2.1 Introduction

Consequent to the AP Reorganisation Act, 2014, distribution network in the State of Telangana is carried out by two distribution companies (DISCOMs) viz., Northern Power Distribution Company of Telangana Limited, (TSNPDCL) and Southern Power Distribution Company of Telangana Limited, (TSSPDCL). TSNPDCL (Company) functions under the administrative control of Department of Energy, Government of Telangana with registered office at Warangal. The Company is the license holder for distribution of power in the five districts/ circles[23] of Telangana. The total share capital of the Company amounting to ₹ 274.76 crore, is held by the Government of Telangana.

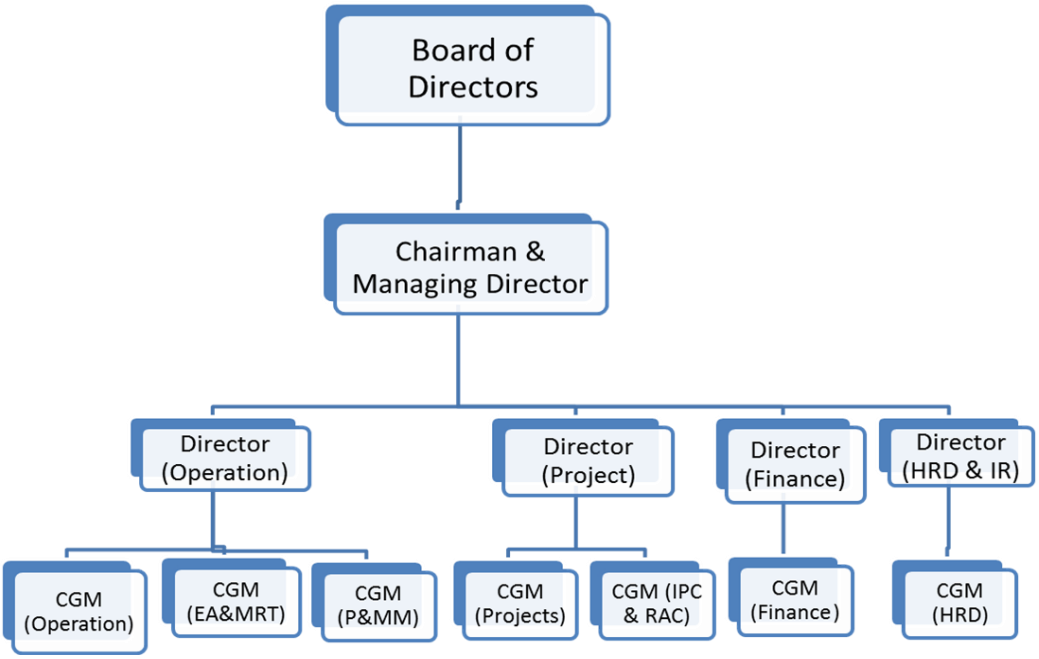
The Distribution sector is the most important link in the power sector value chain, which channelises the revenue realisation to provide overall stability to the sector. The sale of energy by the Company increased from 10,243.92 Million Units (MU) in 2011-12 to 11,565.70 MU in 2015-16, registering a growth of 12.90 *per cent* during the five year period 2011-16. As on 31 March 2016, the Company had a distribution network of 2.16 lakh Circuit Kilometres[24] (CKM) of lines (33/11 Kilo Volts (KV) and Low Tension (LT)), 1,106 Sub-stations, 1,507 Power Transformers (PTR) and 2,42,539 Distribution Transformers (DTR) of various capacities. The turnover of the Company increased from ₹ 5,433.08 crore in 2011-12 to ₹ 7,632.13 crore in 2015-16, registering a growth of 40.48 *per cent* during the period 2011-16. The financial position of the Company deteriorated from a profit of ₹ 3.20 crore in 2011-12 to a loss of ₹ 1,010.08 crore in 2015-16. The cumulative loss of the Company as on 31 March 2016 was ₹ 5,895 crore. The losses were mainly due to higher power purchase cost, making provision for doubtful receivables from the State Government and higher distribution losses, as discussed in Paragraphs 2.6.2.3, 2.6.2.4 and 2.6.3.1. The reasons for the losses in 2014-15 were higher cost of operation and non-recovery thereof, due to adoption of Tariff Order of 2013-14 for 2014-15 also. The tariff proposal submitted for 2014-15 was not approved due to elections, State bifurcation and reduction in subsidy from Government, as discussed in Paragraphs 2.6.4.1 and 2.6.4.5.

[23] Warangal, Khammam, Karimnagar, Adilabad and Nizamabad

[24] Circuit Kilometre (CKM) is the product of the number of lines and the length in Kilometre

2.2 Organisation Chart

The Organisation structure of the Company is detailed below:



2.3 Scope & Methodology of Audit

The Performance Audit covers the performance of the Company during the period from 2011-12 to 2015-16. The Performance Audit mainly deals with network planning and execution, implementation of central schemes, supply of power to consumers including agriculture consumers, billing and collection efficiency, financial management, consumer satisfaction and safety.

The audit methodology adopted for the Performance Audit include:

i) Scrutiny of records at registered office at Warangal and all the five circle offices;

ii) Examination of agenda and minutes of the Board meetings; and

iii) Interaction with the Audited entity and analysis of the data with reference to audit criteria.

2.4 Audit Objectives

The objectives of Performance Audit were to assess:

- adequacy of distribution network and award of works contracts for establishing distribution network in an economic and effective manner;
- whether the Schemes/ Projects were implemented efficiently and effectively;
- operational efficiency in curtailing of sub-transmission and distribution losses;
- billing and collection efficiency of revenue from consumers; and
- whether a system was in place to ascertain the consumer satisfaction and redressal of grievances.

2.5 Audit Criteria

2.5.1 The audit criteria considered for achievement of these audit objectives were:

- The Electricity Act, 2003, the National Electricity Policy, 2005 and the schemes sponsored by Ministry of Power (MoP), Government of India (GoI).
- The guidelines and other directions issued by Ministry of Power, State Electricity Regulatory Commission (SERC), State Government.
- Norms fixed by various agencies[25] with regard to operational activities.
- Agenda and minutes of the meeting of the Board of Directors of the Company
- Standard procedures for award of contracts with reference to the principles of economy and effectiveness, norms for technical and non-technical losses.

2.5.2 The audit objectives and criteria were explained to the Company during the Entry Conference held on 6 June 2016. The Exit Conference was held on 26 October 2016 to discuss the audit findings. The replies of the Government to the audit findings have been considered while finalising the Report.

The Information Technology (IT) policy of the Company, general controls, application controls, design deficiencies, input controls and validation checks and internal controls in IT system were examined and the observations have been included separately.

Acknowledgement

Audit acknowledges and appreciates the co-operation and assistance extended by the officers and the Management of the Company at various stages of conducting the Performance Audit.

2.6 Audit Findings

2.6.1 Distribution Network Planning and Execution

The Distribution Companies in the State are required to prepare long term/ annual plans for creation of infrastructural facilities[26], for efficient distribution of electricity so as to cover maximum population in the State. Besides, DISCOMs are also required to upkeep the existing network and expand the distribution network keeping in view the growth in demand. The planning and execution of network expansion and upkeep of the existing network were examined and findings are discussed below:

2.6.1.1 Shortfall in investment in distribution network

The Company had prepared a Corporate Plan for the five year period from 2012-13 to 2016-17. The demand projected in the five year plan and the actual supply (input units) during the period is indicated in Table 2.1.

[25] CERC, SERC, MoP and the State Government

[26] Load growth & network strengthening, addition of substations, PTRs, DTRs etc.

Table 2.1: Projected Demand and actual supply of electricity

Year	Projected Demand (MU)	Actual Supply (input units in MU)	Percentage of shortfall
2012-13	12,248.62	11,165	8.85
2013-14	12,843.74	11,868	7.60
2014-15	13,438.86	12,802	4.74
2015-16	14,033.98	13,270	5.44
2016-17	14,629.10	Not Available[27]	Not Available

Source: Five Year Corporate Plan 2012-13 to 2016-17

As can be observed from the above table, there was shortfall in actual supply compared to the projected demand in all the years as the Company had not prepared any annual plans for creation of network to meet the projected demand. Against the amounts sanctioned by SERC in the wheeling tariff for creation and upkeep of network, the actual investments made during 2011-12 to 2015-16 were as indicated below:

Table 2.2: Actual investments for upkeep of network

(₹ in crore)

Year	2011-12	2012-13	2013-14	2014-15	2015-16	Total
Sanctioned by SERC	474.22	298.56	287.88	709.00	983.00	2,752.66
Actual investment	313.90	383.59	312.50	334.28	656.35	2,000.62
Shortfall	-160.32	85.03	24.62	-374.72	-326.65	752.04

Source: SERC Orders for Wheeling Tariff and Financial Statements

From the above table, Audit observed that though the investment was more than the amounts sanctioned by SERC during 2012-13 and 2013-14, there was shortfall in investment during 2011-12, 2014-15 and 2015-16. The shortfall in investment during the five year period covered in audit worked out to ₹ 752.04 crore.

Audit observed that due to lack of planning the Company could not utilise the amounts sanctioned for creation of distribution network. Thus, the consumers were deprived of corresponding benefit through better network/ services. SERC also observed (March 2015) that DISCOMs could not achieve the loss reduction trajectory as prescribed for the Control period[28] due to non-utilisation of sanctioned investments.

The Government accepted and agreed during the Exit Conference to implement year-wise plans for investment as per the approvals of SERC.

2.6.1.2 Adequacy of transformation capacity

A Transformer is a static device installed for stepping up or stepping down voltage in transmission and distribution of electricity. The energy received at high voltage (132 KV, 66 KV, 33 KV) from primary sub-stations of the Transmission Companies is transformed to lower voltage (11 KV) at 33/11

[27] Not available as the period is not completed.

[28] Control Period is a multi-year period fixed by the Commission from time to time, usually five years, for which the principles of determination of revenue requirement will be fixed.

KV sub-stations of the Distribution Companies for use by the consumers. In order to cater to the entire connected load, the transformation capacity should be adequate. The ideal ratio of transformation capacity to connected load is considered as 1:1.

The table below indicates the details of transformation capacity at 33/11 KV sub-stations and connected load of the consumers during the period 2011-16:

Table 2.3: Details of Transformation Capacity

Year	Transformers Capacity (MVA[29])	LT Connected Load with PF 0.90		Gap in Transformation capacity (MVA)	Ratio
		MVA	MW		
1	2	3	4	5=3-2	6=2/3
2011-12	6,320	-NA-	-NA-	-NA-	-NA-
2012-13	6,770	7,967.30	7,170.57	1,197.30	0.85:1
2013-14	7,734	8,129.90	7,316.91	395.90	0.95:1
2014-15	8,315	8,368.14	7,531.33	53.14	0.99:1
2015-16	8,816	8,662.61	7,796.35	-153.39	1.02:1

Source: MIS returns/Company reply

It could be seen from the table above that the ratio of transformation capacity to total connected load in the Company had improved from 0.85:1 in 2012-13 to 1:1 in 2015-16. Due to installation of additional transformation capacity, the shortfall of 1197.30 MVA in transformation capacity as on March 2013 was eliminated by March 2016**.**

2.6.1.3 Conversion of Agricultural services under LVDS to HVDS

Distribution of power through High Tension (HT) line is an effective method for reduction of technical losses, prevention of theft, improved voltage profile and better consumer service. The Government of India (GoI) had also stressed (February 2001) the need to adopt LT-less system of distribution by way of replacement of existing LT lines by HT lines to reduce the distribution losses.

A scheme was sanctioned (2011-12) by GoI for conversion of agriculture services under Low Voltage Distribution System (LVDS) to High Voltage Distribution System (HVDS) in all the five circles of the Company with an estimated cost of ₹ 410.48 crore. Out of 1,24,335 agriculture services to be converted to HVDS by March 2016, only 69,934 services (56.25 *per cent*) were converted as on March 2016.

Due to delay in taking up the conversion works and slow progress of works, the Company could not achieve the objective of conversion of agricultural services under LVDS to HVDS to reduce distribution losses (The details of Distribution losses are further discussed in Paragraph 2.6.3.1).

The Government stated (October 2016) that the works were prone to be hampered due to weather conditions and agriculture seasons and it was not possible to execute the works throughout the year due to standing crops. The balance works would, however, be completed during 2016-17.

[29] Mega Volt Ampere (Volts X Amp X 10,00,000)

The fact remained that the scheme sanctioned during 2011-12 was not completed till the date of audit**.**

2.6.1.4 Adequacy of capacitor banks

Capacitor banks improve power factor[30] by regulating the current flow and voltage. In the event of voltage falling below normal, sufficient capacity of capacitor banks, if provided in the system, improve the voltage profile and reduce dissipation of energy, thereby saving energy. The Company had estimated the savings at the rate of ₹ 2 lakh (approx.) per one capacitor of 1 Million Volt Ampere Reactive (MVAR) per year.

As per the APERC Grid Code (3.5.12.5) 2014 as adopted by TSERC, DISCOMs should install capacitors at various locations of the distribution system so that the power factor at the interface with State Transmission Utility (STU) is not less than 90 *per cent*.

As on 31 March 2014, the Company had 490 MVAR capacity of capacitor banks. The Company had assessed requirement (October 2014) of additional 579 MVAR capacity capacitor banks, against which 442 MVAR capacity capacitor banks (76.34 *per cent*) were installed.

Audit observed that the Company had not assessed the requirement of capacitor banks during the period from 2011-12 to 2013-14. The additional capacity assessed during October, 2014 was also not installed, which resulted in shortage of 137 MVAR capacity as on March, 2015. The savings foregone per year worked out to ₹ 2.74 crore.

Further, the Company had assessed (2015-16) the requirement of 1641 MVAR capacity capacitor banks to meet nine hour per day power supply to agriculture sector. However, the company had installed only 242 MVAR capacity capacitor banks in 2015-16 and 1399 MVAR capacity capacitor banks were yet to be installed (March 2016).

The Government stated (October 2016) that as per the present policy of the Government, nine hours' supply was extended in two spells. Hence, the total agricultural load would not affect the sub-stations at a time and the required capacity of capacitors was not as per the estimated 1641 MVAR. However, the capacitor banks were being planned in a phased manner, as per requirement.

2.6.1.5 Procurement of distribution transformers of non-standard ratings (15 kVA)

As per REC specifications, guidelines of Central Electricity Authority (CEA) and Bureau of Indian Standards (BIS), the Standard Ratings of single phase distribution transformers (DTR) shall be 5, 10, 16 and 25 kilovolt ampere (kVA). The full load loss allowed for 16 kVA DTR as per the specifications approved by the Committee,[31] set up to finalise the specifications for single

[30] ratio of Active power (KW) to apparent power (KVA)

[31] Committee (December 2006) headed by GM (T&D) of REC with members from CEA, CPRI, REC, NTPC, Power Grid, NHPC, DVC, UPPCL, MSEB, APTRANSCO, BSEB and WBSEB.

phase DTRs, was 230 watts. The load losses specified were maximum allowable.

Audit observed that the Company had procured 7160 DTRs of 15 kVA capacity during 2011-16, which were not of standard rating as per the specifications/ guidelines/ standards. A further review of the specifications of these DTRs showed that the Company had allowed maximum load losses of 245 watts, which was higher than the maximum limit allowed (230 watts) for 16 kVA transformers.

Apart from load losses, other parameters viz., the limits for temperature rise over ambient temperature were also fixed[32] at higher than the limits in the specifications[33] approved by the Committee. Higher temperature rise over ambient temperature increases the risk of failure of transformers during summer months.

Thus, with the procurement of 7160 transformers (15 KVA), the permissible energy loss additionally allowed, worked out to 0.94 MU[34] per year (i.e. ₹ 58.19 lakh, considering the Average Cost of Supply as ₹ 6.19 per unit) and resulted in higher distribution losses.

During the Exit conference, the Joint Secretary (Energy) directed the Company to carry out the cost benefit analysis and consider the audit point, while procuring DTRs.

2.6.2 Implementation of Projects/ Schemes

In order to make quality power available to all sections of the society and to improve the power sector in the country, Ministry of Power and the State Government have announced various schemes/ projects viz., National Electricity Fund (Interest subsidy) Scheme (NEF), Pump-set Energisation Scheme, Decentralized Distributed Generation (DDG), Financial Restructuring Plan (FRP) Scheme, High Voltage Distribution System (HVDS), Restructured Accelerated Power Development & Reforms Programme (R-APDRP), Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) from time to time. The Performance Audit of implementation of RGGVY and R-APDRP were covered in the CAG's Report for the years 2013 and 2016, respectively. The schemes and projects taken up by the Company during the last five years except RGGVY and R-APDRP were reviewed and the findings are discussed below:

2.6.2.1 National Electricity Fund

Government of India had introduced National Electricity Fund (Interest subsidy) Scheme (NEF) (March 2012) to promote capital investment in distribution sector and provided interest subsidy ranging from three to five *per cent* on the loans taken by public and private power utilities for execution of various capital works. The Ministry of Power had constituted (February 2012) a Steering Committee for ensuring effective implementation of the scheme.

[32] 45 degrees C and 40 degrees C when measured by resistance and thermometer respectively.

[33] 40 degrees C and 35 degrees C when measured by resistance and thermometer respectively.

[34] ((245-230) watts*24 hours*365 days*7160 DTRs)/1000

The scheme was applicable for the works taken up during 2012-13 and 2013-14.

Based on the aggregate score as per the parameters of the scheme, the Company would be entitled to interest subsidy ranging from three to five *per cent.* For availing of interest subsidy, the Company was required to submit details of loan disbursement and actual interest paid, for approval of the Steering Committee. The interest subsidy was to be explicitly indicated in the Aggregate Revenue Requirement (ARR) so as to pass on the benefits to the consumers.

Audit observed that the Company had not assessed the aggregate score each year as per the criteria specified in the scheme. Considering the lowest score (35 to 50) under the scheme, the Company was entitled to subsidy of three *per cent* on interest rate. Due to failure of the Company to claim interest subsidy, the consumers were deprived of the benefit of interest subsidy amounting to ₹ 2.50 crore, calculated on loan outstanding at the beginning of each year during 2012-16.

The Government stated (October 2016) that the score as per the criteria specified in NEF scheme was not calculated so far as a major part of the loan amounts were drawn during 2015 and the interest subsidy would be claimed after completion of works.

The reply was not acceptable as completion of works was not a prerequisite for claiming interest subsidy under the scheme. The Company had not assessed the aggregate score each year as per the criteria specified in the NEF scheme and had not claimed the interest subsidy. Besides, there was no system in place for tracking the score as specified in the scheme to claim the benefits.

During the Exit conference, the Joint Secretary (Energy) accepted the audit observation and directed the Company to develop a proper system.

2.6.2.2 Delay in availing loans from REC for pump set energisation works

The Company had received sanction from REC during August 2014 to June 2015 for financial assistance of ₹ 116.18 crore for pump-set energisation works. The works were to be completed within 24 months from the date of disbursement of first installment. However, reimbursement claims submitted within a period of one month after the scheme period will be considered for release.

The Company had completed execution of works in few areas covered under the above sanctions during 2013-15, i.e. before obtaining the sanction of loan from REC. As per Clause 5(c) of sanction letter of REC, works completed within one year prior to issue of sanction letter were admissible for reimbursement. As such, the Company was entitled to claim reimbursement of 90 *per cent* of the cost of these works as soon as sanction letter was received. However, reimbursement was claimed only in December 2015 i.e. after a delay of nine months from the date of sanction. Due to delay in filing the claims, an amount of ₹ 2.51 crore towards works completed before March 2015, could not be realised promptly on completion of works.

The Government stated (October 2016) that due to non-availability of 10 *per cent* contribution of the Company, the schemes were not formulated in time.

This indicated the failure of the Company in mobilisation of funds through effective realisation of its receivables from consumers, Government and other sources, as discussed in Paragraph 2.6.4.

2.6.2.3 Supply of free power to agricultural consumers

As per the decision of the State Government, free power supply is extended to agricultural consumers for seven hours a day and the shortfall in revenue on account of free power is to be paid by the State Government in the form of subsidy.

During the period 2011-12 to 2015-16, supply of power to agricultural consumers had increased from 4,432.63 MU in 2011-12 to 4,671.95 MU in 2015-16 and the number of connections had increased from 9,22,913 to 10,57,774.

A Paragraph (No.3.3) on 'Tariff Subsidy to Agricultural Consumers' covering the period 2011-14 was included in the CAG's Audit Report No.4 of 2015. Audit observations on various deficiencies in supply of power to consumers and recovery of subsidy from Government during the period 2011-16 are discussed below:

Estimate of agriculture consumption

The Company, while filing its ARR with SERC, estimates the supply of power to agriculture consumers. After detailed scrutiny, SERC fixed the quantum of supply to be made to the agriculture consumers. Accordingly, subsidy would be paid by the State Government.

In view of uncertainty with regard to actual agricultural consumption due to lack of agricultural metering, overall power deficit scenario and severe criticism from public that the projection of agricultural sales filed by the Company was too high, SERC did not accept the estimates of the Company and approved the agriculture sales volume at much lower level compared to the estimates submitted in all the years from 2011-12 to 2015-16. The Company had to adhere to the agricultural sales volume approved by SERC in the Tariff Orders as no provision exists for additional sales to agriculture consumers for whom supply was made at subsidised rates.

The estimates of sale of energy to agriculture consumers, sales quantity approved by SERC, actual sales and its impact on the Company is indicated in the Table 2.4.

Table 2.4: Sale of Energy to Agriculture Consumers

Particulars	2011-12	2012-13	2013-14	2014-15[35]	2015-16	Total
Agriculture consumption estimates submitted to SERC (in MU)	4,154.22	4,586.85	5,032.65	Not Applicable (No tariff)	4,903.82	18,677.54
Agriculture supply approved by SERC (in MU)	3,596.07	3,955.61	3,955.61	3,955.61	4,340.01	19,802.91
Subsidy approved (₹ in crore)	944.46	1,578.90	1,751.27	1,751.27	2,211.73	8,237.63
Actual supply (estimated by Company) (in MU)	4,432.63	4,066.74	4,361.35	4,738.38	4,671.95	22,271.05
Excess supply (in MU)	836.56	111.13	405.74	782.77	331.94	2,468.14
Average cost of supply (₹)	3.32	4.15	4.87	4.87	5.26	--
Loss due to excess supply (₹ in crore)	277.74	46.12	197.60	381.21	174.60	1,077.27

Source: SERC Tariff Orders and Annual Accounts

It could be observed from the table that against the approval of 19,802.91 MU by SERC, the Company supplied 22,271.05 MU during 2011-12 to 2015-16. As the Company had not claimed the cost of additional units supplied to agricultural consumers from the Government, and the SERC, while truing up power purchase cost, had limited the agriculture sale quantity to the quantity indicated in Tariff Order, the Company had incurred a loss of ₹ 1,077.27 crore.

The Government stated during the Exit Conference (October 2016) that the methodology suggested by SERC for estimation of agricultural consumption was followed from 2012-13. However, SERC had not approved the full quantity and had not considered the additional connections released to agricultural consumers. It was further stated that GoI had approved the UDAY scheme for financial turnaround of DISCOMs and the Government had conveyed its intention to join the scheme, which would cover the above loss.

Installation of Capacitors and implementation of DSM measures

The State Government had declared a modified agriculture policy (January 2005) aimed at incentivising Demand Side Management (DSM) measures in the agriculture sector. DSM measures include installation of frictionless foot valves, capacitors of adequate rating and ISI marked mono-blocks for submersible pump-sets for all new connections and also providing these connections with meters. The DISCOMs were also required to ensure installation of capacitors on the existing pump-sets.

Several studies and pilot projects in the country have indicated a minimum of 25 to 30 *per cent* reduction in agriculture consumption on replacement of inefficient pump-sets of farmers with efficient ones.

[35] The company could not obtain Tariff Order for 2014-15 as the Model Code of Conduct of Election Commission was in force and also due to the bifurcation of the State. Multi Year Tariff was also not filed, as a result the Tariff Order of 2013-14 was made applicable for 2014-15.

The details of agriculture connections, actual supply and average consumption during 2011-12 to 2015-16 of the Company are indicated below:

Table 2.5: Percentage of agriculture consumption to total supply

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16
Agriculture connections at the end of the year (Nos.)	9,22,913	9,55,799	9,82,396	10,20,501	10,57,774
Agriculture connections issued during the year (Nos.)	43,225	32,886	26,597	38,105	37,273
Supply to Agriculture connections during the year (in MU)	4,432.63	4,066.74	4,361.35	4,738.38	4,671.95
Total Input Units (MU)	11,913.80	11,164.56	11,867.68	12,801.61	13,269.95
Percentage of Agriculture consumption to total supply	37.21	36.43	36.75	37.01	35.21

Source: MIS returns and Company reply

It could be observed from the table above that the energy supplied to agricultural sector, against total input units of the Company, was more than 35 *per cent* during the years 2011-12 to 2015-16. In the public hearings, some members of general public pointed out that though DISCOMs had claimed that 80 *per cent* of pump-sets were provided with capacitors, only 10 *per cent* of pump-sets were installed with capacitors (2012-13). In the Tariff Order 2013-14, SERC directed DISCOMs to provide the data on energy saved due to installation of capacitors on existing pump-sets within three months and to upload the same on its websites. However, the Company had not assessed and submitted the savings achieved to SERC. The relevant data was also not found on the website of the Company.

The SERC had also directed (March 2013) the Company to take necessary steps for removal/ regularisation of unauthorised agricultural services. Audit observed from the records of the Company that there were 34,870 unauthorised agricultural connections as on March 2016. Out of this, though the connection charges were received in respect of 16,977 services, the same were however not regularised up to March 2016.

The Government stated (October 2016) that all the agricultural services were provided with capacitor of suitable capacity but in many places these were removed by the farmers on the ground that capacitors were causing cases of electrical shock. The farmers were, however, being persuaded to provide capacitors to the services. It was also stated that the Company had planned to release all the pending applications along with unauthorised agricultural services existing by the end of December 2016.

2.6.2.4 Implementation of Financial Restructuring Plan (FRP)

The High Level Panel appointed (July 2010) by the Planning Commission to look into the financial problems of State Electricity Boards had opined that a part of losses were displayed as increase in current assets. The current assets of DISCOMs consisted mainly of subsidy to be paid by the State Government.

In order to turnaround loss making State owned DISCOMs and to ensure their long term viability, GoI had formulated (October 2012) a Financial Restructuring Plan (FRP). The scheme, *inter-alia*, provided for takeover of 50 *per cent* of outstanding Short-Term Liabilities (STL) of DISCOMs as on

31 March 2012 by the State Government, which would be converted into bonds. The remaining 50 *per cent* of STL was to be rescheduled by the lenders with moratorium of three years on principal. The repayment of principal and interest would be guaranteed by the State Government. The Company had short term loans of ₹ 2,495 crore accumulated due to procurement of additional power beyond SERC approved quantities. The State Government agreed (November 2013) to assume liability of ₹ 1,270 crore of the Company as on 31 March 2013. As per the FRP scheme, in-principle approval of SERC was to be obtained before implementation. The important observations in implementation of the scheme are as follows:

- ***Delay in implementation of FRP Scheme***

The FRP scheme was to be implemented by December 2012 by adopting the financial figure as on 31 March 2012. The support under the scheme would be available to the DISCOMS having accumulated losses and facing difficulty in financing operational losses.

However, the Company decided to treat the receivables from State Government as bad debts, only in their accounts for 2012-13 and adopted the same for the above purpose. Therefore, the Company obtained approval of MoP for extension of time and also for adopting the financial figures of 2012-13. The State Government decided to participate in the scheme in April 2013 and approved the scheme in January 2014. Accordingly, as per approval of the Board, the Company issued bonds in three series (February to May 2014). The series 1 was issued (3 February 2014) at coupon rate of 9.95 *per cent*, while series 2 and 3 were issued (28 March 2014 and 30 May 2014 respectively) at a coupon rate of 10 *per cent*. Due to delay in implementation of the scheme, the coupon rate had increased from 9.30 *per cent* (estimated in June 2013) to 9.95 *per cent* in 2014. This had resulted in additional expenditure of ₹ 8.89 crore per annum to the State Government.

The Company stated (October 2016) that the scheme was implemented from 16 January 2014 after receipt of approval of State Government (10 January 2014).

However, due to delay in implementing the scheme, the Company had to issue bonds at higher rate.

- ***Non-Initiation of proposal for takeover of bonds by State Government***

As per FRP scheme, the bonds were to be taken over by the State Government in two to five years. Though the Government had indicated that it would take over the bonds over a period of four years, the Government had not started the process of taking over these bonds even after lapse of more than three years (July 2016). As the Company is accounting the bonds as its liability, the financial ratios, terms of loans and interest rates applicable to the Company were adversely affected. Further, the Company obtained *adhoc* cash credit of ₹ 80 crore from State Bank of Hyderabad at high interest rate of 12.95 *per cent* to service the debt on behalf of the State Government, thereby deteriorating its financial condition.

During the Exit conference (October 2016), the Joint Secretary (Energy) directed the Company to submit the proposal for takeover of bonds, well in advance of finalisation of the budget**.**

- ***Non-achievement of Expected outcomes***

Contrary to expected outcome of financial turnaround and long term viability, FRP scheme worked counterproductive to the Company as the State Government did not honour its commitments making the Company treat the dues from the Government as bad debt, thereby wiping out its entire net worth. Due to non-fulfilment of responsibilities under the scheme by the Company and the State Government, the objectives and expected outcomes of the scheme were not achieved as discussed below:

- ***Non-obtaining the approval of SERC for FRP scheme***

  The Company had not obtained approval of SERC for implementation of FRP scheme and the reasons for the same were not on record. Due to this, SERC did not consider interest of ₹ 140.87 crore on rescheduled loan in the ARR for 2015-16. As such, the Company could not recover the interest of ₹ 140.87 crore through tariff.

- ***Non-enactment of Model State Electricity Distribution Management Responsibility Bill***

  In order to ensure achievement of the operational and financial parameters prescribed in the FRP, the State Governments were to enact Model State Electricity Distribution Management Responsibility Bill within twelve months from the date of circulation of Model Legislation by the Ministry of Power.

  Model Legislation to be enacted by the State Government had been circulated by the Ministry of Power in September 2013. The FRP also provided for nomination of lenders representative on the Board of Directors of the Company.

  Audit observed that the Company had not initiated any action for enactment of the Act and for nomination of lenders representatives on the Board by the State Government.

  During the Exit conference, the Joint Secretary (Energy) directed the Company to move the proposal to nominate lenders representative on the Board**.**

- ***Non-assessment and claiming of incentive under Transitional Finance Mechanism***

  As per Transitional Finance Mechanism (TFM) under the FRP scheme, annual verification of the performance/ achievements of the DISCOMs had to be done through a third party appointed by Central Electricity Authority (CEA) for release of incentive from Government of India. Audit observed that CEA is yet to appoint a third party for annual verification of performance for the period 2012-13 to 2014-15. As such, the Company had not assessed the incentive eligible under TFM.

Similarly, the scheme also provided reimbursement support of 25 *per cent* of principal repayment of bonds issued by the Company and taken over by State Government. However, the State Government was yet to take over the bonds.

The Government stated (October 2016) that as per TFM, annual verification of the performance/ achievements of the Company had to be done through a third party appointed by CEA for release of incentive and the CEA is yet to appoint a third party.

The reply was not acceptable as the claims for incentive had to be first submitted by the Company/State to CEA to avail of the benefits under TFM, which were available during 2013-14 to 2015-16.

- ***Non-inclusion of private sector in State distribution network***

The FRP scheme envisaged involvement of private sector in State distribution network through franchisee arrangement or any other mode of private participation to be prepared by the DISCOMs within a year and submitted to Central Electricity Authority (CEA) for approval. It was observed that no action was taken by the Company in this regard.

The Government stated (October 2016) that Manning and Maintenance works were outsourced by the Company. It was also stated that inclusion of private sector in Distribution network might not be feasible in view of heavy subsidies involved.

However, non engagement of private sector in distribution is not in conformity with the FRP scheme.

- ***Non-installation of meters/ prepaid meters***

In order to ensure billing on actual consumption and to reduce AT&C[36] losses, the scheme provided for installation of prepaid meters by 31 March 2013 for all Government consumers and large consumers (1 MW and above) where defaults had occurred and a time bound plan for metering of all categories of consumers was to be put in place and submitted to the Central Level Monitoring Committee (CLMC) through State Level Monitoring Committee (SLMC). It was observed that neither prepaid meters were installed, nor were targets fixed for conversion of unmetered connections.

The Government stated (October 2016) that procurement and installation of prepaid meters were in progress**.**

- ***Non-functioning of Monitoring Committee***

State Level Monitoring Committee with C&MD of the Company as a member was set up (January 2013) by the State Government for monitoring/ review of the progress on quarterly basis till turnaround of the Company. Audit observed that SLMC had met only once (21 December 2013) so far to review the progress.

[36] Aggregate Technical and Commercial

During the Exit conference the Joint Secretary (Energy) had directed the Company to take initiative to conduct the meetings**.**

➢ ***Ujwal Discom Assurance Yojana (UDAY) scheme***

Government of India had launched *UDAY* scheme in November 2015 to improve the operational and financial efficiency of the State DISCOMs. Under UDAY scheme, State Government would take over 75 *per cent* of the debt of DISCOMs as on 30 September 2015, over a period of two years. The State Government accorded in-principle approval to the scheme. The MoU was signed by Ministry of Power and the Company (January 2017). As per the timelines fixed for achieving the targeted activities of the scheme, compulsory feeder metering was to be completed by June 2016. However, no feeder meters were installed till date (July 2016).

2.6.3 Operational Efficiency

The operational performance of the DISCOMs was judged on the basis of availability of adequate power for distribution, adequacy and reliability of distribution network, minimizing line losses, detection of theft of electricity etc. The deficiencies observed in the Company are discussed below.

2.6.3.1 Distribution losses in excess of SERC norms

The losses at 33 KV stage are termed as sub-transmission losses while those at 11 KV and below are termed as distribution losses. The losses occur mainly on two accounts i.e. technical and commercial. Technical losses occur due to inherent character of the equipment used for transmitting and distributing power and resistance in conductors through which energy is transmitted from one place to another. On the other hand, commercial losses occur due to theft of energy, defective meters, unmetered supply etc.

State Electricity Regulatory Commission determines the maximum percentage of energy losses and considers the same while determining the distribution tariff for the respective year. The energy losses beyond the percentage allowed by SERC are not to be passed on to the consumer and have to be borne by the DISCOMs. Various incentives/ grants under centrally sponsored schemes were also based on achievement of specified reduction in energy losses. Thus, it was imperative for the Company to keep energy losses below the level approved by SERC.

The table below indicates sub-transmission and distribution losses with reference to percentage of loss allowed by SERC during 2011-12 to 2015-16.

Table 2.6: Distribution losses

Sl. No.	Particulars	2011-12	2012-13	2013-14	2014-15	2015-16[37]
1	Energy Purchased (MU)	11,913.80	11,164.56	11,867.68	12,811.53	13,269.95
2	Energy sold (MU)	10,243.93	9,671.61	10,287.00	11,104.80	11,565.70
3	Energy losses (MU) (1-2)	1,669.87	1,492.95	1,580.68	1,706.73	1,704.25

[37] In the Tariff Order for 2015-16 different energy losses were adopted for supplies at different voltage. The energy loss units allowed as per SERC were adopted.

4	Percentage of energy losses {(3/1) x 100}	14.02	13.37	13.32	13.32	12.81
5	Percentage of losses allowed by SERC	13.33	12.36	11.88	11.88	-
6	Excess losses (in percentage) (4-5)	0.69	1.01	1.44	1.44	-
7	Excess losses (in MU) {(6x1)/100}	82.20	112.76	170.89	184.48	185.66
8	Average realization rate per unit (in ₹)	1.72	2.45	2.75	2.72	2.98
9	Value of excess losses (₹ in crore) (7x8)	14.14	27.63	47.00	50.18	55.32
10	Total value of Excess losses for the period from 2011-12 to 2015-16 is ₹ 194.27 crore					

Source: Annual Accounts

From the above, it could be observed that percentage of sub-transmission and distribution losses were higher than the norm fixed by SERC in all the years, though the Company had brought down the loss over the years (14.02 to 12.81 *per cent*). The value of excess loss had increased from ₹ 14.14 crore (2011-12) to ₹ 55.32 crore (2015-16). In order to reduce the losses, the Company had taken up implementation of HVDS, DSM measures, installation of adequate capacitor banks etc. However, due to failure in implementation of loss reduction measures effectively, the Company had suffered loss to the tune of ₹ 194.27 crore during the period 2011-16.

The Government stated (October 2016) that due to reduction in sales at higher voltage categories, the Company could not achieve the loss reduction trajectory. The high voltage category sales mainly depended on energisation of lift irrigation schemes proposed by the Government.

2.6.3.2 Performance of Distribution Transformers

Distribution Transformers (DTRs) play a crucial role in power distribution network. Failure of DTRs results in interruption of power supply to consumers, expenditure on repairs and loss of revenue to the Company.

State Electricity Regulatory Commission, though had not fixed any norm for failures of DTRs, the Company had been following the norm of 12 *per cent*. The details of DTRs failed and the expenditure incurred on their repairs are given below (***Annexure-2.1***):

Table 2.7: Expenditure on repair of failed DTRs

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16	Total
DTRs existing at the close of the year (Nos.)	1,78,880	1,87,944	2,08,158	2,26,447	2,42,826	10,44,255
DTRs failed (Nos.)	19,387	24,358	27,777	26,131	26,006	1,23,659
Percentage of failures	10.84	12.96	13.34	11.54	10.71	11.84
Norm fixed/followed	12	12	12	12	12	12
Expenditure on repair of failed DTRs (₹ in crore)	8.83	15.12	26.70	28.77	25.61	105.03

Source: MIS returns

It could be observed from the ***Annexure-2.1*** that the rate of failure of DTRs was on higher side in all the Circles except Karimnagar and Nizamabad Circles. The percentage of failure ranged from 13.64 to 16.74 in Adilabad Circle, 11.32 to 15.87 in Warangal Circle and 11.10 to 15.18 in Khammam Circle during the review period. However, except 2012-13 and 2013-14, the failure of DTR was within 12 *per cent*. The Company had incurred expenditure of ₹ 105.03 crore on repairs to DTRs during the review period, of which ₹ 6.78 crore was incurred on DTRs failed in excess of the internal norm fixed by the Company.

The reasons for the failure of DTRs in 2015-16 were line faults (65.05 *per cent*), overloading (25.24 *per cent*) and lack of maintenance (9.86 *per cent*) which were preventable with proper monitoring and rectification of line faults.

The Government stated (October 2016) that the Company gradually reduced the failure rate and the rate was above the norm during 2012-13 and 2013-14 as drought conditions prevailed in those years. It was also stated that the Company was making efforts to restrict the failure of DTRs within the prescribed norm**.**

However, the Company had not installed sufficient DTRs to provide relief to the overloaded DTRs.

2.6.3.3 Non-maintenance of required rolling stock of DTRs

The Company is required to maintain healthy DTRs as rolling stock for ensuring replacement of failed DTRs. The norm followed by the Company for maintaining rolling stock was four *per cent* of total DTRs. The rolling stock required as per norm and the actual rolling stock maintained by the Company during the last five years is indicated below:

Table 2.8: Surplus / shortage of Rolling stock of DTRs

Year	Total DTRs	Rolling stock as per norm of 4 *per cent*	Actual Rolling stock	Surplus/ Shortage
2011-12	1,78,880	7,155	7,592	+437
2012-13	1,87,944	7,518	7,947	+429
2013-14	2,08,158	8,326	8,233	-93
2014-15	2,26,447	9,058	8,089	-969
2015-16	2,42,826	9,713	8,840	-873

Source: MIS returns

It could be observed from the above that the Company had not maintained the required rolling stock during the years 2013-16, and shortage was 10.70 *per cent* and 8.99 *per cent* of the norm in 2014-15 and 2015-16 respectively. Further, the data relating to time taken for replacement of failed DTRs was not maintained in the field. In order to avoid shortage of DTRs in replacing failed DTRs, the Company should maintain the required rolling stock.

The Government stated (October 2016) that failure of DTRs was more during certain seasons. The complaints were received telephonically and were

recorded in the system, but details of time taken for replacement were not captured in the system.

2.6.3.4 Delay in completion of works and closure of work orders

As per provisions of Electricity Department Manual, all work orders completed or in-progress should be closed up to 31 March and, in the case of capital-works-in-progress and maintenance works for next year, fresh work orders should be issued.

Audit observed that the work orders issued for execution of various works in the Company were not being closed at the end of the year. The work orders were kept open for long periods, in many cases for more than five years due to non-completion of works within scheduled period, delay in returning of balance unused material to stores, right of way problems in the field and non-availability of matching material in the stores. The details of capital work orders issued, closed during the year and pending closure at the end of the year for the period from 2012-13 to 2015-16 are indicated in the ***Annexure-2.2***.

Audit observed that:

- The number of work orders pending for closure had increased from 13,008 (₹ 319 crore) as on March 2013 to 18,318 (₹ 580 crore) as on March 2016. Out of total 18,318 pending capital work orders, 3097 work orders (₹ 141 crore) were pending for more than one year and 768 work orders (₹ 46 crore) were pending for more than two years.
- Delay in closure of work orders resulted in non-capitalisation of assets and non-charging of depreciation, besides non-inclusion of depreciation in ARR for realisation through Retail Tariff.
- The Audit Committee of the Company had recommended (December 2013) to close all the work orders pending for more than one year in which the assets were already put to use. However, it was observed that there were 84 work orders pending for closure for which works were completed and put to use.
- There were 389 work orders relating to service connections pending for closure as on 31 March 2016 valued at ₹ 5.54 crore. Non-closure of work orders relating to service connections resulted in delay in realisation of revenue to the Company.

The Government stated (October 2016) that the main reasons for not closing the work orders was non-availability of required materials at stores and long duration of schemes like HVDS, R-APDRP etc. It was also mentioned that action was being taken to close the work orders and bring the same to a minimum level by pursuing vigorously**.**

2.6.4 Billing and Collection Efficiency

One of the major aims and objectives of the National Electricity Policy, 2005 was ensuring financial turnaround and commercial viability of Power sector.

The financial viability of the DISCOMs are generally influenced by various factors such as:

- Timely revision of tariff;
- Adequacy of revision of tariff to cover cost of operation;
- Timely release of assured subsidy by the Government;
- Cross subsidisation policy of the Government; and
- Proper billing and collection.

The deficiencies observed by audit are discussed in the following paragraphs.

2.6.4.1 Non-filing of retail tariff proposals under Multi Year Tariff (MYT) framework

State Electricity Regulatory Commission had introduced Multi Year Tariff framework (five years) in 2005, based on which the Company had to file its ARR proposals with SERC for determination of tariff for Wheeling and Retail sale of electricity. The Company, however, expressed its inability to project ARR for five years under Multi Year Tariff (for retail tariff) on the ground that reasonable prediction of their revenue requirement could not be made due to uncertainties surrounding lift irrigation schemes, policy uncertainties and Power Purchase Agreements pending finalisation with a few generating stations. Accordingly, SERC allowed the Company to file annual ARRs.

Multi Year Tariff could have obviated the time, effort and uncertainty of getting Annual Tariff Orders. In view of applicability of model code of conduct of Election Commission and reorganisation of State, the Company could not obtain annual Tariff Order for 2014-15. The Company had not submitted the revised ARR for the remaining period of 2014-15 after formation of Telangana State. In the absence of Tariff Order for 2014-15, the Company had to follow the Tariff Order of 2013-14 for 2014-15 also.

Audit observed that due to its inability to establish required information systems, the Company could not submit the proposals under MYT and avail of the benefits. The loss of the Company had increased from ₹ 33.78 crore during 2013-14 to ₹ 1,348.21 crore during 2014-15, mainly due to adoption of Tariff Order of 2013-14 for 2014-15.

The Government stated (October 2016) that MYT proposals could not be submitted due to difficulties in assessing the availability of power. Government also informed that after implementation of UDAY scheme, it would be submitted quarterly.

The reply was not acceptable, as SERC had suggested MYT tariff after considering all issues involved. Adoption of MYT by the Company would have avoided the adoption of previous year's tariff (2013-14) for 2014-15, and the loss of revenue could have also been reduced.

2.6.4.2 Shortfall in supply of power to subsidised categories

The Company failed in meeting the supply estimates in all the years during 2011-12 to 2015-16. The shortfall in supply was more in LT category where most of the supply was to rural areas. Audit observed that the shortfall in supply was more in the categories where the Government pays subsidy based on estimates. It was seen that against SERC approved supply of 12,491 MU to LT-I category, the Company supplied 11,765 MU only during 2011-16 and thus availed excess subsidy of ₹ 170.13 crore.

The Government stated (October 2016) that if all the subsidised categories including agricultural category were considered, the supplies would have exceeded the SERC approved limits; hence no excess subsidy was claimed.

However, the Company should ensure supplies to all categories as per the quantum approved by SERC. Further, the quantum of supply attributed to agricultural category by the Company was only an estimation which was not accepted by SERC.

2.6.4.3 Cross subsidy beyond the norms suggested by National Tariff Policy

Section 61 of the Electricity Act, 2003, stipulates that tariff should progressively reflect the Cost of Supply of electricity and also reduce cross subsidy in a manner specified by the appropriate commission. The National Tariff Policy (NTP) envisaged that tariff for all categories should range within plus or minus 20 *per cent* of the Average Cost of Supply (ACS) by the year 2010-11.

In the tariff proposals submitted to SERC for approval, the Company had proposed tariff which were beyond the limits allowed as per NTP. A review of the tariff orders for the last five years showed that the tariff fixed for majority of the categories was beyond the limits as given below:

Table 2.9: Details of Tariff fixed

Year	*ACS* (in paise)	Lower limit (in paise)	Upper limit (in paise)	Total categories in Tariff Order	Categories for which the Tariff is fixed		
					less than the minimum	more than the maximum	within the limits
2011-12	382	306	458	75	31	16	28
2012-13	471	377	565	101	42	23	36
2013-14	551	441	661	86	23	22	41
2014-15	551	441	661	86	23	22	41
2015-16	619	495	743	87	30	12	45

Source: SERC Tariff Orders

Audit observed that the Company did not limit the cross subsidy to the suggested levels even beyond the target year (2010-11) and the tariff charged to certain categories reached 189 *per cent*[38] of the *ACS*. The financial impact on categories for which tariff was higher than the maximum allowed as per norm, worked out to ₹ 909.37 crore during 2011-15 ***(Annexure-2.3)***.

The Government stated (October 2016) that all efforts were being made to adhere to the guidelines.

2.6.4.4 Non-filing of additional expenditure through true-up with SERC

Due to increase in number of DTR failures, employee cost, administrative and general expenses, the Repair & Maintenance budget of the Company for 2013-14 was enhanced by ₹ 98.91 crore. The Board accorded sanction for additional

[38] As against the ACS of 619 paise per unit for the year 2015-16, the tariff for Advertisement Hoardings Category was 1170 paise per unit which was 189 *per cent* of ACS.

budget and directed the Company to recover the additional expenditure by filing true-up petition.

However, the Company had not claimed the additional expenditure incurred through true-up petition on the plea that accumulated losses in the Balance Sheet were covered under FRP scheme. This has resulted in avoidable loss of ₹ 98.91 crore.

The Government stated (October 2016) that the Company had not filed the true up proposals for 1st & 2nd control periods in view of the intention conveyed by the Government to join UDAY scheme as the loss would be absorbed by the UDAY scheme.

2.6.4.5 Non receipt of Subsidy from the State Government.

State Electricity Regulatory Commission approves the ARR taking into account subsidy to be released by the State Government, failing which rates contained in the full cost recovery tariff would be operative. The subsidy amount as indicated in the Tariff Order, must be paid by the State Government in monthly installments, in advance.

Audit observed that:

- The Company had received the subsidy as indicated in the tariff orders for the years 2011-12 to 2013-14. However, for the years 2014-15 and 2015-16, though the Company had claimed subsidy of ₹ 5,932.21 crore, it received only ₹ 5,238.98 crore. The Company could neither collect the balance subsidy (₹ 693.23 crore) nor implement the full cost recovery tariff. Non-compliance with tariff orders by the Company had resulted in loss of ₹ 693.23 crore.
- In respect of 2014-15, the Company was entitled to claim ₹ 2,555.28 crore towards subsidy as approved by SERC. However, the Company had claimed ₹ 2,398.81 crore only, resulting in short claim of ₹ 156.47 crore.
- The Company had claimed subsidy as per Tariff Order of SERC i.e. at ₹ 202.45 crore per month for April and May 2014 and at ₹ 199.39 crore per month from June 2014 (reduced due to transfer of seven Mandals to Andhra Pradesh) but did not claim additional subsidy of ₹ 130.14 crore, approved later by SERC (May 2013). This had resulted in loss of ₹ 130.14 crore.
- Due to non-receipt of subsidy from the Government, the Company was forced to defer the payments to the Generation Companies, resulting in payment of Delayed Payment Surcharge (DPS) at 15 to 18 *per cent* per annum. The Company had paid ₹ 1.01 crore as DPS to the Generating Stations during 2015-16.

The Government stated (October 2016) that the subsidy was paid in full for the year 2013-14. For the balance subsidy relating to 2015-16, Government Order (GO) was issued. In respect of 2014-15, the amount agreed as per GO was paid to the Company.

The reply was not acceptable as the Company had adopted Tariff Order for 2013-14 for 2014-15 and against the entitled subsidy amount approved by

SERC of ₹ 2,555.28 crore, an amount of ₹ 2,398.81 crore only was received, leaving a shortfall of ₹ 156.47 crore.

2.6.4.6 Arrears of Revenue

As per SERC directions, DISCOMs had to make all out efforts to ensure timely collection of dues from the Government/ Local Bodies without allowing arrears to build up. SERC had further opined that installation of prepaid meters would act as one of the mechanisms to reduce/ eliminate delays in payment of outstanding bills and arrears by Government Departments.

A review of arrears of revenue showed that an amount of ₹ 1,232 crore[39] was pending for recovery as on 31 March 2016. Out of this, ₹ 820.89 crore was pending from the Government Departments/ Local Bodies and ₹ 249.03 crore was pending from other live services.

A further test-check of HT consumers with arrears of more than ₹ 10 lakh as on 31 May 2016 showed that an amount of ₹ 65.85 crore was pending for recovery from 64 consumers against which the Company was holding security deposit of ₹ 12.49 crore only and there was no security for the balance amount of ₹ 53.35 crore. The above consumers were under 'D' list (Disconnection list) for more than one year. However, contrary to the provisions of General Terms and Conditions of Supply (GTCS), supply was not disconnected. The Company had also not taken any initiative to install prepaid meters for the Government Departments (July 2016). Therefore, the Company should ensure prompt realisation of arrears by implementing GTCS and directions of SERC.

During the Exit conference, the Joint Secretary (Energy) directed the Company to speed up the process of installation of prepaid meters to avoid accumulation of arrears and enable prompt realisation of revenue**.**

2.6.4.7 Non-realisation of dues from Government towards subsidy for Scheduled Tribe (ST) consumers

The State Government had taken a policy decision (July 2013) to provide free power to the Scheduled Caste/Scheduled Tribe (SC/ST) beneficiaries who are residing in SC/ST housing colonies and whose consumption was less than 50 units per month. The arrears of electricity charges as on 31 March 2012 would be paid in two installments in 2013-14 and 2014-15. In respect of monthly payments, DISCOMs were to furnish detailed consumption particulars of each beneficiary in SC/ST colonies whose monthly consumption was below 50 units to Social Welfare Department. It was seen that the Company had receivables of ₹ 32.13 crore and ₹ 70.86 crore as on March 2013 and March 2016 respectively in respect of ST consumers.

SERC had directed (Tariff Order 2013-14 and 2015-16) that the Company should make all out efforts to ensure timely collection of dues from the Government Departments/ Local Bodies without allowing arrears to build up and take necessary steps as per the GTCS.

Though the dues relating to SC consumers were received, the dues in respect of ST consumers amounting to ₹ 71.45 crore to the end of April 2016 were not

[39] LT consumers: ₹ 995.64 crore and HT consumers: ₹ 236.36 crore.

received resulting in blocking up of funds. Though the Company is pursuing the issue with Tribal Welfare Department, the amount is yet to be realised (October 2016).

The Government stated (October 2016) that efforts were being made to release the budget for payment of dues of ST consumers from Tribal Welfare Department.

2.6.4.8 Adoption of kWh units instead of kVAh units for levy of Electricity Duty (ED) on HT consumers

SERC approved kVAh billing system from 2011-12 for all HT Consumers and LT Consumers for whom Trivector meters have been provided. Accordingly, the Company is charging energy charges based on consumption of electricity measured in kVAh.

As per the State Electricity Duty Act, 1939, every licensee in the State is to pay every month to the State Government a duty at the rate of six paise per unit of energy sold except on the sales made to the Government of India for its consumption or on sales to Railways.

Audit observed that though the Company had switched over to kVAh-based billing (2011-12) and measuring the units in terms of kVAh, it was collecting the electricity duty on kWh units. The kVAh-based billing drives the consumer to reach unity power factor. The kVAh units will be higher than kWh units wherever power factor is less than one. As measurement of energy consumption was changed to kVAh, the ED was to be levied on kVAh units instead of kWh units.

Non-adoption of kVAh units for levy of ED during 2011-16 had resulted in loss of revenue of ₹ 6.34 crore to the Government and undue benefit to the HT consumers.

The Government stated (October 2016) that as per GTCS, unit means kWH (indicated by the energy meter) and hence there was no deviation in billing ED.

The reply was not acceptable as SERC had approved kVAh billing system from 2011-12 for all HT consumers. Further, ED Act provided for levy of ED on energy sold and kVAh being used as the unit of measurement for billing, ED should have been levied on kVAh.

2.6.4.9 Arrears of Additional Consumption Deposit from HT and LT services

High Tension/ Low Tension consumers should at all times maintain an amount equivalent to consumption charges (i.e. demand charges and energy charges etc., as applicable) of two months or three months as security during the Agreement period. Subject to billing periods of three months/ two months as specified in SERC Regulation No.6 of 2004, the adequacy of the amount of Consumption Deposit (CD) in respect of consumers shall be reviewed by the Company, generally once in every year (preferably after revision of tariff for the respective year) based on the average consumption for the period representing 12 months from April to March of the previous year. After such review, Additional Consumption Deposit (ACD) would be demanded in case of shortfall and refunded in case of excess.

The Company reviewed ACD requirement in all the years during 2011-12 to 2015-16 and had raised demands. During the year 2015-16, ACD demands were raised on LT services for ₹ 42.17 crore (1,09,627 services) and HT services for ₹ 36.73 crore (1,214 services). Against this, ₹ 11.39 crore (45,511 LT services) and ₹ 28.32 crore (943 HT services) were recovered, leaving a balance of ₹ 30.78 crore (64,116 LT services) and ₹ 8.40 crore (271 HT services) respectively. Though the Company reviewed the ACD requirement, it failed to recover the ACD and to maintain sufficient consumption deposit.

The Government stated (October 2016) that adequate consumption deposit was being maintained for all live HT and LT consumers except Government services which could not be disconnected as they were meant for emergency services like Water Works, Hospitals and Lift Irrigation etc.

2.6.4.10 Delay in recovery of Restriction & Control penalties from HT services

Keeping in view the acute shortage of power during 2012-13, Restriction and Control (R&C) measures were introduced with effect from September 2012, restricting consumption for certain HT consumers[40]. In case of violation of R&C measures, penalties were leviable. The Company had levied penalties for the period from the consumption month of September 2012 to March 2013. However, based on representations/ objections received from the Company/ consumers and contentions raised in various writ petitions, SERC reviewed R&C measures and issued (August 2013) orders for waiver of 50 *per cent* penalties already levied on the consumers as a one-time measure. Refunds arising out of waiver were not to be refunded but were to be adjusted against future bills.

The total demand raised, amount collected, adjustment made towards refund and balance to be collected are indicated below:

Table 2.10: R&C penalties

(₹in crore)

Sl. No.	Particulars	Adila-bad	Karim-Nagar	Kham-mam	Nizam - abad	Wara - ngal	Total
1	**Total demand raised towards R&C Penalties**	12.05	6.55	6.79	5.41	9.83	40.63
2	**Less : Withdrawal of R&C penalties**	3.50*	3.28	3.40	2.71	4.91	17.80
3	**Balance R&C charges to be collected**	8.55	3.28	3.40	2.71	4.91	22.85
4	**Amount already recovered from CC bills**	1.90	2.00	3.29	2.24	2.64	12.07
5	**Balance amount yet to be collected (3-4)**	6.66	1.28	0.10	0.47	2.27	10.78

Source: Company reply

** In Adilabad Circle ₹ 3.50 crore only was withdrawn as certain consumers approached the courts on levy of penalties.*

[40] {HT Category I(A), (B) & II} and LT {III(A), (B) & II(C)}

It could be observed from the table that even after waiver of 50 *per cent* penalties and adjustments/ recoveries, an amount of ₹ 10.78 crore was yet to be recovered from 199 HT consumers. Considering cases where bills stopped (22 cases: ₹ 0.26 crore), under disconnection (16 cases: ₹ 0.31 crore) and under legal dispute (6 cases: ₹ 5.76 crore), an amount of ₹ 4.45 crore was pending for recovery from 155 live services since September 2013.

The Government stated (October 2016) that after formation of Telangana State, a representation was submitted by the industrialists to the State Government for waiver of penalties levied on industries as part of encouragement to the industries and the final decision was awaited**.**

2.6.4.11 Non-recovery of assessed amounts from theft of energy cases

A vigilance team of the Company, headed by an Officer of the rank of Additional Superintendent of Police, was entrusted with the work of conducting raids for checking the premises of the consumers to detect theft/ pilferage of energy cases.

The raids conducted by Vigilance Wing, theft/ pilferages cases detected, amount assessed/ realised etc. are indicated below:

Table 2.11: Unrealised amount in pilferage cases

Year	Consumers as at the end of the year	Raids conducted	Pilferage cases detected	Assessed amount	Amount realised	Unrealised amount	Percentage of unrealised amount
				₹ in crore			
2011-12	44,76,781	1,02,893	12,513	3.66	2.06	1.60	43.72
2012-13	46,74,437	1,13,134	12,618	4.66	2.81	1.85	39.48
2013-14	48,84,013	1,18,571	14,451	6.43	3.77	2.67	41.52
2014-15	50,34,446	1,56,247	16,571	6.20	3.71	2.49	40.16
2015-16	51,78,054	1,48,313	16,120	5.95	5.12	0.83	13.95
Total			**72,273**	**26.90**	**17.47**	**9.43**	**35.06**

Source: MIS returns

For realisation of assessed amounts in pilferage/ theft cases, Disconnection List (D-lists) were being issued to field offices for disconnection of services and follow up action. However, due to ineffective implementation of D-Lists, the arrears accumulated to ₹ 9.43 crore at the end of 2015-16.

The Government stated (October 2016) that review meetings were conducted to improve realisation of assessed amounts. The unrealised amounts were on decreasing trend from 2011-12.

2.6.5 Consumer Satisfaction and Redressal of Grievances

One of the key elements of the Power Sector Reforms was to protect the interest of the consumers and ensure better service to them. The consumers often face problems relating to supply of power such as non-availability of the distribution system for release of new connections or extension of connected load, frequent tripping of lines and/or transformers and improper metering and billing.

2.6.5.1 Non-supply of power to agricultural consumers for seven hours a day

The policy of the State Government is to provide free power to eligible agriculture consumers for seven hours a day. Accordingly, the ARR proposals were based on the assumption of seven hours supply. The cost of supply and subsidy payable by the State Government were also estimated, based on seven hours supply.

During public hearings on tariff proposals, several consumers and other stakeholders expressed concern that the Company had not supplied electricity for the promised seven hours continuously throughout the year.

Though the Company estimated the supplies to agriculture consumers exceeding the quantum of units approved by SERC, on review of records of supply made (day wise) to the agriculture feeders in five circles during January 2016 to March 2016, it was observed that supplies were not made for seven hours a day.

Audit observed that Warangal, Adilabad and Karimnagar circles had 646, 367 and 834 agriculture feeders respectively during the period January 2016 to March 2016. These circles had never supplied power to agriculture feeders for seven hours a day during the entire 91 day period verified in audit. The Khammam circle which had 325 feeders, supplied power for six hours a day or less in all the days in January, February and upto 20 March 2016.

The Company had not ensured supply for seven hours a day to all agriculture feeders uniformly and the Government also had not monitored the supply for seven hours a day, though the subsidy was paid for supply of the same. As supply was less than six hours a day for majority of the feeders in many circles, out of the subsidy of ₹ 8,237.63 crore paid by the Government during last five years (2011-16), about ₹ 1,176.80 crore ($1/7^{th}$ of the subsidy) was not spent on fulfillment of the objective of Government of supplying free power for seven hours to agricultural consumers.

The Government stated (October 2016) that there were occasions where supply exceeded seven hours which compensated for the short supply in other circles. It was further stated that the program of solar power to agricultural connections was under implementation which would ease the problem.

The reply was not acceptable as the Company had extended power for seven hours only to a few feeders in Nizamabad circle while, in other circles, the supply was less than seven hours.

2.6.5.2 Redressal of complaints from Consumers

The Company has a Consumer Care Centre (CCC) facility for resolving the complaints of the consumers relating to fuse off, overhead line/ cable breakdown or underground cable breakdown, DTR failures, transfer of ownership, re-connection of supply, wrong bills/ back bills, meter complaints etc. In case the complaints are not resolved, the consumers can approach Consumer Grievance Redressal Forum (CGRF) established by the Company under Sub- Section (5) of Section 42 of the Electricity Act, 2003. Presently the Forum is catering to the consumers of five circles.

The position of number of complaints at CGRF and their clearances during the five year period is indicated below:

Table 2.12: Year-wise details of complaints at CGRF

Sl. No.	Particulars	2011-12	2012-13	2013-14	2014-15	2015-16
1	**Complaints pending at the beginning of the year**	6	6	40	17	264
2	**Complaints received during the year**	25	351	343	727	378
3	**Complaints redressed**	25	317	366	480	346
4	**Complaints Pending**	6	40	17	264	296

Source: Company website

From the above, it could be observed that the number of complaints registered at CGRF increased from 25 (2011-12) to 378 (2015-16). The Company should strive to resolve the complaints within the time prescribed by SERC to minimise the complaints in CGRF and to avoid payment of compensation/ penalties that may be imposed by CGRF. In this connection, it may be mentioned that the CGRF had awarded compensation/penalty of ₹ 6.78 lakh in respect of 44 cases during 2012-13 to 2015-16.

The Government stated (October 2016) that the number of complaints had increased due to display of citizen charter at all offices of the Company and consumers' awareness regarding CGRF.

2.6.5.3 Implementation of safety measures

Several consumers had expressed concern in public hearings conducted by SERC on issues relating to poor maintenance of network, leading to loss of human and animal lives.

SERC had identified (2009) the following reasons for fatal accidents:

- Sub-standard construction practices
- Not providing neutral wire from 33/11 KV sub-stations for all single-phase transformers
- Not following the standard practices which contemplate providing three separate earth pits for construction of DTR installations

To improve safety in distribution network especially in rural areas and to avoid accidents involving human beings and animals, SERC had provided ₹ 5 crore per year as special appropriation expenses in the MYT for 2nd Control period 2009-14, ₹ 25.89 crore for 2014-15 and 2015-16 and ₹ 61.86 crore in 3rd control period (2014-19).

Further, SERC had directed (March 2015) the Company to prepare safety improvement plan for four year period 2015-19 relating to distribution network and file the report with the Commission by 31 August 2015. However, the Company had not chalked out the plan.

The data relating to electrical accidents occurred and ex-gratia paid during 2011-16 is indicated below:

Table 2.13: Payment of Ex-gratia

Year	Fatal Accidents		Ex-gratia paid (₹ in lakh)
	Human (Nos.)	Animals (Nos.)	
2011-12	221	358	114.91
2012-13	196	281	77.81
2013-14	159	298	114.02
2014-15	147	233	192.21
2015-16	139	234	239.53
Total	862	1404	738.48

Source: MIS returns

From the above, it could be seen that the number of fatal accidents (human) have come down from 221 in 2011-12 to 139 in 2015-16 due to various measures viz., proper earthing, rectification of damaged lines/poles/stay wires/defective transformers, road crossing of lines, fencing of DTRs etc. taken by the Company. The *ex-gratia* paid during 2011-16 amounted to ₹ 7.38 crore.

Audit observed that despite allocation of special appropriation amount for improving the safety of distribution network, the actual expenditure incurred on safety could not be ascertained as the Company had failed to account the expenditure under a separate accounting head.

The Government stated (October 2016) that measures such as strengthening of earthing to single phase transformers, conversion of single phase DTRs, erection of middle poles etc., were taken up to reduce electrical accidents and the Company had ordered material worth ₹ 358 crore for improving safety. The Government also stated that a safety plan was being prepared for submission to SERC**.**

Conclusion

The Company had not drawn up year-wise plans for creation of network to meet projected demand for power. The budget approved by SERC for creation of distribution network was also not fully utilised. Requirement of capacitors was not assessed and installed periodically to save power. The Company had not followed the methodology prescribed by SERC for estimation of agricultural consumption and failed to adhere to the sales volume approved by SERC. Due to exceeding the sales volume and not recovering the cost of additional units, the Company had incurred a loss of ₹ 1,077.27 crore during 2011-16. The Company had not obtained full subsidy sanctioned by SERC for the years 2014-15 and 2015-16 from State Government. The Company had also not claimed additional subsidy of ₹ 130.34 crore sanctioned in Tariff Order applicable for 2014-15. The Company failed to avail the benefits fully under FRP introduced by Government of India during 2012-13. The Company could not control distribution losses within the permissible limits and as a result suffered loss. The Company failed to submit the tariff proposals as per MYT resulting in adoption of tariff of 2013-14 for 2014-15 also. The

Company failed to meet the supply estimates in all the years. Despite allocation of special appropriation amount by SERC for improving the safety of distribution network, the Company had not prepared safety plans. Due to delay in redressal of grievances to the satisfaction of consumers, the complaints registered at CGRF have increased from 25 in 2011-12 to 378 in 2015-16.

Recommendations

The Company may consider:

- ***preparing annual plans for development of distribution network and for utilisation of the amount approved by SERC;***
- ***periodical assessment and installation of capacitor banks to save energy;***
- ***adhering to the sales volume approved in Tariff Order, recovery of subsidy from the State Government as per Tariff Orders and implementation of full cost tariff in the event of non-receipt of full subsidy;***
- ***adhering to the terms and conditions of Projects/ Schemes of Central and State Governments to derive the intended benefits;***
- ***preparation of plans for improving the safety of distribution network and accounting the expenditure under a separate accounting head to monitor the investment on safety.***

Information Technology Audit Report on Billing Systems in Northern Power Distribution Company of Telangana Limited (TSNPDCL)

2.7 Introduction

Electricity consumers are divided into two broad categories i.e. High Tension[41] (HT) consumers and Low Tension[42] (LT) consumers. HT and LT consumers are further classified into various categories as per the provisions of the Tariff Orders issued by the concerned State Electricity Regulatory Commission (SERC) from time to time.

Electricity distribution network in the State of Telangana is governed by two Distribution Companies (DISCOMS) viz., Northern Power Distribution Company of Telangana Limited (TSNPDCL) and Southern Power Distribution Company of Telangana Limited (TSSPDCL). TSNPDCL (Company) was incorporated in March 2000 and caters to the needs of 51.78 lakh (HT-0.03 lakh and LT-51.75 lakh) consumers as at the end of March 2016 in the

[41] High Tension consumer means a consumer (other than those of LT III industrial categories) with a contracted load of 70 kVA and above and/ or having a contracted load exceeding 56 kW/ 75 HP. For LT-III industrial category having contracted load more than 100 HP, HT tariffs are applicable

[42] Low Tension consumer means a consumer with a contracted load of 56 kW/ 75 HP and below except for LT-III category which has a threshold of 75 kW/ 100 HP.

northern districts of Telangana viz., Warangal, Khammam, Karimnagar, Adilabad and Nizamabad districts.

2.8 Organisational Setup

The Company functions under the administrative control of Department of Energy, Government of Telangana. General Manager (IT), who heads the IT Department, reports to the Chief General Manager (Projects) and is assisted by a Senior Accounts Officer at Corporate Office. While the billing of LT consumers is the responsibility of the Assistant Accounts Officers at Electricity Revenue Offices (EROs), billing of HT consumers is done by Senior Accounts Officer (HT) at each circle office.

2.9 Billing Applications

Energy Billing System (EBS) (LT Consumers)

Prior to introduction of Energy Billing System (EBS) (at a cost of ₹ 6.68 crore), the LT consumers were billed through Private Accounting Agencies (PAAs) who maintained the data in different formats like simple text format, dbase files or excel sheets, based on their convenience. EBS, which brought the billing of all LT consumers on one platform, was developed in-house in the year 2013 in Oracle 11g as distributed processing system placed on IBM P750 servers having AIX 6.1 Operating System with windows based desktops at EROs acting as clients.

As at the end of July 2016, the data pertaining to LT consumers, other than those in R-APDRP towns, is maintained in the EBS. The data pertaining to the previous month is uploaded to the spot billing machines which is then used to generate bills for the current month based on the current month consumption. The billing information and the payment information are processed at the Data Centre located in the Corporate Office at Warangal to update the consumer ledgers.

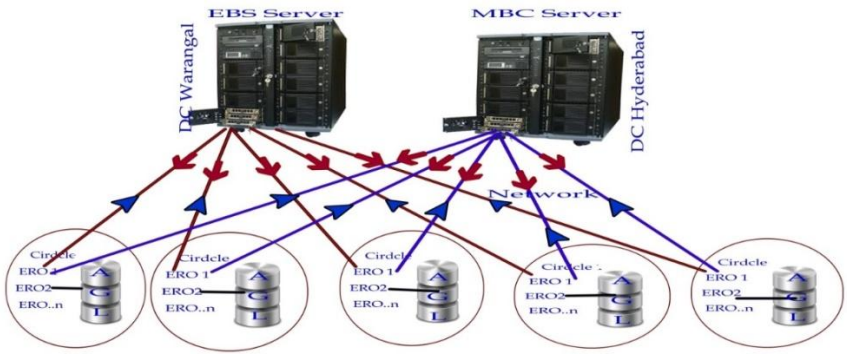
EBS (Agricultural Consumers)

The software was developed in-house on Sun Solaris 8 Operating System with Oracle 7 database and Oracle Forms V4 as back-end and front-end respectively and Pro*C as programming language.

The billing information pertaining to agricultural consumers (LT-V category) is fed by the EROs and is then sent to the Circle Office concerned. The same is processed by the Circle Office and the generated bills are sent to the consumers by the EROs.

Metering, Billing and Collection (MBC) Module (HT Consumers)

The HT consumer data is maintained along with the data pertaining to LT consumers covered under Restructured Accelerated Power Development and Reforms Programme (R-APDRP) in a Data Centre located at Hyderabad in the Metering, Billing and Collection (MBC) module developed under R-APDRP. The billing module is an application with centralised processing at the Data Centre and decentralised data feeding at Circle Offices. The processed bills are then sent to the consumers. A database architecture diagram of these billing applications is shown below:



2.10 Scope of Audit and Audit Methodology

The results of an IT audit on the HT billing systems of the Company was earlier included in the Commercial Audit Report, Government of Andhra Pradesh for the year ended 31 March 2007.

During the present Audit, sample billing data from the databases of LT, HT and Agricultural consumers for the period from 2011-12 to 2015-16 were analysed using CAATs[43] during the period April to August 2016. The results of queries on the databases were cross-verified with physical records at Circle Offices/EROs to evaluate the adequacy of IT controls as well as to identify loss/ leakage of revenue and to examine comprehensiveness of the System.

Sample Selection

There are five[44] Circle Offices, 23 Division Offices and 48 EROs spread over five districts. Among 45 EROs[45] (in these five Circles) where EBS is in use, 10 EROs (two offices from each circle) were selected using simple random sampling technique. Out of the total of 51.75 lakh consumers as at the end of March 2016, the sample selected works out to 17.18 lakh consumers (33.20 *per cent*). Further, the billing data of all 2516 HT consumers (to the end of March 2016) was covered in Audit.

2.11 Audit Objectives

The objectives of the Audit were to see whether

- the Company prepared and implemented IT Policy;
- the IT application for billing implemented by the Company was economical, efficient and effectively addresses business needs and compliance requirements;
- effective internal controls exist to ensure data integrity, safety and business continuity;
- effective controls exist in asset creation/usage, outsourcing and training aspects.

[43] Computer Assisted Audit Techniques

[44] Adilabad, Karimnagar, Khammam, Nizamabad, Warangal Circles

[45] All consumers of 3 EROs out of the total 48 EROs were covered under R-APDRP.

2.12 Audit Criteria

The audit criteria adopted for ensuring the achievement of audit objectives were:

- Provisions of Electricity Act, 2003, the National Electricity Policy and the schemes sponsored by Ministry of Power;
- Tariff Orders issued by SERCs of Andhra Pradesh and Telangana States;
- Guidelines and directions issued by Ministry of Power, SERCs, State Government;
- Norms fixed by various agencies with regard to operational activities;
- Adherence to directions issued by Information Technology & Communications Department vide G. O. RT. No. 268, dated 08 August 2008 for implementation of e-governance projects in PSUs/ Government Departments/ Agencies.

The audit objectives and criteria were explained to the Company during the Entry Conference (6 June 2016). The replies of the Government furnished during the Exit Conference (26 October 2016) have been considered while finalizing the Report.

Acknowledgement

Audit acknowledges and appreciates the co-operation and assistance extended by the officers and the Management of the Company at various stages of conducting the Information Technology Audit.

2.13 Audit Findings

2.13.1 Lack of formulated and documented IT and Security Policies

As per the guidelines issued (August 2008) by the erstwhile Government of Andhra Pradesh (Unified), all Departments/ PSUs were to develop an IT vision and a road map identifying various objectives and services to be provided, milestones to be achieved etc., within a fixed time frame. However, the Company had neither framed a road map nor formed a Steering Committee to guide the development of IT assets till date (August 2016).

Though the Company was utilising IT applications like EBS, MBC, SAP ERP etc., for managing its various operations, it is yet to formulate and document a formal IT policy and a long/ medium-term IT strategy incorporating the time frame, key performance indicators and cost benefit analysis for developing and integrating these applications, resulting in duplication of work as detailed in *Para 2.13.3* infra. This indicates lack of strategic planning in effectively using IT. Further, the Company does not have an approved Information Security Policy for protection of its application/ database as well as the data residing therein as detailed in *Para 2.13.22*.

In this context, a reference is also invited to Para no. 2.5.6 of the 'Review on HT billing' in erstwhile APNPDCL and erstwhile APCPDCL (included in the CAG's Audit Report, Commercial, Government of Andhra Pradesh for the

year ended 31 March 2007) wherein similar comment was included, from which it is evident that the Company did not take any action for the last nine years.

The Government accepted (October 2016) the audit observations and stated that suitable policies would be formulated.

2.13.2 Lack of Blueprints

The Company had not prepared System Requirement Specifications and User Requirement Specifications for its in-house developed "Energy Billing Software" used for billing of LT and agricultural services. Non-preparation of these blueprints would pose a hindrance in making systematic changes in the software as and when needed. Detailed objectives of the software and its achievement could not be verified in Audit.

The Government accepted (October 2016) the audit observation.

2.13.3 Lack of interface between various IT Applications

The Company is utilising SAP ERP for accounting purposes and HT billing system (MBC) for billing of HT consumers. Individual ledger accounts were created in SAP for each of the HT consumers while lumpsum totals were maintained for all LT consumers as a single ledger account.

Audit observed that though the bills were being generated in the HT billing system based on the meter readings fed into the system, the data has to be manually downloaded and then uploaded into SAP due to lack of interface between the SAP ERP and the HT billing system. Further, the data pertaining to payments received from the HT consumers was manually fed for each of the consumer in MBC and SAP separately. Thus, absence of interface between SAP ERP and HT billing system resulted in duplication of work as well as scope for errors (as detailed *in Para 2.13.10*), which might adversely affect the integrity of the databases.

Further, it was also observed that there was no interface between the three billing systems viz., MBC, EBS (LT) and EBS (Agri) utilised for billing of various categories of consumers, which would hinder generation of consolidated MIS from these applications.

The Government accepted (October 2016) the audit observation and stated that an interface between HT billing system and SAP is under development.

2.13.4 Lack of functionalities resulting in manual interventions

Audit verified the records of the Circle Offices and EROs and observed that certain billing components were excluded from the softwares, necessitating manual calculations/ interference, thereby affecting the integrity of the system and completeness of the databases as detailed below:

2.13.4.1 HT Billing

1. Temporary HT service connections were being billed manually till they were regularised and not routed through the HT billing application (MBC) resulting in lack of completeness of the database.
2. Though the data pertaining to the consumers including the date of agreement was included in the application, the application did not

provide for capturing the minimum agreement period, based on which demand could be raised for such minimum period, in case of deration of contracted load/ termination before the expiry of the agreement. Due to non-provision of this functionality, the Company had to manually verify and raise demand in such cases.

3. As per the Regulation No. 6 of 2004, consumers who fail to remit the Security Deposit (SD) within 30 days from the date of intimation thereof, have to pay a surcharge of 18 *per cent* per annum on such amounts. Though the data pertaining to the amount of Security Deposit due from the consumer was available in the system, the application did not provide for automatic calculation of the surcharge and was manually calculated and uploaded to the system.
4. The Application did not provide for revision of bills of the open access consumers[46] through the system. The bills were manually revised and the subsequent bill was adjusted through a Journal Entry. However, the other parameters like units billed etc., were not revised, thus, affecting the integrity of the data utilised for review of adequacy of SDs held.
5. In case of seasonal consumers who utilise power for their main plant during the off-season period, the billing system did not provide for automatic revision of the previous bills and raising of subsequent demand by disallowing the concession available for seasonal consumers.
6. The legacy HT billing application did not provide for billing of HT services on proportionate basis for new consumers, due to which bills for the first month from the date of supply were prepared manually. This lack of functionality was not addressed in the new application also.

   Further, the new MBC billing system was incorrectly designed to generate the first bill from the date of supply to the date of bill, thus, inflating the bill. This necessitated manual withdrawal of the excess amounts for every such first bill. Similar was the case with the first bill of the consumers who were converted from LT III (Industrial) to HT category.
7. Provision for inclusion of assessed amounts in malpractice or theft cases was not provided in the system.

As the above changes were being recorded by way of posting a Rectification Journal Entry due to lack of required functionalities, the database continued to depict the old and incorrect data and did not show the revised billing particulars (meter data etc.,) except for the amounts, wherever revised. As a result, the reports generated would be incorrect and the database would continue to carry the incorrect data. As manual processing results in lesser transparency and may lead to errors, the above processes need to be automated.

[46] Consumers utilising the distribution system of the Company for receiving the supply of electricity from a party other than the Company

2.13.4.2 EBS (LT Billing)

1. In case of billing of LT category-III consumers with a contracted load of 75KW/100 HP and above, the energy charges, fixed charges and Time of Day (TOD) charges were manually calculated and then entered into EBS through in-house computer's EBS login giving scope for errors.
2. Whenever the adequacy of SD of the consumers was reviewed annually, previous SD review data was replaced with the current data due to which historical data was not available in the application. Further, the application neither provided for levy of penal interest on additional SD demanded but not paid by the consumers nor facilitated manual posting of such interest. These shortcomings hindered the ability of the Company to review the payment history of the consumers in respect of SD in addition to undue benefit to the consumers and loss to the Company due to non-levy of penal interest.
3. Manual revision of bills was necessitated due to incorrect logic for calculation of adequacy of SDs from new consumers for whom previous 12 months data was not available.
4. The application was incorrectly designed to generate the first bill from the date of supply to the date of the bill, thus, resulting in excess demand on the consumers. However, these bills were not manually reviewed to verify the accuracy of the bill and to withdraw excess amounts as done in HT billing.

The Government accepted (October 2016) the audit observations and stated that the Company would provide suitable modifications to the software.

2.13.5 Non-migration of legacy billing data

Audit observed that the billing data pertaining to LT consumers is available in EBS from the date of implementation of EBS only i.e., April/ December 2013. This indicated that the Company had not migrated the billing data available in the legacy system into the new application. Further, it was also observed that the legacy applications were not installed in any systems available in the Company, due to which the Company cannot verify the past history of the consumers.

The Government stated (October 2016) that historical data of legacy LT billing systems would be migrated in due course.

2.13.6 Verification of balances on migration

Though the data in the legacy HT billing system was migrated to the MBC system, there were no records to indicate that the migrated data was verified and certified to be error-free.

The Government replied (October 2016) that the data was migrated after thorough verification.

However, no documents were furnished in support of the reply.

2.13.7 Usage of Production Environment for testing in MBC

It is an industry standard practice to test the changes to software in test environment before migrating to production environment to mitigate the probable bugs as well as to ensure that the reliability and integrity of the existing data is not affected. A review of the master tables of the MBC showed that the master tables contained few test consumers, which reflected the fact that the production server is also used for testing, instead of migrating the new features after testing in test environment.

The Government stated (October 2016) that testing was done in stages before moving to production.

However, fact remained that the production database had test data which indicated failure in segregation of testing and production databases.

2.13.8 Design Errors in MBC Master Tables

A review of the structure of the MBC master tables showed that the field definitions were incorrect, and were coupled with lack of proper input validations which gave scope for errors. For instance, Mobile number of SC No. KMM899 was only of 9 digits (excluding the prefix 0) instead of minimum 10 digits. These errors could have been avoided by preparation of the blueprints as mentioned at *Para 2.13.2 supra*.

The Government accepted (October 2016) the audit observation and stated that action would be taken to rectify the errors.

2.13.9 Failure to control dues from consumers exceeding their Security Deposits

HT consumers of the Company should maintain SD equivalent to two months of their average consumption of the previous year. A review of the records at the end of March 2016 showed that the Company allowed accumulation of dues of 508 HT consumers amounting to ₹ 201.19 crore, though they maintained a SD of only ₹ 36.12 crore i.e., an excess of ₹ 165.07 crore, which in turn is equivalent to 9.15 times of the existing SD of these consumers. Though a default by these consumers would lead to financial loss to the Company, the system was not designed to generate alerts whenever the dues of a consumer crossed SD by a predetermined threshold limit.

The Government accepted (October 2016) the audit observation and stated that the above 508 consumers pertained to Government services and mostly Emergency services and that efforts were being made for realization of dues.

2.13.10 Variations between Financial (SAP) and Consumer Ledgers (MBC)

The Company is maintaining financial data of the HT consumers in SAP while maintaining the billing data in MBC i.e., HT billing application. A comparison of the data pertaining to SDs in both the applications showed that there was a difference of ₹ 5.06 crore between the two applications at the end of March 2016, rendering the database undependable.

The Government accepted (October 2016) the audit observation and stated that these differences pertained to period prior to implementation of SAP and that efforts would be made to reconcile the differences.

2.13.11 Incorrect levy of Electricity Duty

A review of the billing data of the HT consumers showed that the application is incorrectly designed to levy Electricity Duty (ED) on the kWh units instead of kVAh units, as detailed in *Para No. 2.6.4.8*. Further, in case of consumers whose consumption was less than the minimum demand, the ED was levied only on the actual units consumed and not on the minimum units billed which was in deviation to the provisions of APED Act.

The Government stated (October 2016) that ED was levied on kWh units as GTCS defined "unit" as kWh.

The reply is not acceptable as the GTCS defined a unit as kWh units indicated by the energy meter for billing purpose while ED Act provided for levy of ED on energy sold. As kVAh is being used as the unit of measurement for billing, ED should be levied on kVAh.

2.13.12 Non-review of Security Deposits of Seasonal Industries as per Regulations

As per the provisions of Regulation No. 6 of 2004 (clause 8), the adequacy of the SD of seasonal industries is to be reviewed twice during the year, once before the commencement of the declared season and again after the completion of the season. It was, however, observed in Audit that the Company was reviewing the adequacy of the SD of its 265 seasonal consumers only once a year along with other consumers which is against the SERC Regulations.

The Government agreed (October 2016) to make necessary changes to the software.

2.13.13 Failure to credit Interest on Security Deposits (ISD) of Bill-stopped Consumers

An analysis of the interest given to the consumers on their SD for the year 2015-16 showed that the Company had not credited interest on SDs (ISD) of ₹ 2.57 crore to 43 HT consumers whose bills were under 'BILL STOP' status in the month of April 2015. However, as the clause 7 of Regulation 6 of 2004 which govern the ISD does not differentiate between the regular and bill-stopped consumers, the action of the Company was incorrect.

The Government stated (October 2016) that security deposit along with interest thereon, would be adjusted at the time of termination of service.

The reply is not tenable as the Regulations stipulated that the ISD should be credited every year.

2.13.14 Non recovery of full cost tariff from consumers

A reference is invited to *Para 2.6.4.5* wherein the non-receipt of subsidy from the State Government was commented upon. As per the tariff orders, the subsidy was to be received in advance every month, failing which SERC rates contained in the full cost recovery tariff (FCRT) would be operative. In this context, it was observed that though the Company had not received the entire subsidy for the years 2014-15 and 2015-16 as per the tariff orders, it could not recover the FCRT from the consumers as the billing applications did not have the functionality to recover FCRT in such eventualities.

The Government replied (October 2016) that the release of pending subsidy from Government is being pursued by the Company.

The reply is not tenable as the Company failed to provide necessary functionalities in the billing system to adhere to the instructions of the SERC.

2.13.15 Incomplete Data in Master Tables

A review of the data in the consumer master tables of all the three billing applications viz., MBC (HT Billing), EBS (LT Billing) and EBS (Agriculture) showed that the data capturing was incomplete in various columns like address, email ID, phone number etc.

The Government replied (October 2016) that the missing data would be collected and updated in the database.

2.13.16 Delay in Spot Billing of LT consumers

A review of the billing of the consumers showed that there was a considerable time lag between two consecutive bills in both monthly and bi-monthly billing. For instance, analysis of ledger data of Jagityal ERO for the month of April 2011 revealed that billing in 70,148 records out of 86,494 bi-monthly records and 14,626 out of 16,562 monthly records was delayed by 4 to 59 days and 4 to 29 days respectively. This delay in spot billing was also continued even after implementation of EBS as indicated by delay in 23,66,794 cases (20.52 *per cent*) out of 115,38,595 total monthly/ bimonthly spot billings of the ten test-checked EROs during the period from May 2013 to March 2016. As the delay in spot billing results in shifting of the consumers to a different slab category based on their average consumption, there is a scope of loss to either consumer or to the Company.

The Government replied (October 2016) that the delays were avoided during the current year and that a new software is implemented to avoid loss to the consumer on account of shifting to higher slab due to delay in billing.

2.13.17 Failure to adhere to guidelines of SERC

An analysis of the billing data of Agriculture consumers showed that the Company had not adhered to the guidelines issued by SERC in its tariff orders as detailed below:

1. SERC vide Para No. 4.1 of Regulation No. 5 of 2004, directed the Company to issue all bills at a periodicity of not more than two months. Audit, however, observed that billing of Agriculture (free) consumers, from whom only customer charges were recoverable, was done only once in six months.

2. Though the tariff orders prescribed different tariffs for different groups of agricultural consumers based on various parameters[47], the same were not captured in the application, thereby requiring manual intervention and giving scope for bias and errors.

3. Though all new agricultural connections were to be given only with meters and after implementation of Demand Side Management (DSM) measures like frictionless foot valve, capacitor of adequate rating, HDPE or RPVC piping at

[47] Land holdings and number of connections held by the agricultural consumer along with the data on the second crop grown

suction and/ or delivery and ISI marked mono-block or submersible pump-sets, out of the 1,33,692 free agricultural connections issued during the period of Audit i.e., April 2011 to March 2016, only 59,894 connections were provided with meters. However, readings were not captured in the application even from these meters.

Further, a test check of the records of Warangal Circle showed that 18,511 consumers released during the period under review were without DSM measures. Audit, however, could not verify similar cases in other four Circles as necessary data was not captured in the relevant tables.

The Government replied (October 2016) that these services pertain to unmetered free agricultural services from which only customer charges are collected and that all free services were released only after installation of DSM measures.

The reply is not acceptable as Warangal Circle data showed that new agricultural services were released without DSM measures. Further, issue of free agricultural connections without meters and issue of bills at six-monthly intervals were against the instructions of SERC.

2.13.18 Billing on the basis of incomplete data

The Company levied additional tariff on HT and LT III consumers (with load above 100 HP) for consumption between 6 pm to 10 pm of everyday as TOD Charges. Audit observed that though TOD charges were correctly levied on HT consumers as per the actual data obtained from the meters, the same were levied at one-sixth of the month's consumption from LT III consumers due to lack of TOD readings. Thus, the Company resorted to billing of LT III consumers on the basis of incomplete data which rendered its billing inaccurate.

The Government replied (October 2016) that TOD is not applicable to LT services.

Audit observed that HT tariff is applied to LT III consumers with load more than 100 HP as per the tariff approved by ERC which included TOD charges. As such, levy of TOD on these LT consumers on approximation due to non-availability of compatible tri-vector meters, rendered billing inaccurate and unreliable.

2.13.19 Weak user authentication

Passwords are used as a mechanism for user identification, authentication and non-repudiation. It was observed that the Company neither had password policy approved by competent authority nor enforced any restrictions on password usage by the users/ administrators. Therefore, there was a risk of unauthorized access and data modification that could not be traced.

The Government stated (October 2016) that password policy would be formulated.

2.13.20 Lack of Backup Policy

The Company did not have any approved Backup Policy. Though the Management stated that backups were taken on daily basis and maintained for 20 days in addition to the backups taken on monthly basis before and after

processing of the ledger, a verification of the backups available with the Company showed that the Company was having only weekend backups and not daily backups. Further, the Company could not produce any record to show that the backups taken at any point of time were actually tested to review its ability to recover data in case of any eventuality.

The Government accepted (October 2016) the audit observation and stated that a backup policy would be formulated.

2.13.21 Deficiencies in Change Management Controls

Modifications made to both master data and the application to accommodate the changes in business rules were not documented. This was evident from the fact that the Management had not maintained any records to indicate that the HT bills generated were test-checked by higher authorities whenever there was a revision in tariff. In this connection, a reference is invited to Para no. 2.5.8 of the Review on HT billing in erstwhile APNPDCL and erstwhile APCPDCL (included in the CAG's Audit Report, Commercial, Government of Andhra Pradesh for the year ended 31 March 2007) wherein similar comment on failure to test check the HT bills was included. Further, a formal policy for authorising changes made and for testing their accuracy did not exist.

The Government accepted (October 2016) the audit observation and stated that change management procedures would be formulated. It was also stated (October 2016) that the bills were test checked across all categories and that records would be maintained in future to substantiate the same.

2.13.22 Lack of Data Security

2.13.22.1 Though the Finance Wing of the Company, after implementation of EBS, instructed the EROs to submit the legacy data to the IT wing, the same was retained with the PAAs, which is a security lapse on part of the Company in maintaining its data. Being the data owner, it was the responsibility of the Company to keep the data, which is critical and confidential, under its control rather than leaving it in the hands of outsourced service providers.

The Government stated (October 2016) that legacy data is being obtained.

2.13.22.2 Further, it was seen in Audit that the HT billing data was maintained by a third party in a Data Centre at Hyderabad along with the data of another DISCOM viz., APSPDCL. The data given to the Audit for analysis included data pertaining to APSPDCL which signifies the fact that the data was not segregated and maintained properly at the Data Centre.

The Government stated (October 2016) that HT billing data is presently maintained in a separate server.

2.13.23 Lack of 'Business Continuity and Disaster Recovery Plan'

The billing system being mission critical for the Company, would impact its revenue earning capacity substantially if the consumer bills are not generated on time. The Company, however, had not prepared any business continuity plan, outlining the action to be undertaken immediately after a disaster and to effectively ensure that information processing capability can be resumed at the earliest. It did not have a disaster recovery plan outlining identities of

personnel, their roles/ responsibilities and plan/ procedure to support such a critical IT system in the event of a failure.

The Government accepted (October 2016) the audit observation and stated that a suitable DR plan would be formulated.

2.13.24 Non-availability of the Source Code with Company

Though the MBC billing software developed under the R-APDRP project is owned by the Company, the source code of the software is yet to be obtained from the implementing agency (M/s TCS Limited). In the absence of the source code with the Company, Audit could not verify the adherence to the guidelines of SERC regarding adjustment of the payments received against arrears/ current dues and annual review of SDs of the consumers.

The Government accepted (October 2016) the audit observation and stated that the source code would be obtained.

2.13.25 Lack of protection from Viruses and Trojans

An analysis of the systems available at EROs where EBS (LT) was installed showed that anti-virus solutions were not installed thus exposing the systems to risk from viruses and trojans.

The Government stated (October 2016) that anti-virus solutions were deployed on all desktops.

However, Audit observed that anti-virus applications were not available in some of the test checked offices.

2.13.26 Lack of documented Training Policy

Audit observed that the Company did not have any training policy for the employees utilising IT billing systems and that none of the users of EBS at two offices[48] were trained till date. Further, the Company did not have any records to indicate that there was an approved evaluation and review mechanism regarding the effectiveness of the trainings imparted to its staff and its utilisation.

The Government accepted (October 2016) the audit observation and stated that training policy would be formulated.

Conclusion

The Company was utilising three billing systems for billing of its HT, LT and Agricultural consumers. In spite of specific instructions from the State Government to develop an IT vision/ road map, the Company had not even developed an IT policy/ strategy to guide its IT activities due to which there was no interface between the IT applications resulting in duplication of work. Further, the Security Deposit balances maintained in the HT billing system differed from those recorded in the books of accounts. Manual processing of several activities resulted in lesser transparency and gave scope for errors. In spite of availability of suitable functionalities in the HT billing application, the Company resorted to manual calculations, thereby affecting the integrity of the

[48]Narasampet and Hanmakonda (Rural) EROs

system and completeness of the database. The systems were vulnerable to internal as well as external attacks due to poor controls.

Recommendations

The Company should:

- ***formulate and document IT and backup policies;***
- ***formulate and implement a comprehensive Business Continuity Plan;***
- ***include all activities of the billing process in the applications to reduce dependence on manual processing and attendant errors creeping into the system;***
- ***integrate the IT applications to prevent duplication of work and scope for errors;***
- ***formulate and implement a comprehensive security policy to safeguard IT assets and fix the existing vulnerabilities; and***
- ***build appropriate IT controls for data integrity and reliability.***