Electricity Act-2003 envisages separate organizations to function for Transmission and Distribution utilities. Pending decision on such structural reorganization of the Board, the present petition has been prepared for functioning of the Board as a composite entity.

This petition contains 9 Chapters. Chapter-2 of this petition describes the performance of the Board during the recent years. The details of the projects

under implementation during 2006-07 and the proposed capital works in 2007-08 are given in Chapter-3. A review of the generation and power purchase made during the year 2006-07 is given as Chapter-6. The estimate of Aggregate Revenue Requirement and the estimate of the Expected Revenue from Charges are given in Chapter-7 and Chapter-8 respectively. The summary of the ARR including the prayer of the Board is given in Chapter-9.

The revised estimate of the revenue expenditure of the Board for the year 2006-07 is Rs.4268.96 Crore and the revenue receipts is Rs.4038.77 Crore leaving a revenue gap of Rs.230.19 Crore.

The estimate of ARR for the year 2007-08 is Rs.4545.02 Crore as against the estimated revenue receipts of Rs.4114.91 Crore (at the existing tariff rates) leaving a revenue deficit of Rs.430.11Crore. The Board is separately taking up with the Government of Kerala suggesting ways to bridge the revenue gap and seeking their approval. The Board shall submit separate proposal to the commission for bridging the revenue gap after obtaining the decisions of the Government.

Pending submission of the proposal to bridge the revenue gap, the Board requests the Commission :

- (i) To approve the revised estimate of expenses of Rs.4268.96 Crore, income of Rs.4038.77Crore and the revenue gap of Rs.230.19 Crore for the year 2006-07.
- (ii) To approve the estimated expenses of Rs.4545.02 Crore, income of Rs.4114.91 Crore and the revenue gap of Rs.430.11Crore for the year 2007-08.
- (iii) To permit the Board to submit the proposal separately for bridging the estimated revenue gap of 2007-08.
- (iv) Direct the State Government to release the subsidy on account of shortfall in revenue of Rs.30 Crore for 2005-06 and Rs.80 Crore up November-2006 during the current year on account of the reduction of tariff of 20 paise per unit implemented as directed by the State Government.

- (v) To allow the Board to revise the present estimates in the event of abnormal increase in fuel price or failure of monsoon during 2007-08 or if there are major changes in the assumptions taken in this petition, due to any contingency which may be beyond the control of the Board.
- (vi) To allow the Board to submit a proposal for truing up of the cost at the end of financial year 2007-08 and any revenue gap arising out of such truing up be allowed separately.
- (vii) To permit continuance of the existing tariff rates to the different categories of consumers till the commission decides on revision of the tariff or orders other measures to bridge the revenue gap for the year 2007-08.
- (viii) To recognize the concept of Regulatory Asset and treat the revenue gap as Regulatory Asset, if the gap for 2005-06 and 2006-07 are not otherwise covered by tariff revision or subsidy from the Government.
- (ix) To permit the Board to present the case in person and submit other details / information as may be necessary before the Commission takes its final decision on the matter.

CHAPTER 2

PERFORMANCE OF THE BOARD

Electricity sector in the country is now in a transition phase. The Electricity Act.2003 was enacted to replace the Electricity Supply Act 1948 with a primary goal to improve the efficiency and quality of service. The Board has been taking several initiatives to improve its physical and financial performances during the past several years, and even well before the enactment of the Electricity Act.2003. The consistent efforts have started yielding commendable results. The success story of KSEB is approved at the national level in various parlors and the recent example is adjudging KSEB as the best performing SEB - 2006 in the country by the INDIA-TECH Foundation. The essence of all these achievements is presented in this Chapter.

2.1 Physical performance

(a) A gist of various developmental activities carried out by the Board in the generation, transmission and distribution sectors during the recent years are given below.

Table - 2.1
Physical Performance during last five years

Particulars	Addition during the Years				
	2002-03	2003-04	2004-05	2005-06	2006-07*
(a) Generation					
Capacity Additions (MW)	0.00	12.60	3.00	14.00	151.75
Allocation from CGS (MW)	285	72	90	225	0.00
(b) Transmission					
EHT Substation (nos)	8	13	26	19	30
EHT Lines (circuit Km)	148	296	206	256	310
HT Lines (circuit km)	1083	1269	675	1062	2000
(c) Distribution					
No of consumers (lakh)	3.55	3.52	5.48	5.48	5.00
LT lines added (circuit km)	5043	4429	4725	6439	10000
No of distribution transformers added	870	1066	1894	1778	3000

- Target for 2006-07

The Board proposes to commission the Kuttiadi Tail Race (3.75MW/15MU), Kuttiadi Additional Extension Scheme (100MW/240MU), Neriamangalam Extension Scheme (25MW/58.27MU), Kuttiyar Diversion (37MU) during the year 2007-08 thereby adding 151.75MW/407.27MU to

the system. Also 23MW of capacity enhancement work would be completed during the year in the Sabarigiri and Neriamangalam projects.

(b) AT & C Loss reduction

Since 2001-02, the Board has been able to achieve significant reduction of losses in the system by replacement of faulty meters and electromechanical meters by electronic meters, anti-theft activities, system improvement schemes, energy audit and computerisation of billing etc. The details of the measures taken to reduce the AT&C loss are given in Chapter-5.

The total loss in the system in 2001-02 was 32.15% which has been reduced to 23.17% by the close of 2006-07. The AT & C losses in the system, reduction achieved and financial savings accrued to the Board are given in the following table.

Table - 2.2
Impact of AT & C loss reduction

Year	Energy sold (MU)	Total energy generated and power purchased by KSEB (MU)	T&D Loss	Impact of loss reduction (estimate)	
			%	Savings in MU	Amount in Rs. Crore
2001-02	8667.32	12773.37	32.15		
2002-03	8873.30	12751.14	30.41	221.06	61.90
2003-04	8910.84	12455.37	28.46	243.36	75.44
2004-05	9384.40	12719.77	26.22	284.65	88.53
2005-06	10269.80	13618.96	24.59	221.99	68.59
2006-07	11250.00	14642.88	23.17	207.93	64.67

It may be observed from the above that despite marginal increase in consumption of energy over the years, the total quantum of energy generated & purchased remained more or less at the same level between 2001-02 and 2004-05 due to progressive reduction in the loss and saving of energy which ranged from 221.06MU to 284.65MU per year. Thus, by way of AT & C loss reduction there has been saving of Rs.61.9 Crore in 2002-03, Rs.75.44 Crore during 2003-04 and

Rs.88.53 Crore in 2004-05, Rs.68.59 Cr in 2005-06, and Rs.64.67 Crore in 2006-07. The Board is targeting to reduce the loss further by 1.41 % in 2006-07 and 1.83% in 2007-08.

2.2 Efficiency in Power Purchase and Generation

- (a) KSEB has been scheduling the generation and power purchase strictly on the basis of merit order of cost of energy. By this way
- in 2005-06, KSEB was able to limit the power purchase from the costly sources such as NTPC- Kayamkulam to 0.46 MU and BSES - Kochi to 36.78MU, which had an average variable cost of more than Rs.4 per unit.
 - KSEB imported 97.54MU at an average rate of Rs.1.83 per unit and exported 856.61MU at an average rate of Rs.2.42 per unit, by availing the benefit of UI and optimizing the generation schedule.
 - optimized the generation schedule in hydel stations, with respect to system frequency to avail the advantage of UI export.
- (b) Availed maximum power from the less costly thermal stations such as NTPC-Ramagundam and NTPC-Talcher-II.
- (c) Achieved savings in fixed cost of NTPC-Kayamkulam by selling the KSEB share to NVVN at a comfort charge of 46 paise per unit. The Board saved approximately Rs. 0.32 Crore during 2005-06 on this ground.
- (d) During the year 2004-05 and 2005-06, KSEB was able to save about Rs.110.00 Crore annually as fixed charge payable to NTPC by sharing 50% of the capacity of the Kayamkulam power with TNEB.
- (e) Reduced the generation from costly KSEB diesel stations - BDPP and KDPP by limiting the generation only during peak hours and exigencies
- (f) Sale of energy during 2006-07 :-
By optimally utilizing the available hydel resources as well availing full allocation of cheaper coal based power CGS, KSEB was able to sell about 780MU through traders and earned about Rs.300 Crore. The details of which are given in Chapter-6.

2.3 Financial Performance

(a) Swapping of High Cost Loans

The Board, by taking advantage of the prevailing interest rates in the financial market has swapped the high cost outstanding loans by borrowing fresh loans at low interest rates. So far, KSEB has swapped Rs.1733.40 Crore of loans, saving an interest liability of Rs.241.08 Crore payable during the rest of the repayment period of the loans and an annual savings of Rs.39.54 Crore. The details of the swapping done are given in the following table.

Table - 2.3
Details of swapping of high cost loans

Year	Item	Amount Rs.Crore	Before Swapping		After Swapping		Premium Paid Rs.Crore	Net Savings Rs.Crore	Annual Net Savings Rs.Crore
			Interest %	Amount Rs.Crore	Interest %	Amount Rs.Crore			
2003-04	Non SLR Bond VI	300.00	15.25	187.58	7.50	54.72		132.86	26.57
	REC Stage I	649.43	13.00 -15.00	278.95	10.50	226.89	20.21	31.85	3.98
	REC Stage II	118.97	13.00	39.97	10.00	29.36	2.96	7.65	0.85
	L I C	187.41	14.00	102.98	11.00	80.91	7.80	14.27	1.10
	PFC Stage I	100.00	15.00 -17.00	67.26	8.50 - 10.00	49.98	8.55	8.73	0.97
	PFC Stage II	18.13	13.50 -15.00	7.21	8.50	5.74	0.94	0.53	0.08
	Loan taken for KDPP	125.00	13.75	48.35	11.25	25.47		22.88	2.29
	Total	1498.94		732.30		473.07	40.46	218.77	35.84
2004-05	Premature redemption - Non SLR Bonds (Bond IX)	6.48	13.25	2.22	6.50	1.09		1.13	0.37
	REC-Short Term Loan	48.77	9.75	3.23	6.50	1.71	0.42	1.10	1.10
	Total	55.25		5.45		2.80	0.42	2.23	1.47
2005-06	Premature redemption -Non SLR Bonds (Bond VII)	1.95	13.75	0.27	6.20	0.12	0	0.15	0.15
	Premature redemption -Non SLR Bonds (Bond VII-a)	1.60	13.00	0.21	6.25	0.10	0	0.11	0.07
	Premature redemption -Non SLR Bonds (Bond X-a)	10.31	11.40	3.41	6.25	1.87		1.54	0.39
	Premature redemption -Non SLR Bonds (Bond X-b)	0.05	11.00	0.03	6.25	0.02		0.01	0.00
	LIC Stage II (2nd Time)	145.20	11.00	68.01	9.00	55.64	4.65	7.55	0.58
	Total	159.11		71.93		57.75	4.65	9.36	1.19
2006-07	Premature redemption-Non SLR Bonds (Bond X-a)	0.10	11.40	0.03	Board's own fund		0.00	0.03	0.00
	Closure of loan from SBT for Neriamangalam	20.00	9.00	10.69	Board's own fund		0.00	10.69	1.04
	Total	20.10		10.72		0.00		10.72	1.04
Grand Total	1733.40		820.40		533.62	45.53	241.08	39.54	

The Board will continue to swap the other high cost loans also wherever feasible.

(b) Restricted borrowing and reduced liabilities

As may be seen from the following table, by restricting the fresh borrowings and repaying the debts promptly, the Board has substantially reduced the outstanding debts.

**Table - 2.4
Outstanding loan liabilities**

Rs.in Crore

Year	Loan Outstanding	Loan Received	Repayment	Closing Balance	Increase over	Interest due for payment	Increase in interest over previous year
	(OB)			(CB)	Previous Year		
2000-01	3551.10	1303.56	283.25	4571.41	1020.31	524.51	90.32
2001-02	4571.41	690.31	489.82	4771.90	200.49	604.89	80.38
2002-03	4771.90	1380.25	1057.99	5094.16	322.26	597.88	-7.01
2003-04	5094.16	2013.39	1751.90	5355.65	261.49	622.16	24.28
2004-05	5355.65	582.15	1396.48	4541.32	-814.33	535.54	-86.62
2005-06	4541.32	379.44	1207.15	3713.62	-827.70	451.44	-84.10
2006-07 (Prov.)	3713.62	536.49	833.67	3416.44	-297.18	380.06	-71.38

(c) Reduction/Increase in interest payment

Due to swapping of high cost loans, reduction in outstanding loans, fresh borrowings from least cost sources and reduction in cost of raising finance by way of dispensing with Government guarantee, upfront payments, commitment charges etc, the Board has substantially reduced the interest burden as given in the Table No.2.4 above.

(d) Increase in revenue

The following table shows the revenue earned by the Board from sale of power and other income.

**Table - 2.5
Details of Revenue earnings**

	Particulars	2002-03	2003-04	2004-05	2005-06	2006-07
1	Energy sold (MU) (including sales outside the State)	8873.30	8910.84	9384.40	10905.70	12030.00
2	Income					
	From Tariff (Rs. Cr)	2480.68	2756.90	2917.36	3367.30	3709.21
	Non tariff (Rs. Cr)	226.27	304.65	339.63	325.43	329.56
	Total (Rs. Cr)	2706.95	3061.55	3256.99	3692.73	4038.77

Despite the fact that the Commission has allowed the existing tariff to continue since October-2002, the Board could increase the revenue over the years.

This was achieved by

- (a) Increase in the sale of energy
- (b) Effecting disconnection / dismantling and RR action against defaulters for improving revenue realisation
- (c) Reducing the commercial losses by replacement of faulty and sluggish meters by electronic meters
- (d) Conducting special revenue recovery adalaths at the level of distribution circles.
- (e) One time settlement option to settle long pending HT/EHT dues
- (f) Tapping the non tariff income sources and
- (g) Intensification of anti power theft activities
- (h) Prudent planning of generation so as to get
 - a. Maximum advantage of UI
 - b. Sell power to other utilities at competitive rates.

(e) Reduction in Revenue Gap

By way of improvement in physical performance, progressive reduction in T&D loss, economy measures in power purchase, reduction in outstanding liabilities and interest cost and other economy measures, the Board could reduce the revenue gap to a large extent from Rs.1316.43 Crore in the year 2001-02 to Rs.144.58 Crore in the year 2005-06, without upward revision of tariff since October-2002. The details of the reduction in revenue gap are given below.

Table - 2.6
Revenue Gap

Rs.Crore

Year	Income			Total Expenditure	Revenue Gap
	Tariff	Non tariff	Total		
2001-02	1945.99	95.86	2041.85	3358.28	-1316.43
2002-03	2480.69	226.27	2706.96	3722.53	-1015.57
2003-04	2756.09	304.66	3060.75	4068.18	-1007.43
2004-05	2917.36	339.65	3257.01	3599.77	-342.76
2005-06 (Prov)	3367.30	325.43	3692.73	3837.32	-144.58
2006-07 (Revised)	3704.21	329.56	4038.77	4268.96	-230.19

The average cost of supply per unit, revenue realization and the gap are given below, which indicate reduction of cost, increasing trend in revenue

realization and sizeable reduction in revenue gap over the years.

Table - 2.7
Comparison of per unit cost of supply and realisation

		(Rs/kWh)					
	Particulars	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
(i)	Average cost of supply	3.87	4.20	4.57	3.84	3.52	3.55
(ii)	Average revenue realised	2.36	3.05	3.43	3.47	3.39	3.36
	Gap = (i) - (ii)	1.51	1.15	1.14	0.37	0.13	0.19

(f) Comparison of Expenses and Revenue

Comparison of the various components of expenditure over the last five years is given below.

Table - 2.8
Expenses per unit Sale of energy

		(Rs/kWh)				
Sl. No.	Particulars	2001-02	2002-03	2003-04	2004-05	2005-06
1	Generation Of Power	0.10	0.19	0.16	0.09	0.05
2	Purchase of power	1.67	2.11	2.12	1.56	1.41
3	Interest & Finance Charges	0.75	0.76	0.82	0.65	0.52
4	Depreciation	0.25	0.31	0.37	0.40	0.36
5	Employee Cost	0.71	0.76	0.88	0.84	0.79
6	Repair & Maintenance	0.08	0.07	0.07	0.08	0.09
7	Administration & General Expenses	0.08	0.06	0.10	0.10	0.10
8	Other Expenses (Other debits + Prior period charges)	0.46	0.10	0.16	0.13	0.20
9	Gross Expenditure (1 to 8)	4.09	4.35	4.67	3.84	3.51
10	Less: Expenses Capitalized	0.14	0.13	0.12	0.05	0.04
11	Less: Interest Capitalized	0.15	0.11	0.09	0.07	0.04
12	Total Expenditure(9 -10 -11)	3.80	4.10	4.46	3.73	3.43
13	Statutory Surplus	0.07	0.09	0.10	0.11	0.09
14	ARR (12 + 13)	3.87	4.20	4.57	3.84	3.52
15	Non-Tariff Income	0.11	0.25	0.34	0.36	0.30
16	Revenue from Tariff	2.25	2.80	3.09	3.11	3.09
17	ERC (15 +16)	2.36	3.05	3.43	3.47	3.39
18	Revenue Gap (14 - 17)	1.51	1.15	1.14	0.37	0.13

Comparison of the item wise expense to the total expenditure is also given below.

Table - 2.9
Comparison of expenses as percentage of total expenses

Particulars	In percentage				
	2001-02	2002-03	2003-04	2004-05	2005-06
Generation of Power	3	5	4	2	1
Purchase of power	44	51	47	42	41
Interest & Finance Charges	20	18	18	17	15
Depreciation	6	8	8	11	10
Employee Cost	19	18	20	23	23
Repair & Maintenance	2	2	2	2	3
Administration & General Expenses	2	1	2	3	3
Other Expenses (Other debits + Prior period charges)	12	2	4	3	6
Gross Expenditure	108	106	105	103	102
Less : Expenses Capitalised	4	3	3	1	1
Less : Interest Capitalised	4	3	2	2	1
Total Expenditure	100	100	100	100	100

It can be seen from the above Tables that the Board was able to reduce the per unit cost of almost all items in the year 2005-06 and 2006-07, over the previous years. There was a considerable reduction in the major components such as cost of generation, cost of power purchase, interest and finance charges, etc. The revenue gap per unit which was in the range of Rs.1.51 per unit in 2001-02 was reduced to Rs.0.13 in 2005-06.

2.4 Measures taken to improve Consumer Satisfaction

a) Trouble Call Management System

The Board has introduced centralized Trouble Call Management System and mobile service units for attending to breakdowns and for restoring interrupted power supply in the cities of Trivandrum, Kollam (including Kundara and East Kallada), Kochi, Kozhikode and Kannur. The consumers can register their complaints relating to interruption of power supply and other breakdowns by dialing the telephone no.1912. The Scheme is proposed to be extended to other towns and cities in a phased manner.

b) Distribution Automation Project

KSEB has introduced distribution automation project in Trivandrum city by installation of 120 RMUs and laying of 120 km of 11 kV XPLE

cables. By implementing this, the restoration of supply to the feeders and reconfiguration of feeders etc can be done at a faster rate and the feeders can be loaded optimally. KSEB propose to extend this to other corporation areas like Kochi and Kozhikkode as part of the APDRP Scheme.

c) Computerisation of Billing and Revenue Collection

Board has already completed computerisation of LT billing, cash collection & accounting in 184 section offices. Data entry work in the balance 426 is in progress.

The HT & EHT billing has also been computerized. When computerisation of LT Billing is completed in all the 610 electrical sections, it will not only facilitate the consumers to pay the bills easily but will also help the Board in retrieval of vital data required for monitoring revenue collection and for such other management functions.

d) Simplification of Procedure for Service Connection

As a measure of service to the consumers, procedure for obtaining new service connection has been simplified.

e) As part of mitigating complaints on metering, consumers themselves have been permitted to purchase energy meters of their own for installation after checking by the Electrical Inspectorate.

f) District Advisory Committee has been constituted in all the districts.

g) Considering the consumer density and geographical area 80 new electrical section offices have been formed through out the state to facilitate better service to the consumers.

h) Additional Service Connections.

The State Government and KSEB are taking efforts to provide additional service connections to 5 lakh consumers every year. 5.48 lakh connections could be given during the year 2005-06 and during 2006-07 also KSEB expects to meet the target.

i) Service connection to Below Poverty Line (BPL) Consumers

During the last four years, the Board could provide 3.05 lakh connections to consumers coming under the BPL category within the

State and 23751 new connections provided during 2005-06 till October 2006.

2.5 Capital Outlay for Special Schemes

- Since 2002, the Board had obtained sanction of Government of India (GoI) for implementation of APDRP scheme worth Rs.905.01 Crore, which have a component of 25% of the cost as grant from GoI.
- Similarly, for electrification of households in unelectrified villages / habitats in the state, the Board has obtained sanction of GoI under the RGGVY scheme for Rs.438.36 Crore, which involve 90% of the cost as grants borne by GoI. Details of these special schemes are given in Chapter-3.

CHAPTER - 3

CAPITAL INVESTMENTS

3.1 Strategy for Capital Investment during 11th plan

Electricity is one of the key drivers for the economic growth and poverty alleviation. The demand for electricity is increasing at a faster rate of about 8% in the State. It is the need of the day to have quality power at affordable rates to all needy consumers.

As per the 17th power survey, there is an additional generation requirement of about 1000MW for the State during next five years. KSEB had set a target for providing affordable and reliable electricity to all house holds on demand by 2011. To meet this prime objective, KSEB has to either develop new generation capacities or purchase additional power from other sources or opt for a balance blend of both. Also the transmission network has to be strengthened and the distribution system improved to meet the consumer need.

In order to meet the additional generation requirement during the 11th plan period for providing energy at affordable rates, KSEB is giving more attention to developing hydel projects within the State and to ensuring share from the upcoming Central Generating Stations that could provide energy at competitive rates.

Hydro power is the commercially viable source for power generation with in the State. To ensure reliable supply of energy, State Government and KSEB are giving due thrust for capacity addition through tapping the hydel potential available with in the State. This has great relevance with the huge increase in power rates witnessed in the bilateral trading market in the country. Introduction of power exchange in the power scarce situations is expected to aggravate the situation further.

KSEB is giving renewed focus on augmenting the hydel capacity with a view to reducing the power purchase cost. KSEB has proposed to add

about 608MW of new hydel capacity during the 11th plan period. A large number of hydel projects with an anticipated capacity of (about 950MW) were also identified for 12th plan period and they are in the stages of detailed investigation and preparation of Detailed Project Report (DPR). The details of the projects proposed to be implemented during 11th plan and 12th plan periods are given as Annexure-A.

The transmission system is to be strengthened in tune with the capacity addition and additional power purchase from CGS. KSEB is giving due importance for enhancing the load handling capacity of the transmission system, avoiding bottlenecks/ congestion in power flow, providing adequate redundancy in transmission system to meet the system exigencies and ensuring availability of power in every part of the State.

Being the State Transmission Utility (STU) in Kerala, KSEB is bound to discharge all the functions of planning, co-ordination and implementation of intra-state transmission system necessary for the State. The details of the substations and lines proposed in the 11th plan period are given as Annexure-A.

The distribution system also needs to be strengthened in tune with the capacity addition in generation and strengthening of transmission network. KSEB, with a view to improving consumer satisfaction, is giving due importance for strengthening the distribution network to provide uninterrupted quality power to the consumers, reduce the technical and commercial losses and to improve the quality of services rendered to the consumers.

About 15% of the house holds in the State is yet to be electrified. KSEB has set a target of 5 lakh new service connections annually during the 11th plan. Adequate infrastructure is to be created to achieve the target.

Another area of concern in the distribution system is the energy loss, which include commercial and technical losses. To reduce the commercial losses,

KSEB is giving more thrust on replacing the faulty and sluggish meters with good quality energy meters. Similarly for reducing the technical losses, KSEB has evolved various capital investment schemes and included in the forthcoming plan period. (The details of the efforts taken by the Board to reduce the Transmission and distribution system) is given as Chapter-5.

KSEB is also giving due importance for the projects under APDRP and RGGVY schemes proposed by the Central Government aiming at total development of sub transmission and distribution systems. The details of the distribution schemes proposed in the 11th plan is given as Annexure-A.

The physical targets of the capital works in the generation, transmission and distribution sector is given below.

Table 3.1
Physical target of projects in the 11th Plan

		2007-08	2008-09	2009-10	2010-11	2011-12	Total
A. Generation							
Capacity Addition	MW	133	11	39	144	282	608
	MU	418	34	63	441	684	1641
B. Transmission							
Substations (No.)							
220kV	NEW	0	0	0	1	1	2
	UPGN	2	0	1	1	0	4
110kV	NEW	5	2	4	1	5	17
	UPGN	6	9	4	5	13	37
66kV		1	4	0	0	1	6
33kV		11	24	6	4	7	52
Lines (km)							
220kV		39	19	29	15	17	118
110kV		166	139	49	246	292	892
66kV		40	15	164	58	52	329
33kV		175	325	78	10	88	676
C. Distribution							
No. of Service connections		500000	500000	450000	450000	450000	2350000
11 kV lines km		3427	3177	3225	3264	3463	16556
LT lines km		4043	3799	3667	4186	3575	19270
Transformers (No.)		2009	2286	2346	2503	2646	11790
HT:LT ratio		1:5.53	1:5.21	1:4.93	1:4.69	1:4	

The review of the capital outlay of the ongoing projects in 2006-07 and the capital outlay for projects proposed in the 11th plan for 2007-08 is given in the following section.

3.2 Review of Capital Outlay of Projects proposed in 2006-07

In the ARR for 2006-07, the Board had estimated a capital expenditure of Rs.760 Crore, but considering the achievements so far, with details as follows:

Table - 3.2
Capital Outlay for 2006-07

Rs. in Crore

Particulars	As per ARR for 2006-07	Revised for 2006-07
Generation	250.00	323.94
Transmission	218.50	168.78
Distribution	290.00	288.00
Other works	1.50	1.50
Total	760.00	782.22

The details of the schemes covered by the proposed capital expenditure during 2006-07 are given below.

a) Revised Capital Outlay for Generation Schemes for 2006-07

The revised capital outlay for the ongoing generation schemes for the year 2006-07 is given below.

Table - 3.3
Revised Capital Outlay for Generation Schemes

Rs. in Crore

Scheme	Revised Capital Outlay
Kuttiadi Tail race	3.10
Neriamangalam Extension	29.00
Kuttiady Addl. Extension Scheme (2 x 50MW)	57.50
Kuttiadi Augmentation	16.50
Azhutha Diversion	0.75
Kuttiar Diversion	2.00
Schemes proposed for 11 th Plan (Details given in Annexure-1)	87.80
Completed Hydel Scheme	6.50
Completed Thermal Scheme	7.06
Wind (Ramakkalmedu)	12.00
Renovation and Modernisation	37.41
Survey and Investigation Works	1.90
Others	62.42
Total	323.94

The details of the revised capital outlay for generation schemes are given as Annexure-B.

(b) Revised capital outlay for Transmission works for 2006-07

Works of several 220 kV, 110kV, 66kV and 33 kV substations and connected transmission lines were taken up during 2006-07 with a view to enhancing the voltage profile, reduce over loading, reduce

T & D loss, evacuate power from the generating stations etc. The revised capital outlay for these schemes are given below.

Table - 3.4
Revised Capital outlay for Transmission works for 2006-07
Rs. in Crore

Details of works	Revised capital outlay
Connected lines of 400 kV	0.10
220 KV Substations and connected lines	50.00
110 KV Substations and connected lines	70.00
66 KV Substations and connected lines	8.00
33 KV Substations and connected lines	30.00
Other works (repairs and maintenance)	5.00
Capacitor installations	0.50
Renovation & Modernisation	0.00
Modernisation of Load Despatch	0.40
Relay	2.78
Modernisation of Communication Systems	2.00
ULDC	0.00
Total	168.78

The details of the capital outlay for transmission works are given in Annexure- B.

(c) Revised capital outlay for Distribution works

During the year 2006-07, Board has set a target of providing 5 lakh new electric connections, construction of 2000 kms. of 11 kV lines, 10000kms of LT lines, installation of 3000nos of new distribution transformers as well as 30000 nos. of street lights and replacement of 4 lakh faulty meters. Board has also made a provision of Rs.175 Crore for the works taken up under APDRP schemes and a provision of Rs.90 Crore for schemes undertaken through RGGVY schemes.

The revised capital outlay for distribution works for the year 2006-07 is given below:

Table - 3.5
Revised Capital Outlay for Distribution works

Rs. in Crore

Sl. No.	Distribution	Revised Capital Outlay
1	Normal	20.00
2	People's Participation Schemes	5.00
3	APDRP Works (Additional Central Assistance to APDRP)	175.00
4	RGGVY	34.00
5	Capital City Development	10.00
	Tsunami Projects (TRP)	4.00
6	Improvement of Quality power supply in Municipalities and Corporations	30.00
7	Tsunami Emergency Assistance Projects	10.00
	Total	288.00

The details are given in Annexure-B.

3.3. Capital Outlay for 2007-08

The Board has provided an outlay of Rs.1022.38 Crore for capital works during 2007-08 as shown in the following table.

Table - 3.6
Capital outlay for 2007-08

Rs. in Crore

Particulars	Amount
Generation	336.22
Transmission	221.80
Distribution	464.36
Total	1022.38

A summary of the proposed capital works is given below. More details are given in Annexure-A.

a) Generation

Board has made a provision for Rs.53.90 Crore for the six ongoing hydel projects with a total capacity of 128.75MW. These projects are expected to be commissioned during 2007-08.

As mentioned earlier, the Board has targeted to implement 453.10 MW of new hydel projects during 11th plan period. A provision of Rs.207.80 Crore has been proposed for the year 2007-08 for these projects. Board has also made a provision of Rs.23.75 Crore for the development of wind and other non-conventional energy sources, Rs.17.55 Crore towards renovation

and modernization of Neriamangalam, Sabarigiri, balance works of PPSHUP etc.

A summary of the capital outlay for the generation works proposed for 2007-08 is given below.

**Table - 3.7
Capital Outlay for the Generation Projects for the year 2007-08**

Item	Capacity MW	Capital Outlay for 2007-08 Rs. Cr	Remarks
Ongoing Schemes	128.75	53.90	Proposed to complete in 2007-08
New Schemes (11 th Plan projects)	453.10	207.80	Proposed to Commission during 11 th plan period
Completed Schemes (Additional/R&M Works)		0.83	Balance works of completed schemes
Completed thermal		5.74	
Wind & Non-conventional	23.30	23.75	
Renovation & Modernisation	3.00	17.55	
Survey & investigation		5.00	
Projects proposed for 12 th plan	929.20	0.00	
Others		21.65	
Total		336.22	

b) Transmission

For 2007-08, Board has made a provision of Rs.221.80 Crore towards the various 220kV, 110kV, 66 kV and 33 kV substations and associated transmission lines and also for upgradation and modernization of transmission system. The summary of the details of the capital works in transmission sector is given below.

Table 3.8
Capital Outlay for the proposed Transmission projects for 2007-08

Sl. No.	Item	2007-08		
		Substation (No.)	Line (km)	Amount (Rs. Cr)
1	220 KV Substations and connected lines	2	39.349	65.06
2	110 KV Substations and connected lines	11	124	98.19
3	66 KV Substations and connected lines	1	40	21.00
4	33 KV Substations and connected lines	11	174.63	28.10
5	Other works (repairs and maintenance)			2.50
6	Capacitor installations			0.00
	Total			214.85
	Provision in 12th Plan Schemes			0.00
7	Renovation & Modernisation			0.00
A	Modernisation of Load Despatch			0.80
B	Relay			2.44
C	Modernisation of Communication System			3.71
D	ULDC			0.00
	Total			6.95
	TOTAL	25	377.98	221.80

c) Distribution

For the year 2007-08, Board has made an ambitious target of providing 5 lakh new service connections, construction of 3427kms of 11kV lines, 4043 kms of LT lines and installation of 2009 nos. of distribution transformers. These are inclusive of the schemes covered under APDRP and RGGVY schemes. The details of the capital outlay for the distribution works proposed for the year 2007-08 are given below.

Table - 3.9

Capital Outlay for the proposed Capital works in Distribution Sector

SI. No.	SCHEME / WORK	Capital outlay		
		Quantity	Amount Rs.Cr	
1	Normal			
	Service Connections	No.	336340	50.45
	11 kV lines	km	210	6.24
	LT lines			
	LT Single Phase	km	1770	25.49
	LT 3 Phase	km	1169	27.00
	1 Phase to 3 Phase Conversion	km	1767	21.56
	Installation of Distribution Transformer	No.	1039	12.68
	Faulty Meter Replacement	No.	412827	20.64
	Street light installation	No.	36560	5.12
	Total Amount (1)			169.18
2	People's Participation Schemes			24.12
3	APDRP Works (Additional Central Assistance to APDRP)			75.31
4	RGGVY			126.46
5	Capital City Development			4.60
6	Tsunami Projects(TRP)			12.25
7	Improvement of Quality power supply in - Municipalities and Corporations-Implementation of SCADA , GIS and Networking			4.33
8	Tsunami Emergency Assistance Projects			9.16
9	High voltage distribution system			1.00
10	Re-conductoring of old LT lines			5.38
11	Power factor compensation using shunt and series capacitors			0.50
12	Introducing automatic voltage boosters in select areas of low voltage as an interim measure			4.08
13	TCMS			1.00
14	Automatic Meter Reading System			1.00
15	Infrastructure for improving Customer care			1.00
16	Special scheme for providing service connections to socially and economically backward sections		50000	25.00
	Total (2 to 16)			295.19
	Grand Total			464.36

The scheme wise details of the capital outlay for generation, transmission and distribution sectors are given in Annexure-A.

CHAPTER - 4

ESTIMATE OF CONSUMPTION OF ENERGY

4.1 Consumer Profile.

In the ARR for 2006-07, the Board had estimated the aggregate sale of energy as 10064.55 MU for 2005-06 and 10796.34 MU for 2006-07. The overall annual growth rate expected during 2005-06 and 2006-07 were 7.25% and 7.27% respectively over the previous years. But the actual sale of energy in 2005-06 was 10269.8 MU showing an increase of 9.43% over 2004-05. The increase in the sale of energy during 2005-06 is mainly due to:

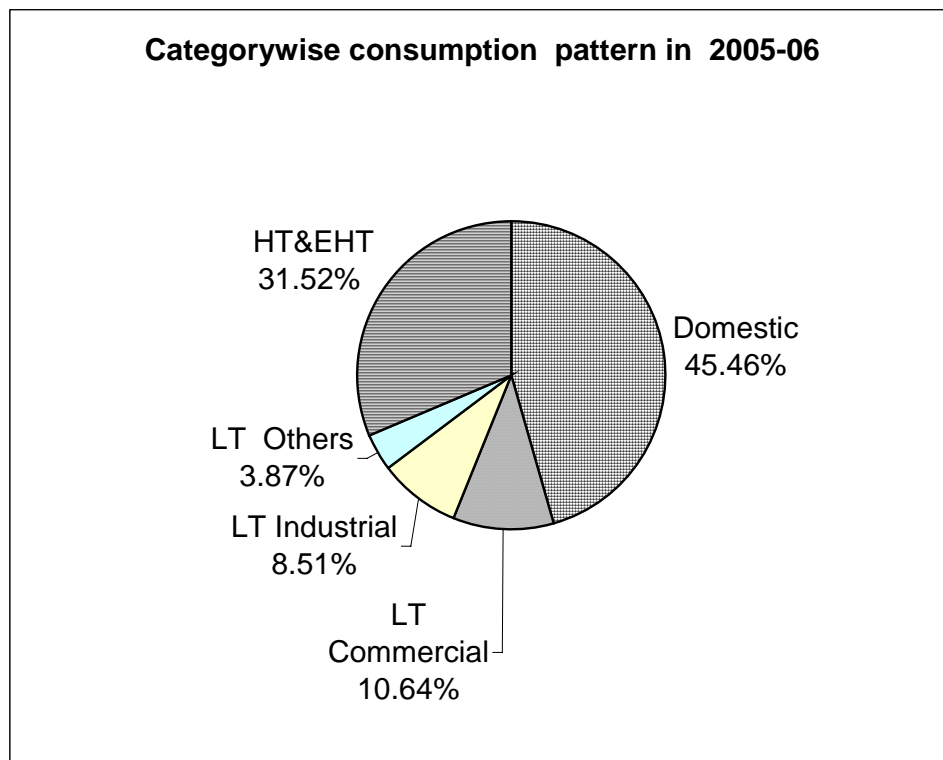
- a. Board's initiative for providing more number of connections
- b. Efforts to provide power at better voltage with minimum interruptions.
- c. Avoiding of power cut and load shedding during the year.
- d. Good frequency profile of the power system.

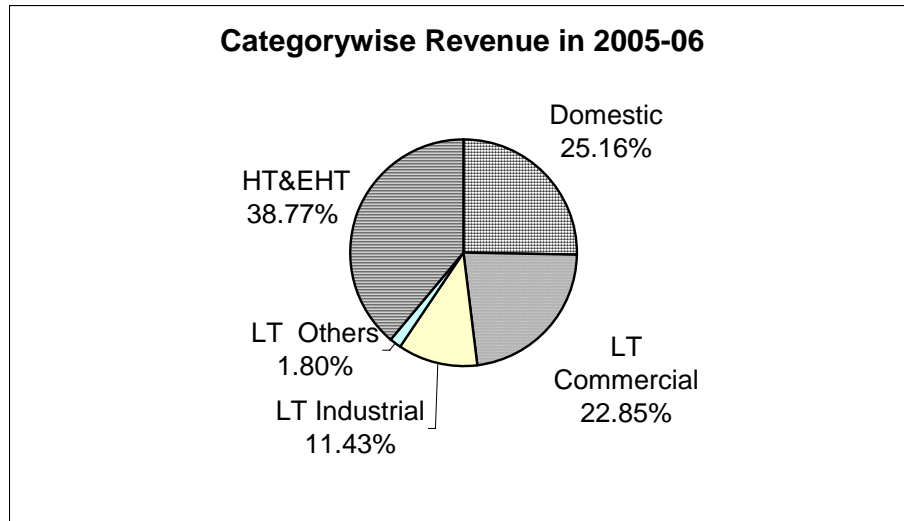
The category wise consumer strength and the quantum of energy consumed by them during 2005-06 are given below.

Table - 4.1
Consumer Profile as on 31.3.2006

Category	Number of consumers as on 31.3.2006	% of total consumers	Consumption in MU	% of total consumption	Revenue Rs.in Crore	% of total revenue
Domestic	6545692	78.91	4668.36	45.46	797.66	25.16
LT Commercial	1202468	14.50	1092.66	10.64	724.44	22.85
LT Industrial	119021	1.43	873.90	8.51	362.41	11.43
LT Others	425896	5.13	397.35	3.87	56.96	1.79
HT & EHT including Railway Traction and Bulk supply	2004	0.03	3237.53	31.52	1229.32	38.77
Total	8295081	100.00	10269.80	100.00	3170.79	100.00

It is observed that when the Domestic consumers accounted for 79% of the total number of consumers and consumed energy to the extent of 45.5%, the HT & EHT consumers accounted for only 0.03% and consumed 32% of the total energy sold by the Board . Thus, the Domestic consumers, though constitute the largest group and avail power at low voltage, consume about 46% of the total energy, contribute to greater loss of energy and peak hour demand to the electricity system and account for only about 25% of the total revenue of the Board. The HT & EHT consumers consuming 32% of the energy account for about 39% of the revenue. Industrial consumption in the State has started showing improvement. LT industries segment has shown 3.5% consumer growth with 8% growth in per capita consumption. When HT & EHT segment is appraised in the same terms, there is 7.2% increase in the segment wise consumption. A pictorial representation of consumption pattern and revenue earnings is given below.





4.2. Methodology of assessment of energy consumption

The consumer category wise consumption of energy was estimated on the basis of prior period data as done in the previous years. The results so obtained are very close to reality and hence the same methods are applied now. Different factors affecting consumption of energy and considered for the estimation are:

- i. Existing consumer strength and yearly growth,
- ii. Regional characteristics of consumers within the State of Kerala.
- iii. Seasonal variations and
- iv. Change in consumer habits.

Actual growth rate in the number of consumers and month-wise consumption in each category of consumers during the previous year and first half of the current year were adopted for projecting the consumption of next year.

As the Electrical Circles are distributed across the State, the circle wise analysis when integrated with the State level projections, provide due weightage of all regional factors. So the circle wise and consumer category wise historical data cover the regional as well as category wise variations.

The role of seasons and variation among calendar months were taken care of by analyzing the change of category wise consumption from month to

month. Change pattern from first half of the year to second half in the immediate preceding year was used to estimate the second half-year consumption of the current year.

The estimation based on the above method has covered influence of the factors and facilitated to arrive at the realistic energy consumption values. Comparison of the previous year's estimate with the actuals is given in the Table - 4.2.

4.3. Consumption of energy in 2005-06

The major category of consumers are domestic, commercial, LT industrial and HT & EHT industrial consumers. The category wise energy consumption for the year 2005-06 was estimated in November 2005 by taking into consideration of the half yearly actuals upto September 2005. The consumption of energy by the Domestic consumers in 2005-06 was estimated at 4609.00 MU, but the actual consumption was 4668.36 MU showing only 1.28% variation from the projection. In the case of Commercial category, the estimated consumption was 1038 MU but the actual consumption was 1092.66 MU. Generally all the category-wise consumption during 2005-06 is very close to KSEB's estimate. The overall sale was within 2% from the quantity projected by the Board.

The actual consumption by all categories of the consumers in 2005-06 was 9.43% higher than that of the previous year as summarized in the table below.

Table - 4.2
Category wise consumption in 2004-05 and 2005-06

Million Units

Category	2004-05	2005-06		
	Actual	SERC approved	Revised estimate	Actual
Domestic	4262.30	4541.00	4609.00	4668.36
Commercial	947.60	974.00	1038.00	1092.66
Industrial	782.90	873.00	820.00	873.90
Irrigation & Dewatering	190.80	202.00	195.00	189.57
Public Lighting	182.70	188.00	197.00	207.78
LT Total	6366.30	6778.00	6859.00	7032.27
HT-I Industrial	1238.20	1241.00	1340.00	1362.24
HT-II Non Industrial/ Non Commercial	141.00	150.00	129.00	130.11
HT-IIB				0.02
HT-III - Agriculture	9.40	8.00	10.00	9.54
HT-IV - Commercial	338.70	368.00	368.00	377.87
EHT	1035.70	1032.00	1017.00	1003.75
Railway Traction	43.60	56.00	56.00	57.94
Bulk supply	211.50	200.00	285.55	296.06
Grand Total	9384.40	9833.00	10064.55	10269.80

4.4 Consumption of energy in 2006-07

While preparing the ARR for 2006-07, consumption of energy for 2006-07 was estimated at 10796.34 MU. Considering the actual sale of energy in 2005-06 and the sale upto September 2006, the total sale of energy for 2006-07 is re-estimated at 11250.10MU as given in the following table.

Table- 4.3
Category wise consumption for 2006-07

in Million Units

Category	ARR Estimate	S E R C approved	Revised Estimate
Domestic	5002.00	5002.00	5175.00
Commercial	1145.00	1165.00	1230.00
Industrial	863.00	863.00	950.00
Irrigation & Dewatering	205.00	205.00	205.00
Public Lighting	205.00	205.00	229.00
LT Total	7420.00	7440.00	7789.00
HT-I Industrial	1430.00	1460.00	1468.00
HT-II Non Industrial/ Non commercial	141.07	141.00	132.00
HT IIB			0.10
HTIII- Agriculture	10.27	10.00	10.00
HT IV Commercial	394.00	400.00	416.00
EHT 66 KV	313.94	314.00	306.00
EHT 110KV	715.00	720.00	733.00
Railway Traction	61.00	61.00	65.00
Bulk Supply	311.06	314.00	331.00
Grand Total	10796.34	10860.00	11250.10

Considering the actual sale of energy in 2005-06 and the sale upto September 2006 the sale in low tension (LT) consumers is expected to grow at 10.76 % in 2006-07 as against 10.46% in 2005-06. In the case of EHT Industrial, the actual sale up to September06 showed an increasing trend in EHT 110KV and hence the consumption is re estimated from 715 MU to 733MU. An overall growth of 9.55 % from previous year is expected in 2006-07 as against the corresponding figure of 9.43% in 2005-06.

4.5 Consumption of energy in 2007-08

The estimated consumption of energy in 2007-08 has been computed more or less at the same growth rate witnessed in 2006-07. The following table summarises the estimated consumption for 2007-08 vis-a-vis the revised estimate for 2006-07 and actual of 2005-06.

Table - 4.4
Category wise consumption

in Million Units

Category	2005-06	2006-07	2007-08
	Actual	Revised estimate	Estimate
Domestic	4668.36	5175.00	5700.00
Commercial	1092.66	1230.00	1390.00
Industrial	873.90	950.00	1030.00
Irrigation & Dewatering	189.57	205.00	237.00
Public Lighting	207.78	229.00	252.00
LT Total	7032.27	7789.00	8609.00
HT I Industrial	1362.24	1468.00	1563.00
HT II Non Industrial Non Commercial	130.11	132.00	138.00
HT IIB	0.02	0.10	0.10
HTIII -Agriculture	9.54	10.00	11.00
HT IV- Commercial	377.87	416.00	464.00
EHT 66 KV	289.97	306.00	328.00
EHT 110 KV	713.78	733.00	756.00
Railway Traction	57.94	65.00	74.00
Bulk supply	296.06	331.00	351.00
Grand Total	10269.80	11250.10	12294.10
Increase over the previous year	885.40	980.29	1044.00

An overall growth of 9.28% is expected for 2007-08. The projection of 12294.10 MU is reasonable and hence may please be approved by the Hon'ble Commission.

CHAPTER – 5

AGGREGATE TECHNICAL & COMMERCIAL (AT & C) LOSSES

5.1 Introduction

The energy loss in the KSEB system is accounted as internal loss and the energy loss during wheeling of the power purchased from the Central Generating Stations (CGS) as external loss. The internal loss is the difference between net Ex. bus energy generated and power purchased and the energy sold. External energy loss is the transmission loss in the PGCIL transmission lines between the Central Generating Stations bus and KSEB bus. Even though KSEB has no control on the external loss, the energy from the CGS is to be scheduled at the CGS bus and KSEB has to pay for the same. The ex-bus energy in the KSEB system is the sum of internally generated energy minus auxiliary consumption and the power purchased minus external loss. There was an external loss of 3.88% during 2005-06 and 4.5% for the current year (2006-07) upto September.

5.2 Transmission and Distribution loss

The Transmission and Distribution Losses (T&D) of a system can be classified in to two components. (1) Technical Losses and (2) Commercial losses. The technical losses include the inherent losses in the transmission and distribution systems upto the point of supply at the' premises of consumers. Commercial losses include losses such as theft of power, errors in billing and collection etc other than technical factors.

Technical loss reduction

Technical loss reduction is an area where KSEB continues to give due focus. It is roughly estimated that the losses in the transmission system of voltage level below 220 KV is about 5% of the total energy input. The remaining technical losses are contributed by the distribution system. So KSEB has been taking efforts to strengthen the primary and secondary distribution system through

- (a) Constructing more high voltage distribution system which will improve the HT:LT ratio as well as reduce distribution loss.

- (b) Strengthening of sub transmission network by upgrading voltage levels of distribution feeders from 11kV to 33kV.
- (c) Re-conductoring of old LT lines.
- (d) Using higher size conductors at the substation end of 11kV feeders.
- (e) Power factor compensation using shunt and series capacitors.
- (f) Introducing automatic voltage boosters in select areas of low voltages.
- (g) Rearrangement of LT feeders to avoid overloading as well as under loading of distribution transformers.
- (h) Reducing length of LT lines by suitable relocation of distribution transformers.
- (i) Introducing amorphous core transformers for reducing core losses.
- (j) Introducing the concept of 'less LT' system in select areas.
- (k) Balance the load on distribution feeders through regular monitoring.
- (l) Energy audit at transformer level and fixing of responsibility.

Even though the ideal ratio of HT-LT line for a power system is 1:1 in the State of Kerala, the ratio is about 1:6. This is mainly due to the topography especially in the hilly areas and dispersed pattern of housing in rural areas in the State. A sudden transition in HT-LT ratio from the present level of 1:6 to 1:1 is not possible due to variety of reasons ranging from availability of required capital to other constraints in the physical implementation.

Further, it may also please be noted that the construction of HT lines requires way leave clearance at least to a width of 4 metres for 11 kV lines. It is more in the case of higher voltage of lines. Construction of 11 kV lines to the tune of 1,75,000 km would involve a way leave clearance over about 68,000 hectares of land. In a State like Kerala where density of population is highest in the country and is covered by thick vegetation, it is extremely difficult to achieve the ideal situation in a short span of time. Therefore, being a highly capital intensive work involving innumerable collective and individual resistance at local level, the reduction in technical loss thereon should be realistically worked out.

However, during the 11th plan, Board is targeting to improve the HT-LT ratio from the present level of 1: 6 to 1:4.

5.3 AT&C loss reduction during 2001-02 to 2005-06

As mentioned earlier, KSEB has been giving more thrust on commercial loss reduction through the following efforts.

- Refining the method of estimation of the losses.
- Replacement of faulty and sluggish electromechanical meters by electronic meters.
- Intensification of theft detection by the anti power-theft squad.
- Computerisation of billing and revenue collection.
- Conducting energy audit wherever feasible.
- Development of transmission and distribution systems.
- Conducting loss analysis at circle level.
- Installing transformer, feeder and border meters to determine the loss points.
- Giving incentives for load factor and power factor improvements.

The number of faulty meters replaced during the last few years is given below:

Year	Faulty meter replacements (Nos)
2002-03	4.21 Lakh
2003-04	8.67 Lakh
2004-05	4.35 Lakh
2005-06	6.38 Lakh
2006-07 (Up to Sep-06)	1.02 Lakh

The performance of Anti Power Theft Squad during 2001-02 to 2005-06 is given below:

Year	No of Inspections	Amount Assessed (Rs.Crore)	Amount Realised (Rs.Crore)
2001-02	6215	5.69	3.45
2002-03	7888	17.48	3.82
2003-04	14354	12.27	5.24
2004-05	10287	40.46	8.11
2005-06	15611	21.69	9.82
2006-07 (upto Sep-06)	7459	7.83	7.01

The Board constructed more substations and lines during the last three years for reducing the technical loss, as detailed below:

Particulars	2003-04	2004-05	2005-06
Substations (No.)			
220 kV	1	1	1
110 kV	6	8	4
66 kV	3	2	4
33 kV	7	15	10
Lines (Km)			
220 kV	4.3	15	56
110 kV	154.6	30	55
66 kV	8.4	5	13
33 kV	95.4	157	131

Through these efforts, the AT&C loss in the system has been reduced from 30.76% in the year 2001-02 to 22.96% in 2005-06, details of which are given below:

Year	Gross Loss			Internal loss in the KSEB system		
	Total Loss (MU)	% of reduction	Extent of reduction (%)	Total Loss (MU)	% of reduction	Extent of reduction (%)
2001-02	4106.05	32.15		3850.99	30.76	
2002-03	3877.84	30.41	1.73	3639.03	29.08	1.68
2003-04	3544.53	28.46	1.95	3370.03	27.44	1.64
2004-05	3335.32	26.22	2.24	3120.39	24.95	2.49
2005-06	3349.16	24.59	1.63	3061.42	22.96	1.99

5.4 Target of loss reduction in 2005-06 and 2006-07

The Board will continue to intensify the measures for reduction of AT & C loss during 2006-07 and 2007-08 so as to bring further down the losses by the following measures:

- (i) Faulty meter replacements
 - During the year 2006-07, the Board has target to replace 4 lakh of faulty meters and so far (upto September 2006) 1.02 lakh faulty meters have been replaced.
 - In 2007-08, the target is to replace 4.13 lakh faulty meters.
- (ii) Intensification of theft detection

During the year 2006-07, upto September -2006, APTS has detected 7459 cases of theft involving a penal assessment of

Rs.7.83 Crore out of which Rs.7.01 Crore has already been realised. The Board shall continue the efforts of theft detection.

(iii) Installation of new substations and lines

The Board has plan to construct the following number of substations in 2006-07 & 2007-08

	2006-07	2007-08
Substations (Nos.)		
220 kV	1	2
110 kV	5	11
66 kV	4	1
33 kV	20	11
Lines (km)		
220 kV	2.4	39.0
110 kV	115.7	166.0
66 kV	33.3	40.0
33 kV	170.5	175.0

(iv) The ongoing and the proposed works in the distribution sector during 2006-07 and 2007-08 is given below:

Particulars	2006-07	2007-08
11 kV line (km)	2000	3427
LT line (km)	10000	4043
Distribution transformers (Nos)	3000	2009

(v) For the year 2007-08, provision has been made for strengthening of sub transmission and distribution network through the APDRP schemes under city schemes, covered in the three major cities, Trivandrum, Kochi and Kozhikode. This scheme includes supply of Ring Main Units (RMU) and accessories, installation, cable termination, testing and commissioning of RMUs, installation, joining, testing and commissioning of 11kV cables, supply of distribution transformers and accessories, installation, cable termination, testing and commissioning of distribution transformers etc.

(vi) Under Rajiv Gandhi Grameen Vidyuthikaran Yojana (RGGVY) Scheme covered in the seven districts of Idukki, Palakkad, Malappuram, Kozhikode, Wayanad, Kannur and Kasargod, about

2440 Nos distribution transformers, 2653.7 kms of 11 kV lines, 895.4km of LT single phase lines, 209.1km of LT three phase lines are targeted for implementation. Also, under these schemes, 61094 Nos. of BPL connections and 52567 Nos. of APL connections are targeted during 2007-08.

Despite these efforts, the loss reduction anticipated in the KSEB system during the year 2006-07 is about 1.41% only. Considering the ongoing and proposed efforts in technical and commercial loss reduction, the Board has set a target of 1.83% during the year 2007-08.

The actual energy losses in KSEB system during the period from 2001-02 to 2005-06 and the estimated losses in 2006-07 and 2007-08 are given below.

Table - 5.1
AT & C loss reduction

Sl. No.	Items	2001-02 (Actual)	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (Prov.)	2006-07 (Revised)	2007-08 (Estimate)
1	KSEB own Generation							
1.(a)	Energy generated (MU) (gross incl. Hydro, Wind, KSEB thermal)	7142.18	5475.74	4488.06	6377.06	7600.78	7704.60	7224.59
1.(b)	Aux. Consumption (MU)	45.63	44.97	48.10	48.08	46.42	42.17	40.48
1.(c)	Net energy generation(MU)	7096.55	5430.77	4439.96	6328.98	7554.36	7662.43	7184.11
2	Power Purchase							
2.(a)	Total Power purchase (MU) (including External loss)	5676.82	7320.37	8015.41	6390.74	6700.27	7804.37	8489.93
2.(b)	External Loss (MU)	255.06	238.81	174.50	214.93	287.64	346.61	359.44
2.(c)	Power purchase at KSEB bus (MU) 2(a) - 2 (b)	5421.76	7081.56	7840.91	6175.81	6412.63	7457.76	8130.49
3	Total energy generated and power purchased by KSEB (MU) 1(c) + 2(a)	12773.37	12751.14	12455.37	12719.72	14254.63	15466.80	15674.04
4	Energy sales through NVVN & PTC (displacement mode) (MU)					635.90	780.01	0.00
5	Net Energy generated & purchased for KSEB (MU) (3) - (4)	12773.37	12751.14	12455.37	12719.72	13618.73	14686.79	15674.04
6	Energy sales with in the State (MU)	8667.32	8873.30	8910.84	9384.40	10269.80	11250.00	12294.00
7	Total energy loss (MU) (5) - (6)	4106.05	3877.84	3544.53	3335.32	3348.93	3436.79	3380.04
8	Total energy Loss (%) (7)/(5)	32.15	30.41	28.46	26.22	24.59	23.40	21.56
9	Extent of Reduction (%)		1.73	1.95	2.24	1.63	1.19	1.84
10	Energy generated and Power purchase to the KSEB system (excl. external loss) (MU) 1 (c) + 2(c) - 4	12518.31	12512.33	12280.87	12504.79	13331.09	14340.18	15314.60
11	Energy loss in the KSEB system (internal) (MU) (10) - (6)	3850.99	3639.03	3370.03	3120.39	3061.29	3090.18	3020.60
12	Internal energy loss (%) (11)/(10)	30.76	29.08	27.44	24.95	22.96	21.55	19.72
13	Extent of Reduction in the KSEB system (%)		1.68	1.64	2.49	1.99	1.41	1.83

CHAPTER - 6

REVIEW OF GENERATION AND POWER PURCHASE MADE DURING THE YEAR 2006-07

6.1 Review of Energy consumption

The sale of energy as well as the total energy requirement at generation end have shown an increasing trend during the year 2006-07. A comparison of the monthly energy consumption at the generation end during the last three years from 2004-05 is given below.

Table - 6.1
Monthly Energy Consumption

Month	2004-05	2005-06		2006-07		Remarks
	Actual (MU)	Actual (MU)	Increase over previous year (%)	Total consumption at Generation end (MU)	Increase over previous year (%)	
Apr	1060.8	1119.1	5.5	1263.6	12.9	Actual
May	983.7	1212.5	23.3	1226.7	1.2	
Jun	956.0	1050.5	9.9	1154.2	9.9	
Jul	1035.5	1038.8	0.3	1160.0	11.7	
Aug	1011.2	1113.8	10.2	1215.5	9.1	
Sep	1044.8	1074.1	2.8	1171.2	9.0	
Oct	1055.7	1159.7	9.9	1233.4	6.4	
Nov	1050.3	1101.8	4.9	1179.0	7.0	Anticipated
Dec	1118.6	1160.3	3.7	1241.5	7.0	
Jan	1133.8	1187.8	4.8	1270.9	7.0	
Feb	1047.1	1115.3	6.5	1193.4	7.0	
Mar	1222.2	1287.0	5.3	1377.1	7.0	
Total	12719.8	13620.7	7.1	14686.5	7.8	

During this year from April-2006 to October-2006, actual monthly growth is 8.6% in energy consumption and expects a growth of 7% during the remaining months from November-2006 to March 2007. This increase in energy consumption is mainly because of

- Efforts taken by the Board to provide more electricity connections. During the last two years, KSEB had given an average of 5 lakh new service connections and targeted to provide 5 lakh new connections during the year 2006-07 also.
- KSEB's effort to provide quality power at proper voltage and with

minimum interruptions. There was no scheduled power cut and load shedding during the year.

- Good frequency profile of the power system.

6.2 Review of Hydel Generating Stations of KSEB

As on 01-11-2006, KSEB had 24 hydel energy generating stations with a total installed capacity of 1842.6 MW. The hydel stations of KSEB can be grouped into four categories on the basis of the storage capacity of the reservoirs. The details of the four groups are given in tables 6.2, 6.3, 6.4 and 6.5.

Table - 6.2

Group-1 Hydel stations with high storage capacity

Sl. No.	Name of station	Installed capacity (MW)	Reservoir details			Generation details as per Design		Remarks
			Storage Capacity (Mm ³)	Annual yield of water from own catchment (Mm ³)	Storage capacity as percentage of yield	Annual Generation (MU)	PLF (%)	
1	Idukki	780	1460.0	1629.7	90	2398.0	35.1	
2	Idamalayar	75	1017.8	1520.0	67	380.0	57.8	
3	Sabarigiri	300	477.5	829.6	58	1338.0	58.0	Pamba & Kakki reservoirs
4	Sholayar	54	149.2	349.5	43	233.0	49.3	Assured release from Tamilnadu as per PAP agreement.
5	Kakkad	50		-	-	262.0	59.8	Tailrace of Sabarigiri
6	Kallada	15	488.5	-	-	65.0	49.5	Reservoir owned by Irrigation Department
7	Peppara	3	65.0	-	-	11.5	43.8	
	Total	1277	3658.0	4328.8	71	4687.5	41.9	

Table - 6.3
Group-2 Hydel stations with low storage capacity

Sl. No.	Name of station	Installed capacity (MW)	Reservoir details			Generation details as per Design		Remarks
			Storage Capacity (Mm ³)	Annual yield of water from own catchment (Mm ³)	Storage capacity as percentage of yield	Annual Generation (MU)	PLF (%)	
1	Panniar	30.0	96.37	357.84	27.0	158.0	60.1	Anayirankal & Ponmudi reservoirs
2	Pallivasal	37.5	63.01	216.75	29.0	284.0	86.5	Kundala & Mattupatty reservoirs
3	Kuttiadi	75.0	33.99	205.30	17.0	248.0	37.7	Same reservoir
4	Kuttiadi-Extension	50.0				75.0	17.1	
5	Sengulam	48.0	1.61	-	-	182.0	43.3	Tail race of Pallivasal
	Sub total	240.5	193.37	779.89	24.8	947.0	45.0	

Table - 6.4
Group-3 Run off the river Stations

Sl. No.	Name of station	Installed capacity (MW)	Reservoir details			Generation details as per Design	
			Storage Capacity (Mm ³)	Annual yield of water from own catchment (Mm ³)	Storage capacity as percentage of yield	Annual Generation (MU)	PLF (%)
1	Neriamangalam	45	5.56	189.41	3.00	237	60.3
2	Lower Periyar	180	4.55	284.60	2.00	493	31.4
3	Poringalkuthu	32	30.36	766.00	4.00	170	60.8
4	Poringalkuthu-LB	16				74	52.9
	Total	273	40.47	1240.01	3.20	974	40.8

Table 6.5
Group-4 Small Hydel Plants

Sl. No.	Name of station	Installed capacity (MW)	Annual Energy as per Design	PLF as per design (%)
1	Madupatty	2.00	6.40	36.5
2	Malampuzha	2.50	5.60	25.6
3	Chempukadavu-1	2.70	6.59	27.9
4	Chempukadavu-2	3.75	9.03	27.5
5	Urumi-1	3.75	9.72	29.6
6	Urumi-2	2.40	6.25	29.7
7	Malankara	10.50	65.00	70.7
8	Lower Meenmutty	3.50	7.63	24.9
	Total	31.10	116.22	

In addition to these, two units of Neriamangalam HEP were upgraded from 15 MW to 18MW and two units of Sabarigiri HEP have been upgraded to an additional capacity of 15 MW (one unit from 50MW to 60MW and another unit from 50MW to 55MW).

6.3 Hydel Generation

During the current year 2006-07, Kerala has received very good rainfall (especially the second monsoon) which resulted in good inflow into KSEB reservoirs. The target of hydel generation for the year 2006-07 was revised from the ARR figure of 6789.4MU to 7457.7 MU. The month wise estimate of hydel generation as given in the ARR 06-07 and the actual generation from April-06 to October-06 and the targeted hydel generation from November 2006 to March 2007 are given below.

**Table. 6.6
Hydel Generation in the Year 2006-07**

in Million Units

Month	As per ARR	Actual	Anticipated	Remarks
Apr	658.5	726.6		
May	680.5	637.7		
Jun	537.9	659.4		
Jul	555.8	652.2		
Aug	555.8	560.5		
Sep	537.9	547.7		
Oct	555.8	631.0		
Nov	537.9		579.0	Estimate based on the current reservoir position and expecting average inflow for the remaining months
Dec	555.8		631.2	
Jan	555.8		631.2	
Feb	502.0		570.1	
Mar	555.8		631.2	
Total	6789.4		7457.7	

6.4 Power Purchase from Central Generating Stations (CGS)

The present allocation from Central Generating Stations (CGS) as on 01-11-2006 is as follows:

**Table - 6.7
Allocation from CGS as on 01-11-2006**

Sl. No.	Power Plant	Total capacity in operation (MW)	Firm allocation (%)	Allocation (including unallocated share) (%)	Allocated Capacity to KSEB (MW)
1	Talcher - II	2000	23.00	23.00	460
2	NLCII - Stage I	630	10.00	11.63	73
3	NTPC (RSPTS)	2100	11.70	14.74	310
4	NTPC- RSTPS- New	500	12.20	15.77	79
5	NLC – Expansion	420	14.00	18.53	78
6	NLCII - Stage II	840	10.70	12.32	103
7	MAPS	340	5.30	6.27	21
8	Kaiga	440	8.60	13.12	58
9	Eastern region (Unallocated portion)				0
	Total	7270			1182

6.5 Availability of energy and variable cost of generation of CGS

The availability of energy from CGS based on the CERC norms on target availability and the average variable cost of power from CGS are given below:

Table - 6.8
Energy availability from CGS

Sl No.	Power Plant	Aux Consumption (%)	Target PLF (%)	Avg. energy availability (MU/day)	Average variable cost (April-06 to Sep-06) (Rs/kWh)
1	Talcher – II	8.5	80	8.1	0.64
3	NTPC (RSPTS)	8.5	80	5.4	1.04
4	NTPC- RSTPS- New	8.5	80	1.4	1.04
5	NLC – Exp	10.0	77	1.3	1.14
2	NLCII - Stage I	10.0	77	1.2	1.20
6	NLCII - Stage II	10.0	77	1.7	1.20
7	MAPS	10.0	40	0.2	2.18*
8	Kaiga	10.0	75	0.9	3.20*
9	Eastern region	8.5	80	0.0	1.15
	Total			20.3	

*Including fixed cost

At the present level of allocation and availability, the total quantum of energy that will be available from the CGS is 20.30 MU per day. But normally, the average daily availability of energy from CGS is more than the estimate made based on the norms, because of the higher PLF of the stations than the CERC norms. The average variable cost of CGS is ranging from Rs.0.64 per unit to Rs.1.20 per unit (except nuclear stations- Kaiga and MAPS).

6.6 Scheduling of Generation and Power Purchase in 2006-07

As explained in section 6.3, this year the rainfall received in the State is better in comparison to many of the previous years and the inflow being received in the KSEB hydel reservoirs is also better.

KSEB has been giving maximum efforts to optimally utilize the water available in the reservoirs. During the monsoon months of the year, KSEB has been continuously operating the runoff the river plants and plants with minimum storage at full capacity, so that the spill could be avoided/

minimised.

Since the variable cost of generation from CGS is in the range of Rs.0.64 to Rs.1.20 per unit, KSEB has been availing the full allocation from CGS (except some contingencies during spilling) and efforts were taken to sell the surplus energy available if any. The MAPS and Kaiga are nuclear power stations and they are out of the purview of ABT. So, even though the cost of generation from these stations are higher, KSEB has no flexibility in reducing the generation from these stations, but forced to avail the full allocated share from these plants irrespective of costs.

Due to the high price of Naphtha and LSHS, KSEB has been avoiding the scheduling of generation of energy from BSES- Kochi, KPCL- Kasargod and NTPC–Kayamkulam during the year. But in order to meet the peak load requirement and to increase the system reliability, KSEB has been scheduling about 40MW from BDPP and about 60 MW from KDPP during peak hours.

6.7 Availability of Surplus Power during the year 2006-07

With the increased hydel generation on account of good monsoon received in 2006-07 and also on account of the better utilization of allocation from CGS, KSEB has experienced availability of surplus energy during 2006-07. The estimated availability of surplus power in 2006-07 is given below:-.

Table - 6.9
Details of surplus power

Sl. No.	Internal Generation	Million Units
(I)	Hydel generation	7457.67
(ii)	KSEB thermal generation	243.92
(iii)	Wind	3.00
(iv)	Total Internal Generation	7704.60
	Less Auxiliary consumption	43.39
(v)	Power purchase from CGS	7729.54
(vi)	Power purchase from IPPs	74.83
(vii)	Total Energy Availability	15465.58
(viii)	Energy requirement (with in the State)	14685.56
(ix)	Surplus	780.01

The month wise details of surplus power are as follows:-

Table - 6.10
Month wise details of surplus power

Month	Surplus energy (MU)	Remarks
Apr-06	174.6	Actual
May-06	135.1	
Jun-06	116.8	
Jul-06	127.2	
Aug-06	32.4	
Sep-06	72.3	
Oct-06	71.9	
Nov-06	27.5	
Dec-06	22.2	
Jan-07	0.0	
Feb-07	0.0	
Mar-07	0.0	
Total	780.0	

This includes the sale of 48.35 MU and 26.14MU from BSES-Kochi to TNEB during April-06 and May-06 respectively at variable cost plus comfort charge of 51 paise per unit.

KSEB has been exploring the ways to sell the surplus energy. The various options available before KSEB to manage the surplus energy are

- (i) Sale of the surplus power to other States through traders.
- (ii) Export of power as UI to the grid and
- (iii) Reduce the schedule of allocated power from CGS.

But, the average frequency profile of the grid during the monsoon period was in the range of 49.7 to 49.8Hz and the corresponding UI rates Rs.2.45 to Rs.2.10 per unit respectively. As mentioned earlier, the average variable cost of power from CGS during the year is in the range of Rs.0.64 to Rs.1.20 per unit. But, the traders M/s NVVN, a subsidiary of NTPC and M/s.PTC had offered very competitive rates ranging from Rs.3.60 per unit to Rs.4.35 per unit during the period from April-06 onwards for the surplus energy available with KSEB, and this option i.e., sale of surplus power through power traders is better than the other two options.

6.8 Sale of surplus power to other States

As in 2005-06, during 2006-07 also, KSEB has been exploring the

possibility of selling the surplus power to other States at competitive rates through the power traders, with the approval of KSERC and the State Government. KSEB has been selling the surplus power through the Central Public Sector undertakings such as NTPC Vidyut Vyapar Nigam Limited (NVVN) and Power Trading Corporation (PTC) from April-2006 onwards and the details of energy sold are given below :-

Table - 6.11
Details of energy sold through NVVN and PTC

Month	Sale through NVVN			Sale through PTC			Total		
	Unit sold (MU)	Unit Rate (Rs/kWh)	Amount (Rs.Cr)	Unit sold (MU)	Unit Rate (Rs/kWh)	Amount (Rs.Cr)	Unit sold (MU)	Unit Rate (Rs/kWh)	Amount (Rs.Cr)
Apr-06	126.19	3.60	45.43				126.19	3.60	45.43
May-06	108.95	4.25	46.30				108.95	4.25	46.30
Jun-06	114.76	4.25	48.77	2.01	4.25	0.86	116.77	4.25	49.63
Jul-06	90.51	4.25	38.47	36.69	4.25	15.60	127.20	4.25	54.06
Aug-06	26.30	4.30	11.31	6.15	4.30	2.64	32.45	4.30	13.95
Sep-06	33.25	4.30	14.30	39.06	4.30	16.80	72.31	4.30	31.09
Oct-06	45.33	4.30	19.49	26.62	4.30	11.44	71.95	4.30	30.94
Total	545.28	4.11	224.07	110.53	4.28	47.34	655.81	4.14	271.40

Due to the very high variable cost for the power from BSES-Kochi (due to the exorbitant price of Naphtha), KSEB was not scheduling power from there for own energy requirement and has been exploring the possibility to sell unutilized power from BSES at variable cost plus comfort charges. Thus KSEB was able to sell the energy from there to TNEB at variable cost plus a comfort charge of 51 paise per unit during April-06 and May-06 as detailed below.

Table - 6.12
Details of energy sold from BSES to TNEB.

Month	Sale to TNEB	Energy Charges		Comfort charges		Total amount
	(MU)	Rs/unit	(Rs.Cr)	Rs/unit	(Rs.Cr)	(Rs. Cr)
Apr-06	48.35	5.75	27.80	0.51	2.47	30.26
May-06	26.14	6.30	16.48	0.51	1.33	17.81
Total	74.49		44.27		3.80	48.07

As directed by the Commission, KSEB has invited offers from all traders of F-category for the sale of surplus power during the remaining months of the

year from November-2006. M/s PTC has offered a rate of Rs.5.765 per unit for a continuous off-peak sale of 19 hours from 23:00 hours to 18:00 hours per day and a rate of Rs.5.51 per unit for a period of 7 ½ hours from 23:00 hours to 5:30 hours and 17:00 hours to 18:00 hours at Kerala periphery. Even though they have offered better rates, the actual sale was far below the agreed quantum. The proposed sale of surplus power during November and December 2006 is given below.

Table - 6.13
Proposed surplus sale during remaining part of 2006-07

Month	Energy (MU)	Rate (Rs/kWh)	Amount (Rs.Cr)
Nov-06	27.53	5.76	15.86
Dec-06	22.17	5.76	12.77
Total	49.70		28.63

6.9 Generation and power purchase schedule for the remaining period of the year 2006-07

With the present hydro storage status in the reservoirs and also expecting an inflow equivalent to the average of past 10 years during the remaining period of the current water year (2006-07), KSEB expects to have an average hydel generation of 20.36 MU per day during the remaining part of the financial year.

Based on the present allocation from the CGS and with reference to the CERC norms for target availability and auxiliary consumption, the average quantum of energy expected to KSEB from CGS is 20.30 MU per day.

Expecting normal increase in peak demand during summer months, KSEB proposed to schedule about 40MW from BDPP and 60 MW from KDPP for two hours per day to meet the evening peak demand.

Considering the high variable cost, KSEB does not propose to avail power from NTPC-Kayamkulam, BSES Kochi and KPCL Kasargod during the remaining months of the current financial year, until the variable costs are within permissible limits of the merit order and except during contingencies.

Considering the comparatively lower variable cost of CGS power and

expecting better rates for selling the surplus energy as UI or sale through traders, KSEB propose to schedule the full allocated power from CGS and simultaneously sell the surplus energy through power traders.

The abstract of monthly schedule for the year 2006-07 and the revised source wise generation and power purchase planned as per the above mentioned principles are given in Annexure 6(1) and Annexure 6(2) respectively.

A summary of the generation, power purchase and their utilization in 2006-07 is given below.

**Table - 6.14
Sources and Utilisation of Energy in 2006-07**

Particulars	Actual up to October-2006	Estimate for the rest of 2006-07	Total
Availability			
Generation			
(Incl. Hydro, KSEB thermal & Wind) (MU)	4509.89	3194.71	7704.60
Less Auxiliary consumption	24.40	18.99	43.39
Import (excl. surrender) (MU)	4594.03	3135.51	7729.54
IPPs	74.83		74.83
Total availability (MU)	9154.35	6311.23	15465.58
Utilisation			
Consumption with in the state (MU)	8424.03	6261.53	14685.56
Surplus sale (MU)	730.31	49.70	780.01
Total utilisation of power (MU)	9154.35	6311.24	15465.58

6.10 Benefit of Sale of Surplus Power

Summary of the sale of surplus power effected so far and proposed during rest of 2006-07 are given below.

**Table - 6.15
Benefit through Sale of Surplus Power**

Nature of sale	April-06 to Oct-06		Nov-06 to Mar-06		Total	
	Units	Amount	Units	Amount	Units	Amount
	(MU)	(Rs.Cr)	(MU)	(Rs.Cr)	(MU)	(Rs.Cr)
Sale through NVVN and PTC	655.81	271.40			655.81	271.40
Sale through PTC (bidding route)			49.70	28.63	49.70	28.63
Sale to TNEB (BSES power)*	74.49	3.80			74.49	3.80
Total	730.30	275.20	49.70	28.63	780.00	303.83

* Comfort charges only considered

It may be noted that through the sale of surplus energy to the tune of 780

MU, KSEB was able earn an additional revenue of Rs.303.83 Crore by better utilization of the available resources.

6.11 Revised Cost Estimate for 2006-07

Based on the revised schedule, generation and power purchase schedule and cost for the year 2006-07 is given in Data Form-F2. It can be seen that the revised total generation & power purchase cost for the year 2006-07 is Rs.1862.76 Crore against the earlier estimate of Rs.1689.11 Crore. But, as explained earlier, there is an additional revenue of Rs.303.83 Crore through the surplus sale etc and the net generation and power purchase cost for the year 2006-07 is Rs.1558.93 Crore only. The additional revenue earned by sale of surplus power through the traders has been accounted as revenue from sale of power to other States under the head income from sale of power.

CHAPTER - 7

AGGREGATE REVENUE REQUIREMENT (ARR)

7.1 ESTIMATE OF COST OF GENERATION AND POWER PURCHASE FOR THE YEAR 2007-08

7.1.1 Demand for energy in 2007-08

The detailed estimate of consumption of energy in the year 2007-08 is given in Chapter-4. The sale of energy (consumption) within the State in the year 2007-08 is estimated at 12294 MU. As explained in Chapter-5, KSEB is targeting for a reduction of T&D loss by 1.41% in 2006-07 and 1.83% in 2007-08. Based on the estimated sale of energy and the targeted loss reduction and considering the present level of external loss in the PGCIL lines, the total energy requirement for the year 2007-08 excluding auxiliary consumption is 15674.04 MU. The net energy requirement excluding external loss is 15314.6 MU. The energy to be generated / purchased from different sources viz, KSEB stations, Central Generating Stations (CGS) and IPPs in the year 2007-08 and the associated costs are discussed in this Chapter.

7.1.2 New hydel capacity addition proposed in 2007-08

The details of the existing hydel stations and their capacity has been discussed in Chapter-6. Kuttiadi Addl Extension (100MW, 240MU), Kuttiar diversion (37 MU), Neriamangalam Extension (25 MW, 58MU), Kuttiadi Tail Race (3.75 MW, 15MU) are expected to start commercial operation during the year 2007-08.

Table - 7.1
New Hydel stations

Sl. No.	Name of the station	Installed capacity (MW)	Annual expected energy (MU)	Remarks
1	Kuttiadi Addl Extension	100.0	240.0	
2	Kuttiar diversion		37.0	To augment Idukki reservoir
3	Kuttiadi tail race	3.8	15.0	
4	Neriamangalam Extension	25.0	58.0	
	Sub Total	128.8	350.0	

7.1.3 Cost of Generation

(a) Estimation of Hydel generation for 2007-08

The month wise inflow of water received in the KSEB reservoirs during the last 10 years, i.e., from 1997-98 to 2006-07 is given in the Annexure 7(1). The annual inflow of water in terms of million units received during 1997-98 to 2006-07 is given below:

Table - 7.2
Annual inflow

Year	Annual inflow (MU)
1997-98	5786
1998-99	8833
1999-00	6289
2000-01	6269
2001-02	6735
2002-03	4268
2003-04	4509
2004-05	6232
2005-06	8519
2006-07*	6794
Average	6424

* Estimate

As explained in Chapter-6, in the current year (2006-07), KSEB has received better rainfall as compared to the average rainfall of previous ten years and hence will be in a position to generate hydel energy of about 7458 MU. Expecting normal inflow of water during the remaining months of 2006-07, KSEB plans to have an average hydel generation of 20.36 MU per day till May-2007. Similarly, anticipating a water inflow in 2007-08 equivalent to the last 10 years average, an average hydel generation of 17.57 MU per day is expected from June 2007 onwards. Thus, the targeted hydel generation in 2007-08 (April-2007 to March-2008) from the existing stations is estimated as $(20.36 \times 61 + 17.57 \times 304) = 6584\text{MU}$. The month wise and daily hydel generation may vary depending on the climatic conditions, variation in monthly and daily demand, availability of generating machines, availability of power from other sources etc. The generation from the new capacity additions- i.e., from the Kuttiadi Addl Extension, Neriamangalam Extension, Kuttiadi Tail Race and Kuttiar diversion will be about 350MU. Thus, the total

estimated hydel generation in 2007-08 is 6934 MU.

The month wise and daily hydel generation is regulated on the following principles.

- During the monsoon months (June to November), the runoff the river plants, small hydel stations and part of the low storage plants are operated continuously to avoid spilling of water. On an average, about 500 MW to 600 MW is under operation as base load during the monsoon period.
- The generation from the high storage plants are being limited to peak hours during the monsoon months and maximum water is stored for use in the summer months. In the summer months, in addition to power generation, the water is also used for irrigation, drinking and industrial purposes and salinity control etc. Thus the endeavour of the Board is to maximize storage of water during the monsoon months in all its reservoirs without/ or minimum spilling of water.
- Every year, each generating unit of the hydel plants is subjected to maintenance for one month. The maintenance schedules are prepared in such a way that, all the units of the run off the river and low storage plants are available for generation during the monsoon months and kept ready for maintenance during the summer months. In the high storage plants, the maintenance is usually done during the monsoon periods so as to ensure their full availability in summer. The proposed maintenance schedule for the hydel generation units in the year 2007-08 is given in Annexure-7(3). The availability of hydel generation capacity is estimated considering the annual maintenance schedule and also allowing a derating factor of 5% for frequency variation, voltage drop, reactive loading etc. The net monthly capacity availability is in the range of 1550 MW to 1600 MW.
- The scheduling of each hydel station is determined by the requirement of energy, capacity availability, type of the plant- run off the river type or storage type, peaking requirement, system

constraints etc. Since the variable cost of hydel energy is very small, all possible measures are being taken for maximizing the generation from the hydel stations.

The proposed monthly station-wise hydel generation targeted for the year 2007-08 is given in Annexure-7(4). But it may be noted that, the hydel generation covers only about 50% of the annual energy requirement and the balance requirement is being met from other sources such as import from the Central Generating Stations, IPPs, KSEB's own thermal stations, UI drawals etc.

The proposed station wise hydel generation in 2007-08 is summarised in the following table.

Table - 7.3
Targeted Hydel Generation for 2007-08

Name of the station	Targeted generation (MU)
Idukki (incl. aug)	2342
Sabarigiri	1256
Kuttiady	588
Lower Periyar	496
Idamalyar	337
Poringal +PLBE	280
Kuttiadi Addl Ext	240
Neriamangalam	235
Sholayar	232
Pallivasal	219
Kakkad	183
Sengulam	181
Panniar	160
Ner- Extension	58
Kallada	55
Malankara	23
Kuttiadi Tail race	15
Urumi	13
Chembukadavu	11
Peppara	5
Madupetty	4
Malampuzha	1
Total Hydro	6934

(b) Auxiliary consumption of hydel stations

Based on the past experience, the auxiliary consumption of the hydel station is taken as 0.5% of the gross generation. Thus, the total auxiliary consumption for the year 2007-08 is estimated as 34.67MU. The net hydel generation available at the generation end after meeting the auxiliary consumption is 6899.33 MU.

(c) Variable cost of hydel generation.

The variable cost of generation of hydel energy is very low as compared to the variable cost of thermal energy. The variable cost of hydel energy is primarily on account of lubricating oil and other consumables required for running the plants. Based on the past accounts, the variable cost of hydel energy is assessed at three paise/unit. The other costs involved in hydel generation such as repair and maintenance costs, operating expenses, employee costs etc are not included here as they are accounted in separate heads. Thus, the estimated total variable cost of hydel generation in 2007-08 is Rs.20.70 Crore as tabulated below.

**Table - 7.4
Variable cost of hydel generation**

Gross Generation (MU)	Auxiliary Consumption (MU)	Net Hydel Generation (MU)	Variable cost of Generation (Rs/kWh)	Total variable cost (Rs. Cr)
6934	34.67	6899.33	0.03	20.70

(d) KSEB Thermal Stations

KSEB has two thermal stations, viz. Brahmapuram Diesel Power Plant (106.6 MW) and Kozhikode Diesel Power Plant (128 MW) which use Low Sulphur Heavy Stock (LSHS) as the main fuel. During the last one year, there has been exorbitant rise in the price of LSHS and the variable cost of generation from these stations are the highest except the naphtha based stations.

The price of LSHS and the variable cost of BDPP and KDPP during the period April-06 to October-06 is given in the following table.

Table - 7.5
Price of LSHS and variable cost of BDPP & KDPP

Month	Base price of LSHS	* Price of LSHS	Variable cost	
			KDPP	BDPP
	(Rs/MT)	(Rs/MT)	(Rs/kWh)	(Rs/kWh)
Apr-06	19047	23042	4.79	5.28
May-06	19932	24112	5.37	6.06
Jun-06	19472	23556	5.87	6.26
Jul-06	18917	22884	5.31	6.45
Aug-06	20042	24245	5.27	6.09
Sep-06	17667	21372	5.22	6.27
Oct-06	16437	19884	4.95	
Average	18788	22728	5.08	5.80

* Excise duty - 16.32%, Sales tax-4%

It may be noted that, in addition to LSHS as fuel, diesel is used for initial starting of the machines at BDPP and KDPP. The variable cost of generation at BDPP is slightly higher than that of KDPP due to the large quantity of diesel requirements for the initial starting of machines at BDPP.

Presently, KSEB is not scheduling generation from BDPP and KDPP except under exigencies. Considering the increase in peak load requirements and also for system reliability, KSEB proposes to operate 40MW from BDPP and 60 MW from KDPP during peak hours in 2007-08. The proposed monthly schedule from BDPP and KDPP in the year 2007-08 is given as Annexure 7(3). Thus, KSEB proposes to generate 115.20 MU from BDPP and 176.00 MU from KDPP during 2007-08.

The abstract of generation from BDPP & KDPP and the estimated cost of generation are given below.

Table - 7.6
Generation and cost of BDPP and KDPP

Generating station	Gross Generation (MU)	Auxiliary Consumption (MU)	Net Generation (MU)	Variable cost (Rs/kWh)	Total variable cost (Rs. Cr)
BDPP	41.32	0.83	40.49	5.80	23.49
KDPP	61.98	1.24	60.74	5.08	30.86
Total	103.30	2.06	101.23		54.34

* Auxiliary consumption is estimated as 2% of the generation

7.1.4 Cost of Power Purchase

(a) Import from the Central Generating Stations (CGS)

(i) Allocation from Central Generating Stations

The present allocation from the Central Generating Stations and expected daily generation from these stations are given in Table 6.8.

In addition to the existing CGS, the ongoing nuclear stations Kaiga-Stage-II and Kudamkulam Nuclear stations are expected to start commercial operation during 2007-08, with details as follows.

Table - 7.7
Proposed CGS to be commissioned in 2007-08

Name of the station	Total capacity	Capacity expected to start commercial operation	Allocation to KSEB (%)	Allocated capacity	Expected date of commercial operation
	(MW)	(MW)		(MW)	
Kudamkulam	2000	1000	16.00	160.0	Apr-07
Kaiga - Stg-II	440	440	13.12	57.7	Jan-08
Total	2440	1440		217.7	

(ii) Cost of energy from the Central Generating stations

Fixed cost

The estimate of the fixed cost commitment of KSEB to the Central Generating Stations based on the latest tariff orders of CERC/claims of the CGS are given below:

Table - 7.8
Fixed cost commitment to CGS in 2007-08

Sl. No.	Power Plant	Allocation to KSEB	Fixed cost
		(MW)	(Rs. Cr)
1	Talcher - II	460	227.9
2	NLC-II - Stage-1	73	10.8
3	NTPC- RSTPS	310	64.5
4	NTPC- RSTPS (New)	79	32.5
5	NLCII - Stage II	103	24.6
6	Eastern Region	0	0.0
7	NLC - Exp	78	46.7
8	MAPS	21	25.0
9	Kaiga	58	102.7
10	Kudamkulam	160	81.6
11	Kaiga- Stg-II	58	110.9
	Total	1400	727.3

As final tariff orders of CGS for the period 2004-09 are yet to be issued by CERC, there are chances of increase in the estimated fixed cost.

Variable cost

The average variable cost for the period April-06 to September-06 claimed by the CGS is given below.

Table-7.9
Variable cost of CGS for the period April-06 to September-06

SI No	Name of the station	Variable cost (Rs/kWh)						
		Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Average
1	Talcher Stage-II	0.62	0.77	0.58	0.58	0.61	0.67	0.64
2	NTPC-RSTPS	1.03	1.00	1.07	1.04	1.05	1.05	1.04
3	NLC Expansion	1.14	1.14	1.14	1.13	1.14	1.14	1.14
4	NLC-Stage-II	1.20	1.20	1.20	1.19	1.20	1.19	1.20
5	NLC-Stage-I	1.20	1.20	1.20	1.19	1.20	1.19	1.20
6	MAPS	2.22	2.16	2.20	2.19	2.18	2.12	2.18
7	Kaiga	3.22	3.17	3.21	3.20	3.23	3.20	3.20

The expected variable cost of Kudamkulam plant is about Rs.3.50 per unit and the same of Kaiga Stage-II is about Rs.3.25 per unit.

(iii) Energy availability from CGS for the year 2007-08

The availability of energy from the CGS is estimated based on the norms fixed by CERC. The CERC norms (last three year average for nuclear stations) on auxiliary consumption and target availability of the stations are given below.

Table - 7.10
Auxiliary consumption and target PLF of CGS

SI No.	Power Plant	Auxiliary Consumption (%)	Target PLF (%)
1	Talcher - II	8.5	80
2	NLCII - Stage I	10.0	75
3	NTPC (RSPTS)	8.5	80
4	NTPC- RSTPS- New	8.5	80
5	NLC II - Stage II	10.0	75
6	NLC - Exp	10.0	75
7	MAPS	10.0	75
8	Kaiga	10.0	75
9	Kudamkulam	10.0	75
10	Kaiga- Stage-II	10.0	75

KSEB expects an average availability of 1000MW from CGS from April

to December 2007 and 1100 MW from January 2008 (with the commissioning of Kudamkulam plant). Based on the CERC operating norms and target availability, KSEB expects an average availability of 22.1 MU from CGS during the period April-07 to Dec-07 and 24 MU from Jan-08 to March-08. It may be noted that, the actual operating PLF of most of the CGS are usually much higher than the CERC norms and the energy availability also is higher.

With effect from January 2003, all the Central Generating Stations except Nuclear stations-MAPS and Kaiga fall under the scheme of Availability Based Tariff (ABT). Under the ABT, KSEB has been scheduling the energy requirement from the CGS within the allocated share based on the merit order of variable cost of energy, but have to bear the full fixed cost commitments irrespective of availing of power or not.

KSEB has fully availed the allocated share from the CGS from 2003-04 till date except during contingencies of spilling of reservoirs.

Since MAPS and Kaiga do not come under the ABT scheme, KSEB and other beneficiary states have to fully avail the allocated share of generation from MAPS and Kaiga and there is no flexibility of surrendering the allocated share. The full allocated availability of energy from these stations are to be scheduled for the year 2007-08.

Considering the energy requirement of 2007-08, KSEB proposes to avail the full allocation from the CGS. The energy from the CGS stations is scheduled at the generator bus and there is an average PGCIL line loss of 4.5% (average external loss for the period from April-06 to September-06) in the transmission system between the generator bus and KSEB bus.

The energy scheduled from the CGS at the generator bus, external loss, energy available at KSEB bus, fixed cost, variable cost and the

total cost of proposed power purchase from the CGS in 2007-08 are given in the following table. The month wise schedule of energy from CGS is given in Annexure 7(3).

Table - 7.11
Estimated Cost of Power Purchase from the CGS in 2007-08

SI No.	Source	Energy scheduled at generator bus	External loss	Net Energy input into KSEB system	Fixed cost	Variable unit cost	Variable cost	Total (Rs.Cr)
		(MU)	(MU)	(MU)	(Rs.Cr)	(Rs/kWh)	(Rs.Cr)	(Rs.Cr)
1	Talcher - II	2949.67	132.74	2816.93	227.86	0.64	188.78	418.05
2	NLC II - Stage-I	433.24	19.50	413.74	10.80	1.20	51.99	76.28
3	NTPC- RSTPS	1984.87	89.32	1895.55	64.50	1.04	206.43	301.59
4	NTPC- RSTPS (New)	505.61	22.75	482.86	32.54	1.04	52.58	85.12
5	NLC II - Stage II	611.92	27.54	584.39	24.62	1.20	73.43	101.97
6	Eastern Region	0.00	0.00	0.00		0.00	0.00	0.00
7	NLC - Exp	460.19	20.71	439.48	46.68	1.14	52.46	104.14
8	MAPS	126.05	5.67	120.38	24.96	1.98	0.00	27.73
9	Kaiga	341.35	15.36	325.99	102.75	3.01	0.00	103.04
10	Kudamkulam	233.28	10.50	222.78	75.82	3.25		75.82
11	Kaiga Stage-II	341.35	15.36	325.99	110.94	3.25		110.94
12	UI Export/sale	529.92		529.92		2.50	105.98	105.98
	Total	8517.44	359.44	8158.00	721.46		731.65	1510.66

7.1.5 Power purchase from IPPs

The installed capacity, capacity allotted to KSEB, target availability and maximum annual generation possible from the three IPPs, i.e., NTPC-Kayamkulam, BSES-Kochi and KPCL Kasaragod are given below.

Table - 7.12
Installed capacity and Energy availability from IPPs

Station	Installed capacity (MW)	Capacity allocated to KSEB (MW)	Target availability (%)	Maximum annual generation capability (MU)	Fuel used
BSES	157	157	80	1100	Naphtha
NTPC-Kayamkulam	360	180	80	1261	Naphtha
KPCL	20	20	80	140	LSHS
Total	537	357		2502	

NTPC Kayamkulam was conceived as a station entirely dedicated to Kerala. But as per the existing arrangement, 180 MW of power from NTPC

Kayamkulam is being availed by TNEB and this arrangement shall continue in the coming years also. The total annual fixed cost commitment of KSEB to these stations based on the latest claims/CERC orders are given below

**Table - 7.13
Fixed cost commitment to the IPPs**

Source	Fixed cost commitments (Rs. Cr)
KPCL	16.48
BSES	102.00
Kayamkulam	98.34
Total	216.82

The BSES and NTPC- Kayamkulam stations are using naphtha as fuel. Due to the very high cost of naphtha, the present variable cost of energy from these stations is about Rs.6.20 per unit. KPCL station is using LSHS as fuel and the present average variable cost of generation from this station is about Rs.5.00 per unit.

**Table - 7.14
Variable cost of NTPC- Kayamkulam and BSES**

Month	Base price of Naphtha (Rs/MT)	Price including excise duty and sales tax* (Rs/MT)	Variable cost	
			NTPC- Kayamkulam (Rs/kWh)	BSES (Rs/kWh)
Apr-06	26345	31870	6.14	5.78
May-06	28740	34768	6.68	6.29
Jun-06	29240	35372	6.80	6.40
Jul-06	30510	36909	7.08	6.67
Aug-06	31750	38409	7.36	6.94
Sep-06	28110	34005	6.54	6.16
Oct-06	26720	32324	6.22	5.86
Nov-06	24700	29880	5.77	5.43
Average	28264	34192	6.57	6.19

* Excise duty- 16.32%, Sales tax- 4%

Since, the variable cost of energy of BSES, NTPC – Kayamkulam and KPCL is very high, KSEB has not been scheduling any generation from these stations during the year 2006-07. If the variable cost of generation from BSES and NTPC Kayamkulam continue to be as high as of now, KSEB would be constrained to restrict availing power from these stations only during contingencies in 2007-08.

The proposed generation and cost of power purchase from KPCL, BSES and NTPC- Kayamkulam for the year 2007-08 are given below.

**Table - 7.15
Proposed generation and cost from IPPs**

Source	Annual generation proposed (MU)	Fixed cost (Rs.Cr)	Variable cost (Rs.Cr)	Total (Rs.Cr)
KPCL	50.24	16.48	25.12	41.60
BSES	110.09	102.00	68.15	170.15
NTPC- Kayamkulam	0.00	98.34	0.00	98.34
Total	160.34	216.82	93.27	310.09

7.1.6 Unscheduled Interchange and optimization of Generation

After the introduction of ABT scheme in the Southern Region from January 2003, the CGS stations viz. NTPC-Ramagundam, NTPC-Talcher-II, NLC-II Stage-I, NLC-II Stage-II, NLC-Expansion are operating under ABT. The nuclear stations such as MAPS and Kaiga are out side the purview of ABT and operating as must run units and KSEB is availing the full allocated share from the Nuclear Stations- MAPS and Kaiga, irrespective of the cost.

Under the ABT, the schedule from the generating stations is prepared for 96 time blocks of 15 minutes duration in a day. The schedule is prepared by the KSEB Load Dispatch Centre based on the expected demand and energy availability from internal sources, the demand of the previous week and previous day, climate, water availability in the hydel reservoirs, possibility of spill, machine availability in the power plants and variable cost of generation of KSEB thermal stations, BSES, NTPC-Kayamkulam , KPCL etc.

Any deviation of the actual drawl from the scheduled generation of power from CGS will attract UI Charges. The revised UI charges fixed by CERC for the period 2004-05 to 2008-09 are given below (with effect from 01-10-2004).

<u>Average frequency</u>	<u>UI Rate (Paise per kWh)</u>
50.5 Hz and above	0.00
Below 50.5 Hz to 49.8	
for every 0.02 Hz decrease	6.00
Between 49.8 Hz to 49 Hz	
for every 0.02 Hz decrease	9.00
Below 49.00 Hz	570.00

CERC has taken initiatives to raise ceiling price of UI transaction from the present level of Rs.5.70 per unit to Rs.9.00 per unit.

Under ABT, if the system frequency is less than 50 Hz (usually during peak hours) , KSEB can get the advantage of exporting energy at higher rate as UI during the peak hours by judiciously operating the hydel stations. Similarly, if the system frequency is above 50Hz, KSEB can get the advantage of importing more power as UI at cheaper rates by reducing or dispensing with the generation from the costly thermal stations such as BSES, KPCL, NTPC – Kayamkulam, BDPP and KDPP and also by reducing hydel generation and conserving water for use in unfavourable conditions.

Even though, UI plays an important role in power trading, the real time UI rates are function of system frequency which is unpredictable even on a day to day basis. UI is only a trading mechanism, which is designed to promote grid discipline and cannot be deemed as a source of power. So the trading under UI system cannot be scheduled and incorporated in the Long-term (annual) or short- term (monthly) planning. But, KSEB will utilize the UI to the maximum advantage by exporting energy during low frequency period by judiciously increasing the generation from the hydel stations and importing energy during high frequency period by backing down the costly stations as well as by backing down the hydel stations for conserving more water in the reservoirs for the use in the period of water scarcity.

7.1.7 General Strategy followed by KSEB in scheduling of Generation and Power Purchase

The following is the strategy followed by KSEB to optimize the generation and to reduce cost of power.

- Optimise the hydel generation by
 - Maximizing the hydel generation from runoff the river plants and small hydels during monsoon months and to reduce / avoid spill if any.

- Conserving maximum water in the storage reservoirs during monsoon months for use in the summer months.
 - Maximum use of the storage plants for peak load operation.
 - Scheduling the annual maintenance of the hydel stations in such a way that full units of the run-off the river plants and small hydel plants shall be available in monsoon months and full capacity of the storage plants shall be available in summer months.
- Maximum hydel capacity be exploited to meet the peak load requirement as well as to explore the possibility of UI export
 - Avail full allocation from the less costly Central Generating Stations and explore the possibility of selling the surplus energy if any.
 - Schedule the generation strictly as per the merit order of cost.
 - Minimize or stop the generation from the costly internal thermal stations- BSES, NTPC-Kayamkulam & KPCL.
 - Minimize the generation from BDPP & KDPP and schedule them only to supplement the need of the system during peak hours and to manage system constraints.
 - Avail the benefit of ABT by availing more import as UI when system favours- i.e. when system frequency is higher and UI rate is lower than the variable cost of internal thermal stations.
 - Explore the possibility of UI export during peak hours and in summer when system frequency is lower and UI rate are higher by judiciously operating the hydel stations.
 - Ensure maximum availability of machine in the hydel stations by appropriate scheduling of maintenance, renovation etc. The details of the annual maintenance schedule of hydel capacity are given as Annexure 7(4).
 - Continuous efforts to add hydel capacity not only as a source of power to meet future demand, but also as a means to reduce cost.
 - Ensure timely payment of dues to CGS and avail maximum benefit of incentive for timely payment.

7.1.8 Merit Order Stack

The merit order stack up based on the current variable cost of generation (April to September – 2006) is given below.

Table - 7.16
Merit Order Stack of different energy sources

Source	Estimated variable cost for 2007-08 (Rs/kWh)
Hydel	0.03
Talcher - II	0.64
NTPC- RSTPS	1.04
NTPC- RSTPS (New)	1.04
NLC - Exp	1.14
NLC II - Stage-I	1.20
NLC II - Stage II	1.20
MAPS	1.98
UI	3.00
Kaiga	3.01
Kaiga Stage-II	3.25
Kudamkulam	3.50
KPCL	5.00
BDPP	5.08
KDPP	5.80
BSES	6.19
Kayamkulam	6.57

The details of the monthly schedule from each source for the year 2006-07 are given in Annexure- 7(2).

7.1.9 Transmission charges payable to PGCIL

KSEB is paying the transmission charges to PGCIL for evacuating the allocated power from the Central Generating Stations to KSEB bus based on the tariff order issued by CERC. The approximate wheeling charge for the energy evacuated from CGS is about 20 paise per unit. KSEB is also paying transmission charges for the two dedicated lines within the state i.e., Kayamkulam – Pallom and Kayamkulam-Edamon constructed by PGCIL for evacuating power from the NTPC plant at Kayamkulam.

The transmission charges claimed by PGCIL during April-2006 to September-2006 and the estimate for 2007-08 are as follows:

Table - 7.17
Transmission charges to PGCIL (Rs. Crore)

SI No	Items	April-06 to September-06	Estimate for 2007-08*
1	Southern Region		
	Transmission charges	69.96	141.02
	ULDC Charges	6.51	13.12
	Sub total	76.47	154.14
2	NTPC Kayamkualm	16.73	33.46
3	Total charges (excluding income tax, incentives etc)		187.60

7.1.10 Other Charges payable to CGS

In addition to fixed charges, variable energy charges and transmission charges, the beneficiary State utilities are liable to pay income tax, incentives, water cess, foreign exchange rate variation etc to the CGS. The amount paid on this account during 2003-04, 2004-05, 2005-06 and the estimates for 2006-07 and 2007-08 are given below.

Table- 7.18
Other Charges payable to CGS

Rs. in Crore

Source	2003-04 (Actual)	2004-05 (Actual)	2005-06 (Actual)	2006-07 (Estimate)	2007-08 (Estimate)
Generators					
Talcher - II	1.06	4.03	-0.87	1.41	1.41
NLC II – Stage I	18.97	14.00	7.50	13.49	13.49
NTPC- RSTPS	10.54	57.64	23.80	30.66	30.66
Eastern Region	1.23	13.58	-19.08	0.00	0.00
NLC II – Stage II	11.76	0.00	0.00	3.92	3.92
MAPS	4.76	2.40	1.15	2.77	2.77
NLC (Exp)		2.73	62.71	5.00	5.00
BSES			80.00	40.00	0.0
Kayamkulam	1.75	0.00	0.00	0.00	0.00
KPCL					
Kaiga	0.22	0.38	0.25	0.30	0.29
PGCIL					
Eastern Region	1.75	0.30	0.00	0.00	
Southern Region	21.96	14.20	0.00	12.05	12.05
Kayamkulam	0.00	1.36	0.00		
Total	74.00	110.62	155.46	109.60	69.59

7.1.11 Summary of Cost of Generation and Power Purchase

The Table below provides the summary of the cost of generation and power purchase for the year 2007-08, based on the planned schedule of drawal of power from various sources.

Table- 7.19
Projected Generation and Power Purchase Expenses for the Year 2007-08

Source	Energy Produced /Purchased	Auxiliary Consumption	External Loss	Net Energy Input to KSEB T&D system	Fixed Cost	Incentive, Tax, etc.	Total Variable cost	Total Cost
	MU	MU	MU	MU	Rs. Cr	Rs. Cr	Rs. Cr	Rs. Cr
KSEB Internal								
Hydel	6930.45	34.65	0.00	6895.80	0.00	0.00	20.69	20.69*
Wind -Kanjikode	3.00	0.00	0.00	3.00	0.00	0.00	0.62	0.62
BDPP	41.32	0.83	0.00	40.49	0.00	0.00	23.49	23.49
KDPP	61.98	1.24	0.00	60.74	0.00	0.00	30.86	30.86
Sub total	7036.75	36.72		7000.03			75.65	54.96
Power Purchase								
Talcher - II	2949.67	0.00	132.74	2816.93	227.86	1.41	188.78	418.05
NLC II – Stage I	433.24	0.00	19.50	413.74	10.80	13.49	51.99	76.28
NTPC- RSTPS	1984.87	0.00	89.32	1895.55	64.50	30.66	206.43	301.59
NTPC- RSTPS (New)	505.61	0.00	22.75	482.86	32.54	0.00	52.58	85.12
NLC II - Stage II	611.92		27.54	584.39	24.62	3.92	73.43	101.97
Eastern Region	0.00	0.00	0.00	0.00		0.00	0.00	0.00
NLC - Exp	460.19	0.00	20.71	439.48	46.68	5.00	52.46	104.14
MAPS	126.05	0.00	5.67	120.38	24.96	2.77	0.00	27.73
Kaiga	341.35	0.00	15.36	325.99	102.75	0.29	0.00	103.04
Kudamkulam	233.28	0.00	10.50	222.78	75.82	0.00		75.82
Kaiga Stage II	341.35		15.36	325.99	110.94			110.94
UI Export/sale	529.92			529.92			105.98	105.98
KPCL	50.24	0.00		50.24	16.48	0.00	25.12	41.60
BSES	110.09	0.00		110.09	102.00	0.00	68.15	170.15
Kayamkulam	-0.01	0.00		-0.01	98.34	0.00	-0.01	98.33
PGCIL								
Eastern Region				0.00	0.00	0.00	0.00	0.00
Southern Region	0.00			0.00	154.14	12.05	0.00	166.19
Kayamkulam	0.00			0.00	33.46	0.00	0.00	33.46
Sub total	8677.77				1125.88	69.59	824.92	2020.39
TOTAL	15714.52	36.72	359.44	15318.36	1125.88	69.59	900.56	2075.35

*Variable cost of hydel generation is given in the Table only for comparison and the cost is accounted for in other heads.

7.2 Interest and Finance charges.

7.2.1 Interest & Finance charges of 2005-06

In the ARR for the year 2005-06, the Board projected a total fresh borrowing of Rs.1000 Crore and repayment of the existing bonds and loans to the tune of Rs.1042.09 Crore in 2005-06 and estimated an outstanding balance of Rs.4813.25 Crore at the end of the year 2005-06. However, the Board reviewed the matter at the time of

submission of the ARR for the FY 2006-07 and refixed the repayment of loans etc as Rs.1140.93 Crore with a reduction in borrowings proposed for the year 2005-06 to Rs.511.43 Crore. Accordingly, while submitting the ARR for 2006-07, the Board estimated an outstanding balance of loans and bonds of Rs.3911.83 Crore as on 31-3-2006. But due to effective management by way of limiting the borrowings in 2005-06 mainly for capital works, the Board was able to contain the borrowings to Rs.379.44 Crore including Rs.66.28 Crore received from Government of Kerala towards APDRP and repay loans and bonds to the extent of Rs.1207.15 Crore and thus reduced the outstanding balance of the liabilities of the Board to Rs.3713.62 Crore at the end of March 2006 as shown below.

Table - 7.20
Borrowings & repayments during the year 2005-06

Rs.in Crore

Item	OB		Borrowing			Redemption			Closing Balance		
	ARR	Revised	ARR	Revised	Actual	ARR	Revised	Actual	ARR	Revised	Actual as per provl. accounts
Loans from GOK	330.61	311.41	0.00	26.92	66.28	0.00	0.00	0.00	330.61	338.33	377.69
Bonds	1077.30	1070.91	0.00	0.00	0.00	364.73	367.71	378.07	712.57	703.20	692.85
Loans from Financial Institutions	3447.43	3259.01	1000.00	484.51	313.16	677.36	773.22	829.08	3770.07	2870.30	2643.08
Total	4855.34	4541.33	1000.00	511.43	379.44	1042.09	1140.93	1207.15	4813.25	3911.83	3713.62

In the ARR & ERC for 2005-06 filed on 15-11-2004, pending the Commission's orders on the ARR for 2004-05, the Board projected an amount of Rs.617.68 Crore towards Interest & Finance charges. However, the Commission admitted an amount of Rs.583.60 Crore. But during submission of the ARR for 2006-07, the Board re- estimated the Interest & Finance Charges for 2005-06 at Rs.552.00 Crore. The actual expenses towards Interest & Finance charges during the year 2005-06 as per the Provisional accounts are Rs.565.82 Crore. The break up details are as follows:

Table - 7. 21
Interest and Finance Charges incurred in 2005-06

Rs.in Crore

Particulars	2004-05 (Actual)	2005-06			
		ARR	ARR Revised	SERC	Actual (Provl.)
Interest on outstanding loans and bonds	535.54	526.97	461.29	463.99	451.44
Other Interest and Finance Charges					
Interest on borrowings for working capital	7.03	13.00	13.00	6.50	4.92
Discount to consumers for timely payment	0.37	4.00	4.00	4.00	0.70
Interest on PF	28.45	40.00	40.00	40.00	33.61
Other Interest	0.01	0.20	0.20	0.20	0.00
Cost of raising finance:	0.12	3.00	3.00	3.00	0.24
Other Charges	34.07	30.51	30.51	30.51	38.13
Interest to consumers	0.00	0.00	0.00	35.40	32.74
Rebate to NVVN	0.00	617.68	0.00	0.00	4.04
Subtotal	70.05	90.71	90.71	119.61	114.38
Total	605.59	617.68	552.00	583.60	565.82

Substantial reduction in interest payments during 2005-06 was achieved by combination of the following measures adopted in earlier years:

- a. Continued swapping of high cost loans as detailed in the Chapter-3 of ARR for 2005-06.
- b. Borrowing from least cost sources
- c. Restricted borrowings resulting in reduction of outstanding liabilities
- d. Reduction in cost of raising finance by way of dispensing with Govt. guarantee, up front payments, commitment charges etc.
- e. General reduction in interest rates.
- f. Preclosure of loans / bonds resulting in reduction of outstanding liabilities.
- g. Reduction in outstanding liabilities (loans & bonds) of the Board by Rs.827.71 Crore coupled with reduction of interest by Rs.39.77 Crore is one of the significant improvements in performance made by the Board during 2005-06.

7.2.2 Revised Estimate of Interest on outstanding debts payable in 2006-07

In the ARR for 2006-07, the Board proposed to incur Rs.760.00 Crore on capital works during 2006-07, which was revised and enhanced slightly to Rs.782.22 Crore during the year towards capital expenditure. The Board reviewed the fund requirement in 2006-07 and planned to limit the total borrowings to Rs.536.49 Crore against Rs.600 Crore projected in ARR for 2006-07. This level of limited borrowing along with the internal resources is required to meet the planned capital expenditure of Rs.782.22 Crore (RE 2006-07), and repayment of past loans etc., amounting to Rs.833.67 Crore in 2006-07. It is heartening to note that of late the Board's internal resource is able to meet repayment of past loans and interest thereof and part of the capital expenditure as well. An estimate of internal resources and utilisation of the same in 2006-07 is given below:-

Table - 7.22
Sources & Uses (2006-07)

Sl. No.	Particulars	Amount Rs.in Crore
1	Net Deficit from earnings	-12.77
2	Add Depreciation	423.91
3	Add Contributions and Grants	100.00
4	Add Receipts from Debt & Deposit	568.26
5	Internal resources (1+2+3+4)	1079.40
6	Less Repayment of Loans	833.67
7	Less Funds for capital work	782.22
8	Fresh Borrowing required (5-6-7)	536.49

The following Table shows the revised estimate of borrowing and repayments and interest liabilities for 2006-07.

Table - 7.23
Interest charges on Loans & Bonds (2006-07) in Rupees Crore

Sl. No.	Particulars	Rate of Interest (%)	Balance at the beginning of the year	Planned borrowings during the year	Planned redemption during the year	Balance out standing at the end of the year	Interest for the year
I	Loans from Government	11.50 - 17.50	377.69	59.09	0.00	436.78	41.14
II	Loans from others						
	KSE Bond	11.50 - 13.00	73.15	0.00	0.00	73.15	8.62
	Non SLR Bonds	15.50 - 11.40	619.70	0.00	300.53	319.17	63.53
	REC	7.00 - 11.75	670.13	0.00	150.01	520.12	65.44
	REC OECF	16.00	10.96	0.00	2.74	8.22	1.75
	Comm'l Banks	7.00 - 8.00	0.00	0.00	0.00	0.00	0.00
	LIC	11.00	26.00	0.00	2.00	24.00	2.68
	PFC	6.00 - 10.50	103.82	0.00	15.24	88.58	9.10
	Loan from CBI	7.00	180.00	0.00	60.00	120.00	10.64
	EDCK	7.01	25.33	0.00	10.27	15.06	1.59
	EDCP	6.80	74.48	0.00	18.86	55.62	4.86
	Subtotal		1783.57	0.00	559.65	1223.92	168.21
III	Loans from others						
	IDBI	9.50 - 13.50	89.96	0.00	49.84	40.12	20.08
	SIDBI	12.57-13.50	4.01	0.00	2.54	1.47	0.70
	LIC	11.00	111.59	0.00	17.27	94.32	10.38
	REC	7.00 -11.75	191.74	19.22	55.43	155.53	18.73
	PFC-STL	7.50	0.00	0.00	0.00	0.00	0.00
	Can Fin Homes	8.00	0.00	0.00	0.00	0.00	0.00
	Credit Lyonnais	5.95	80.62	0.00	20.77	59.85	4.71
	KDPP	6.90	37.73	0.00	9.43	28.30	2.64
	KPFC	6.25 -12.25	879.21	0.00	28.74	850.47	90.04
	SBT	6.50	20.00	0.00	20.00	0.00	0.26
	STL from UBI	7.50 -8.00	87.50	0.00	20.00	67.50	5.24
	STL from SYB	6.50	50.00	0.00	50.00	0.00	0.75
	Subtotal		1552.36	19.22	274.02	1297.56	153.53
	Additional borrowing	8.75	0.00	458.18	0.00	458.18	17.18
	Grand Total		3713.62	536.49	833.67	3416.44	380.06

Thus as per the revised estimate for 2006-07, there would be a closing balance of loans and bonds of Rs.3416.44 Crore as against Rs.3911.83 Crore projected in the ARR&ERC for 2006-'07. The estimated reduction in the closing balance of outstanding liabilities of the Board as on 31.3.07 is on account of restriction of the fresh borrowings & other efficiency measures such as pre closure of loans / bonds effected by the Board. The Board has not only restructured the outstanding liabilities, wherever feasible, but also reduced the liabilities significantly, which is a major fiscal

measure achieved to improve the financial position of the Board. Reduction of the outstanding debts coupled with restructuring of the debts by alternate low cost loans /reduced interest rate (swapping) etc. will continue to pay dividend in the coming years too.

Though the Board has saturated in its efforts to further restructure the loans, it will continue to milk the cow. It is to be noted that the outstanding loans of certain sources mentioned below are not amenable to swapping or restructuring.

1. Balance outstanding of Rs.991.13 Crore payable to KPFC includes Rs.837.74 Crore being the funds raised by issue of Bonds by KPFC and on lent to the Board as loans. There is no scope for the Board for restructuring them immediately as they can be repaid / swapped only when there is put / call option.
2. In respect of the balance amount of Non-SLR Bonds issued by the Board, redemption can be made only at the time of put / call option, wherever exist. However, as part of the Board's efforts to reduce the debt servicing commitments, the Board had requested the bondholders whether they were willing to redeem the Bonds prematurely. The response was not discouraging and the Bonds worth Rs.10.03 Crore (as on 1.11.2005) could be redeemed prematurely.
3. Past borrowings from IDBI is in the form of financial assistance to the Board through a scheme of discounting of bills of exchange. In view of the decline in interest rates the Board had requested the IDBI to reduce their interest rate of 13.50%. But IDBI refused to consider pre closure of the bills already discounted and expressed willingness to reduce interest rate to 9.50% for future assistance only .Since the Board was able to source funds below the rate, the Board had not availed any assistance from IDBI so far during the current period.
4. The outstanding loan from REC (Rs.915.83 Crore) was availed for more than 1300 schemes with varying rates of interest. Out of these 504 schemes for Rs.649.43 Crore in the first stage and

Rs.118.97 Crore in the second stage was swapped to bring down the interest rate to 10.50% per annum by paying premium to REC for swapping. REC has declined to make reduction in the borrowing for the OECF schemes.

5. Following the negotiation with the LIC authorities the LIC have reduced rate of interest to 11% (after a rebate of 0.5% for prompt payment) for their loans once. They have declined further reduction in rates. However, as a result of effective follow up from the Board LIC had agreed to reduce their rate of interest from 11% to 9% (on prompt payment) for the outstanding balance of loans amounting to Rs.145.29 Crore w.e.f 1.12.2005. The Board paid a premium of Rs.4.97 Crore to the LIC for effecting the interest reduction.
6. The Government of Kerala have also declined to reduce the interest rate against the outstanding debts of Rs.377.69 Crore.
7. The revised estimate of borrowing and redemption of loans in 2006-07 vis-à-vis the estimate contained in the ARR for 2006-07 is given below. The differences between the revised estimate and ARR figures are on account of reduction in the outstanding balances as on 01.04.2006 and reduction in the planned borrowing during the year 2006-07.
8. The Board has repaid the loan of Rs.20 Crore availed from SBT for NES when SBT effected a hike in interest rate. This was done after the efforts to persuade SBT to retain the original rate of interest failed.

Table - 7. 24
Summary of Borrowings & Repayments for the year 2006-07(RE)

Item	Opening Balance as on 01.04.06		Borrowing in 2006-07		Redemption in 2006-07		Closing Balance as on 31.03.07	
	ARR	Revised	ARR	Revised	ARR	Revised	ARR	Revised
Loans from GOK	338.33	377.69	0.00	59.09	0.00	0.00	338.33	436.78
Existing Bonds	703.20	692.85	0.00	0.00	300.53	300.53	402.67	392.32
Loans from Financial Institutions	2870.30	2643.08	600.00	477.40	447.03	533.14	3023.27	2587.34
Total	3911.83	3713.62	600.00	536.49	747.56	833.67	3764.27	3416.44

Rs.in Crore

7.2.3 Estimate of Interest on outstanding debts payable in 2007-08

As mentioned above, the opening balance of outstanding loans and bonds as on 01.04.2007 would be Rs.3416.44 Crore. In 2007-08, the Board proposes to incur Rs.1026.86 Crore on capital projects, the details of which are given in Chapter-3. In addition, the Board will have to repay past debts to the tune of Rs.536.70 Crore during 2007-08. As could be seen from the following estimate, the Board will be able to meet these requirements from its internal resources and borrowings of Rs.584.59 Crore.

**Table - 7.25
Sources & Uses (2007-08)**

		Rs.in Crore
Sl. No.	Particulars	Amount
1	Net Deficit from earnings	-212.69
2	Add Depreciation	460.42
3	Add Contributions & Grants	100.00
4	Add Receipts from Debt & Deposit	631.24
5	Internal resources (1+2+3+4)	978.97
6	Less Repayment of Loans	536.70
7	Less Funds for capital work	1026.86
8	Fresh Borrowing required (5-6-7)	584.59

As mentioned earlier, the Board has capacity to meet part of the capital expenditure from internal resources.

The estimated interest on outstanding debts payable in 2007-08 is given in the following table.

Table - 7.26
Interest Charges on Loans & Bonds -2007-08

Rs.in Crore

Sl. No.	Particulars	Rate of Interest (%)	Balance at the beginning of the year	Planned borrowing during the year	Planned redemption during the year	Balance out standing at the end of the year	Interest for the year
I	Loans from Government	11.50- 17.50	436.78	50.00	0.00	486.78	45.64
II	Loans from others secured						
	KSE Bond	11.50 - 13.00	73.15	0.00	10.45	62.70	8.62
	Non SLR Bonds	15.50 - 11.40	319.17	0.00	198.60	120.57	33.76
	REC	7.00 -11.75	520.12	0.00	105.10	415.02	49.55
	REC OECF	16.00	8.22	0.00	2.74	5.48	1.31
	LIC	11.00	24.00	0.00	2.00	22.00	2.64
	PFC	6.00 - 9.00	88.58	0.00	17.11	71.47	7.22
	Loan from CBI	7.00	120.00	0.00	60.00	60.00	6.48
	EDCK	7.01	15.06	0.00	10.01	5.05	0.86
	EDCP	6.80	55.62	0.00	18.26	37.36	2.20
	Subtotal		1223.92	0.00	424.27	799.65	112.64
III	Loans from others unsecured						
	IDBI	9.50 - 13.50	40.12	0.00	24.75	15.37	10.02
	SIDBI	12.57-13.50	1.47	0.00	1.15	0.32	0.27
	LIC	11.00	94.32	0.00	16.37	77.95	9.57
	REC	7.00-11.75	155.53	0.00	11.59	143.94	14.82
	PFC-STL	7.50	0.00	0.00	0.00	0.00	0.00
	Can Fin Homes	8.00	0.00	0.00	0.00	0.00	0.00
	Credit Lyonnais	5.95	59.85	0.00	20.16	39.69	3.34
	KDPP	6.90	28.30	0.00	9.43	18.87	1.79
	KPFC	6.25-12.25	850.47	0.00	8.98	841.49	88.00
	SBT	6.50	0.00	0.00	0.00	0.00	0.00
	STL from UBI	7.50-8.00	67.50	0.00	20.00	47.50	4.90
	STL from Syndicate Bank	6.50	0.00	0.00	0.00	0.00	0.00
	Subtotal		1297.56	0.00	112.43	1185.13	132.71
	Additional borrowing 05-06	8.75	458.18	534.59	0.00	992.77	65.29
	Grand Total		3416.44	584.59	536.70	3464.33	356.28

It may be noted that restriction of fresh borrowings and restructuring/ swapping of high cost loans etc made in the past are expected to pay dividend by way of reduction in overall interest from Rs.380.06 Crore in 2006-07 to Rs. 356.28 Crore in 2007-08 on the outstanding liabilities.

7.2.4 Interest payable on the security deposit of the consumers

As per sub clause (4) of section 47 of the Electricity Act, 2003 a Licensee is required to pay interest on the security deposit furnished by the consumers at a rate equivalent to the bank rate or more. In accordance with the clause

16(1) of the Supply Code specified by the KSERC and further clarification issued by the Commission thereon, the Board has decided to credit the consumers account with interest w.e.f.2005-06 at the rate of 6% on the Security Deposit at credit as on 1st of April 2004 and to pay interest at bank rate in future also on the available amount of security deposit by way of adjustment in the electricity bills during the 1st quarter of every year. Accordingly, the total amount of security deposit at credit of the consumers as on 01.04.2005 being Rs. 545.46 Crore and on 1.4.2006 being Rs.624.08 Crore, the amount of interest payable for 2006-07 is estimated at Rs.32.73 Crore and for 2007-08 it is estimated at Rs.37.44 Crore.

7.2.5 Interest on borrowings for working capital

Interest on borrowings for working capital depends on the current assets and current liabilities of the Board. The major item of the current assets is the subsidy receivable from the Government of Kerala, which was Rs.4325.14 Crore at the beginning of the year 2005-06. The amount is inclusive of the actual revenue gap in excess of the amount determined by the Commission i.e. Rs.296.46 Crore in 2004-05 and accounted as subsidy receivable from the Government. During 2005-06 the Commission determined the revenue gap of the Board as Rs.51.31 Crore. But the actual revenue gap as per the provisional accounts for 2005-06 is Rs.144.58 Crore. Even though the Commission had earnestly recommended to the Government of Kerala for waiver of duties and levies to the tune of Rs.200.00 Crore and release the balance Rs.96.00 Crore as cash subsidy for the year 2004-05, the Government have not taken a decision on the matter. So the actual revenue gap during the year 2005-06, ie. Rs.144.58 Crore has been accounted in the Books of the Board as subsidy receivable from the Govt. Unless the subsidy amount is received from the Government, the Board's working capital will continue to remain negative. The receivables against sale of power which is another major component of the current asset is Rs.1410.09 Crore as on 31.03.06 as against Rs.1416.46 Crore as on 31.03.2005. Despite the Board's efforts, the collection efficiency of electricity bills could not be improved significantly due to nonpayment of electricity charges by few Government departments,

Public Sector Undertakings and by the private consumers and sick industries. The Board is making all efforts to limit the borrowing towards working capital to the bare minimum. However, the Board cannot do away with the borrowing for working capital when huge amount is due to be received from Govt. and others.

The present requirement of working capital is met by the Board by operating cash credit, overdraft, and working capital demand loan accounts with major commercial banks such as SBT, Canara Bank, IOB, South Indian Bank, Dhanalekshmi Bank and IDBI. Their rate of interest varies from 7.75% to 9.00%. Now the banks are charging more or less the same rate for short term loans. The Board has not availed any fresh short term loans. Thus, by such efficient and alternate financial management, the Board was able to limit the interest on the working capital to Rs.4.92 Crore during 2005-06 as against Rs.13.00 Crore estimated in the ARR. In line with the past trend, it is estimated that interest on borrowings for working capital in 2006-07 would be Rs.5.00 Crore and in 2007-08 it would be Rs.5.41 Crore.

7. 2.6 Rebate to consumers for advance payment of charges

The present rate of rebate allowed by the Board on advance payment of electricity charges by the consumers is 4% for advance payment of 12 months' charges and 2% for 6 months' charges. The actual payment towards rebate to the consumers during 2005-06 was Rs.4.75 Crore (including Rs.4.04 Crore paid to NVVN). In line with the above, the amount estimated for the year 2006-07 is revised to Rs.7.67 Crore and the amount for 2007-08 is estimated at Rs.0.78 Crore.

7.2.7 Interest on Provident Fund balance

As per the Annual Accounts for 2005-06, there is a credit balance of Rs.412.32 Crore in the GPF accounts of the Board employees and interest at the prescribed rate payable on the balance is Rs.33.61 Crore. Since the arrears of DA of the employees are compulsorily deposited in the GPF accounts and cannot be withdrawn in the near future, the credit balance in

the GPF is expected to increase in 2006-07. In view of the impending DA arrears payable to the Board employees from 01.01.2005, the interest on the GPF balance is re estimated at Rs.36.37 Crore for the year 2006-07 and it is estimated that in 2007-08 it would be Rs.42.11 Crore in the normal course. These are statutory payments and hence be admitted.

7.2.8 Cost of raising finance

Due to reduction of borrowings and the Board's insistence with the lenders not to charge processing fee, commissions, premium for premature closure of loans etc, the cost of raising finance during the year 2005-06 was Rs.0.24 Crore only. By paying premium etc, the Board had swapped debts of Rs.1555.82 Crore and reduced the rates of interest during 2003-04 and 2004-05. In the year 2005-06, the Board incurred Rs.4.65 Crore towards premium for swapping of loans. Even though the scope for further swapping of debts is limited, in the light of willingness expressed by LIC to reduce the interest rate from 11% to 9%, w.e.f 01.12.2005 on payment of premium amounting to Rs.4.63 Crore, the amount of Rs.1.00 Crore provided in the ARR for 2006-07 towards cost of raising finance is kept at Rs.1.00 Crore only in the revised estimate for 2006-07 and the same level for the year 2007-08 to facilitate swapping, if possible.

7.2.9 Guarantee Commission

The Board is paying guarantee commission to the GOK at the rate of 0.75% on the outstanding guaranteed amount of loans/bonds. The guarantee commission due and payable during the year 2004-05 in pursuance of the G.O.(Ms) No.487/04/Fin dated 16.10.04 of the GOK that the Board should pay Guarantee Commission for all kinds of loans outstanding as on 31st March of the preceding year was Rs.20.15 Crore. In this connection, it is to be noted that the Government of Kerala vide G.O. dated 20.5.04, has frozen the guarantee provided to the Board and directed that the Board should negotiate all the loans without Government guarantee in future. Since then the Board has not availed any new guarantee from Govt. of Kerala. The estimation of the outstanding balance of Government secured loan as on 31-03-2007 is Rs.1223.92 Crore and the same at the end of the financial year is Rs.799.65 Crore (with a

repayment of Rs.424.27 Crore during the year 07-08). For the existing guarantee, the amount of guarantee commission payable in 2006-07 would be Rs.13.91 Crore and it would be Rs.9.30 Crore in 2007-08.

7.2.10 Other charges and bank charges

The charges include bank charges for remittance between offices, collection of electricity charges from the consumers, service tax and other bank charges. During 2005-06, the actual payment in this account was Rs.10.47 Crore. After taking into account the newly added item of service tax on cheques issued from current account and the increase in the number of new section offices and collection centres opened by the Board, the total bank charges is likely to increase and it is estimated that the charges would be Rs.10.41 Crore in the year 2006-07 and, Rs.6.28 Crore in the year 2007-08.

The summary of the revised estimate of Interest and Finance charges for 2006-07 and the estimate for 2007-08 is given below.

Table - 7.27
Summary of Interest and Finance Charges

Particulars	Rs.in Crore				
	2005-06 Accounts	2006-07		2007-08	
		ARR	SERC	Revised	Estimate
I - Interest on outstanding Loans&Bonds	451.44	424.50	412.25	380.06	356.28
II - Interest on Security Deposit	32.74	32.73	32.73	32.73	37.44
III - Other Interest and Finance Charges					
Interest on borrowings for working capital	4.92	7.50	7.50	5.00	5.41
Rebate to consumers for timely payment	4.75	0.70	0.70	7.67	0.78
Interest on PF	33.30	40.00	36.13	36.37	42.11
Other Interest	7.82	0.01	0.01	0.01	0.01
Cost of raising finance:	0.23	1.00	1.00	1.00	1.00
Guarantee Commission	20.15	23.32	23.32	13.91	9.30
Bank Charges	10.47			10.41	6.28
Total of (III)	81.64	72.53	68.66	74.37	64.89
Grand Total (I+II+III)	565.82	529.76	513.64	487.16	458.61

Other interest for 2005-06 comprises of Rs.2.85 Crore towards interest on Electricity duty and Rs.4.65 Crore paid as premium for swapping of loans. Progressive reduction in Interest & Finance charges achieved by the Board since 2003-04 is given below:

Rs.in Crore

Year	Amount	Reduction
2003-04 (Actual)	726.32	
2004-05	605.59	120.73
2005-06 (Provisional)	565.82	39.77
2006-07 (RE)	487.16	78.66
2007-08 (BE)	458.61	28.55

As the provisions for Interest & Finance charges have been estimated at bare minimum and bulk of them are committed liabilities, the Commission may approve the provisions as in the Table 7.27 above.

7.3 Depreciation

The Board projected in the ARR for 2006-07 an amount of Rs.7603.00 Crore as Gross Fixed Asset at the beginning for the year 2006-07 with an addition of an amount of Rs.603.33 Crore for the year. The GFA addition during the year 2006-07 has been revised to Rs.625.78 Crore. On the basis of the norms given in the Annual Accounts Rules, the depreciation for the year 2006-07 was estimated as Rs.424.32 Crore. The revised depreciation for the year 2006-07 has shown only a nominal change and the revised estimate value is Rs.423.91 Crore. The depreciation estimated for the year 2007-08 under Annual Accounting Rules is Rs.460.42 Crore as indicated in the following table.

**Table - 7.28
DEPRECIATION**

Rs.in Crore

Details of Assets	2005-06 (Provisional)	2006-07 (Revised)		2007-08	
	Accumulated Depreciation at the end of the year	Depreciation for the year	Accumulated Depreciation at the end of the year	Depreciation for the year	Accumulated Depreciation at the end of the year
Land & Rights	0.00	0.00	0.00	0.00	0.00
Buildings	110.91	15.97	126.88	17.50	144.38
Hydraulic Works	167.41	21.35	188.76	21.80	210.56
Other Civil Works	28.34	6.88	35.22	8.04	43.26
Plant & Machinery	1091.25	181.46	1272.71	191.87	1464.58
Cable Network etc	1240.52	195.55	1436.07	218.18	1654.25
Vehicles	10.22	0.11	10.33	0.12	10.45
Furniture and Fixtures	8.02	0.85	8.87	0.96	9.83
Office Equipments	7.61	1.74	9.35	1.95	11.30
Total	2664.28	423.91	3088.19	460.42	3548.61

In the order approving the ARR & ERC for 2006-07 the Commission has reduced the amount of depreciation to Rs.247.43 Crore allowing depreciation as per CERC norms. But it is mandatory on the part of KSEB to keep the accounts and associated components as per the Annual Accounts Rules in force.

The quote in the Commission's order approving ARR & ERC for 2006-07 is as follows:

“The Central Commission may notify the rates of depreciation in respect of generation and transmission assets. The depreciation rates so notified would also be applicable for distribution with appropriate modification as may be evolved by the Forum of Regulators. The rates of depreciation so notified would be applicable for the purpose of tariffs as well as accounting.”

In this connection it may be noted that the Forum of Regulators have not yet come up with any modification till date. In the absence of any change in the accounting rules, the Board is statutorily bound to keep its accounts as per the Annual Accounts Rules. In the policy guidelines issued to the Commission by the Government of Kerala this aspect is reiterated.

The accounts of the Board prepared on the basis of the Annual Accounts Rules have been certified by the CAG of India.

So, the amount of Rs.423.91 Crore as per the revised estimate towards depreciation for 2006-07 and the amount of Rs.460.42 Crore which is estimated for 2007-08 may be admitted.

7.4 Employee cost

The expenditure under the head “Employee cost” includes direct Employee cost and the terminal benefits as well as pensionary claims of retired employees. The provision for employee cost made in the ARR for the year 2006-07 was Rs.882.20 Crore as against the actuals Rs.862.52 Crore incurred in 2005-06. For 2006-07, the Commission approved an amount of Rs.823.45 Crore. But the actual employee cost during the current year (2006-07) up to July is Rs.241.53 Crore and the revised estimate is

Rs.920.00 Crore. The projected employee cost for the year 2007-08 partially covers the impact of wage revision which is due for implementation.

DA and terminal benefits to the Board employees are allowed periodically in line with the policy of Government of Kerala and hence the Board cannot deny payment of such benefits. As and when Government release DA instalments to its employees, the benefits are extended to the employees in the Board as well. This is in line with the wage agreement with the employees and Government policy. Though the Board has adopted strict control wherever possible to reduce expenses under the category like other allowances, overtime, bonus etc., its efforts to contain the overall expenditure on employees, gets over shadowed due to the price index based DA revision, reintroduction of leave salary in lieu of surrender of earned leave etc. by the Government which have automatic implications on the Board. The revised estimate for 2006-07 and the projection for 2007-08 along with the actuals of 2005-06 are given in the Table below:

**Table - 7.29
Employee Cost**

Rs. in Crore

Particulars	2005-06			2006-07			2007-08
	Projected	Approved by SERC	Actual	Projected	Approved by SERC	Estimated	Projected
Salaries+ DA	416.16	359.36	435.55	452.99	443.70	481.91	508.25
Overtime, Other Allowances, Bonus	19.79	19.79	22.02	24.08	22.00	26.84	27.86
Earned leave Encashment, Medical Reimbursement, Staff Welfare etc	23.32	23.33	30.06	27.74	22.75	33.81	37.00
Terminal Benefits	480.17	443.43	374.89	377.39	335.00	377.44	391.89
Total Employee Cost	939.44	845.91	862.52	882.20	823.45	920.00	965.00

Four installments of DA (total 14%) sanctioned to the Central Government employees upto 01.07.2006 are pending to be adopted by Government of Kerala. So appropriate provision has been made to accommodate the likely increase in DA in the year 2007-08. As a Government policy decision, the leave surrender for 20 days for the employees has been re-established and therefore it is estimated that an additional expenditure of Rs.30 Crore is envisaged under this head. It is assumed that about 90 percent of the employees would encash their earned leave.

As part of the austerity measures to tide over the financial crisis during 2001, Government of Kerala had put a temporary ban on creation of new posts and fresh recruitments in all government departments for three years. With a view to limiting expenditure, the electrical section/division of offices required to be created in proportion to the increase in the consumer strength was kept pending. In many offices, the consumer strength of unwieldy size has started affecting quality of service adversely to the consumers.

To cope up with the requirement, the Government has lifted the ban on recruitment and there will be additional expenditure on account of new recruitment to fill up the vacancies. The Board finds it difficult to undertake works relating to new connections, line extension, voltage improvement, system improvement works to reduce the technical losses, energy audit related works and substation construction/maintenance etc. for want of sufficient staff. The consumer service is also seriously affected by the shortage of staff. To reduce electrical accidents, more effective and timely maintenance works are to be carried out in the distribution system. Hence the Board has decided that the vacancies in the vital areas are to be urgently filled up for the better performance of the Board. Subsequent to the filing of the ARR for the year 2006-07, two Distribution Circles, eight Electrical Divisions, three Sub-Divisions and seven Electrical Sections have been newly formed to render better service to the customers. The Board has initiated action to fill up the vacancies and provision for this purpose has been made in the estimate for 2007-08.

The detailed break up of the estimated employee cost for the year 2006-07 and 2007-08 are tabulated below:

**Table - 7.30
Details of Employee Cost**

Sl. No.	Particulars	Rs.in Crore			
		2005-06 Actual	2006-07 Projected Estimated		2007-08 Anticipated / Budgeted
1	Salaries	251.82	243.70	259.53	272.22
2	Overtime/Holiday Wages	0.06	0.15	0.83	0.87
3	DA	183.73	209.29	222.38	236.03
4	Other Allowances	19.27	20.70	23.41	24.26
5	Bonus	2.69	3.23	2.60	2.73
6	Sub Total of 1 to 5	457.57	477.07	508.75	536.11
7	Medical Expenses Reimbursement	2.23	2.20	2.98	3.13
8	Earned Leave Encashment	27.21	25.00	29.93	32.92
9	Payment under Workmen's Compensation	0.39	0.45	0.57	0.60
10	Leave Salary & Pension Contribution	0.0200	0.0040	0.05	0.05
11	Reimbursement of Stamp Duty	0.0000	0.0052	0.00	0.00
12	Sub Total 7 to 11	29.85	27.66	33.53	36.70
13	Staff Welfare Expenses	0.21	0.08	0.28	0.30
14	Terminal Benefits	374.89	377.39	377.44	391.89
15	Sub-Total of 13 to 14	375.10	377.47	377.72	392.19
16	Grand Total	862.52	882.20	920.00	965.00

Employee cost is a firm liability and hence need to be allowed as projected by the Board. The position of the employee cost on different parameters is indicated below. The number of employees indicated are the status at the beginning of the corresponding financial years.

**Table – 7.31
Performance of Employees**

Particulars	2005-06	2006-07	2007-08
No. of employees	25565	25558	26170
No. of Consumers in Lakh	8295081	8774388	9256020
Energy sold in MU	10905.70	12030.10	12294.10
Revenue from sale of energy (Rs. in Crore)	3170.79	3405.38	3753.07
No. of consumers/employee	324.47	343.31	353.69
Revenue/employee (Rs. in Lakh)	12.40	13.32	14.34
Employee cost (Rs. in Crore) excluding terminal benefits	487.63	542.56	573.11
Employee cost/unit of energy sold (Rs.) excluding pension	0.45	0.45	0.47
Employee per MU of energy sold	2.34	2.12	2.13

The two major indicators pointing at improving operating efficiency of employees is the number of consumers served by each employee as well as revenue earned per employee. The number of consumers per employee has been increasing every year and Revenue per employee is also increasing. The increase in employee cost per unit of energy sold has been increasing marginally from year to year. This is mainly due to non-appreciable increase in sales/consumption of energy during the relevant period and the tariff remains unchanged except for the marginal reduction in energy charges for domestic and commercial consumers.

With a view to improve operating efficiency and timely service, the number of employees has to be increased in proportion to the number of consumers. Increase in the number of consumers per employee and revenue per employee shows that the employee cost is not unduly disproportionate to the volume of work.

7.5 Repairs and Maintenance Cost (R&M)

The principles behind expenditure on repairs and maintenance (R&M) is restoring of an asset back to the level of output /efficiency at which it was originally put to use. The expenditure on R&M attains much importance in a utility like the KSE Board and it depends on the volume and age of the assets employed. Irrespective of use, the plant and machinery of the electricity utility has to be kept in a state of readiness to meet contingencies. As per rules, the expenditure on repairs & maintenance has to be charged to revenue head in the same year in which it is incurred.

In the ARR for 2005-'06, the Board had projected Rs.89.09 Crore towards repairs and maintenance cost. The Commission had admitted an amount of Rs.85.25 Crore for the purpose. However, the actual expenses in this regard in 2005-06, as per the provisional accounts, is Rs.93.82 Crore which exceeded the amount approved by the Commission. Considering the steady growth in the number of consumers, energy consumption, system expansion etc and higher level of usage of assets in 2006-07, the Board

had projected a requirement of Rs.96.50 Crore towards R&M expenses in the ARR for 2006-07. The Commission had approved Rs.90.00 Crore.

It is a universal fact that the investment required to keep the assets in good condition increases with the age and extent of service. The Commission has also urged the Board to pay adequate attention to the R&M works. The Board continues to do the repairs and maintenance works as estimated in the ARR for 2006-07 to ensure quality of service to the consumers. Board is operating within all its constraints and limitations not to compromise on the reliability and quality of the system. There was a total increase by 25.95% in the actual R&M expenses from FY 2004-05 to FY 2005-06, and has exceeded the level projected by the Board in the relevant ARR. In the circumstances, for the forthcoming year 2007-08, it is estimated that an average of 5% increase in R&M over the amount projected for the current year (2006-07) is inevitable. Accordingly, the R&M expense for the year 2007-08 is proposed as given in the following table.

Table - 7.32
Repair and Maintenance Cost

Rs.in Crore

Sl. No.	Particulars	2005-06	2006-07		2007-08			
		Prov.	ARR	KSERC	Revised	Projection		
						Consumption of stores, fuel etc.	Other Expenses	Total
1	Plant & Machinery	25.25	22.28		26.51	13.06	14.33	27.38
2	Buildings	1.72	1.60		1.81	0.88	0.97	1.85
3	Other Civil works	3.99	3.26		4.19	2.01	2.20	4.21
4	Hydraulic works	0.85	0.93		0.89	0.44	0.48	0.92
5	Lines,Cable networks	57.69	65.57		60.57	29.72	32.62	62.34
6	Vehicles	3.99	2.50		4.19	2.10	2.31	4.41
7	Furniture & fixtures	0.04	0.06		0.04	0.02	0.02	0.04
8	Office equipment	0.29	0.30		0.30	0.15	0.17	0.32
	Total	93.82	96.50	90.00	98.51	48.38	53.09	101.47

In the above estimate it may be noted that in view of the crucial nature of the item, an increase of 3% is anticipated in 2007-08 for the item plant & machinery over the expenses estimated for the year 2006-07. So also a 3% increase is estimated for the item line cable networks during 2007-08. The expenses in respect of all other items are kept more or less at the same

level estimated for the year 2006-07. In this connection, it is to be noted that the Board had a gross fixed assets (GFA) of Rs.7059.97 Crore at the end of the FY 2004-05 and there has been addition of asset to the extent of Rs.651.65 Crore during 2005-06 against Rs.905.68 Crore estimated in the ARR for 2005-06 and thus the GFA has increased to Rs.7711.62 Crore as on 01.04.2006. The Board projected in the ARR for 2006-07, addition of assets to the value of Rs.603.33 Crore. However, it is estimated that the addition to the GFA during the year 2006-07 would be Rs.625.78 Crore. Accordingly the GFA at the beginning of 2007-08 is estimated to be Rs.8337.40 Crore. So it may be noted that the projected R&M works for the year 2007-08 would be only 1.24 % of the gross fixed assets (excluding land & rights) at the beginning of the year which is at a lower level than the estimate for 2006-07, as shown below.

Table - 7. 33
R&M as percentage of Gross Fixed Asset

Details of Assets	2005-06			2006-07			2007-08		
	GFA at the beginning of the year (Rs. Cr) (Provsl)	R&M (Rs. Cr) (Actual)	%	GFA at the beginning of the year (Rs. Cr)	R&M (Rs. Cr) (ARR)	%	GFA at the beginning of the year (Rs. Cr) (estimate)	R&M (Rs.Cr) (estimate)	%
Buildings	405.92	1.72	0.02	439.98	1.81	0.02	481.97	1.85	0.02
Hydraulic Works	717.78	0.85	0.01	837.30	0.89	0.01	854.89	0.92	0.01
Other Civil Works	179.11	3.99	0.06	227.66	4.19	0.06	266.32	4.21	0.05
Plant and Machinery	2847.90	25.25	0.37	2984.47	26.51	0.36	3155.80	27.38	0.34
Lines, Cable Network etc.	2677.08	57.69	0.84	2931.72	60.57	0.81	3271.11	62.34	0.77
Vehicles	11.53	3.99	0.06	11.82	4.19	0.06	12.15	4.41	0.05
Furniture and Fixtures	11.82	0.04	0.00	12.17	0.04	0.00	13.66	0.04	0.00
Office Equipments	15.69	0.29	0.00	17.40	0.30	0.00	19.54	0.32	0.00
Total	6866.83	93.82	1.36	7462.52	98.51	1.32	8075.44	101.47	1.24

It may be noted that, as per the CERC norms, the R&M expenses allowed for hydro projects is 1.5% of the capital cost in the base year with an escalation of 4% in the subsequent years. The Board's estimate is well within the norms of CERC.

Since the R&M works decides the quality and reliability of supply to the consumers, and the estimate accounts for just 1.24% of the asset, it is appealed that the provision as estimated be admitted. The detailed

function-wise physical R&M programme for the FY 2007-08 will be furnished separately.

7.6 Administration and General Expenses

Administration & General (A&G) expenses include various items of heterogeneous nature and some of them have direct relationship with the rate of inflation in the country. The total A & G Expenses during 2004-05 as per the accounts finally adopted by the Board after audit by C&AG was Rs.95.01 Crore and the same in 2005-06 was Rs.113.84 Crore (as per the provisional accounts).

In the ARR for 2005-06, the Board projected the expenditure on Administration and General activities as Rs.98.27 Crore. In the ARR for 2006-07, the projected figure was Rs.108.85 Crore. A significant part of the Administration & General Expenses is the Electricity Duty payable by the Board to the Govt. of Kerala. As per the Kerala State Electricity Duty Act, 1963, the Board is liable to pay Duty at the rate of 6 ps/unit of net energy sold to the consumers. In the past, the Board calculated the duty under section 3(1) of the Act only on the internal generation of power and the power purchased from outside the State was not considered. Now the Board, in compliance with the audit observations and direction of the State Government, decided to pay duty on the imported power too. So the increase in the A&G expenses is mainly on account of the increase in the amount payable by the Board to the State Government as electricity duty under Section 3(1) of the Kerala Electricity Duty Act 1963. The amount of duty payable by the Board is calculated as shown in the table below:

Table - 7.34
Electricity duty payable

SI No.	Particulars	2005-06 (Actual)	2006-07 (Revised Estimate)	2007-08 (Estimate)
1	Energy available for sale(MU)	10905.70	12030.10	12294.10
2	Consumption by NPG (MU)	7.74	8.00	8.00
3	Bulk supply(MU) including railway traction	354.03	396.00	425.00
4	Subtotal (2+3)	361.77	404.00	433.00
5	Total energy on which duty is payable (MU) (1-4)	10543.93	11626.10	11861.10
6	Ele. Duty @ 6ps /unit (Rs.in Crore)	63.26	69.76	71.16

Projection of Electricity Duty payable is dependent on the anticipated generation and purchase of energy. The A&G Expenses excluding the Electricity Duty payable by the Board in 2004-05 was Rs.40.03 Crore and it was Rs.50.58 Crore in 2005-06. The estimated amount of duty payable in 2006-07 and 2007-08 are Rs.69.76 Crore and Rs.71.16 Crore respectively. The detailed estimates for the year 2006-07 and 2007-'08 are given below:

Table – 7.35
Administration and General Expenses

Sl. No.	Particulars	Rs.in Crore		
		2005-06 Provisional	2006-07 Revised	2007-08 Estimate
1	Rents, rates and taxes	3.55	3.73	3.82
2	Insurance	0.98	1.03	1.06
3	Telephone/telex charges, etc.	3.60	3.78	3.88
4	Internet and related charges	0.07	0.07	0.08
5	Legal charges	8.43	8.85	9.08
6	Audit fees	1.60	1.68	1.72
7	Consultancy charges	0.20	0.21	0.22
8	Other Professional charges	0.24	0.25	0.26
9	Conveyance and vehicle hire charges	9.77	10.26	10.52
10	Sub Total (Total of 1 to 9)	28.44	29.86	30.63
11	OTHER EXPENSES			
	a) Fees and subscriptions	0.22	0.23	0.24
	d) Printing & stationary	3.58	3.76	3.86
	e) Advertisements	0.60	0.63	0.65
	f) Contributions/donations	1.63	1.71	1.76
	g) Electricity charges	2.73	2.87	2.94
	h) Water charges	0.12	0.13	0.13
	i) Entertainment	0.65	0.68	0.70
	j) Miscellaneous expenses	8.53	8.96	9.19
12	Total of Other Expenses	18.06	18.96	19.45
13	Freight	2.04	2.14	2.20
14	Other purchase related expenses	2.04	2.14	2.20
	Total	50.58	53.11	54.47
15	Ele. Duty u/s 3(l), KED Act	63.26	69.76	71.16
	GRAND TOTAL	113.84	122.87	125.63

In agreement with the inflationary trend, an overall annual increase in expenditure by about 5% is anticipated on items like Rent, Rate, Taxes, and Electricity charges, Water Charges, Entertainment & Freight, Telephone & Internet, Conveyance Charges and Printing and Stationary in 2006-07 and a nominal increase of 2.5 % is anticipated for 2007-08. The expenditure on telephone and internet charges is likely to increase as the sections are to be linked to the head quarters for transmission of data &

information. Growth in computer stationery for computerized billing is an additional item of expenditure.

The Board is imparting training on a large-scale to the Officers and staff to improve productivity and efficiency. Conduct of training on safety measures, maintenance and skill development in computer application etc. has become inevitable. Therefore, the Board plans to depute the staff to the various training centers within the state under the control of the Board and other centers outside the state.

To cope up with the expansion of the activities, the Board is forced to open more circles, divisions and electrical section offices. Most of the new electrical sections are in rented buildings. The rent coupled with additional vehicles and other infrastructure to these newly formed offices would increase the A&G expenses. To improve quality of service, the Board has already setup Trouble Call management units in major cities and plan to expand such service in other places too.

With the increase in electricity connections to meet the target of "electricity on demand to all", especially to the downtrodden mass in the coastal belt, tribal settlements and similar other segments of the population, there is sizable increase in procurement of materials and execution of schemes. All these activities are expected to increase the charges of freight, travelling of personnel and purchase related administrative activities.

It may be noted that the priority of the Board during these years was to contain the rising revenue deficit first and bring it down subsequently. The Board has successfully achieved the objective. To achieve this, the Board had resorted to all means of economy measures and eliminated all wasteful expenses, however small they were and could keep the A&G expenses at sub optimal level. Now with the easing of the chronic financial problem of the Board, it is necessary to pay due attention to such aspects of administrative requirement kept postponed. Therefore the A&G expenses are expected to increase in 2007-08 unlike in the past when they were

under regimented control. But to have control over these expenses through budgetary control, the increase projected is restricted to just 2.5% over the figures of 2006-07. However, the Board will continue to use its broom to sweep the unproductive and unnecessary administrative expenses.

The revised estimate of A&G expenses in 2006-07 is Rs.122.87 Crore and the estimate for 2007-08 is Rs.125.63 Crore. Though the absolute figures are marginally increasing over the years, which is obvious, the percentage of A&G expenses to the total revenue expenditure remains, more or less constant over the years. The Board is as conscious as any one else to control such costs and accordingly the A&G expenses have been estimated to the barest minimum. Hence it is submitted that the commission may approve the amount as estimated by the Board.

7.7 Other Expenses

7.7.1 Prior period Expenses

As per the commercial accounting principles the Board has to take into account both the income as well as the expenses relating to the prior periods. The Board may receive income on account of receipts from consumers relating to prior period, interest and other income relating to prior period during an accounting year. The expenses relating to prior period may include expenses towards power purchase, fuel related expenses, operating expense, employee cost, depreciation on account of belated capitalization of assets, interest and finance charges, other charges of past liabilities etc. The actual charges during 2005-06 as per the accounts were Rs.82.01 Crore. The Board projected Rs.87.50 Crore towards net prior period charges in the ARR for 2006-07 and the revised figure is Rs.86.11 Crore

In addition to the normal charges required to be provided towards prior period income and expenses, special consideration have to be given to account for the arrears of likely pay revision to the employees in 2007-08. So also, there are disputed / pending claims such as payment of entry tax against purchase of cement, steel etc. made by the Board in the past but yet to be settled due to pendency of disputes between the Board and

Sales Tax Department of the State. There are also cases of prior period charges to be settled based on audit observations on the Accounts of the Board. In view of the above and other contingencies, it is re-estimated that Board's net prior period expenses during 2006-07 would be Rs.86.11 Crore as shown in the following table. The amount estimated for 2007-08 is Rs.87.00 Crore. This has been done on the basis of likely settlement of past claims and other contingencies that will get firmed up and other adjustments to be made to settle the audit objections etc.

**Table - 7.36
Prior Period Expenses**

Rs. in Crore

Particulars	2005-06	2006-07			2007-08
	Actual	ARR	SERC	Revised	Estimate
I Income relating to previous Year					
1. Receipt from consumers	151.73	120.00		138.08	140.54
2. Excess provision for Depreciation in prior period	0.00	1.00		1.83	1.85
3. Excess interest & Finance charges	0.00	8.00		18.31	18.50
4. Other excess provision	25.13	0.50		0.89	0.89
5. Other income relating to prior period	201.17	100.00		54.82	56.52
Total	378.03	229.50		213.93	218.30
II Expenditure relating to previous years					
1. Short provision for purchase	170.34	85.50		82.41	83.26
2. Fuel related expenses relating to prior period	0.00	0.50		0.92	0.93
3. Operating expenses relating to prior period	0.71	8.00		16.48	16.65
4. Employee cost relating to prior period	70.54	55.00		82.72	83.58
5. Depreciation under provided in prior period	0.00	10.00		18.31	18.50
6. Interest & Finance charges	215.32	8.00		43.64	44.09
7. Other charges relating to previous years	3.13	150.00		55.56	58.29
Total	460.04	317.00		300.04	305.30
Net prior period credit/charges(I-II)	-82.01	-87.50		-86.11	-87.00

7.7.2 Other Debits

The expenses relating to research and development, bad and doubtful debts and miscellaneous losses and write-offs are included in 'Other Debits'. In 2005-06 the total expenses in that head was Rs.132.29 Crore. During the current year (2006-07), this expense is expected to be

Rs.138.90 Crore and for the next year (2007-08), it is estimated to be Rs. 140.00 Crore. The following table gives the estimates for the various items included in other debits.

**Table - 7.38
Other debits**

Sl. No.	Particulars	Rs. in Crore		
		Previous Year* (2005-06)	Current Year** (2006-07)	Ensuing year** (2007-08)
1	Research and Development Expenses	0.11	0.27	0.59
2	Provision for Bad and Doubtful debts	129.57	107.71	115.78
3	Miscellaneous Losses and write-offs	2.61	30.92	23.63
	Total	132.29	138.90	140.00

*Actuals; ** Estimates

7.8 Return on Equity

The Board is in a transitory stage of reforms and has to function on commercial lines. The Board's efforts to improve efficiency and contain borrowings cannot bear fruit unless the Board's efforts are supplemented with reasonable revenue from tariff and return on investment. Under the circumstances of non-revision of tariff since October 2002, non-release of subsidy by GOK etc., the Board has to find out additional funds for capital investment on its own. So it is necessary that the Board do earn reasonable return on its investment. In the ARR for 2006-07, the Board requested the Commission to allow 14% return on equity of Rs.1553 Crore and the Commission graciously allowed the request i.e., Rs.217.42 Crore for the year 2006-07. CERC have been allowing ROE @ 14% to the central power utilities. So the Board requests that the same principle as already approved by the Commission may be followed for the year 2007-08 also and Rs.217.42 Crore be allowed as return on equity.

7.9 Summary of Aggregate Revenue Requirement

Projections for the various items of the expense components discussed in the Chapters 6 and 7 are summarized in the Table below

Table - 7.39
Aggregate Revenue Requirement (ARR)

Rs. in Crore

Items	2005-06	2006-07			2007-08
	(Actual)	KSEB (ARR)	KSERC (Order)	KSEB (Revised)	(ARR)
Generation Of Power	51.30	43.09	43.09	128.69	54.96
Purchase of power	1533.93	1646.02	1646.02	1734.07	2020.39
Interest & Finance Charges	565.82	529.76	513.64	487.16	458.61
Depreciation	392.65	424.32	247.43	423.91	460.42
Employee Cost	862.52	882.20	823.45	920.00	965.00
Repair & Maintenance	93.82	96.50	90.00	98.51	101.47
Administration & General Expenses	113.85	108.85	105.00	122.87	125.63
Other Expenses	214.30	146.75	91.78	225.01	227.00
Gross Expenditure (A)	3828.18	3877.49	3560.41	4140.22	4413.48
Less : Expenses Capitalised	48.50	43.90	43.90	42.21	37.63
Less : Interest Capitalised	43.61	53.50	53.50	46.47	48.25
Net Expenditure (B)	3736.06	3780.09	3463.01	4051.54	4327.60
Statutory Surplus	101.26	217.42	217.42	217.42	217.42
ARR (D) = (B) + (C)	3837.32	3997.51	3680.43	4268.96	4545.02

CHAPTER - 8

EXPECTED REVENUE FROM CHARGES

8.1 Revenue from Sale of Energy

While approving the ARR&ERC for 2006-07, the Kerala State Electricity Regulatory Commission allowed continuing the existing tariff. The Government of Kerala vide letter dated 21.12.2005 directed the Board to reduce the electricity charges of LT I (A) Domestic, LT VII (A)< VII(B) commercial category of consumers by 20 paise per unit. Further the Government of Kerala vide letter dated 11.1.06 directed the Board to reduce the tariff of offices of Political Parties approved by the Election Commission of India and coming under HT category by reducing demand charges from Rs.300/KVA to Rs.175/KVA and energy charges from Rs.3.00/unit to Rs.1.75/unit . Accordingly the Board had taken up the proposal before the KSERC for tariff reduction of the above categories. The Commission was pleased to issue orders dated 05.01.06 to reduce the tariff of Domestic and Commercial categories with effect from 01.01.2006. The summary of the revenue realised in 2005-06 is given in the Table below.

Table - 8.1
Revenue from sale of power in 2005-06

Category	Sale of energy in MU	Revenue excluding Electricity duty Rs.in Crore	Average realization in Ps./ unit
Domestic	4660.62	797.66	171.15
NPG	7.74	0.00	0.00
Commercial	1092.66	724.44	663.00
Public Lighting	207.78	38.07	183.24
Irrigation & Dewatering	189.57	18.88	99.61
Industrial LT	873.90	362.41	414.71
HT & EHT	2883.53	1128.70	391.43
Railway Traction	57.94	19.72	340.43
Bulk Supply	296.06	80.90	273.23
Sub Total	10269.80	3170.79	308.75
Sale of power to other States	635.90	196.51	309.03
Grand Total	10905.70	3367.30	308.98

As mentioned in Chapter 4, the domestic category which consumed about 45.5% of the total energy sold, contributed only about 25% of the sales revenue. The LT commercial category consuming about 11% of energy contributed about 23% of the revenue from sale of energy. The HT & EHT consumers who consumed about 32% of the energy sold accounted for 39% of the income from sale of power. The overall average realization per unit of power sold was Ps 308.98. But besides the domestic consumers, other categories such as agriculture, public lighting and bulk supply were charged at cross subsidized rates far lower than the average rate of realization.

Revenue forecast for 2006-07 and 2007-08 has been made based on the reduced tariff allowed to Domestic and Commercial consumers and offices of Political Parties as approved by the KSERC in its order dated 5.1.06. The summary of the revised estimated revenue for 2006-07 and estimate for 2007-08 is given below:-

Table - 8.2
Estimate of Revenue from sale of power

Category	2006-07		2007-08	
	Revised Estimate		Estimate	
	Sale of energy in MU	Revenue from tariff (Rs.in Crore)	Sale of energy in MU	Revenue from tariff (Rs. in Crore)
Domestic	5167.00	856.20	5692.00	975.54
Commercial	1230.00	810.10	1390.00	927.52
Public Lighting	229.00	41.96	252.00	46.18
Irrigation & Dewatering	205.00	18.88	237.00	21.17
Industrial LT	950.00	380.03	1030.00	408.19
NPG	8.00	0.00	8.00	0.00
HT & EHT	3065.10	1179.37	3260.10	1247.05
Railway Traction	65.00	22.35	74.00	24.93
Bulk Supply	331.00	96.50	351.00	102.48
Total	11250.10	3405.38	12294.10	3753.07
Sale of power to other States	780.00	303.83	0.00	0.00
Grand Total	12030.10	3709.21	12294.10	3753.07

Details of sale of off peak surplus power and sale to prevent spill from hydro reservoirs to other states/Traders during 2006-07 is given in Chapter-6. KSEB expects about Rs. 303.83 Crore as additional revenue from sale of surplus power during 2006-07.

The projected revenue from sale of power based on the revised tariff rate in 2006-07 is Rs.3709.21 Crore. The shortfall in revenue due to subsidy against the 20 paise per unit offered to Domestic and Commercial consumers amounts to approximately Rs.120 Crore.

Assuming that the tariff rebate for the above categories will continue for 2007-08 also, revenue from sale of power estimated based on the revised tariff rate for 2007-08 is Rs.3753.07 Crore. The shortfall in revenue due to subsidy in 2007-08 comes to Rs.135 Crore. The detailed computation of the revenue expected from the various existing tariff categories for 2007-08 is given in the Dataform G&Z.

8.2 Non Tariff Income

The Board estimated a non-tariff income of Rs.301.31 Crore in the ARR for 2006-07. The Commission determined it as Rs.290.51 Crore by reducing the estimate relating to miscellaneous charges. However, the Board on a review, on the basis of the actuals up to September, 2006 re estimated the non-tariff income for the current year at Rs. 329.56 Crore. The projection for 2007-08 is Rs.361.84 Crore. The split up details are tabulated below.

**Table - 8.3
Non Tariff Income**

Rs. in Crore

Sl. No.	Particulars	2005-06	2006-07			2007-08
		Accounts	ARR	KSERC	Revised	
1	Meter Rent/Service Line Rental	125.86	134.27	134.27	126.00	138.60
2	Recoveries on Theft of Power/Malpractices	0.00	15.00	15.00	7.01	10.00
3	Wheeling Charges Recoveries	7.46	5.16	5.16	27.30	30.00
4	Miscellaneous Charges (UCM, Service connection fee, Fee for maintenance of Public lighting, Testing fee, Reconnection fee, Penalty charges, Minimum Guarantee charges, Charges for Service connection minimum, Meter Box charges, Power allocation charges etc.	89.50	75.80	65.00	64.58	68.26
	Total	222.82	230.23	219.43	224.89	246.86
5	Grant in aid for Research Projects	0.00	0.00	0.00	0.00	0.00
6	Interest on Staff Loans and Advances	1.46	1.70	1.70	1.46	1.46
7	Income from Investments	1.35	0.70	0.70	1.35	1.35
8	Interest on Advances to suppliers/Contractors	1.44	0.54	0.54	1.17	1.17
9	Interest from Banks	4.71	3.10	3.10	13.87	10.69
10	Rebate Received	56.10	41.32	41.32	47.68	56.22
11	Income from Trading	8.59	4.09	4.09	10.00	12.00
12	Income from staff welfare Activities	0.00	0.00	0.00	0.00	0.00
13	Miscellaneous Receipts	28.97	19.63	19.63	29.14	32.09
	Total	102.62	71.08	71.08	104.67	114.98
	Grand Total	325.44	301.31	290.51	329.56	361.84

The major items of non tariff income are the following:

Meter Rent

The consumer strength of the Board excluding HT, EHT consumers as on 01.04.2006 was 82.95 lakh. The Board estimates that 5 lakh fresh connections will be given during the current year 2006-07 and that an amount of Rs.126.00 Crore can be earned as meter rent. So also it is projected that there would be 5 lakh new connections during 2007-08 and

as a result the Board would get total revenue of Rs.138.38 Crore as meter rent.

Recoveries on theft of power

The board has been taking efforts to detect theft and misuse of electricity. By taking concerted and efficient measures for detection of unauthorized use / illegal extraction of energy, the income from this account during current year is Rs.7.01 Crore and it is estimated that an amount of Rs.10.00 Crore would be collected in 2007-08.

Wheeling charges recoveries

The wheeling charges accounted are inclusive of the comfort charges received from NVVN for the power traded from NTPC, Kayamkulam station. The comfort charges received/ anticipated for the sale of KSEB share from NTPC-Kayamkulam through M/s NVVN and BSES power to TNEB are given below:

Month	Sale from NTPC-Kylm through NVVN		BSES sale to TNEB		Total	Remarks
	Energy (MU)	Comfort charges (Rs.Cr)	Energy (MU)	Comfort charges (Rs.Cr)	Comfort charges (Rs.Cr)	
Apr-06	79.27	3.65	48.75	2.49	6.13	Actuals
May-06	28.97	1.33	26.28	1.34	2.67	
Nov-06	100.50	4.62			4.62	Anticipated
Dec-06	103.85	4.78			4.78	
Jan-07	103.85	4.78			4.78	
Feb-07	93.80	4.31			4.31	
Total	510.24	23.47	75.02	3.83	27.30	

Thus, an amount of Rs.27.30 Crore is estimated for 2006-07. Similarly, KSEB proposes to sell the unutilized power from Kayamkulam station and BSES to others at comfort charges and KSEB expects about Rs.30.00 Crore on this account. This amount will depend totally on the actual sale if any on this account.

Miscellaneous Charges

The Miscellaneous charges includes charges such as unconnected minimum, testing fee, minimum guarantee charge, meter box charges, power allocation charges etc, In the light of the Supply code issued by the Commission, the consumers cannot be charged for unconnected minimum, power allocation charges and minimum guarantee charges at the level previously charged by the Board.

Rebate

Rebate is the incentive receivable by the Board for arranging timely payment of power purchase cost etc. to CGS. The present rate of rebate is 2% of the bill. This also includes rebate for prompt repayment of principal amount due to PFC/REC etc. The Board received Rs.56.10 Crore as rebate for prompt payment mainly of the power purchase cost during the year 2005-06. The estimate of rebate to be received during 2006-07 and 2007-08 is based on the power purchase cost and it is estimated as Rs.47.68 Crore for 2006-07 and Rs.56.22 Crore for 2007-08.

Miscellaneous receipts

Receipts in this account include items like rental for staff quarters, rental from contractors and others, excess found on physical verification of cash, stock and fixed assets, security deposit forfeited, receipts from sale of trees , usufructs etc,. Estimates are made on the basis of actual up to August 2006.

8.3 Total Expected Revenue from Charges

It is the sum of the revenue from Tariff and the revenue from Non Tariff items. Summary of the revenue from Tariff and Non Tariff items for the years 2005-06, 2006-07 and 2007-08 are given in the following table.

Table - 8.4
Total expected revenue from charges

Nature of Revenue	2005-06	2006-07	2007-08
	(Actual)	(Revised)	(Estimate)
Tariff Income	3367.30	3709.21	3753.07
Non Tariff Income	325.43	329.56	361.84
Total Income	3692.73	4038.77	4114.91

Rs.in Crore

CHAPTER - 9

SUMMARY OF AGGREGATE REVENUE REQUIREMENT

FOR THE FINANCIAL YEAR 2007-08

The projected expenses and receipts for the year 2007-08 have been described in details in the previous chapters 7 & 8. The following table summarizes the various items of expenditure and revenue requirement for the year 2007-08 vis-a-vis the revised estimate for the year 2006-07 and actual of 2005-06.

Table 9.1
Aggregate Revenue Requirement for the year 2007-08

Rs. in Crore

Items	2005-06	2006-07			2007-08
	(Actual)	KSEB (ARR)	KSERC (Order)	KSEB (Revised)	(ARR)
Generation Of Power	51.30	43.09	43.09	128.69	54.96
Purchase of power	1533.93	1646.02	1646.02	1734.07	2020.39
Interest & Finance Charges	565.82	529.76	513.64	487.16	458.61
Depreciation	392.65	424.32	247.43	423.91	460.42
Employee Cost	862.52	882.20	823.45	920.00	965.00
Repair & Maintenance	93.82	96.50	90.00	98.51	101.47
Administration & General Expenses	113.85	108.85	105.00	122.87	125.63
Other Expenses	214.30	146.75	91.78	225.01	227.00
Gross Expenditure (A)	3828.18	3877.49	3560.41	4140.22	4413.48
Less : Expenses Capitalised	48.50	43.90	43.90	42.21	37.63
Less : Interest Capitalised	43.61	53.50	53.50	46.47	48.25
Net Expenditure (B)	3736.06	3780.09	3463.01	4051.54	4327.60
Return on Equity (RoE)	101.26	217.42	217.42	217.42	217.42
ARR (D) = (B) + (C)	3837.32	3997.51	3680.43	4268.96	4545.02
Less Non-Tariff Income	325.43	301.31	290.51	329.56	361.84
Less : Revenue from Tariff					
(a) With in the State	3170.79	3393.42	3424.55	3405.38	3753.07
(b) Outside the State	196.51		150.00	303.83	
Total Income	3692.73	3694.73	3865.06	4038.77	4114.91
Revenue Gap	144.58	302.78	-184.63	230.19	430.11

The projected aggregate revenue requirement consisting of all expenses and statutory surplus for the financial year 2007-08 is Rs.4545.02 Crore. The projected total revenue from charges is Rs.4114.91 Crore, inclusive of revenue from sale of power as Rs.3753.07 Crore and Non-Tariff income as Rs.361.84 Crore. This leaves an estimated revenue gap of Rs. 430.11 Crore for the year 2007-08. The revised estimated revenue gap for the year 2006-07 is Rs.230.19 Crore.

KSERC vide the order dated 05-01-2006 has directed the Board to collect the tariff of LT-1(a) Domestic and LT-VII (A) & (B) Commercial categories of consumers by reducing 20 paise per unit as directed by the State Government and the same is continuing. The revenue estimate for the year 2007-08 has been estimated at the reduced tariff and expects a revenue short fall of about Rs.135 Crore on this account. Also, due to the reduced tariff, there was a revenue short fall of Rs.30 Crore during 2005-06 and Rs.120 Crore during 2006-07. Vide the order dated 05-01-2006, KSERC has directed the Board to release the shortfall in revenue on account of 20 paise reduction to Domestic and Commercial category as subsidy on monthly instalments, but no money has received yet on this account. So, it is requested before the Commission to give necessary direction to release the subsidy on this account at the earliest.

The Board is writing to the Government suggesting ways to bridge the revenue gap for the year 2007-08. The Board shall submit the proposal for bridging the revenue gap for 2007-08 separately to the Commission after obtaining specific direction from the State Government. Pending submission of proposal to bridge the revenue gap, the Board requests the Commission,

- (i) To approve the revised estimated expenses of Rs.4268.96 Crore, income of Rs.4038.77 Crore and the revenue gap of Rs.230.19 Crore for the year 2006-07.
- (ii) To approve the estimated expenses of Rs.4545.02 Crore, income of Rs.4114.91 Crore and the revenue gap of Rs.430.11 Crore for the year 2007-08.
- (iii) Direct the State Government to release the subsidy on account of shortfall in revenue of Rs.30 Crore for 2005-06 and Rs.80 Crore up

November-2006 during the current year on account of the reduction of tariff of 20 paise per unit as directed by the State Government.

- (iv) To permit the Board to submit separate proposal for bridging the revenue gap of 2007-08.
- (v) To allow the revenue gap for 2006-07 as per the revised estimates for 2006-07 projected in this petition and decide the manner of bridging the deficit in excess of the deficit already assessed by the Commission for that year. It is prayed that the Commission may treat the additional deficit either as Regulatory Asset to be absorbed in future tariff or recommend to the Government to pay as subsidy so as to avoid tariff revision.
- (vi) To allow the Board to revise the present estimates in the event of abnormal increase in fuel price or failure of monsoon during 2007-08 or if there are major changes in the assumptions taken in this petition, due to any contingency which may be beyond the control of the Board.
- (vii) To allow the Board to submit a proposal for truing up of the cost at the end of financial year 2007-08 and any revenue gap arising out of such truing up be allowed separately.
- (viii) To permit continuance of the existing tariff rates to the different categories of consumers till the commission decides on revision of the tariff or orders other measures to bridge the revenue gap for the year 2007-08 and the additional revenue gaps for 2005-06 and 2006-07.
- (ix) To recognize the concept of Regulatory Asset and treat the revenue gaps as Regulatory Asset, if the gaps are not otherwise covered by tariff revision or subsidy from the Government.
- (x) To permit the Board to present the case in person and submit other details / information as may be necessary before the Commission takes its final decision on the matter.