FIFTEENTH KERALA LEGISLATIVE ASSEMBLY

COMMITTEE
ON
PUBLIC UNDERTAKINGS
(2023-2026)

TWENTY THIRD REPORT

(Presented on 1st February 2024)

SECRETARIAT OF THE KERALA LEGISLATURE
THIRUVANANTHAPURAM
2024

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On

Kerala State Electricity Board Limited
(Based on the Report of the Comptroller and Auditor General of India for the year ended 31st March, 2016)

308/2024.

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COMMITTEE ON PUBLIC UNDERTAKINGS

(2023-2026)

COMPOSITION

Chairman:

Shri E. Chandrasekharan.

Members:

Shri A. P. Anilkumar

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Shri Kadakampally Surendran

Shri P. Ubaidulla.

Legislature Secretariat:

Shri Shaji C. Baby, Secretary in charge

Shri Venugopal R., Joint Secretary

Smt. Jayasree M., Deputy Secretary

Shri Mohanan O., Under Secretary.

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* In the vacancy of Shri K. B. Ganesh Kumar sworn in as Transport Minister w.e.f. 16-1-2024

INTRODUCTION

I, the Chairman, Committee on Public Undertakings (2023-2026) having been authorised by the Committee to present the Report on its behalf, present this Twenty Third Report on The Kerala State Electricity Board Limited based on the report of the Comptroller and Auditor General of India for the year ended 31st March, 2016 relating to the Public Sector Undertakings of the State of Kerala.

The aforesaid Report of the Comptroller and Auditor General of India was laid on the Table of the House on 27-5-2017. The consideration of the audit paragraphs included in this report and the examination of the departmental witness in connection thereto were made by the Committee on Public Undertakings (2021-2023) at its meeting held on 29-11-2021.

This Report was considered and approved by the Committee (2023-2026) at its meeting held on 22-12-2023.

The Committee place on record its appreciation for the assistance rendered to them by the Accountant General (Audit), Kerala in the examination of the Audit paragraphs included in this Report.

The Committee wishes to express thanks to the officials of the Power department of the Secretariat and the Kerala State Electricity Board Limited for placing the materials and information solicited in connection with the examination of the subject. The Committee also wishes to thank in particular the Secretaries to Government, Power and Finance Department and the officials of the Kerala State Electricity Board Limited who appeared for evidence and assisted the Committee by placing their views before the Committee.

E. CHANDRASEKHARAN,

Chairman,

Committee on Public Undertakings.

Thiruvananthapuram,

1st February 2024.

REPORT
on
KERALA STATE ELECTRICITY BOARD LIMITED

Audit Paragraph 2.3 – 2.3.12.2 (2015-2016)

2.3 Information System Audit of HT and EHT Billing and Accounting software used by Kerala State Electricity Board Limited

2.3.1 Introduction

Kerala State Electricity Board Limited (Company), incorporated in January 2011[1], is engaged in generation, transmission and distribution of electricity in Kerala. The electricity consumers of the Company are divided into Low Tension[2] (LT), High Tension[3] (HT) and Extra High Tension[4] (EHT) categories.

As of March 2016, the Company had 1.17 crore LT consumers, 5020 HT consumers[5] and 53 EHT consumers[6]. These consumers had been billed for consumption of electricity at rates approved as per the Tariff Orders of the Kerala State Electricity Regulatory Commission (KSERC). The billing of consumers was also subject to the provisions of Kerala State Electricity Supply Codes (Supply Code) 2005 and 2014.

With a view to automate key revenue billing and collection activities in respect of HT/EHT consumers and to improve customer satisfaction, the Board of Directors (BoD) of the Company decided (July 2008) to implement a comprehensive and fully automated computerised system consisting of HT/EHT

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1 The Company was formed after unbundling the erstwhile Kerala State Electricity Board in accordance with the provisions of Electricity Act, 2003.

2 Low Tension consumers are those consumers who avail supply of electricity at a voltage not exceeding 1,000 volts under normal conditions subject to the percentage variation as may be specified by the Central Electricity Authority (CEA) from time to time.

3 High Tension consumers are those consumers who avail supply of electricity at voltage higher than 1000 volts but do not exceed 33,000 volts under normal conditions subject to the percentage variation as may be specified by the CEA from time to time.

4 Extra High Tension consumers are those consumers who avail supply of electricity at voltage higher than 33,000 volts under normal conditions subject to the percentage variation as may be specified by the CEA from time to time.

5 Excluding dismantled service connections.

6 Excluding dismantled service connections.

billing application software, Automated Meter Reading (AMR)[7] system and web enabled services for the HT/EHT consumers. The Company introduced the billing and accounting software, Enterprise Related Generalised Information System (ENRGISE) developed by Tata Consultancy Services Limited (TCS) in September 2010. ENRGISE was based on Linux operating system and used Postgres Plus Advanced Server for database management.

Details of revenue from HT/EHT consumers and the total revenue from sale of power during the last five years ending 2015-16 are given in Table 2.33.

Table 2.33: Details of revenue from HT/EHT consumers

(Figures: ₹ in crore)

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16
Revenue from sale of power to HT/EHT consumers[8]	1,845.70	2,484.20	2,977.78	3,007.70	3,284.80
Total revenue from sale of power including LT consumers	5,593.02	7,223.39	9,978.88	9,879.35	10,487.71
Percentage of revenue from sale of power to HT/EHT consumers to total revenue from sale of power	33.00	34.39	29.84	30.44	31.32

Source: Annual accounts of the Company.

2.3.2 Organisational structure :

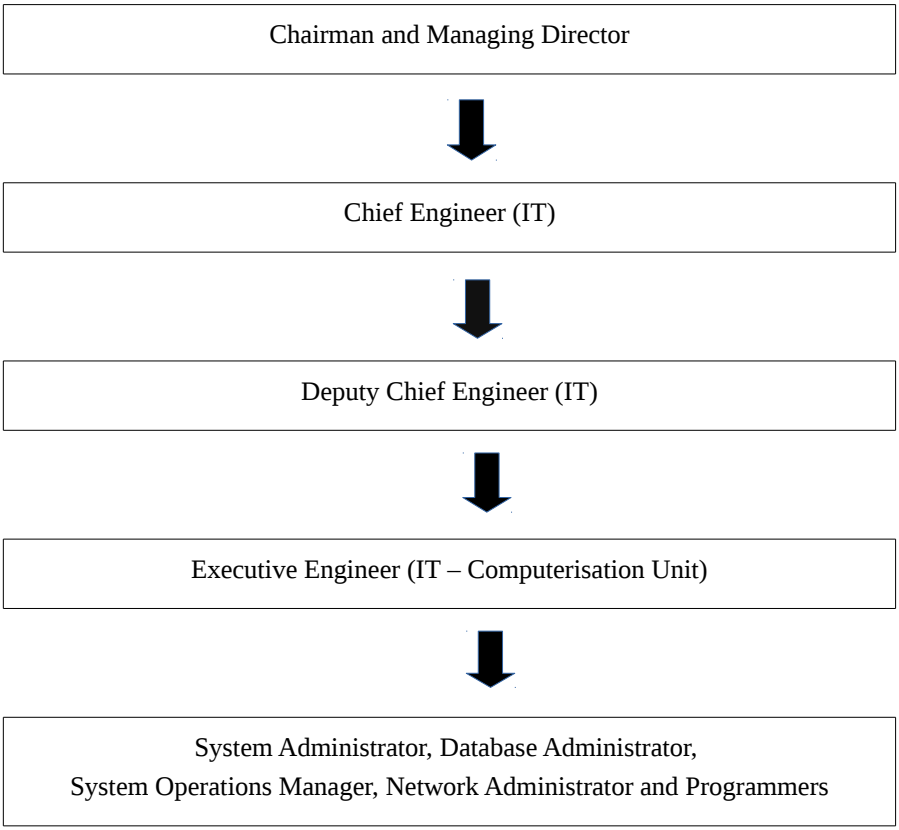
The Information Technology (IT) wing of the Company was responsible for overall development, implementation and maintenance relating to automation of various functional areas of the Company. The Chief Engineer (IT) reports directly to the Chairman and Managing Director of the Company and is assisted by a Deputy Chief Engineer and Executive Engineers (EEs). IT–Computerisation Unit

7 The main objective of AMR system is to acquire meter data from HT/EHT consumer meters automatically from remote avoiding any human intervention.

8 Including deemed HT Consumers.

(IT-CU) at Corporate Office is headed by an Executive Engineer responsible for the monitoring and maintenance of HT and EHT billing system. Organisational set-up of IT Computerisation Unit is given in Chart 2.2 below:

Chart 2.2: Organisational set-up of IT Computerisation Unit



2.3.3 HT/EHT Billing Process

The Company had 747 Electrical Section offices[9] as at the end of July 2016, out of which 746 Section offices were connected to Wide Area Network (WAN)[10] . The electricity consumption of HT/EHT consumers was assessed for billing by

9 Electrical Section offices are the base level offices in the distribution wing of the Company.

10 WAN stands for Wide Area Network. It is a computer network over a large geographical area used to relay data among various computer terminals.

the Assistant Engineers (AEs) at Electrical Section offices through meter reading[11] taken manually. Meter reading data along with other details were thereafter sent[12] to Special Officer-Revenue (SOR) at the Corporate Office. The authorised staff at SOR uploaded the data into the billing software and bills were generated. The bills were then issued to the consumers for making payments.

2.3.4 Audit Objectives

The audit objectives were to assess whether:

- there existed a proper plan and procedure to develop and implement the system to achieve the Company's objectives and requirements;
- the system efficiently supported the business process and ensured compliance of applicable rules and regulations and the bills were generated accordingly;
- adequate security controls were in place in the system; and
- the system provided complete, reliable and authorised information for management use.

2.3.5 Audit Criteria

Audit adopted the following criteria:

- Business rules, regulations and procedures of the Company;
- Information security policy and password policy of the Company;
- Orders/ circulars/ notifications issued by Government of India, Government of Kerala and Board of Directors of the Company from time to time;
- Tender documents and request for proposal and System Requirement Specification; and
- Best practices for IT development and implementation.

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11 The meter readings were taken at every billing cycle normally at the end of a month.

12 From July 2016 onwards, AEs of all Electrical Section offices were allowed to upload the meter reading data directly to the billing system.

2.3.6 Audit scope and methodology

The scope of IT Audit included the evaluation of the software used for computerised HT/EHT billing and the effectiveness of the software in generating correct billing for the Company. The scope also included review of records at IT-CU and office of the SOR at Corporate office. The data of bills maintained in the central server, located at Corporate Office of the Company at Thiruvananthapuram, in respect of all HT/EHT consumers pertaining to the period April 2011 to July 2016 was selected for checking and evaluation with a view to ascertain completeness, regularity, integrity and consistency of data. The entire data of the above period was obtained in the form of a database dump and was analysed using Computer Assisted Audit Techniques. The adequacy of IT controls was evaluated to identify loss/omission/excess collection of revenue and to ensure comprehensiveness of the billing software.

2.3.7 Audit Findings

Audit findings on the computerisation of HT/EHT billing system are discussed in succeeding paragraphs.

2.3.8 Software development and implementation

2.3.8.1 Delay in framing of System Requirement Specifications

As per the work order, system study and design and coding had to be completed by Tata Consultancy Services Limited (TCS) by November 2009. System Requirement Specifications [13] (SRS) which is vital for development of the software should have been submitted before November 2009. We observed that the SRS was submitted by the TCS in April 2010 after a delay of four months and the BoD of the Company approved the SRS only in November 2010 after parallel running and system testing. The system development and implementation was, thus, done by TCS without a formally approved and mutually agreed SRS.

GoK replied (January 2017) that a functional committee having domain experts had approved the SRS in June 2010.

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13 A System Requirements Specification is a description of a software system to be developed. It lays out various requirements of a system.

The reply was not acceptable since the SRS had to be approved before the completion of software development and system integration. The SRS was, however, approved (November 2010) only after the completion of software development and system integration in June 2010.

2.3.8.2 Incomplete development

A tender was invited (September 2008) for the computerisation of the HT/EHT billing system and the work was awarded (June 2009) to TCS who quoted the lowest price of ₹3.99 crore. The scope of the work included providing and implementing HT/EHT billing system and web enabled services (Phase 1) and providing and implementing AMR system for HT/EHT consumers (Phase 2).

TCS completed the software development and the system integration[14] of HT/EHT Billing Application (Phase 1) in June 2010 and the software was tested on pilot basis (parallel run) for two months (July and August 2010) by generating bills of five months, April to August 2010. The billing software was rolled out in September 2010 and monthly bills for all HT/EHT consumers for the month of September 2010 were generated and sent to the consumers. Thereafter, the new software was being used for bill generation of all HT/ EHT consumers. The web enabled services were commissioned in July 2011.

The functionalities like Reports on revenue loss due to theft of power, Security Deposit (SD) assessment, Consumer Personal Ledger (CPL) and Unauthorised Additional Load (UAL) billing and Audit are indispensable for correct and timely billing of consumers, timely revenue collection, proper and correct review of SD, proper accounting of collections, billing/ levying of penalty for UAL, etc. Though these were included in the System Requirement Specification (SRS), functionalities like SD assessment and CPL were incorporated or implemented after rolling out of the software. We also noticed that the implementation of these functionalities were defective as discussed in Paragraphs 2.3.9 and 2.3.12. The functionalities like Reports on revenue loss due to theft of power, UAL billing and Audit were yet to be incorporated (January 2017).

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14 System integration is the process of bringing together the sub-systems into one system.

Government of Kerala (GoK) replied (January 2017) that SD assessment, detection of theft and UAL were done at field offices (Electrical Section offices) and provision was given in the application for capturing these details as per the SRS. The reply was not acceptable as the functionalities like Reports on revenue loss due to theft of power, UAL billing and Audit were yet to be incorporated (January 2017) and implemented. Functionalities like SD assessment and CPL were defective.

2.3.8.3 Non-implementation of Automated Meter Reading system

Even though the computerised billing (Phase 1: cost ₹1.93 crore) was rolled out in September 2010, the Company had not awarded the work order for implementing the AMR system (Phase 2) as of September 2016 as the Company claimed that none of the bidders had proven experience in implementation of AMR system in India. In the absence of bidders with experience in AMR system, the Company had decided to implement AMR in a phased manner. Subsequently, the Company decided (January 2010) to implement AMR system under RAPDRP[15] scheme announced by Government of India (GoI) in which financial assistance was available for implementation of AMR. However, AMR system under RAPDRP had not been implemented so far (January 2017).

Due to non-implementation of AMR system, SOR/IT-CU wings at Corporate Office were deprived of direct access to the meter data of the consumers and therefore, meter readings were being done manually. Data transfer from Electrical Section offices to the central server was, therefore, subjected to human interventions.

GoK stated (January 2017) that the implementation of AMR system was excluded as the Company decided to implement it under RAPDRP scheme announced by GoI during the same period in which financial assistance for the same was available. The fact, however, remained that the Company could not implement the AMR even under RAPDRP so far (January 2017).

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15 Restructured Accelerated Power Development and Reforms Programme was a power reforms scheme introduced by GoI.

2.3.9 Mapping of business rules

HT/EHT billing process was a mission critical system, which directly impacts the revenue collection of the Company. Therefore, all business processes relating to billing, collection and accounting of HT/EHT consumption had to be mapped correctly in the application software. Further, the business processes mapped in the software had to be compliant with the applicable laws, rules and regulations with all the necessary controls to ensure that the amount billed and collected conformed to the prescribed rules and regulations.

We observed that relevant business rules had not been fully and correctly mapped into the application, which had an impact on the revenue realisation as discussed in succeeding paragraphs.

2.3.9.1 Short collection of energy charges from deemed HT consumers

As per the Supply Codes, 2005/ 2014, electricity connections with Contract Demand (CD) 100 kVA or below were allowed to draw electricity from LT distribution lines. KSERC, however, allowed a few consumers who were drawing electricity at LT voltage with CD above 100 kVA before the introduction of Supply Code, 2005 to continue this facility. These consumers were classified by the Company as Deemed HT consumers with effect from March 2005. As per the schedule of tariff issued by KSERC with effect from May 2013, the deemed HT consumers were to be charged[16] under HT and LT tariff for demand and energy charges, respectively. The Company had 64 deemed HT consumers as of August 2016.

We, however, noticed that billing procedure mapped in the system for deemed HT consumers was not as per the above schedule of tariff issued by KSERC but same as applied for HT consumers with an additional three per cent energy charges. The additional three per cent was charged since the billing of both demand and energy charges of deemed HT consumers under the HT Tariff would result in revenue loss to the Company. However, this three per cent was not

16 Charges for electricity mainly include two components (1) Demand charge on the connected load/ contract demand and (2) Energy charges based on the units consumed.

sufficient to make good the revenue loss in the case of deemed HT consumers except industrial and agricultural consumers. This resulted in short collection of energy charges amounting to ₹1.44 crore from 22 deemed HT consumers for the period from May 2013 to July 2016.

GoK replied (January 2017) that there was no clear classification of deemed HT consumers in Supply Code 2014. GoK also stated that the matter had been taken up with KSERC and was being implemented in the system.

The reply was not acceptable since the Company had classified these consumers as deemed HT consumers since March 2005 and could be separately identified from the database. Further, the failure to charge deemed HT consumers as per the Schedules of Tariff resulted in revenue loss to the Company.

2.3.9.2 Non-collection of increased demand charge from seasonal consumers

As per the tariff order, seasonal consumers[17] are billed for the period of actual use of power under appropriate tariff category. The monthly minimum charges for the billing period shall be 75 per cent of the Contract Demand[18] as increased by a formula i.e., 5(12-N) % where 'N' is the number of months during which the consumer registers himself to utilise the power in a year. There were three seasonal customers as noticed from the database.

We observed that this business rule of charging increased minimum charges was not mapped into the system. As a result, the system failed to collect increased demand charges amounting to ₹5.08 lakh from these three consumers[19] during April 2011 to March 2016.

GoK replied (January 2017) that action had been taken for realising the short collection.

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17 Seasonal consumers are those consumers who are registered as seasonal consumers with the Company and intend to avail electricity only during a season in a year under HT Tariff. They will not be billed for the idling period.

18 Contract demand means the maximum demand of energy agreed to be supplied by the licensee (Company).

19 Consumers Numbers: 1365040000096 (₹ 0.76 lakh), 1365040002974 ₹ 0.97 lakh) and 1366750003726 (₹ 3.35 lakh).

2.3.9.3 Non-mapping of business rule with regard to annual review of contract demand

As per Regulation 101 of the Electricity Supply Code 2014, if the recorded Maximum Demand (MD) of HT/EHT consumer exceeded the Contract Demand[20] (CD) in any three billing periods during the previous financial year, the Company shall issue a notice of 30 days to the consumer to submit an application for enhancement of contract demand within the notice period. If there was no response from the consumer within the notice period, the Company shall enhance the contract demand of the consumer to the extent of average three top readings of MD during the previous financial year. If the distribution system is not adequate to meet the enhanced demand, the consumer shall be directed to restrict the demand to the permissible limit, till necessary augmentation/upgradation/uprating works are done in the distribution system.

We observed that the above business rule was not incorporated effectively in the system as detailed below:

- During 2014-15, recorded MD in respect of 803 consumers exceeded the CD in three or more billing periods. 640 of these consumers did not, however, enhance the CD during the year 2015-16 as required by the Supply Code 2014.

- Distribution system of the Company was sufficient to meet the enhanced demand of 616 consumers out of the above 640 consumers. Had the Company enhanced the CD as per the requirements of Supply Code 2014, the demand charges could have been charged on these 616 consumers on the enhanced CD from May 2015 onwards (taking into account the notice period of 30 days). The enhanced demand charges foregone, for the period from May 2015 to March 2016 worked out to ₹2.43 crore.

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20 Contract demand means the maximum demand of energy agreed to be supplied by the licensee (Company).

- Supply Code 2014[21] provided for review of security deposit of consumers on enhancement of contract demand by adopting a methodology[22] for determining the security deposit. We, however, observed that this provision to review the adequacy of security deposit on enhancement of contract demand was not mapped in the system.

GoK replied (January 2017) that appropriate action would be taken to regularise contract demand and further stated that there was no financial loss as the Company had been charging 50 per cent extra over the normal demand charges whenever MD exceeded CD.

The reply was not correct as the enhanced demand charge foregone had been worked out after considering the excess demand charges levied by the Company during the month in which the actual consumption exceeded the CD.

2.3.9.4 Mapping of wrong tariff

Tariffs were determined on the basis of the purpose for which electricity was used by consumers. Prior to August 2014, banking and financial institutions, Government guest houses, insurance and telecommunication companies drawing electricity at high tension voltage were billed under "HT IV Commercial tariff". As per the schedule of tariff which came into effect from August 2014, banking and financial institutions and Government guest houses were classified under "HT II A (General)" tariff and insurance and telecommunication companies were classified under "HT II B (General)" tariff. Under the revised tariff order, the tariff rates applicable to HT II A and HT II B consumers were lower than that of HT IV consumers.

We observed that the revised categorisation of consumers and their tariffs were not updated/ mapped into ENRGISE. Consequently, 11 banking companies, three guest houses, three insurance companies and three telecommunication

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21 Regulation 68.

22 In the case of enhancement of load, cash deposit shall be collected by adopting the formula- Load * Load Factor of the category in which consumer falls * Period taken for determination of security deposit * Current tariff in which load factor is the percentage value varying from 40 to 100 per cent depending upon the tariff of the consumer as given in the Annexure 3 to Supply Code 2014.

companies continued to be billed under the pre-revised tariffs. This resulted in excess collection of energy charges amounting to ₹87.23 lakh from the above consumers during August 2014 to March 2016.

GoK replied (Janaury 2017) that report from the agreement authority[23] concerned was required for assigning new purposes based on the new tariff order and the change of tariff would be effected based on such reports. The reply, however, was silent on the above mentioned consumers.

2.3.9.5 Excess collection of meter rent

Until September 2014, the applicable meter rent per month for energy meters with Availability Based Tariff (ABT)/ Time of the Day (TOD) facilities supplied by the Company was ₹5,000 for the first month of electricity connection and ₹6,000 thereafter. The KSERC had revised (September 2014) the meter rent for ABT/ TOD meters as ₹1,000 with effect from October 2014. BoD of the Company had also adopted the revised meter rent in November 2014.

We observed that the change in the meter rent was not properly incorporated in the system and as a result, the Company continued to collect meter rent at higher rates from 22 consumers during the period from October 2014 to August 2016 resulting in excess collection of meter rent amounting to ₹9.86 lakh.

While accepting the observation, GoK stated (January 2017) that modification in the application was being done for implementing the same.

2.3.9.6 Penal interest on belated payment

As per the Regulation 131 of Supply Code 2014, if a consumer failed to remit the bill amount on or before the due date, the Company shall recover interest on the amount of the bill at the rate of 12 per cent per annum for delay up to 30 days and thereafter, at the rate of 18 per cent per annum for the entire period of delay.

We noticed that the above provision in the Supply Code 2014 was not mapped in the system. Due to this, there was shortfall in collection of interest of ₹14.72 lakh from 349 consumers who had paid the electricity bill belatedly during the period from April 2014 to March 2016.

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23 Agreement authorities are Deputy Chief Engineers/ Chief Engineers who enter into agreement with consumers for electricity connection.

GoK replied (January 2017) that the errors were due to wrong calculation of arrear and a separate team had been formed for correcting the errors identified.

2.3.9.7 Collection of electricity duty

As per the Kerala Electricity Duty Act, 1963, consumers were liable to pay electricity duty at specified rate to the State Government for consumption of energy. Section 12 of the Act, however, exempted institutions of Government of India from payment of electricity duty.

We observed that the Company had not effectively mapped this rule into the system which resulted in:

- Collection of electricity duty amounting to ₹17.16 lakh from five institutions of Government of India. Though consumers were being tagged as "Central Government" in the system, Electricity Duty was collected from them. This indicated that the charging of the Electricity Duty was not automated in the system and was subjected to human intervention.
- Non-collection of electricity duty amounting to ₹4.81 lakh from three consumers during the period from April 2011 to July 2016.

GoK intimated that exemption field for five "Central Government" consumers identified by Audit was updated and electricity duty field of other three consumers was made applicable and bills were revised accordingly. It was also assured that the software would be modified to charge electricity duty from all consumers except the specified categories.

2.3.9.8 Deficiencies in determination and collection of Security Deposit (SD)

As per the Supply Code 2014, consumers were required to provide SD at the rates approved by the KSERC for availing electricity connection. The amount of SD was determined by adopting a formula[24]. This formula was also adopted for calculating the amount of SD at the time of addition of connected load. Further, all

24 Load * Load Factor of the category in which consumer falls * Period taken for determination of security deposit *Current tariff.

HT consumers were required to maintain SD equivalent to two times the average monthly bill amount throughout the period of service connection. If it was found that the SD available with the Company was more than required, the excess amount shall be refunded to the consumer by way of adjustment in the ensuing two electricity bills.

We reviewed the tables pertaining to SD in the system and observed the following deficiencies:

- The processes to determine the SD was not mapped in the system. Therefore, the adequacy of SD at the time of connection and on further enhancement of load could not be ensured and checked in the system.
- GoK stated (January 2017) that the methodology to determine the SD would be automated while implementing the workflow based new connection.
- As per the SRS, the interest payable on SD was to be calculated on periodic basis as defined by the Company from time to time. We observed that the interest rate applied for the financial year 2012-13 was 8 per cent though the bank rate effective as on 1-4-2012 was 9.5 per cent. This resulted in short payment of interest of ₹ 2.50 crore to consumers.

GoK replied (January 2017) that a mechanism would be established to get the bank rate for each year promptly so as to update the same in the system.

- Initial SDs were collected from the consumers before effecting service connections. The amount of deposits collected from all the consumers were entered into an account of dummy consumer (1355460009367) created for this purpose. After effecting service connections, the SDs were transferred to respective consumer's account. We noticed that an amount of ₹14.80 crore was pending (August 2016) allocation from the account of dummy consumer to the respective consumer's account.

GoK stated (January 2017) that steps had been taken to reduce the collections in the dummy consumer account. It was further stated that the amount transferred to

actual consumer had not been deducted from the dummy consumer in some cases and hence, the figures were not actual.

- The fact, however, remained that these consumers were deprived of interest on SD due to delay in allocation of SD to their account. Further, data integrity in respect of SD could not be ensured.
- During 2015-16, an excess interest of ₹0.19 crore on SD for the period 2014-15 was credited to 56 consumers which had to be revised and adjusted later (March 2016) manually. GoK stated that the excess interest credited has been recovered and adjusted.

2.3.9.9 Collection of income tax at source

As per the Income Tax Act, 1961 the Company was required to deduct income tax at source (TDS) on the interest (where interest exceeded ₹5000 in a year) on the security amount deposited by the consumers. The Permanent Account Number (PAN) of consumers containing 10 digit alpha-numeric codes had to be correctly mapped in the system for correct deduction and deposit of amount of tax.

A review of the database revealed that:

- Control for ensuring correct combination of alpha numeric code was absent which resulted in wrong entry of PAN in respect of eight consumers. Status of the consumer such as corporate, non-corporate, etc., was also not linked to the PAN.

GoK replied (January 2017) that these errors happened during initial migration and PAN validation had been rectified. It was also stated that appropriate PAN validation based on the above classification would be implemented.

- TDS was deducted in respect of 121 consumers (Central Government, State Government, local bodies, etc.) who were exempted from income tax.

GoK stated (January 2017) that “not applicable field” of exempted consumers had been updated and “TDS applicable field” was made mandatory.

2.3.10 General IT controls

IT controls in a computer system are all the manual and programmed methods, policies and procedures that ensure the protection of the entity's assets, the accuracy and reliability of its records and the operational adherence to the management standards. It includes General controls and Application controls. General controls are concerned with the organisation's IT infrastructure, IT related policies and working practices.

2.3.10.1 Issues in data migration

Prior to implementation of ENRGISE, the Company was using an application software for billing of HT/ EHT consumers since December 1999. This software was based on Linux Operating System and Oracle database. The data migration to new software was carried out by the SOR. Data which was not available in the old software was captured manually. The data in the new system was verified to determine whether data was accurate, complete and was supported in the new system.

We observed that critical data fields in the new database were incorrectly migrated due to lack of input controls in the new software and data was not properly checked during data migration as brought out below.

- In respect of nine consumers whose details were migrated from the old application software, date of connection was mentioned as "0001-09-22, 0007-08-31, 0096-12-13" instead of meaningful date format.
- One of the functionalities envisaged in the billing system was to inform consumers regarding new bill over the email/ mobile phone. For this purpose, correct email ids and mobile phone numbers (having 10 digits) of the consumers were to be entered in the system.

We noticed that email id of 119 consumers were incorrect. Email id of another 308 consumers were entered as "htbill@kseb.in" which was the default email id assigned by the Company during the migration. Similarly, in the case of 329 consumers, mobile numbers with more than 10 digits were entered in the system indicating absence of control for checking the format of phone numbers.

GoK stated (January 2017) that efforts were being made for correcting data and providing validation for checking length of mobile number.

- Out of the 15,918 meters (as at March 2016) in the master table for meters, meter ownership id in respect of 3,385 meters were null, indicating ambiguity in ownership of the meters. Further, the connection status of 1,533 meters out of these 3,385 was recorded in the database as "working". The above facts indicated active usage of these meters even though the ownership details were incomplete.

GoK stated (January 2017) that steps had been taken for rectifying errors. The fact, however, remained that the ownership of the meters pointed out could not be verified from the system. As such collection of meter rent for all the meters owned by the Company could not be ensured by the system.

2.3.10.2 Password policy

An organisation should have a good password policy to ensure security of data. We observed that:

- The Company had a documented password policy which was implemented in February 2015 after a period of more than five years from the date of implementation of computerised billing software. Even though, the IT-CU Department could chalk out the Password policy, it was not approved by any competent authority including the BoD of the Company even as of October 2016.

- As per the Password policy of the Company, all the user level passwords shall be changed periodically at least once every three months. We analysed the compliance of this provision in the Password policy and noticed that out of 1,055 users given access to ENRGISE up to 10 August 2016, 730 employees had not adhered to the policy of the Company. These employees logged into the system using passwords, which were more than three months old. The age of the passwords ranged up to six years.

- As on 10 August 2016, there were 906 active users. Out of these, 99 users never logged into the system while 76 users had not logged into the system during the last six months. In some of the cases, the users had last logged into the system four years ago.

The GoK replied (January 2017) that individual logins had been removed as part of implementation of Single Sign On and employees could log into Company portal using their employee id and password. Login and password management of all users to the portal are now handled by a user management application, which is in compliance with the password policy of the Company.

2.3.11 Application controls

Application controls are used in a computer system to provide assurance that all transactions are valid, authorised and complete. Application controls include input controls and validation controls. We reviewed the adequacy of general and application controls in the Company and noticed lack of proper input controls and validation controls as discussed below.

2.3.11.1 Lack of input control

The objectives of the input controls are to validate source data, authorisation and entry so that accurate, reliable and complete data is accepted by the application in a timely manner. While data input can be manual or system interface driven, errors and omissions can be minimised through good input design, adequate segregation of duties, etc. Review of the ENRGISE database revealed lack of input controls as detailed below:

- As per Regulation 70 of the Supply Code 2014, consumers were required to provide security deposit (SD) for availing electricity connection and 50 per cent of the SD may be in the form of bank guarantee (BG). BGs have unique numbers and name of issuing bank.We observed that in respect of 11 consumers[25], the same BG number was used and in respect of four consumers[26], name of the bank was not mentioned.

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25 Consumer Numbers - 1355040002327, 1355150003426, 1365620001002, 1366070002202, 1356780003111, 1356780000856, 1355040002327, 1346340003239, 1345160001680, 1355460003571 and 1346460001901.

26 Four consumers- Consumer Numbers 1355200003256, 1366630003269, 1346300000606 and 1365020001905.

GoK stated (January 2017) that proper validation for preventing entry of same BG number and drop down list for selecting bank would be incorporated.

- As per Regulations 99 and 100 of the Supply Code 2014, an HT/EHT consumer could change the contract demand within a specified period after the date of connection. We observed that the date of connection in respect of six consumers was later than the date of contract demand change.

GoK replied (January 2017) that errors were rectified and control mechanism implemented.

- The purpose for which electricity was proposed to be used and the product proposed to be manufactured by the consumer were the basic criteria for assigning tariff to industrial and commercial consumers. The product and purpose had to be entered in the system for correct billing.

We observed that in respect of 2,119 consumers, neither purpose nor product was entered in the system and as such, the correctness of tariff assigned to these consumers could not be ensured.

- Correct and useful data is essential for any computer application. We noticed that date of application was recorded as later than the date of connection or date of receipt of security deposit in respect of 2,331 consumers.

GoK stated (January 2017) that application date was created by the system and other dates were entered based on the documents received from the agreement authority.

The fact, however, remained that there was a mismatch of dates in the system.

2.3.11.2 Lack of validation controls

Adequate validation controls should be incorporated in the billing software for correct and prompt billing of consumers. As per Regulation 125 of the Supply

Code 2014, in case of defective/ damaged meters, the Company shall collect energy charges from consumers based on average consumption only for a maximum period of two billing cycles during which time the Company shall replace the defective/ damaged meter with a correct meter.

We noticed that the system allowed billing based on the average consumption for connections with defective meters for longer periods which ranged up to 37 months.

GoK stated (January 2017) that cases cited were not those of faulty meters but were cases of multiplication factor or PT voltage missing which was shown as meter faulty. However, GoK assured that the application would be modified for identifying such errors in multiplication factor and capturing voltage details during meter reading entry.

The reply was not acceptable since the SRS contained provision for mapping of status of meters in the system which was not done.

2.3.12 Generation of reports

The application software must be capable of generation of quality reports on various data coming under its purview as and when required by the stakeholders.

We noticed that the software was capable of generating reports relating to all modules in user defined formats. Apart from reports on regular information such as revenue, collection and arrears, the system generated customised reports as per the requirement of the management and operational staff.

We noticed cases, where incorrect and incomplete data were stored and processed in the billing software and consequent generation of inaccurate and unreliable reports as explained below.

2.3.12.1 Consumer Personal Ledger (CPL)

As per the SRS, a Consumer Personal Ledger (CPL) report was to be designed to display all relevant billing and payment details and outstanding details, if any, for a particular consumer. The SRS envisaged CPL as a statement of

a consumer's consumption, billing and payment history. Audit analysed the database and noticed the following deficiencies relating to CPL:

- The Company incorporated the CPL module in the system only in December 2014. The tables in the database relating to CPL did not contain any details of transaction that occurred prior to March 2014.
- Though relevant fields were available in the CPL table for opening balance of outstanding energy charges, demand for the month, cumulative balances, etc., we noticed differences in respect of total demand as per the actual demand table and CPL table. We also noticed that there were substantial differences between the total realised amount in collection table and total amount in the CPL table during the period from April 2015 to March 2016. Due to above deficiencies, the Company could not put to use the CPL module for MIS and reporting purposes.

GoK stated (January 2017) that deficiencies identified were since rectified and demand, collection and consumption details in CPL of consumers showed correct figures. The fact, however, remained that though CPL was one of the vital functionalities as given in the SRS and Work Order, it was not properly built into the system

2.3.12.2 Inadequate information on the bills

As per the provisions of the Supply Code 2005/ 2014, the bill issued for sale of power to HT/EHT consumers shall mandatorily include information pertaining to the consumer, tariff, payment modes available, meters used, etc.

We, however, noticed that the bills generated through ENRGISE did not include mandatory details such as meter number and identification details of meter, status of meter (OK/ defective/ not available), billing status (regular/ assessed/ provisional bill/ special bill with reason), etc. The absence of vital details/ status of meters not only made the bills less transparent but also inconsistent with Supply Code 2005/ 2014.

GoK stated (January 2017) that all the details of meter would be provided to consumer if there was any meter replacement. Further, all the information were also available in HT/EHT Web Enabled Customers Portal.

The reply was not acceptable since as per the provisions in the Supply Code 2005/ 2014, the bill issued for sale of power to HT/EHT consumers shall mandatorily include information pertaining to the consumer, tariff, payment modes available, meters used, etc.

Conclusion

Absence of a mutually agreed system requirement specification in development of the system resulted in deficient billing application software. Though the system was envisaged as a comprehensive billing system, many of the features originally envisaged were not built into the system software. Absence of adequate input controls resulted in processing of incomplete, inaccurate and unreliable data and consequent generation of incorrect bills. The business rules in many cases were found to be improperly incorporated into the system along with insufficient application controls and validation checks. In many cases, the system failed to generate accurate and reliable reports for Management Information System due to storing and processing incorrect and incomplete data in the database.

Recommendations

The Company should:

1. incorporate all functionalities and modules which were originally envisaged in the system without delay;

2. ensure that all business rules are suitably incorporated in ENRGISE. Efforts should be made to build adequate input control mechanism in the system to ensure that genuine, accurate and reliable data are processed; and

3. incorporate validation controls in the software to prevent loss of revenue.

[Audit Paragraphs 2.3 to 2.3.12.2 contained in the Report of the Comptroller and Auditor General of India for the year ended 31st March 2016 (Power & Energy)]

The notes furnished by the Government on the audit paragraph are given in Appendix II

Discussion and Findings of the Committee

The Committee enquired about the audit para that SRS which was vital for the development of the software (ENRGISE) was submitted by TCS in April 2010 after a delay of four months and the board of directors approved the same only in November 2010 after parallel running and software testing. Thus the system development and implementation was done by TCS without a formally approved and mutually agreed SRS.

The witness informed the Committee that the approval of the board was not necessary as the board had already constituted a functional committee for the purpose and that committee had been authorised to finalise and approve the SRS. On June 11, 2010, the Committee approved the SRS, which was later ratified by the Board. It was also informed that the parallel running of the system started only after the approval of SRS by the functional committee. The witness also stated that the Board had the authority to delegate its functions to any officer or subcommittee. The witness also added that software ENRGISE is working properly and the deficiencies pointed out by Audit has been addressed and rectified.

The Committee enquired about the incomplete development of the software such as functionalities like reports on revenue loss, UAL billing and audit which are indispensable for correct and timely billing of consumers. The witness replied that the formulae for calculating theft of power and UAL (Unauthorised Additonal Load) undergo changes from time to time according to tariff revision. A uniform methodology for the same had been prepared and implemented later after the software implementation. He added that the defects identified in the functionalities like Security Deposit (SD) assessment and CPL (Consumers Personal Ledger) were also corrected and the above functionalities have been incorporated now.

The Committee enquired about the present status of AMR system. The witness informed the Committee that the Board decided to implement the Automated Meter Reading System under Government of India's RAPDRP scheme (Restructured Accelerated Power Development and Reforms Programme).

He added that it could not be implemented due to the non-compliance of meters that were in use. He reported that AMR system was included in the new RDSS scheme (Revamped Distribution Sector Scheme).

The Committee sought clarification about Short Collection of Energy charges from deemed HT consumers which resulted in the loss of ₹1.44 crores due to the billing procedure mapped in the system that was not as per the schedule of Tariff issued by KSERC. The witness informed the Committee that KSERC had not defined deemed HT consumers anywhere in the Tariff schedule. He added that deemed HT consumers were to be charged the same as with the HT consumers with an additional 3% of the energy charges. The related loss of the transformer was less than that of 3% and hence KSEBL had not incurred any loss.

The Committee enquired about the failure of the system in collecting increased demand charges from seasonal consumers since the business rule for charging increased demand charges was not mapped in the system. The witness accepted the audit observation and added that the short collection identified in the audit had been realised from the consumers concerned and provision had been incorporated later in the software to collect demand charges from seasonal consumers.

The Committee enquired as to why the annual evaluation of contract demand was not effectively mapped into the system, leading to loss of money. The witness stated that a provision for review of security deposit and contract demand enhancement was incorporated in the software and is being working effectively. To a query of the Committee about the date of completion of the rectification process, the witness replied that it was finished in 2015 itself.

The Committee sought more information on the audit reference that ENRGISE had not been updated or mapped to reflect the new categorization of consumers and their prices, which led to an excess collection of energy costs totaling ₹ 87.23 lakh rupees. The witness explained that some HT-IV commercial tariff consumers were classified into the HT II A (General) and HT II B (General) tariffs as part of the 2014 tariff revision. The witness also stated that following

the audit observation, the tariff rates of 11 banks, 3 guest houses and 6 insurance and telecommunication companies had been altered based on the agreement authority's report.

Regarding the audit para about the excess collection of meter rent the witness informed that the lapses in software had been rectified. The Committee observed that there was no information in the reply furnished by the Government regarding the repayment of the excess amount collected. At this juncture, the Committee commented that it was the right of the consumers to get back the excess amount collected by the Board.

Regarding the collection of electricity duty due to the problem in mapping of the concerned rule in the software, the witness informed that the software had been modified to collect electricity duty from all HT consumers except the specified category of consumers.

The Committee demanded an explanation for the audit findings that an amount of ₹14.80 crore was pending allocation from the account of a dummy consumer to the account of the respective consumer. The witness replied that the applicant for a new connection would not be registered as a consumer until the connection process is completed. The security deposit collected at the circle office was deposited into a dummy consumer's account and forwarded to the Special Officer Revenue. The SDs were transferred to the respective consumer's account only after service connections are made.

To a query about the calculation of interest on SD the witness informed that there was no provision for automated interest calculation in the software at the time of the audit and added that this lapse had been resolved by introducing automated interest calculation in the software.

The Committee enquired whether the software's problem of PAN validation and TDS deduction had been resolved. The witness informed the Committee that the software now included appropriate PAN validation and that the TDS application field had made mandatory.

When the Committee enquired about the issues during data migration, the witness stated that all of the issues discovered during the data migration had been rectified.

To a query regarding the audit observation that during data migration ownership Id in respect of 3,385 meters were found null, the witness informed that usually HT/EHT meters were purchased by the consumers themselves and during data migration process the system only captured the data of meter supplied by the KSEBL and hence such discrepancies occured before. It was further clarified that the Software is now working properly and the deficiencies pointed out have been addressed and rectified.

The Committee enquired whether the computer system problems, such as the use of the same Bank Guarantee (BG) number and the inaccuracy of dates recorded, had been resolved. The witness replied that all of the errors discovered during the audit were corrected. The witness added that a proper validation mechanism had been implemented to ensure the system's smooth functioning.

Regarding the audit para, the witness informed the Committee that a new system for determining the CT/PT faulty status was incorporated into the software based on audit observations.

The Committee observed that KSEBL has a tendency of imposing huge fine after a gap of two or three years without conducting periodic inspections. The Committee opined that the absence of periodical inspection and imposing huge fine cause heavy burden on the consumers and hence this practice has to be avoided.

The Committee enquired about the defects in Consumer Personal Ledger. The witness replied that the discrepancies in the actual demand and CPL table had been rectified following the audit observations.

The Committee sought clarification on the absence of mandatory details on bill generated through ENRGISE. The witness informed the Committee that in the case of multiple metre readings, the details of the second reading are also provided with the bill, and that all of the provisions in the supply code have now been incorporated into the Software.

Conclusions/Recommendations

1. The Committee observes that the implementation of Automated Meter Reading system (AMR) is essential for the accuracy and effectiveness of the system in generating correct billng which enable direct access to the meter data of the consumers and it can avoid discrepancies due to human interventions. The Committee understands that the Company had decided to implement it under RDSS (Revamped Distribution Section Scheme). Hence the Committee directs that AMR should be implemented in a time bound manner and desires to furnish with the status of the implementation of AMR.

2. The Committee notice that since the change in meter rent was not properly incorporated in the system, the Company continued to collect meter rent at higher rates resulting in excess collection of meter rent amounting to Rs.9.86 lakh. The Committee understands that the lapses in the software had been rectified but the excess amount collected has not yet been repaid to the consumers concerned. The Committee is of the opinion that the consumers have every right to get back the excess amount collected from them and recommends that the excess amount collected should be repaid in a time bound manner.

3. The Committee notices that the Company follows a practice of imposing huge amount as fine after a gap of two or three years without conducting periodic inspections. The Committee observes that this practice causes heavy burden on the consumers and they may struggle in remitting the same. Hence the Committee urges to conduct periodical inspection and thereby to avoid imposing huge amount of fine. The Committee also finds that timely inspection may enhance the revenue collection of the Board. Therefore the Committee suggests to conduct periodical inspection on time and the steps taken in this regard should be intimated to the Committee at the earliest.

E. CHANDRASEKHARAN

Chairman,
Committee on Public Undertakings.

Thiruvananthapuram,
1st February, 2024.

APPENDIX – I

SUMMARY OF MAIN CONCLUSIONS/RECOMMENDATION

Sl. No.	Para. No.	Department Concerned	Conclusions/Recommendations
1	2	3	4
1	1	Power	The Committee observes that the implementation of Automated Meter Reading system (AMR) is essential for the accuracy and effectiveness of the system in generating correct billng with enable direct access to the meter data of the consumers and it can avoid discrepancies due to avoid human interventions. The Committee understands that the company had decided to implement it under RDSS (Revamped Distribution Section Scheme). Hence the Committee directs that AMR should be implemented in a time bound manner and desires to be furnished with the status of the implementation of AMR.
2	2	Power	The Committee finds since the change in meter rent was not properly incorporated in the system, the Company continued to collect meter rent at higher rates resulting in excess collection of meter rent amounting to Rs.9.86 lakh. The Committee understands that the lapses in the software had been rectified but the excess amount collected had not yet repaid to the consumers concerned. The Committee is of the opinion that the consumers have every right to get back the excess amount collected from

1	2	3	4
			them. The Committee infers that the excess amount collected has not been repaid yet. Hence the Committee recommends that the excess amount collected should be repaid in a time bound manner.
3	3	Power	The Committee notices that the Company follows a practice of imposing huge amount as fine after a gap of two or three years without conducting periodic inspections. The Committee observes that the practice causes heavy burden on the consumers may struggle in remitting the same. Hence the Committee desires to conduct periodical inspection and to thereby to avoid imposing huge amount of fine. The Committee also finds that timely inspection may enhance the revenue collections of the Board. Therefore the Committee suggests to conduct periodical inspection on time and the steps taken in this regard shall be intimated to the Committee at the earliest.

1	2	3	4
			them. The Committee infers that the excess amount collected has not been repaid yet. Hence the Committee recommends that the excess amount collected should be repaid in a time bound manner.
3	3	Power	The Committee notices that the Company follows a practice of imposing huge amount as fine after a gap of two or three years without conducting periodic inspections. The Committee observes that the practice causes heavy burden on the consumers may struggle in remitting the same. Hence the Committee desires to conduct periodical inspection and to thereby to avoid imposing huge amount of fine. The Committee also finds that timely inspection may enhance the revenue collections of the Board. Therefore the Committee suggests to conduct periodical inspection on time and the steps taken in this regard shall be intimated to the Committee at the earliest.

APPENDIX II

GOVERNMENT OF KERALA
POWER (A) DEPARTMENT
STATEMENT OF ACTION TAKEN ON PARA 2.3. CONTAINED IN THE REPORT OF THE COMPTROLLER AND AUDITOR GENERAL OF INDIA ON PUBLIC SECTOR UNDETAKINGS FOR THE YEAR ENDED 31 MARCH 2016.

INTRODUCTION **2.3.1** Kerala State Electricity Board Limited (Company), incorporated in January 2011, is engaged in generation, transmission and distribution of electricity in Kerala. The electricity consumers of the Company are divided into Low Tension (LT), High Tension (HT) and Extra High Tension (EHT) categories. As of March 2016, the Company had 1.17 crore LT consumers, 5020 HT consumers and 53 EHT consumers. These consumers had been billed for consumption of electricity at rates approved as per the Tariff Orders of the Kerala State Electricity Regulatory Commission (KSERC). The billing of consumers was also subject to the provisions of Kerala State Electricity Supply Codes (Supply Code) 2005 and 2014. With a view to automate key revenue billing and collection activities in respect of HT/EHT consumers and to improve customer satisfaction, the Board of Directors (BoD) of the Company decided (July 2008) to implement a comprehensive and fully automated computerised system consisting of HT/EHT billing application software, Automated Meter Reading (AMR) system and web enabled services for the HT/EHT consumers. The Company introduced the billing and accounting software, Enterprise Related Generalised Information System (ENRGISE) developed by Tata Consultancy Services Limited (TCS) in September 2010. ENRGISE was based on Linux operating system and used Postgres Plus Advanced Server for database management.	

Details of revenue from HT/EHT consumers and the total revenue from sale of power during the last five years ending 2015-16 are given in *Table 2.33.*

Table 2.33: Details of revenue from HT/EHT consumers

(Figures: ` in crore)

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16
Revenue from sale of power to HT/ EHT consumers	1845.7	2,484.20	2,977.78	3,007.70	3,284.80
Total revenue from sale of power including LT consumers	5,593.02	7,223.39	9,978.88	9,879.35	10,487.71
Percentage of revenue from sale of power to HT/ EHT con sumers to total rev enue from sale of power	33.00	34.39	29.84	30.44	31.32

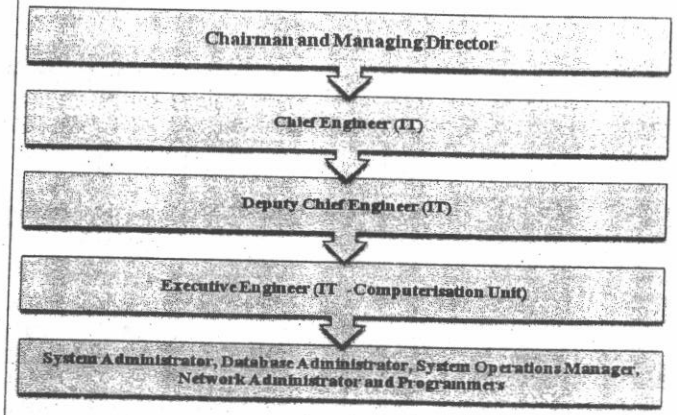
Source: Annual accounts of the Company.

Organisational structure

2.3.2 The Information Technology (IT) wing of the Company was responsible for overall development, implementation and maintenance relating to automation of various functional areas of the Company. The Chief Engineer (IT) reports directly to the Chairman and Managing Director of the Company and is assisted by a

Deputy Chief Engineer and Executive Engineers (EEs). IT–Computerisation Unit (IT-CU) at Corporate Office is headed by an Executive Engineer responsible for the monitoring and maintenance of HT and EHT billing system. Organisational set-up of IT Computerisation Unit is given in Chart 2.2 below:

***Chart 2.2: Organisational set-* up of IT Computerisation Unit**



HT/EHT Billing Process

2.3.3 The Company had 747 Electrical Section offices as at the end of July 2016, out of which 746 Section offices were connected to Wide Area Network (WAN). The electricity consumption of HT/EHT consumers was assessed for billing by the Assistant Engineers (AEs) at Electrical Section offices through meter reading taken manually. Meter reading data along with other details were thereafter sent to Special Officer-Revenue (SOR) at the Corporate Office. The authorised staff at SOR uploaded the data into the billing software and bills were generated. The bills were then issued to the consumers for making payments.

Audit objectives

2.3.4 The audit objectives were to assess whether:

- there existed a proper plan and procedure to develop and implement the system to achieve the Company's objectives and requirements;
- the system efficiently supported the business process and ensured compliance of applicable rules and regulations and the bills were generated accordingly;
- adequate security controls were in place in the system; and
- the system provided complete, reliable and authorised information for management use.

Audit Criteria

2.3.5 Audit adopted the following criteria:

- Business rules, regulations and procedures of the Company;
- Information security policy and password policy of the Company;
- Orders/ circulars/ notifications issued by Government of India, Government of Kerala and Board of Directors of the Company from time to time;
- Tender documents and request for proposal and System Requirement Specification; and
- Best practices for IT development and implementation.

Audit Scope and Methodology

2.3.6 The scope of IT Audit included the evaluation of the software used for computerised HT/EHT billing and the effectiveness of the software in generating correct billing for the Company. The scope also included review of records at IT-CU and office of the SOR at Corporate office. The data of bills maintained in the central server, located at Corporate Office of the Company at Thiruvananthapuram, in respect of all HT/EHT consumers pertaining to the period April 2011 to July 2016 was selected for checking and evaluation with a view to ascertain completeness, regularity, integrity and consistency of data. The entire data of the

above period was obtained in the form of a database dump and was analysed using Computer Assisted Audit Techniques. The adequacy of IT controls was evaluated to identify loss/omission/excess collection of revenue and to ensure comprehensiveness of the billing software.	
Audit Findings **2.3.7** Audit findings on the computerisation of HT/EHT billing system are discussed in succeeding paragraphs.	
2.3.8 Software development and implementation **Delay in framing of System Requirement Specifications** **2.3.8.1** As per the work order, system study and design and coding had to be completed by Tata Consultancy Services Limited (TCS) by November 2009. System Requirement Specifications (SRS) which is vital for development of the software should have been submitted before November 2009. We observed that the SRS was submitted by the TCS in April 2010 after a delay of four months and the BoD of the Company approved the SRS only in November 2010 after parallel running and system testing. The system development and implementation was, thus, done by TCS without a formally approved and mutually agreed SRS. GoK replied (January 2017) that a functional committee having domain experts had approved the SRS in June 2010. The reply was not acceptable since the SRS had to be approved before the completion of software development and system integration. The SRS was, however, approved (November 2010) only after the completion of software development and system integration in June 2010.	Board vide B.O(FM)No.750/2008 (MIS.CO/130/FC / 2007-08) dated 26.03.2008 constituted a Functional Committee on HT/EHT Billing with domain experts from various fields for finalization and approval of System Requirement Specifications (SRS) along with the user acceptance testing of the software. Functional committee had approved the SRS on 11.06.2010, based on which TCS was implemented the software. Later the SRS was forwarded to Board for formal approval. The functional committee approved the SRS in June 2010. The parallel running of the system was started after the approval of SRS by functional committee. In order to save time, the design and development work were done parallel and its finalisation was done after the approval from functional committee The approval of SRS by Board is a formal process and the delay in getting Board approval has no impact on software development or its implementation.

Incomplete development

2.3.8.2 A tender was invited (September 2008) for the computerisation of the HT/EHT billing system and the work was awarded (June 2009) to TCS who quoted the lowest price of ₹3.99 crore. The scope of the work included providing and implementing HT/EHT billing system and web enabled services (Phase 1) and providing and implementing AMR system for HT/EHT consumers (Phase 2).

TCS completed the software development and the system integration of HT/EHT Billing Application (Phase 1) in June 2010 and the software was tested on pilot basis (parallel run) for two months (July and August 2010) by generating bills of five months, April to August 2010. The billing software was rolled out in September 2010 and monthly bills for all HT/EHT consumers for the month of September 2010 were generated and sent to the consumers. Thereafter, the new software was being used for bill generation of all HT/ EHT consumers. The web enabled services were commissioned in July 2011.

The functionalities like Reports on revenue loss due to theft of power, Security Deposit (SD) assessment, Consumer Personal Ledger (CPL) and Unauthorised Additional Load (UAL) billing and Audit are indispensable for correct and timely billing of consumers, timely revenue collection, proper and correct review of SD, proper accounting of collections, billing/ levying of penalty for UAL, etc. Though these were included in the System Requirement Specification (SRS), functionalities like SD assessment and CPL were incorporated or implemented after rolling out of the software. We also noticed that the implementation of these functionalities were defective as discussed in *Paragraphs 2.3.9 and 2.3.12*. The functionalities like Reports on revenue loss due to theft of power, UAL billing and Audit were yet to be incorporated (January 2017).

Government of Kerala (GoK) replied (January 2017) that SD assessment, detection of theft and UAL were done at field offices (Electrical Section offices) and provision was given in the application for capturing these details as perthe SRS. The reply was not acceptable as the functionalities like Reports on revenue loss due

The formulae for calculating theft of power and UAL undergo change from time to time based on various Board Orders and orders from various judicial and quasi-judicial fora like, High Court Consumer Grievance Redressed Forum (CGRF) on a case to case basis. The Assessing Officer (Assistant Engineer) prepares the penal invoice with the help of corporate office based on the findings in site mahazar. A uniform methodology for the same is being prepared and a Work Shop for the same was conducted by KSEBL on 28/6/2017. On finalization of the rules the same will be incorporated in the system.

As there were drastic changes in billing logic due to tariff revision during the project execution period, reports developed required changes. These changes have been incorporated and are now available in the system.

Reports on functionalities like Security Deposit (SD) assessment, Consumer Personal Ledger (CPL) were corrected and is now available in System.

Exceptions reports are already available in the system for audit purpose. Additional audit reports required are being incorporated.

to theft of power, UAL billing and Audit were yet to be incorporated (January 2017) and implemented. Functionalities like SD assessment and CPL were defective.	
Non – implementation of Automated Meter Reading System **2.3.8.3** Even though the computerised billing (Phase 1: cost ₹1.93 crore) was rolled out in September 2010, the Company had not awarded the work order for implementing the AMR system (Phase 2) as of September 2016 as the Company claimed that none of the bidders had proven experience in implementation of AMR system in India. In the absence of bidders with experience in AMR system, the Company had decided to implement AMR in a phased manner. Subsequently, the Company decided (January 2010) to implement AMR system under RAPDRP scheme announced by Government of India (GoI) in which financial assistance was available for implementation of AMR. However, AMR system under RAPDRP had not been implemented so far (January 2017). Due to non-implementation of AMR system, SOR/IT-CU wings at Corporate Office were deprived of direct access to the meter data of the consumers and therefore, meter readings were being done manually. Data transfer from Electrical Section offices to the central server was, therefore, subjected to human interventions. GoK stated (January 2017) that the implementation of AMR system was excluded as the Company decided to implement it under RAPDRP scheme announced by GoI during the same period in which financial assistance for the same was available. The fact, however, remained that the Company could not implement the AMR even under RAPDRP so far (January 2017).	Even though HT/EHT billing was envisaged as a comprehensive billing system, Automated Meter Reading (AMR) was excluded later by the Board, as it was covered under Government of India's (GoI) RAPDRP (Restructured Accelerated Power Development Programme) during the same period, in which financial assistance was available for the implementation of AMR system for HT/EHT consumers. While implementing AMR system several technical difficulties were faced by KSEBL due to non compliance of data exchange standards by the existing meters of HT/EHT consumers. Board later decided to replace meters of all HT/EHT consumers as part of implementation of AMR. The purchase of AMR compliant meters are in progress. The meters supplied by the vendors were sent to CPRI laboratory Bangalore for testing. Pre-qualification of the vendors will be done based on the test report of CPRI. This is expected by the end of August 2017. Once these meters are installed, AMR will be implemented in system.
Mapping of business rules **2.3.9** HT/EHT billing process was a mission critical system, which directly impacts the revenue collection of the Company. Therefore, all business processes relating to billing, collection and accounting of HT/EHT consumption had to be mapped correctly in the application software. Further, the business processes	

mapped in the software had to be compliant with the applicable laws, rules and regulations with all the necessary controls to ensure that the amount billed and collected conformed to the prescribed rules and regulations. We observed that relevant business rules had not been fully and correctly mapped into the application, which had an impact on the revenue realisation as discussed in succeeding paragraphs.	
Short collection of energy charges from deemed HT consumers **2.3.9.1** As per the Supply Codes, 2005/ 2014, electricity connections with contract demand (CD) 100 kVA or below were allowed to draw electricity from LT distribution lines. KSERC, however, allowed a few consumers who were drawing electricity at LT voltage with CD above 100 kVA before the introduction of Supply Code, 2005 to continue this facility. These consumers were classified by the Company as Deemed HT consumers with effect from March 2005. As per the schedule of tariff issued by KSERC with effect from May 2013, the deemed HT consumers were to be charged under HT and LT tariff for demand and energy charges, respectively. The Company had 64 deemed HT consumers as of August 2016. We, however, noticed that billing procedure mapped in the system for deemed HT consumers was not as per the above schedule of tariff issued by KSERC but same as applied for HT consumers with an additional three *per cent* energy charges. The additional three *per cent* was charged since the billing of both demand and energy charges of deemed HT consumers under the HT Tariff would result in revenue loss to the Company. However, this three *per cent* was not sufficient to make good the revenue loss in the case of deemed HT consumers except industrial and agricultural consumers. This resulted in short collection of energy charges amounting to ₹1.44 crore from 22 deemed HT consumers for the period from May 2013 to July 2016. GoK replied (January 2017) that there was no clear classification of deemed HT consumers in Supply Code 2014. GoK also stated that the matter had been taken up with KSERC and was being implemented in the system.	KSEBL used to provide Low tension electric connection to consumers up to 150 kVA till first supply code was promulgated by KSERC i.e. till 02.03.2005.The Supply Code, 2005 reduced the permissible load to 100 kVA. KSERC later permitted up to a load of 150 kVA for the consumers existing as on the date of implementation of Supply Code, 2005 (vide KESC 4th Amendment Regn.,2008). KSERC vide letter dated 16.12.2008 permitted all LT consumers existing as on 02.03.2005 to continue as LT after connecting up additional load upto a total of 150kVA irrespective of their existing load below or above 100 kVA. In the new Supply Code, 2014 also, the permissible load was retained at 100 kVA and also permitted all LT consumers existing as on 02.03.2005 had a sanctioned load exceeding thelimit of 100 kVA to operate at LT subject to realization of low voltage supply surcharge, with the same sanctioned load and at the same voltage level of supply, until an upward is sought by the consumer. But, KSERC also issued KESC (Removal of difficulties) third order, 2014 in conformity with the above. KSERC has issued orders to levy low voltage supply surcharge w.e.f. 18.04.2017 only. From the above, it is evident that the consumers existed as on 02.03.2005 can be permitted to continue to avail supply

The reply was not acceptable since the Company had classified these consumers as deemed HT consumers since March 2005 and could be separately identified from the database. Further, the failure to charge deemed HT consumers as per the Schedules of Tariff resulted in revenue loss to the Company.	at LT with a connected load of 150 kVA and hence the tariff applicable is Low tension. But there were certain consumers existed as on 02.03.2005 and having connected load/contract demand above 150 kVA who continued to avail supply LT. In order to mitigate the billing problems, Board has issued orders on 22.04.2016.As per this Board order, these consumers have to be billed in accordance with the general condition in the tariff schedule w.e.f. 16.08.2014. But in the case of certain consumers having connected load above 150 kVA , as pointed out by the audit team , their meters is in the LT side but their billing is as per HT tariff. HT reading for the billing purpose shall be computed by adding 2% to the LT reading to determine the kVA billing demand and 3% to determine the total monthly energy consumption. All these consumers had installed their own transformers for availing service connection and LT cables (only of shorter length) are used from transformer to the distribution network of the consumer. So the loss on account of providing connection at LT is the losses in the transformer only. Studies also revealed that normally the losses in transformers are well below 3% and hence there was no real commercial loss sustained by KSEBL as pointed out by the audit party. KSERC, through the schedule of tariff w.e.f. 16.08.2014 has ordered to levy demand charge applicable to HT consumers and energy charge on LT tariff for deemed HT consumers , with a view to compensate the losses in providing the connection

	under LT for consumers having higher CD/ connected load than specified in the regulation. In fact, Commission has decided this charge for consumers with high loss percentage (Consumers located away from dist. Transformers). Also KSERC has not defined 'Deemed HT' consumers anywhere in the KESC and in the Tariff Schedule. In order to alleviate the ambiguity in billing of above categories of consumers, KSEBL issued order dated 22.04.2016, in conformity with the KESC and its Removal of difficulties order 2014. Now, KSERC has introduced low voltage supply surcharge for consumers having connected load /contract demand above 100 kW / 100 kV and availing supply at level and hence regular electricity bills have to be issued for above consumers with low voltage supply surcharge w.e.f 18.04.2017. Now KSEBL is implementing these changes in the system. It may also be noted that, there is only one private consumer in the list and rest of them are Govt. medical colleges and Technical education institutions in the Government sector.
Non-collection of increased demand charge from seasonal consumers **2.3.9.2** As per the tariff order, seasonal consumers are billed for the period of actual use of power under appropriate tariff category. The monthly minimum charges for the billing period shall be 75 *per cent* of the Contract Demand as increased by a formula i.e., 5(12-N) % where 'N' is the number of months during which the consumer registers himself to utilise the power in a year. There were three seasonal customers as noticed from the database.	At present, seasonal consumers are being billed manually. Implementation of additional rule for charging increased demand charge for seasonal consumers was given low priority, as there are only 3 consumers in this category and effort required for implementing the same was high. However, based on the audit observation, software will be modified for

	incorporating seasonal billing.
We observed that this business rule of charging increased minimum charges was not mapped into the system. As a result, the system failed to collect increased demand charges amounting to ₹5.08 lakh from these three consumers during April 2011 to March 2016. GoK replied (January 2017) that action had been taken for realising the short collection.	The short collection identified in the audit has already been realised from the identified consumers.

Non-mapping of business rule with regard to annual review of contract demand **2.3.9.3** As per Regulation 101 of the Electricity Supply Code 2014, if the recorded Maximum Demand (MD) of HT/EHT consumer exceeded the contract demand (CD) in any three billing periods during the previous financial year, the Company shall issue a notice of 30 days to the consumer to submit an application for enhancement of contract demand within the notice period. If there was no response from the consumer within the notice period, the Company shall enhance the contract demand of the consumer to the extent of average three top readings of MD during the previous financial year. If the distribution system is not adequate to meet the enhanced demand, the consumer shall be directed to restrict the demand to the permissible limit, till necessary augmentation/up gradation/uprating works are done in the distribution system. We observed that the above business rule was not incorporated effectively in the system as detailed below: ➢ During 2014-15, recorded MD in respect of 803 consumers exceeded the CD in three or more billing periods. 640 of these consumers did not, however, enhance the CD during the year 2015-16 as required by the Supply Code 2014. ➢ Distribution system of the Company was sufficient to meet the enhanced demand of 616 consumers out of the above 640 consumers. Had the Company enhanced the CD as per the requirements of Supply Code 2014, the demand charges could have been charged on these 616 consumers on the enhanced CD from May 2015 onwards (taking into account the notice period of 30 days). The enhanced demand charges foregone, for the period from May 2015 to March 2016 worked out to ₹2.43 crore. ➢ Supply Code 2014 provided for review of security deposit of consumers on enhancement of contract demand by adopting a methodology for determining the security deposit. We, however, observed that this provision to review the adequacy of security deposit on enhancement of contract demand was not mapped in the system.	As per regulation 101 of Supply Code 2014, notices have been issued to the consumer whose Recorded Maximum Demand (RMD) has exceeded the contract demand. It may please be noted that, as per Regulation 101 (2), the contract demand can be automatically enhanced, whereas, Regulation 101 (6), states that, for enhancing the contract demand the licensee and applicant shall follow the procedure and time lines with respect to acceptance of application for, site inspection, issuance of demand note and payment of the estimated expenditure for works in accordance with regulation 99 of the code. Hence it is not possible to unilaterally increase the contract demand of the consumer. However, based on the audit observation, notices have been issued to all consumers whose RMD has exceeded Contract Demand. Also, the consumer can approach the Consumer Grievance Redressal Forum (CGRF) if they are not satisfied with the decision of the licensee. Such recourse taken by the consumer may lead to litigation and blockage of revenue to KSE Board Ltd. Audit observation on mapping of contract demand enhancement is correct and the same can be incorporated in the system in future. But the practical difficulty in adhering to the policy may please be considered. Majority of the high value consumers are industrial consumers and are being charged at a higher tariff. The Recorded Maximum Demand (RMD) of most of these consumers is below contract demand and no incentive is given to these consumers in this regard, even though

GoK replied (January 2017) that appropriate action would be taken to regularise contract demand and further stated that there was no financial loss as the Company had been charging 50 *per cent* extra over the normal demand charges whenever MD exceeded CD. The reply was not correct as the enhanced demand charge foregone had been worked out after considering the excess demand charges levied by the Company during the month in which the actual consumption exceeded the CD.	it is a gain to KSEBL. So as a consumer and industrial friendly approach, KSEB is not unilaterally changing the contract demand of consumers with occasional increase in RMD over contract demand. Now there is a decline in the number of HT/EHT consumers of KSEBL, since many of them are opting for open access. Strict adherence to the policy will have a negative impact to the utility, as more consumers will opt for open access and thereby leading to revenue loss to KSEBL. However, notices are issued and actions are being taken against consumers with regular increase in RMD as per the provisions of the supply code. 151 consumers have enhanced contract demand during the Financial Year 2015-2016 and 147 consumers during 2016-2017. 535 contract demand enhancement notices were issued to field based on increased consumption during the Financial Year 2016-2017. The methodology suggested in Supply Code for review of security deposit of consumers on enhancement of contract demand will be automated while implementing the work flow based new service connection and other related services.
Mapping of wrong tariff **2.3.9.4** Tariffs were determined on the basis of the purpose for which electricity was used by consumers. Prior to August 2014, banking and financial institutions, Government guest houses, insurance and telecommunication companies drawing electricity at high tension voltage were billed under 'HT IV Commercial tariff'. As per the schedule of tariff which came into effect from August 2014, banking and	Separate classification for Banking and Financial Institutions, Govt. Guest Houses, Insurance Companies and Telecommunication Industries were introduced in tariff revision order 16.08.2014. Previously all such consumers were billed under commercial tariff.

financial institutions and Government guest houses were classified under 'HT II A (General)' tariff and insurance and telecommunication companies were classified under 'HT II B (General)' tariff. Under the revised tariff order, the tariff rates applicable to HT II A and HT II B consumers were lower than that of HT IV consumers. We observed that the revised categorisation of consumers and their tariffs were not updated/ mapped into ENRGISE. Consequently, 11 banking companies, three guest houses, three insurance companies and three telecommunication companies continued to be billed under the pre-revised tariffs. This resulted in excess collection of energy charges amounting to ₹87.23 lakh from the above consumers during August 2014 to March 2016. GoK replied (January 2017) that report from the agreement authority concerned was required for assigning new purposes based on the new tariff order and the change of tariff would be effected based on such reports. The reply, however, was silent on the above mentioned consumers.	However all firms having the name of such institutions could not be classified in the respective category as the purpose given in the agreement is commercial. So while assigning the purpose as per the new tariff order, it was decided to assign the new purposes by collecting report from the agreement authority concerned, after verification of the product and processes of the consumer. Based on the report received from the agreement authority, the purpose of 7 banking, 1 BSNL telephone exchange and 1 guest house were changed and billed accordingly. In other cases, the agreement authority has reported not to change the purpose even though the consumer is a financial institution/insurance company, as the purpose is of commercial type. Abstract details of consumers identified by the audit are *11 Banks* – 7 consumers tariff changed to HT-II(B), 2 – reported commercial usage, 2- awaiting report from agreement authority *3 Guest Houses* – 1 consumer tariff changed to HTII (A), 1 – reported commercial usage, 1 – awaiting report from agreement Authority. *6 Insurance & Telecommunication* – 1 Consumer tariff changed, 2 – reported commercial usage, 3 - awaiting report from agreement Authority.
Excess collection of meter rent **2.3.9.5** Until September 2014, the applicable meter rent per month for energy meters with Availability Based Tariff (ABT)/ Time of the Day (TOD) facilities supplied by the Company was ₹5,000 for the first month of electricity connection and ₹6,000 thereafter. The KSERC had revised (September 2014) the meter rent for	The order for meter rent issued by KSERC did not specify HT/EHT category and hence not implemented in the system. Later clarification for HT/EHT category has been received and is now implemented in the

ABT/ TOD meters as ₹1,000 with effect from October 2014. BoD of the Company had also adopted the revised meter rent in November 2014. We observed that the change in the meter rent was not properly incorporated in the system and as a result, the Company continued to collect meter rent at higher rates from 22 consumers during the period from October 2014 to August 2016 resulting in excess collection of meter rent amounting to ₹9.86 lakh. While accepting the observation, GoK stated (January 2017) that modification in the application was being done for implementing the same.	software. At present, there is no excess meter rent collection from any of the HT/EHT consumers.
Penal interest on belated payment **2.3.9.6** As per the Regulation 131 of Supply Code 2014, if a consumer failed to remit the bill amount on or before the due date, the Company shall recover interest on the amount of the bill at the rate of 12 *per cent per annum* for delay up to 30 days and thereafter, at the rate of 18 *per cent per annum* for the entire period of delay. We noticed that the above provision in the Supply Code 2014 was not mapped in the system. Due to this, there was shortfall in collection of interest of ₹14.72 lakh from 349 consumers who had paid the electricity bill belatedly during the period from April 2014 to March 2016. GoK replied (January 2017) that the errors were due to wrong calculation of arrear and a separate team had been formed for correcting the errors identified.	Provision for calculating penal interest as per Supply Code, 2014 is now correctly mapped in the system. However, the short collection identified by the audit on interest from April 2014 to March 2016, are being examined by a dedicated team. The exact short collection, if any, will be realised from the consumer after the audit.

Collection of electricity duty **2.3.9.7** As per the Kerala Electricity Duty Act, 1963, consumers were liable to pay electricity duty at specified rate to the State Government for consumption of energy. Section 12 of the Act, however, exempted institutions of Government of India from payment of electricity duty. We observed that the Company had not effectively mapped this rule into the system which resulted in: ➢ Collection of electricity duty amounting to ₹17.16 lakh from five institutions of Government of India. Though consumers were being tagged as 'Central Government' in the system, Electricity Duty was collected from them. This indicated that the charging of the Electricity Duty was not automated in the system and was subjected to human intervention. ➢ Non-collection of electricity duty amounting to ₹4.81 lakh from three consumers during the period from April 2011 to July 2016. GoK intimated that exemption field for five 'Central Government' consumers identified by Audit was updated and electricity duty field of other three consumers was made applicable and bills were revised accordingly. It was also assured that the software would be modified to charge electricity duty from all consumers except the specified categories.	Electricity duty exemption field updated for 5 Government consumers identified in the audit and no duty is now collected from these consumers. Electricity duty field was made applicable for three consumers identified in the audit and bills were revised for realization of short collection. Software is modified to include electricity duty for all consumers, exempt the specified category of consumers.
Deficiencies in determination and collection of Security Deposit (SD) **2.3.9.8** As per the Supply Code 2014, consumers were required to provide SD at the rates approved by the KSERC for availing electricity connection. The amount of SD was determined by adopting a formula. This formula was also adopted for calculating the amount of SD at the time of addition of connected load. Further, all HT consumers were required to maintain SD equivalent to two times the average monthly bill amount throughout the period of service connection. If it was found that the SD available with the Company was more than required, the excess amount	

shall be refunded to the consumer by way of adjustment in the ensuing two electricity bills.	
We reviewed the tables pertaining to SD in the system and observed the following deficiencies: ➢ **The processes to determine the SD was not mapped in the system. Therefore, the adequacy of SD at the time of connection and on further enhancement of load could not be ensured and checked in the system.** GoK stated (January 2017) that the methodology to determine the SD would be automated while implementing the workflow based new connection.	Calculation of security deposit at the time of new connection and on further enhancement of load is done manually by the Assistant Engineers of respective Electrical Section. So data entry error in the system will not affect the calculation of Security Deposit. This will be automated while implementing the work flow based new connection in the system.
➢ As per the SRS, the interest payable on SD was to be calculated on periodic basis as defined by the Company from time to time. We observed that the interest rate applied for the financial year 2012-13 was 8 *per cent* though the bank rate effective as on 01/04/2012 was 9.5 *per cent*. This resulted in short payment of interest of ₹2.50 crore to consumers. GoK replied (January 2017) that a mechanism would be established to get the bank rate for each year promptly so as to update the same in the system.	The accrued interest on Security Deposit for each financial year is calculated based on the average interest rate prevailing in the respective year.
➢ Initial SDs were collected from the consumers before effecting service connections. The amount of deposits collected from all the consumers were entered into an account of dummy consumer (1355460009367) created for this purpose. After effecting service connections, the SDs were transferred to respective consumer's account. We noticed that an amount of ₹14.80 crore was pending (August 2016) allocation from the account of dummy consumer to the respective consumer's account. GoK stated (January 2017) that steps had been taken to reduce the collections in the dummy consumer account. It was further stated that the amount transferred to actual consumer had not been deducted from the dummy consumer in some cases and hence, the figures were not actual.	Effort is being taken to reduce the amount outstanding in the dummy consumer account. No amount was accumulated during this financial year in this account. All consumers were asked to verify and report any difference in the amount of Security Deposit shown in the invoice. Such requests were considered and amount if any found due is credited to the consumer account from the dummy account.

The fact, however, remained that these consumers were deprived of interest on SD due to delay in allocation of SD to their account. Further, data integrity in respect of SD could not be ensured. ➢ During 2015-16, an excess interest of ₹0.19 crore on SD for the period 2014-15 was credited to 56 consumers which had to be revised and adjusted later (March 2016) manually. GoK stated that the excess interest credited has been recovered and adjusted.	Excess interest credited to 56 consumers for the period 2014-15, as given by the audit has been recovered and adjusted. At present, interest calculation of SD is working properly.
Collection of income tax at source **2.3.9.9** As per the Income Tax Act, 1961 the Company was required to deduct income tax at source (TDS) on the interest (where interest exceeded ₹5000 in a year) on the security amount deposited by the consumers. The Permanent Account Number (PAN) of consumers containing 10 digit alpha-numeric codes had to be correctly mapped in the system for correct deduction and deposit of amount of tax. A review of the database revealed that: ➢ Control for ensuring correct combination of alpha numeric code was absent which resulted in wrong entry of PAN in respect of eight consumers. Status of the consumer such as corporate, non-corporate, etc., was also not linked to the PAN. GoK replied (January 2017) that these errors happened during initial migration and PAN validation had been rectified. It was also stated that appropriate PAN validation based on the above classification would be implemented. ➢ TDS was deducted in respect of 121 consumers (Central Government, State Government, local bodies, *etc.*) who were exempted from income tax. GoK stated (January 2017) that 'not applicable field' of exempted consumers had been updated and 'TDS applicable field' was made mandatory.	PAN number validation is already implemented in the software. Consumers with wrong PAN numbers were identified and efforts are being taken to contact these consumers for collecting correct data for updating the database. Data for classification of PAN numbers into corporate, non-corporate etc. are not available. Appropriate PAN validation based on the above classification will be implemented after getting the above details. Errors identified by audit have been rectified. TDS applicable field is now mandatory.

General IT Controls **2.3.10** IT controls in a computer system are all the manual and programmed methods, policies and procedures that ensure the protection of the entity's assets, the accuracy and reliability of its records and the operational adherence to the management standards. It includes General controls and Application controls. General controls are concerned with the organisation's IT infrastructure, IT related policies and working practices.	
Issues in data migration **2.3.10.1** Prior to implementation of ENRGISE, the Company was using an application software for billing of HT/ EHT consumers since December 1999. This software was based on Linux Operating System and Oracle database. The data migration to new software was carried out by the SOR. Data which was not available in the old software was captured manually. The data in the new system was verified to determine whether data was accurate, complete and was supported in the new system. We observed that critical data fields in the new database were incorrectly migrated due to lack of input controls in the new software and data was not properly checked during data migration as brought out below. In respect of nine consumers whose details were migrated from the old application software, date of connection was mentioned as '0001-09-22, 0007-08-31, 0096-12-13' instead of meaningful date format. ➢ One of the functionalities envisaged in the billing system was to inform consumers regarding new bill over the email/ mobile phone. For this purpose, correct email ids and mobile phone numbers (having 10 digits) of the consumers were to be entered in the system.	Date of connection in respect of migrated consumers identified in the audit has been rectified. Mobile Phone number validation is already in system and is restricted to numeric values only. Validation for checking length of mobile number is implemented. Email ID validation is already implemented in system. Errors in email id occurred due to lack of validation during the initial migration. Later email id's found to be incorrect were changed to a default KSEBL mail id htbill@KSEBL.in). Consumer bills are sent to the registered email id as and when bill is generated in system. Efforts are being taken for collecting correct data from consumers and more than 100 consumers' email id have been updated in system. As meter rent was applicable only for main meters

We noticed that email id of 119 consumers were incorrect. Email id of another 308 consumers were entered as "htbill@kseb.in" which was the default email id assigned by the Company during the migration. Similarly, in the case of 329 consumers, mobile numbers with more than 10 digits were entered in the system indicating absence of control for checking the format of phone numbers. GoK stated (January 2017) that efforts were being made for correcting data and providing validation for checking length of mobile number. ➢ Out of the 15,918 meters (as at March 2016) in the master table for meters, meter ownership id in respect of 3,385 meters were null, indicating ambiguity in ownership of the meters. Further, the connection status of 1,533 meters out of these 3,385 was recorded in the database as 'working'. The above facts indicated active usage of these meters even though the ownership details were incomplete. GoK stated (January 2017) that steps had been taken for rectifying errors. The fact, however, remained that the ownership of the meters pointed out could not be verified from the system. As such collection of meter rent for all the meters owned by the Company could not be ensured by the system.	owned by KSEBL, only that particular field was updated during initial data migration. Since there were only two type of ownership viz, consumer/KSEBL, all other ownership status other than KSEBL was considered as consumer by the system. However, all other meters without ownership details were updated as consumer meter. Ownership field of all new meters are now captured through the system. Hence all meters entered through system after the initial upload after 08/2010 have meter ownership details. There is no error in meter rent calculation in the system, as KSEBL owned meters are clearly marked in the system.
Password policy **2.3.10.2** An organization should have a good password policy to ensure security of data. We observed that: The Company had a documented password policy which was implemented in February 2015 after a period of more than five years from the date of implementation of computerised billing software. Even though, the IT CU Department could chalk out the Password policy, it was not approved by any competent authority including the BoD of the Company even as of October 2016.	Computerization activities of the Board were taken up in a phased manner based on the prioritization in IT Road Map. HT/EHT billing system was developed during the initial stages and Board has not adopted any password policy at the time of development of HT/EHT application and hence application itself was having its

➢ As per the Password policy of the Company, all the user level passwords shall be changed periodically at least once every three months. We analysed the compliance of this provision in the Password policy and noticed that out of 1,055 users given access to ENRGISE up to 10 August 2016, 730 employees had not adhered to the policy of the Company. These employees logged into the system using passwords, which were more than three months old. The age of the passwords ranged up to six years. ➢ on 10 August 2016, there were 906 active users. Out of these, 99 users never logged into the system while 76 users had not logged into the system during the last six months. In some of the cases, the users had last logged into the system four years ago. ➢ The GoK replied (January 2017) that individual logins had been removed as part of implementation of Single Sign On and employees could log into Company portal using their employee id and password. Login and password management of all users to the portal are now handled by a user management application, which is in compliance with the password policy of the Company.	own password policy which was being followed by all the users of the application. Majority of the IT applications were implemented in KSEBL as part of RAPDRP project and Board has adopted a password policy for all the applications and decided to bring all application under a Single Sign On for implementation of the policy. As part of Single Sign On implementation, individual application logins has been removed and all applications are now integrated into a single sign on portal. Employees can log in to KSEBL portal using their User id (employee code) and password. Login and password management of all users to the portal are now handled by a user management application, which is in compliance with the password policy of KSEBL.
Application controls **2.3.11** Application controls are used in a computer system to provide assurance that all transactions are valid, authorised and complete. Application controls include input controls and validation controls. We reviewed the adequacy of general and application controls in the Company and noticed lack of proper input controls and validation controls as discussed below.	

Lack of input control **2.3.11.1** The objectives of the input controls are to validate source data, authorization and entry so that accurate, reliable and **complete** data is accepted by the application in a timely manner. While data input can be manual or system interface driven, errors and omissions can be minimized through good input design, adequate segregation of duties, etc. Review of the ENRGISE database revealed lack of input controls as detailed below:	
➢ As per Regulation 70 of the Supply Code 2014, consumers were required to provide security deposit (SD) for availing electricity connection and 50 *per cent* of the SD may be in the form of bank guarantee (BG). BGs have unique numbers and name of issuing bank. We observed that in respect of 11 consumers, the same BG number was used and in respect of four consumers, name of the bank was not mentioned. GoK stated (January 2017) that proper validation for preventing entry of same BG number and drop down list for selecting bank would be incorporated.	Validation for preventing entry of same Bank Guarantee (BG) number has been incorporated in the system. Drop down list for selecting bank is under implementation.
➢ As per Regulations 99 and 100 of the Supply Code 2014, an HT/EHT consumer could change the contract demand within a specified period after the date of connection. We observed that the date of connection in respect of six consumers was later than the date of contract demand change. GoK replied (January 2017) that errors were rectified and control mechanism implemented.	The error identified in audit has been rectified and proper validation has been implemented.
➢ The purpose for which electricity was proposed to be used and the product proposed to be manufactured by the consumer were the basic criteria for assigning tariff to industrial and commercial consumers. The product and purpose had to be entered in the system for correct billing.	Purpose for which electricity is used is captured in the system and is required for identifying the tariff for billing the consumer. Hence there are no consumers in the system without purpose. Product details of consumer have no significance in tariff determination.

We observed that in respect of 2,119 consumers, neither purpose nor product was entered in the system and as such, the correctness of tariff assigned to these consumers could not be ensured. ➢ Correct and useful data is essential for any computer application. We noticed that date of application was recorded as later than the date of connection or date of receipt of security deposit in respect of 2,331 consumers. GoK stated (January 2017) that application date was created by the system and other dates were entered based on the documents received from the agreement authority. The fact, however, remained that there was a mismatch of dates in the system.	The date on which application is created in the system is taken as the application date and all other dates are entered based on the documents received from the agreement authority. Provision will be given for capturing application date separately, if the applications are entered at a later date from the corporate office.
Lack of Validation controls 2.3.11.2 Adequate validation controls should be incorporated in the billing software for correct and prompt billing of consumers. As per Regulation 125 of the Supply Code 2014, in case of defective/ damaged meters, the Company shall collect energy charges from consumers based on average consumption only for a maximum period of two billing cycles during which time the Company shall replace the defective/ damaged meter with a correct meter. We noticed that the system allowed billing based on the average consumption for connections with defective meters for longer periods which ranged up to 37 months.	In case of defective or damaged meter, meter faulty penalty is being charged after 60 days of reading start date for which average bill has been issued. The observation of the audit that this facility is not implemented in the system is not correct. Meter faulty penalty has not been charged in cases where error in Multiplication Factor or PT voltage missing in any phase found on inspection by HT Meter Testing units. In such cases bills issued for the mentioned periods are revised with previous average. The reading start date of first bill which is revised is shown as Meter Faulty Date even though the meter is

GoK stated (January 2017) that cases cited were not those of faulty meters but were cases of multiplication factor or PT voltage missing which was shown as meter faulty. However, GoK assured that the application would be modified for identifying such errors in multiplication factor and capturing voltage details during meter reading entry. The reply was not acceptable since the SRS contained provision for mapping of status of meters in the system which was not done.	not faulty. Provision is given in the software for capturing the voltage details during meter reading. Application is being modified for identifying multiplication factor changes without meter change.
Generation of reports **2.3.12** The application software must be capable of generation of quality reports on various data coming under its purview as and when required by the stakeholders. We noticed that the software was capable of generating reports relating to all modules in user defined formats. Apart from reports on regular information such as revenue, collection and arrears, the system generated customized reports as per the requirement of the management and operational staff. We noticed cases, where incorrect and incomplete data were stored and processed in the billing software and consequent generation of inaccurate and unreliable reports as explained below.	
Consumer Personal Ledger (CPL) **2.3.12.1** As per the SRS, a Consumer Personal Ledger (CPL) report was to be designed to display all relevant billing and payment details and outstanding details, if any, for a particular consumer. The SRS envisaged CPL as a statement of a	The Consumer Personal Ledger (CPL) module was initially introduced with effect from April 2010 taking

consumer's consumption, billing and payment history. Audit analysed the database and noticed the following deficiencies relating to CPL: **The Company incorporated the CPL module in the system only in December 2014. The tables in the database relating to CPL did not contain any details of transaction that occurred prior to March 2014.** ➢ Though relevant fields were available in the CPL table for opening balance of outstanding energy charges, demand for the month, cumulative balances, etc., we noticed differences in respect of total demand as per the actual demand table and CPL table. We also noticed that there were substantial differences between the total realised amount in collection table and total amount in the CPL table during the period from April 2015 to March 2016. Due to above deficiencies, the Company could not put to use the CPL module for MIS and reporting purposes. GoK stated (January 2017) that deficiencies identified were since rectified and demand, collection and consumption details in CPL of consumers showed correct figures. The fact, however, remained that though CPL was one of the vital functionalities as given in the SRS and Work Order, it was not properly built into the system.	data directly from the respective tables which were time consuming. Later modifications in CPL report were necessitated due to the effect of tariff revision, addition of new heads and bill revisions. Accordingly, it was decided to process and generate CPL data on a scheduled basis for populating on a separate table for taking CPL report more efficiently and this was introduced from March 2014. Deficiencies identified were rectified and now demand, collection and consumption details in CPL of a consumer are showing correct figures.
Inadequate information on the bills **2.3.12.2** As per the provisions of the Supply Code 2005/ 2014, the bill issued for sale of power to HT/EHT consumers shall mandatorily include information pertaining to the consumer, tariff, payment modes available, meters used, etc. We, however, noticed that the bills generated through ENRGISE did not include mandatory details such as meter number and identification details of meter, status of meter (OK/ defective/ not available), billing status (regular/ assessed/ provisional bill/ special bill with reason), etc. The absence of vital details/ status of meters not only made the bills less transparent but also inconsistent with Supply Code 2005/ 2014.	In case of meter replacement during a billing period, an additional 'Multiple Meter Reading Report' is provided to the consumers along with bill, which contains details like meter number of old and new meter, meter reading start date and end date along with the initial and final readings of both meters. Status of meter, in case of faulty main meter is displayed in the remarks column of the bill. In all other cases the meter is readable and working. All bills taken from the system for a month are considered as regular bills. Bill type of any other non-regular bill is specified in the bill head itself.

GoK stated (January 2017) that all the details of meter would be provided to consumer if there was any meter replacement. Further, all the information were also available in HT/EHT Web Enabled Customers Portal. The reply was not acceptable since as per the provisions in the Supply Code 2005/ 2014, the bill issued for sale of power to HT/EHT consumers shall mandatorily include information pertaining to the consumer, tariff, payment modes available, meters used, etc.	All details including meter number, status, reading details etc. are also available in the bill.
Conclusion **Absence of a mutually agreed system requirement specification in development of the system resulted in deficient billing application software. Though the system was envisaged as a comprehensive billing system, many of the features originally envisaged were not built into the system software. Absence of adequate input controls resulted in processing of incomplete, inaccurate and unreliable data and consequent generation of incorrect bills. The business rules in many cases were found to be improperly incorporated into the system along with insufficient application controls and validation checks. In many cases, the system failed to generate accurate and reliable reports for Management Information System due to storing and processing incorrect and incomplete data in the database.** **Recommendation** **The Company should:** **1.incorporate all functionalities and modules which were originally envisaged in the system without delay;**	Almost all business processes have been implemented in the software. New and additional business processes will be implemented as and when required. As pointed out in the audit report, the system is capable of generating various reports required for the utility. Accurate and reliable reports are being generated from the system and are being used for Management Information System. 1.All functionalities as per System Requirement Specification finalised by the functional committee for HT/EHT billing has been implemented in the system except seasonal consumers (three water authority/minor irrigation consumers) billing. The billing of seasonal

	consumers was not implemented due to some error in excess demand calculation, which will be rectified and implemented immediately.
2.ensure that all business rules are suitably incorporated in ENRGISE. Efforts should be made to build adequate input control mechanism in the system to ensure that genuine, accurate and reliable data are processed; and	2.Adequate input control mechanism has already been implemented in the system. However, based on audit findings,additional input controls will be implemented wherever required.
3.incorporate validation controls in the software to prevent loss of revenue.	3.On analysis of audit report, there is no revenue loss to the Board due to inadequate application controls through validation checks except for the Electricity Duty. Short collection of electricity duty identified by the audit was recovered from the consumer by issuing additional notice. Proper control mechanism will be implemented for preventing the identified errors.

In the light of the above facts and explanations, the audit para may kindly be dropped.

Ratnamma.V

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