



सत्यमेव जयते

**Performance Audit Report of the
Comptroller and Auditor General of India
on
Centralised Information Technology Billing System
being operated by State Power Utilities**



लोकहितार्थं सत्यनिष्ठा

Dedicated to Truth in Public Interest



**Government of Uttar Pradesh
Report No. 03 of the year 2021**

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Comptroller and Auditor General of India
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Centralised Information Technology Billing System
being Operated by State Power Utilities**

**Government of Uttar Pradesh
Report No. 03 of the year 2021
(Performance Audit)**

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Preface

This Report deals with the results of the audit of Uttar Pradesh Power Corporation Limited and its four subsidiary power distribution companies under Energy Department of the Government of Uttar Pradesh. The Report has been prepared for submission to the Governor of Uttar Pradesh under Section 19A of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971 as amended from time to time.

The accounts of Government companies (including companies deemed to be Government companies as per the provisions of the Companies Act) are audited by the Comptroller and Auditor General of India (CAG) under the provisions of Section 143 (6) of the Companies Act, 2013. The accounts certified by the Statutory Auditors (Chartered Accountants) appointed by the CAG under the Companies Act are subject to supplementary audit by officers of the CAG and the CAG gives his comments or supplements the reports of the Statutory Auditors. In addition, these companies are also subject to test audit by the CAG.

The Report contains the results of the Performance Audit on 'Centralised Information Technology Billing System being operated by State Power Utilities' covering the period 2014-15 to 2018-19.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

EXECUTIVE SUMMARY

Performance Audit on Centralised Information Technology Billing System Being Operated by State Power Utilities

Executive Summary

Introduction

State Power Distribution Utilities of Uttar Pradesh, commonly known as DISCOMs, use Centralised Information Technology Billing System being implemented by the Uttar Pradesh Power Corporation Limited (Company). The Company has two IT-based revenue billing systems viz. Energy Distribution and Service Management System (EDSMS) (commonly known as R-APDRP billing system) implemented (June 2015) under Re-structured Accelerated Power Development and Reforms Programme (R-APDRP) in 168 selected towns of Uttar Pradesh and mPower (commonly known as Non R-APDRP billing system) implemented (September 2017) in Non R-APDRP areas of the State. As on 31 March 2019, a total of 2.58 crore consumers were billed under EDSMS and mPower systems (0.67 crore under EDSMS and 1.91 crore under mPower), with an aggregate contracted load of 51,148.31 megawatt (EDSMS: 20,372.89 Megawatt & mPower: 30,775.42 megawatt) as on March 2019. Further, 1,35,102 consumers were billed manually as of March 2019.

The performance audit of IT-based revenue billing system was conducted for a period of five years *i.e.* from 2014-15 to 2018-19 to examine whether the process of development and acquisition of IT system was transparent, economic and competitive; whether business rules were properly mapped and all required functionalities were provided in the IT application; and whether the implementation of the IT system led to achievement of organisational objectives. Audit examined the records maintained by the Company and four DISCOMs (MVVNL, PuVVNL, PVVNL & DVVNL) Headquarters related to the IT billing systems being operated by it. The electronic billing data for the period April 2018 to March 2019 were collected from the Company and analysed through Computer Assisted Audit Techniques, Tableau and Microsoft Excel tools.

Audit noticed that even after lapse of seven years from the scheduled date of completion of Part-A of R-APDRP, the Company is still unable to generate AT&C losses and therefore calculates the AT&C loss manually. This has defeated the basic objective of elimination of human intervention in energy accounting and auditing in R-APDRP area. There was anomaly in mapping of pertinent and correct business rules in both the IT billing systems of the Company which adversely affected the interests of the stakeholders. The Company did not ensure validation checks for various data inputs. The Company did not have a Business Continuity and Disaster Recovery Plan. Important audit findings arising out of the performance audit are detailed below:

IT enabled energy accounting and auditing

Despite being commented in CAG's Performance Audit Report No. 06 of 2016 and even after lapse of seven years from the scheduled date of completion of Part-A of R-APDRP, the Company failed to complete/update the baseline data of consumers, electrical assets and automated metering in R-APDRP System. Hence, the Company could not utilise GIS-based

Consumer Indexing & Assets Mapping module, Assets Management module, Network Analysis module, Meter Data Acquisition System and Energy Audit module. As a result, the system-generated AT&C loss report was highly erratic defeating the primary objective of automated calculation of AT&C losses without human intervention. Further, in the Non R-APDRP billing system, there is no automated system of energy accounting, auditing and generation of AT&C loss report.

(Paragraphs 2.1 to 2.9)

General Controls

The Company did not formulate and adopt essential IT policies with respect to Human Resource responsible for managing IT activities, Document Retention, IT Security, Business Continuity and Disaster Recovery Plan. It also failed to ensure genuineness/reasonableness of the rates of Original Equipment Manufacturers charged by AMC/ATS vendor and did not carry out annual maintenance of IT assets in a prudent manner.

(Paragraphs 3.1 to 3.4)

Further, the Company neither analysed the possibility of extending the existing R-APDRP system in Non R-APDRP area nor undertook cost benefit analysis while awarding the contract of additional IT billing system. Confidentiality in the IT system was compromised as the Company failed to restrict the log on sessions and also to disable login IDs of deceased/transferred/retired employees on time.

(Paragraphs 3.7 to 3.10)

Application Controls

Mapping of pertinent and correct business rules to the processes/systems is of utmost importance. An analysis of the electronic billing data for the period April 2018 to March 2019 revealed that the IT systems failed in mapping of pertinent and correct business rules of the Company which adversely affected the interests of the stakeholders such as:

- the Government, with respect to non- charging of electricity duty involving ₹ 43.83 crore and non-deduction of tax at source against interest on security deposit involving ₹ 7.99 crore;
- the Company, with respect to mapping of due date, calculation of fixed charges in absence of maximum demand, short/non-deposit of security deposit/additional security deposit (₹ 2,623.56 crore), enhancement of contracted load and penalty for inaccessibility of meter (₹ 21.71 crore); and
- the consumers, with respect to interest on advance deposit and unadjusted balances of consumers (₹ 94.59 crore), rebate on solar water heating plant and rebate to rural consumers shifted from unmetered to metered category (₹ 61.16 crore).

Besides, manual intervention in cases of charging for protective load, preparation of estimate, bill revisions, preparation of penal billing and billing of consumers defeated the purpose of automated billing.

(Paragraphs 4.1 to 4.2.11)

Input Controls and Validation Checks

The Company did not ensure validation checks for various data inputs. This resulted in deficient consumers' database and duplicate entries against already existing consumers causing blocking of revenue due to non-traceability of consumers in cases where dues are to be recovered. Further, non-linking of consumers to their respective categories of Rate Schedule in both the IT billing systems caused loss of substantial revenue (₹ 18.02 crore) to the DISCOMs in 2018-19.

(Paragraphs 5.1 to 5.3)

Other Issues

The Company's internal controls leave much to be desired as evidenced by the failure of the Company to deploy IT billing systems in generation of meter-read plan for optimisation of billing, monitoring of realisation of arrears amounting to ₹ 54,400.13 crore and execution of permanent disconnection having arrears of ₹ 3,441.21 crore as of March 2019 and raising bills on actual consumption basis. The Company also failed to comply with the decision of the Board regarding installation of prepaid meters for Government consumers as out of 69,794 such consumers prepaid meters had been installed only for 39 consumers. The continued and increasing level of commercial losses of the Company/DISCOMs is a testimony of the inadequacy/failure in controls of the entities.

(Paragraphs 6.1 to 6.6)

Recommendations and Response of Government thereon:		
Sl. No.	Recommendation	Response of Government
1.	The Company should complete and update the baseline data of consumers and electrical assets on priority basis in a strict time bound manner so that accurate AT&C loss report is generated automatically without human intervention.	Accepted
2.	Automated reading through Meter Data Acquisition System (MDAS) should be specifically improved from the abysmally low level of 19.71 <i>per cent</i> . Without automated metering, the objective of acquiring accurate, reliable data for baselining, measuring and billing electricity consumption and AT&C losses cannot be achieved.	Response awaited
3.	The Company should consider participation of top level management for effectively monitoring the management of IT related issues and should formulate and implement clear and comprehensive IT policies and periodically review them.	Accepted
4.	Necessary due diligence in maintenance of IT assets and undertaking cost benefit analysis before procurement of new systems through a transparent process of tendering should be scrupulously followed.	Accepted

Sl. No.	Recommendation	Response of Government
5.	The Company should monitor the user IDs of the employees and undertake the work of system management and database administration for maintaining data confidentiality and security.	Accepted
6.	The Company should ensure mapping of all relevant business rules in the IT billing systems to avoid manual intervention for safeguarding the interests of all stakeholders (<i>i.e.</i> the Government, the Company and the Consumers) and should periodically review and update them.	Accepted
7.	The Company should have robust in-built input controls to ensure completeness and correctness of data in order to ensure integrity of the database.	Accepted
8.	The Company should strengthen the internal control mechanism with respect to proper monitoring of the billing systems including proper issuance of bills and recovery of energy charges from defaulters/permanently disconnected consumers to safeguard the interest of the Company/DISCOMs.	Accepted

CHAPTER–I

Introduction

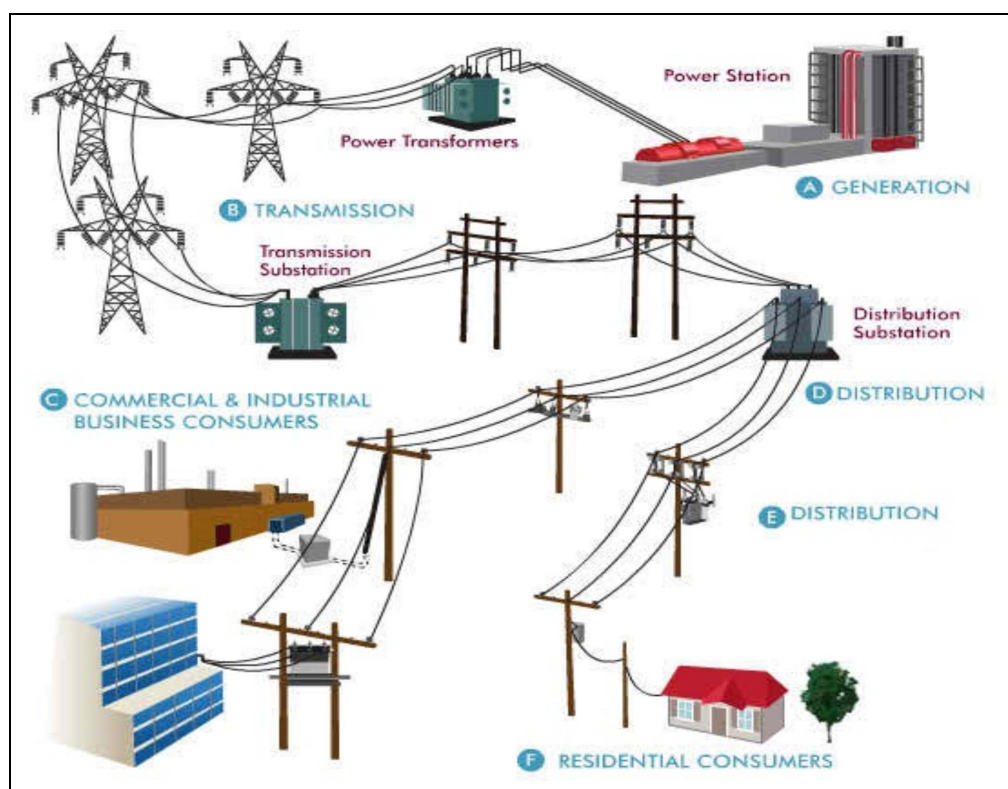
Chapter I

Introduction

1.1 The Uttar Pradesh Power Corporation Limited (Company) was created following the unbundling of the Uttar Pradesh State Electricity Board (UPSEB) under the First Reforms Transfer Scheme (January 2000), for discharging the function of distribution of electricity within the State. The Company was further unbundled¹ in 2003 into four² new distribution companies (DISCOMs). The Company, however, continues to be the holding Company for all the DISCOMs in the State and manages centralised IT-based revenue billing systems.

The process flow of electricity distribution from generation to distribution is depicted in **Chart 1.1**:

Chart 1.1: Flow chart of electricity distribution system



Source: Information provided by the Company

About the IT-based revenue billing systems

1.2 The Company has two IT-based revenue billing systems viz. Energy Distribution and Service Management System (EDSMS) implemented³ (June 2015) under Re-structured Accelerated Power Development and

¹ Uttar Pradesh Transfer of Distribution Undertaking Scheme, 2003.

² Madhyanchal Vidyut Vitaran Nigam Limited (MVVNL, Lucknow), Purvanchal Vidyut Vitaran Nigam Limited (PuVVNL, Varanasi), Pashchimanchal Vidyut Vitaran Nigam Limited (PVVNL, Meerut) and Dakshinanchal Vidyut Vitaran Nigam Limited (DVVNL, Agra).

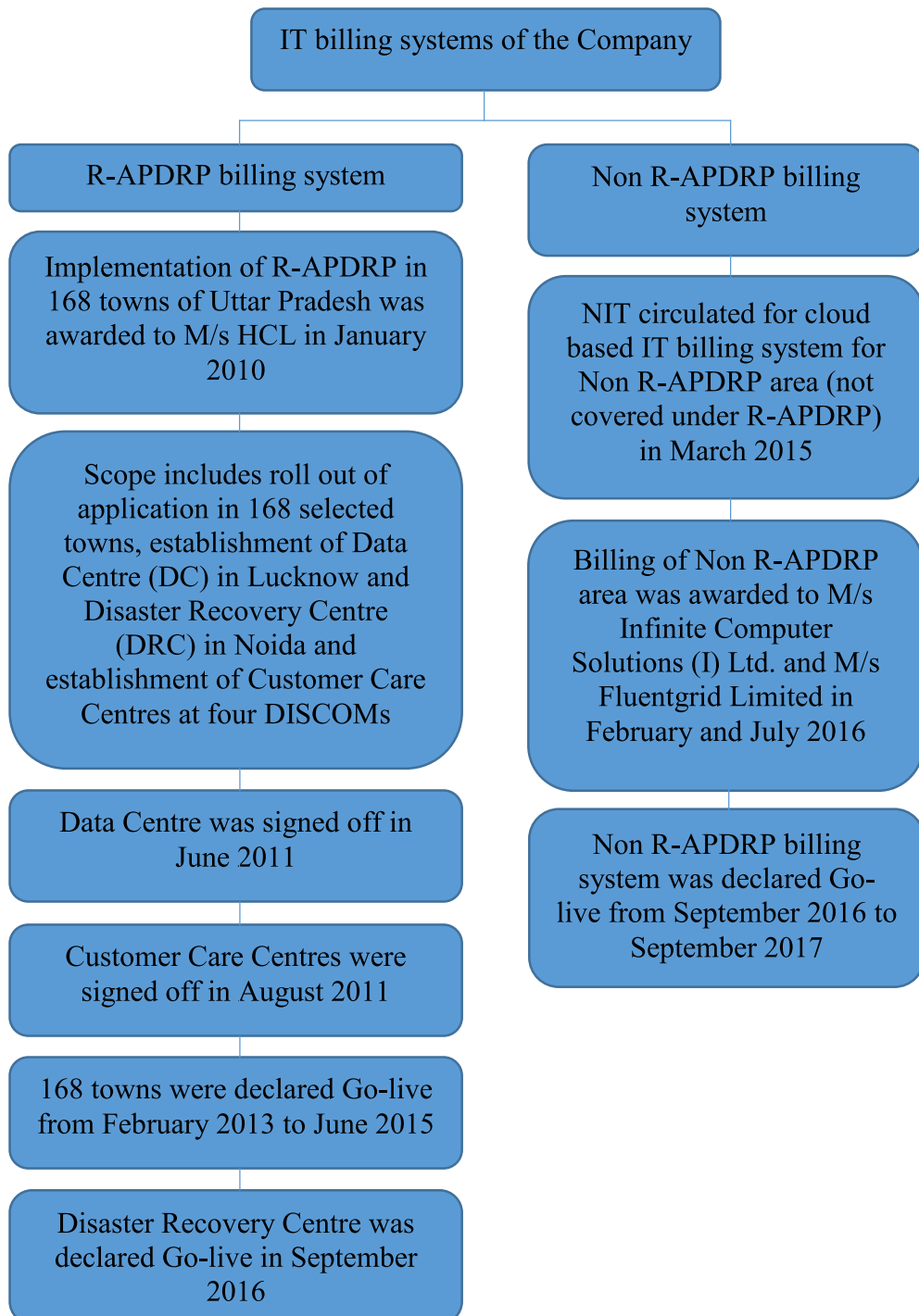
³ Last Go-live date of the towns out of total selected 168 towns has been considered as implementation date of EDSMS system.

Reforms Programme (R-APDRP) in 168 selected towns of the State and mPower implemented⁴ (September 2017) in non R-APDRP areas of the State.

EDSMS and mPower billing systems are commonly known as R-APDRP billing system and Non R-APDRP billing system, respectively within the Company.

The timeline for implementation of both the IT billing systems is depicted in **Chart 1.2:**

Chart 1.2: Time line of implementation of IT billing systems



⁴ Last Go-live date of Non R-APDRP division has been considered as implementation date of mPower system.

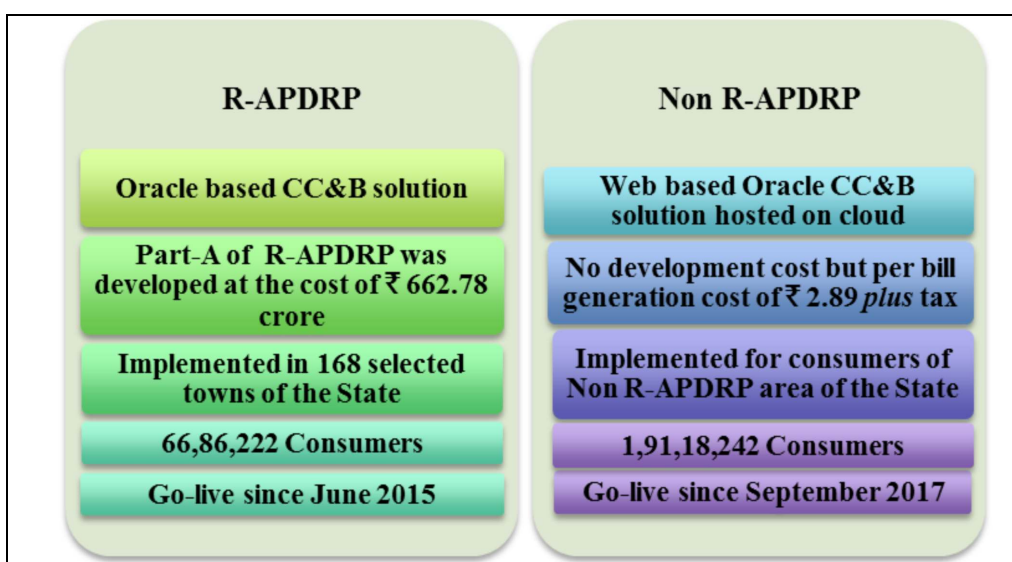
A brief description of the IT-based revenue billing systems (*viz.* R-APDRP and Non R-APDRP) being used by the Company is given below:

(i) The EDSMS solution (R-APDRP billing system) is bundled with Oracle⁵ CC&B 2.3.1 version. The centralised database for EDSMS is Oracle 11g running on Sun Solaris Server Cluster⁶ in Active-Active mode⁷. The R-APDRP billing system (Part-A of the R-APDRP) was implemented at a total cost of ₹ 662.78 crore. The R-APDRP towns were made Go-live⁸ from February 2013 to June 2015.

(ii) mPower suite (Non R-APDRP billing system) is a centralised Web-based Oracle CC&B solution hosted on the cloud. mPower suite is running on version 3.6 with database running on Oracle 12c. It is based on operating cost model at the rate of ₹ 2.89 (*plus* applicable taxes) per consumer per month basis. The non R-APDRP divisions were made Go-live from September 2016 to September 2017.

Key facts of both IT billing systems are depicted in **Chart 1.3**.

Chart 1.3: R-APDRP and Non R-APDRP



The DISCOMs of the Company serve bills to the consumers on the basis of meter reading done through various modes. A flow chart of the entire billing process is depicted in **Chart 1.4**:

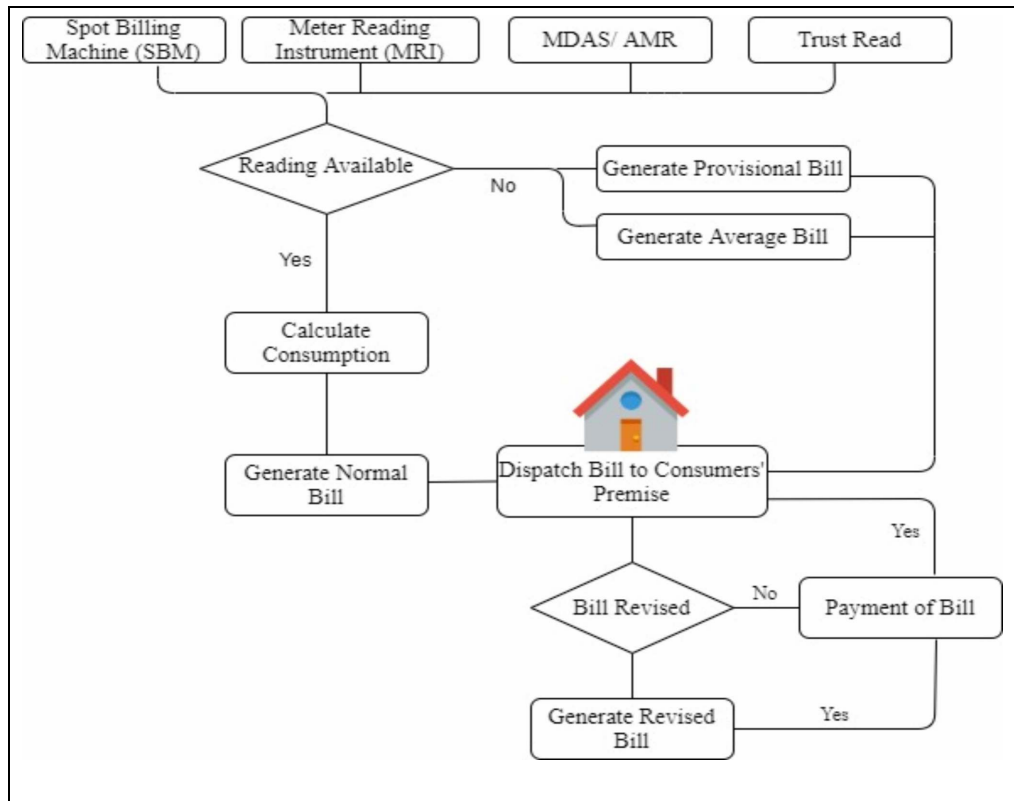
⁵ Oracle database (Oracle DB) is a relational database management system (RDBMS) from the Oracle Corporation.

⁶ Sun Cluster operates by having redundant computers or nodes where one or more computers continue to provide service if another fails.

⁷ An active-active cluster is typically made up of at least two nodes, both actively running the same kind of service simultaneously. The main purpose of an active-active cluster is to achieve load balancing. Load balancing distributes workloads across all nodes in order to prevent any single node from getting overloaded. Because when there are more nodes available to serve, there will also be a marked improvement in throughput and response times.

⁸ Go-live is a date on which the IT system becomes operational.

Chart 1.4: Billing process



Source: Information provided by the Company

Organisational set up

1.3 The Management of the Company is vested with a Board of Directors comprising Chairman, Managing Director (MD) and five other Directors⁹ appointed by the State Government. Further, the management of the DISCOMs is vested with a Board of Directors each comprising Managing Director (MD) and four other Directors appointed by the State Government.

Nodal Officers (of the level of Superintending Engineers) at the Company and in each DISCOM's Headquarters are responsible to monitor the implementation of the IT systems and coordinate with all stakeholders. The organisational set up is shown in **Appendix-1.1**.

Outcomes intended to be achieved

1.4 The intended outcomes which were to be achieved by using IT billing systems in energy distribution are:

- Reduction in the reported Aggregate Technical & Commercial (AT&C) losses¹⁰; and
- Minimum human intervention in the entire billing process leading to elimination of errors and improved billing efficiency and improved revenue collection.

⁹ Director (P&M), Director (Commercial), Director (Distribution), Director (Technical) and Director (Finance).

¹⁰ AT&C loss is the combination of technical loss (transformation losses and losses on distribution lines due to inherent resistance and poor power factor) & commercial loss (theft, defective meter reading, default in payment and inefficiency in collection).

Audit Objectives

1.5 The objectives of the audit were to examine whether:

- The process of development and acquisition of IT system was transparent, economic and competitive.
- Business rules were properly mapped and all required functionalities provided in the IT application. This will include examination of
 - (i) IT system development
 - (ii) Outsourcing
 - (iii) Information security including IT security plans; and
- The implementation of IT system led to achievement of organisational objectives.

Scope of Audit

1.6 The Performance Audit covered a period of five years *i.e.* from 2014-15 to 2018-19. Audit examined the records maintained by the Company and DISCOMs at their Headquarters related to the IT billing systems being operated by them. Further, for examination of basic records of consumers, 38 divisions (10.24 *per cent*) of four DISCOMs, out of total 371 divisions were selected through Stratified Random Sampling Method. During the audit, the electronic data of IT billing systems (R-APDRP and Non R-APDRP) for the period April 2018 to March 2019 was analysed.

The total number of in-service¹¹ consumers under R-APDRP and non R-APDRP billing systems were 66,86,222 and 1,91,18,242, respectively, with an aggregate contracted load of 51,148.31 megawatt (R-APDRP: 20,372.89 megawatt & non R-APDRP: 30,775.42 megawatt) as on March 2019. Further, 1,35,102 consumers were billed manually as of March 2019. The category-wise consumers billed through respective IT billing system vis-à-vis connected loads are detailed in **Table 1.1**:

Table 1.1: Statement showing system-wise, category-wise consumers and connected load of both IT billing systems

Category of Consumer	No. of Consumers	Connected load (in MW)	No. of Consumers	Connected load (in MW)
	R-APDRP billing system		Non R-APDRP billing system	
LMV 1-Domestic	56,20,367	12,857.82	1,73,76,374	20,362.09
LMV 2-Non-Domestic	9,46,078	2,568.76	4,27,394	1,228.84
LMV 3-Public Lighting	701	20.99	492	5.33
LMV 4-Institutional	17,544	221.40	62,257	180.93
LMV 5-Private Tube wells	4,438	22.35	11,71,004	6,323.52
LMV 6-Small & Medium Power	78,739	981.23	62,068	586.98

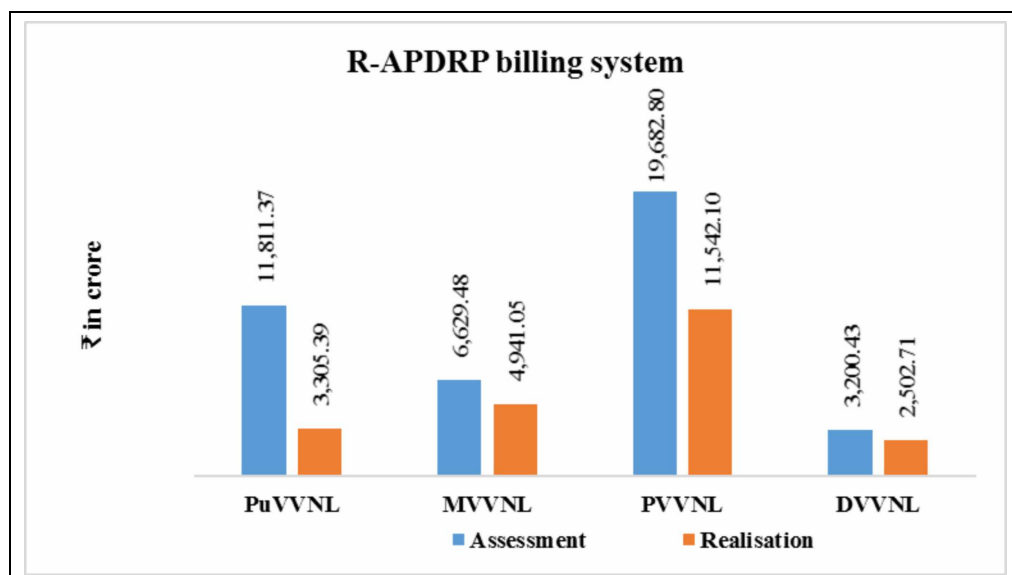
¹¹ In-service consumers are billable consumers of both the IT billing systems which is shown under the status of in-service in R-APDRP billing system and live in Non R-APDRP billing system.

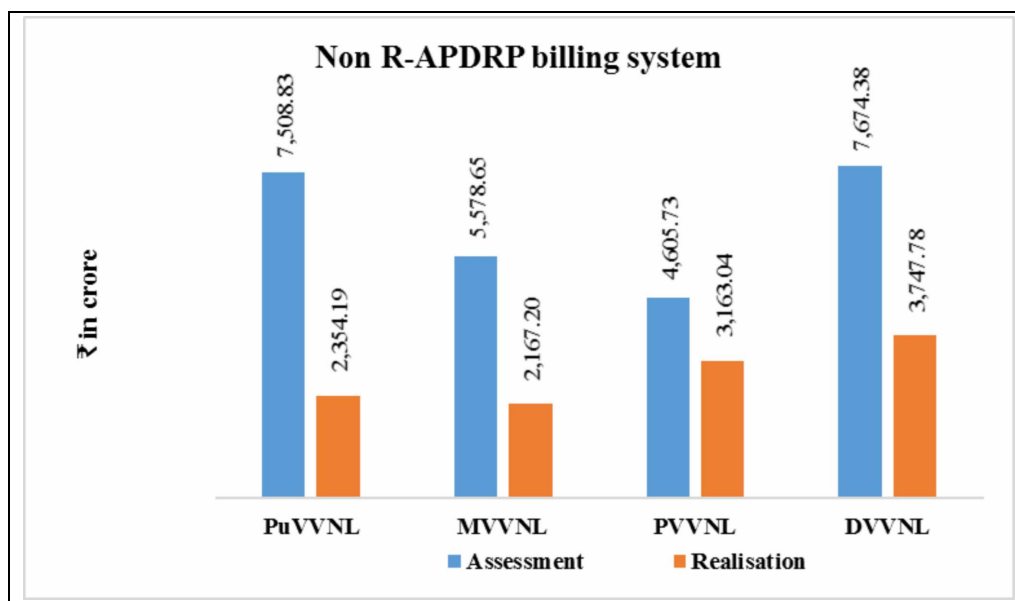
Category of Consumer	No. of Consumers	Connected load (in MW)	No. of Consumers	Connected load (in MW)
	R-APDRP billing system		Non R-APDRP billing system	
LMV 7-Public water works	5,603	184.28	7,297	66.79
LMV 8-State Tube wells	78	2.80	5,989	107.70
LMV 9-Temporary Supply	2,032	3.40	195	1.69
LMV 10-Departmental Employees	126	0.32	-	-
HV 1-Non-industrial Bulk Load	4,000	1,429.34	461	156.80
HV 2-Large and Heavy Power	6,504	2,075.51	4,628	1,594.20
HV 3- Railway Traction	3	1.93	5	40.50
HV 4-Lift Irrigation Works	9	2.78	78	120.06
Total	66,86,222	20,372.89	1,91,18,242	30,775.42
Grand Total	2,58,04,464	51,148.31		

Source: Based on data provided by the Company

Further, the revenue assessment and realisation of the four DISCOMs for the year 2018-19 were ₹ 66,691.67 crore and ₹ 33,723.47 crore (50.56 per cent), respectively. The IT billing system-wise assessment and realisation of all the four DISCOMs are depicted in **Chart 1.5**:

Chart 1.5: Assessment and realisation of four DISCOMs during 2018-19





Source: Based on analysis of data provided by the Company

Audit Methodology

1.7 The Performance Audit was conducted from January 2019 to December 2019. The methodology adopted for attaining the audit objectives with reference to audit criteria consisted of explaining the audit objectives to the Government and the Management of the Company in the Entry Conference held on 3 July 2019. The electronic billing data for the period April 2018 to March 2019 were collected from the Company and analysed through Computer Assisted Audit Techniques, Tableau and Microsoft Excel tools. With a view to assess the implementation of IT billing systems, the existence of general controls, adequacy of operational controls and mapping of business rules in IT billing systems by the Company and DISCOMs, documents were examined and discussions with the Management of the Company were conducted.

The Draft Performance Audit Report was issued to the Management in February 2020 and reply was received in July 2020. After incorporating replies of the Management, the Draft Performance Report was issued to the Government/Management for obtaining their comments (9 February 2021). The reply is awaited. The Exit Conference was held on 16 March 2021. The Government has accepted seven recommendations (out of a total of eight recommendations) in the Exit Conference, whereas their response to one recommendation is awaited. Considering the comments/views put forth by the Government/Management in the Exit Conference, the Draft Report has been finalised.

Audit Criteria

1.8 The audit criteria for assessing the achievements of audit objectives were:

- the Electricity Act, 2003;
- the Information Technology Act, 2000;
- Electricity Supply Code, 2005 (the Code), Rate Schedule, Cost Data Book and orders issued by Uttar Pradesh Electricity Regulatory Commission (UPERC);

- agenda and Minutes of Board of Directors' meeting (BoD), circulars and orders of the Company and DISCOMs;
- system documentation: (i) System Requirement Specification (SRS) and (ii) Request for Proposals (RFP);
- Service Level Agreement (SLA) entered into with outsourced agencies;
- Circulars issued by Central Vigilance Commission (CVC);
- User Manuals/operation manual of the IT systems; and
- the Company's IT Policy including access controls.

Limitations of the Audit

1.9 During the course of the audit, the Company/DISCOMs failed to produce the following records/information to Audit:

- Records related to establishment of Data Centre (DC) and augmentation therein, Facility Management Services (FMS), Annual Maintenance Contract/Annual Technical Support (AMC/ATS) of DC and end locations, closure report of R-APDRP maintained by MVVNL;
- Details of electrical assets of R-APDRP town as on Go-live date and subsequent additions thereon upto March 2019 along with its GIS database of prior and post Go-live periods;
- Consumer Indexing against the electrical assets/network of R-APDRP towns for prior and post Go-live periods;
- AT&C report of the Company, all four DISCOMs (R-APDRP and Non R-APDRP area-wise) for the period 2014-15 to 2018-19;
- Copy of service level agreement (SLA) reports for facility management services (FMS) of R-APDRP system of DC, Disaster Recovery Centre (DRC) and towns of MVVNL;
- Files of net connectivity at modems installed on meters at sub-station, feeder, DT and HT/LT consumers; and files of Network Bandwidth Service Provider (NBSP), SLA reports and document related to payment to NBSP of both the IT billing systems;
- Cost benefit analysis of IT billing system to be deployed in non R-APDRP area;
- Complete documentation of topic-wise training scheduled by the Company for both the IT billing systems along with the details of participants who attended the training.
- Complete documentation of change management, problems and incident management, documentation of R-APDRP billing systems for the period 2014-15 to 2018-19 and non R-APDRP billing system for the period 2017-18 to 2018-19;
- Billing logic/mapping of rules (Rate Schedule, Cost Data Book etc.) of both the IT billing systems as on Go-live date and subsequent changes therein during April 2014 to March 2019;

- Details of the database of the batch process initiated due to revision of Rate Schedule of R-APDRP billing system for the period 2014-15 to 2018-19 and non R-APDRP billing system for the period 2017-18 to 2018-19;
- Billing component-wise break-up of consumers' billing data for the period prior to December 2017 of R-APDRP system; and
- Details of manpower deployed for handling the IT billing systems at the Company and DISCOMs Headquarters and at field level along with their stream of specialisation.

Audit Findings

1.10 The audit findings are based on the scrutiny of records of billing data and review of IT-based revenue billing systems. The significant audit findings have been discussed hereafter under separate chapters.

CHAPTER–II
IT Enabled Energy Accounting and
Auditing

Chapter II

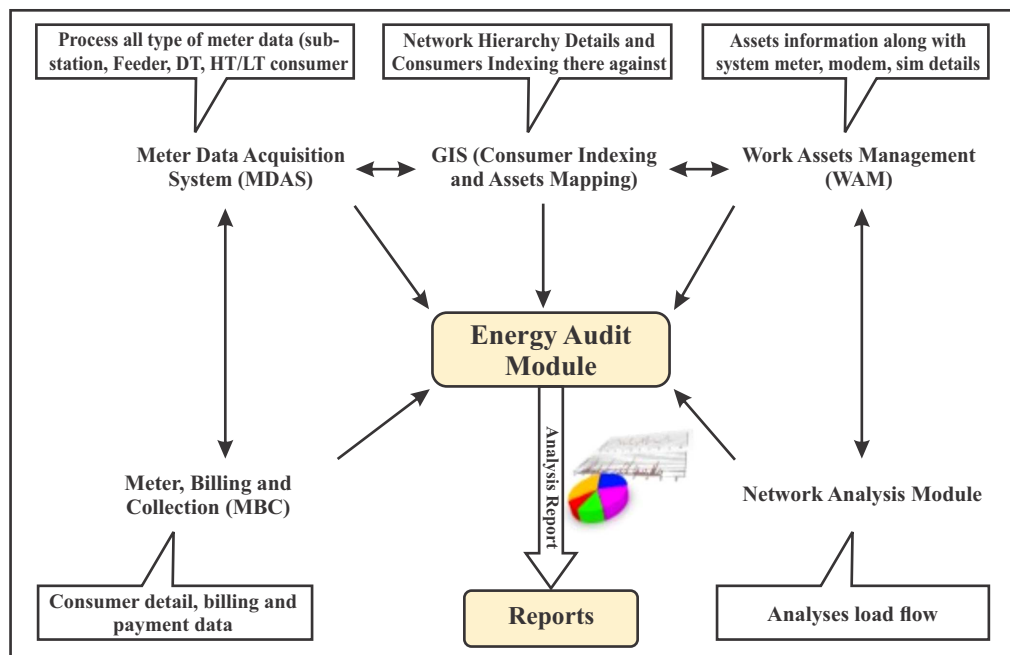
IT enabled energy accounting and auditing

R-APDRP billing system

2.1 Under R-APDRP billing system, 17 different modules have been developed and implemented which work in integration with each other. Each module was designed for a specific purpose and was required to be fully functional for automated energy accounting and auditing. Out of these modules, the Energy Audit (EA) module was designed for identifying the loss pockets and taking corrective actions for reduction of AT&C losses.

EA module was designed to collect data of billed energy, billed amount and collection amount from Metering, Billing and Collection (MBC¹) modules, meter data (Sub-stations, Feeders and Distribution Transformers) from Meter Data Acquisition System² (MDAS) module and use Geographic Information System³ (GIS)-based Consumer Indexing and Asset Mapping database for deriving energy consumption of consumers connected to any node and identify loss pockets within the network area, as depicted in **Chart 2.1**:

Chart 2.1: Functioning of Energy Audit module



Source: Operation manual of the modules of R-APDRP billing system

A Performance Audit on Re-structured Accelerated Power Development and Reforms Programme (R-APDRP), covering the period 2009-10 to 2015-16, was featured in Chapter-II of the Report No. 06 of 2016 on Public Sector Undertakings (PSUs) of the Comptroller and Auditor General of India for the year ended March 2016⁴, Government of Uttar Pradesh. The Performance Audit

¹ The various modules available in MBC are New Connection, Metering, Billing, Collection, Disconnection, and Customer Care Centre.

² Acquire data from metering devices such as sub-station meter, feeder meters, DT meters, and HT/LT consumer meters through modems and without any human intervention.

³ GIS is a system which captures, stores, analyses, manages, and presents data (*like* sub-stations, feeders, transformers, poles, meters, cables & consumers) linked to the location(s).

⁴ Hereinafter referred as 'the Performance Audit Report of 2016'.

covered various observations related to the implementation of the R-APDRP in the State and the shortcomings commented upon in the above report, still exist.

Deficient utilisation of modules resulted in erratic AT&C loss report

2.2 Part-A (IT) of R-APDRP provided for preparation of base-line data for the project area covering GIS-based Consumer indexing and Asset mapping of the entire distribution network and Automatic meter reading of DTs, HT Consumers, Feeders and Boundary meters. It included adoption of IT applications for meter reading, billing & collection, energy accounting and auditing without human intervention. As per the agreement entered with Information Technology Implementation Agency (ITIA), IT-based system was scheduled to be established under Part-A within 18 months *i.e.* by July 2011 from the date of award (January 2010) of work whereas the Go-live date of the system was June 2015.

In the Performance Audit Report of 2016 at paragraphs 2.1.10 and 2.1.12, Audit pointed out that the IT-enabled system was not completed by ITIA due to which the baseline data could not be verified by the Third Party Independent Evaluation Agency (TPIEA) upto October 2016. As a result, the town-wise⁵ AT&C loss report generated by the system even after declaration of Go-live was erratic, as it ranged between (-) 99.83 *per cent* and 99.92 *per cent* during July 2015 to July 2016 which defeated the objective of eliminating human intervention in energy accounting/auditing.

During the present audit, it was noticed that despite being commented upon in the Performance Audit Report of 2016 and even after lapse of seven years⁶, the Company failed to establish the IT-based system and complete the baseline data. The reasons for this state of affairs are non-updation of GIS data of electrical assets, non-tagging of consumers with their hierarchical network of electrical assets and lack of automatic fetching of meter data at MDAS through modems installed at Sub-stations, Feeders, Distribution Transformers (DTs) and HT/LT consumers. As a result, the town-wise⁷ AT&C loss report generated through EA module was not accurate and reliable as it ranged between (-) 1,51,15,08,579 *per cent* and 45,240.82 *per cent* during 2018-19. Consequently, the Company was left with no choice but to calculate the AT&C loss manually which defeated the basic objective of elimination of human intervention in energy accounting and auditing in R-APDRP area.

Further, due to lack of baseline data the Company could not utilise the modules *viz.* Energy Audit module, GIS based Consumer Indexing and Asset Mapping module, Asset Management module and GIS-based Integrated Network analysis module. Thus despite incurring expenditure on acquisition of these hardware and software along with the cost of AMC/ATS to the tune of ₹ 40.57 crore (***Appendix-2.1***), incurred during the period 2014-15 to 2018-19, the objective of having accurate and reliable AT&C loss figures could not be fully achieved.

⁵ In 43 sampled towns out of total 168 towns covered under R-APDRP.

⁶ From the scheduled date of completion of Part-A of R-APDRP *i.e.* July 2011 upto March 2019.

⁷ Of total 168 towns under R-APDRP.

In the Exit Conference (March 2021), the Government acknowledged the issue of system generated erratic AT&C report and stated that deficiencies were detected in system generated energy accounting and the issue was being addressed.

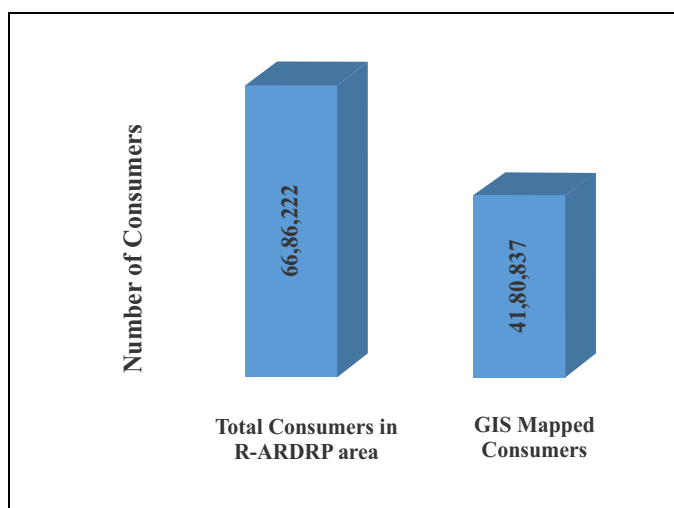
Failure in implementing GIS based consumer indexing and assets mapping module

2.3 To start developing a GIS map for power distribution network, Differential Global Positioning System⁸ (DGPS)/Global Positioning System (GPS) survey becomes necessary for geo-referencing and mapping the electrical assets on the digital base map. The purpose of the application was to index all the consumers' database with respect to their unique electrical address upto Go-live date (June 2015).

The White Paper⁹ provided that to perform correct energy audit and accounting of towns utilising MBC and MDAS data, it is absolutely essential that the towns should have up-to-date GIS asset and consumer information in the GIS repository at the time of Go-live and also during subsequent operation. Therefore, the incremental changes (addition/ deletion/modification) of electrical assets and consumers in GIS repository were also required to be updated in the system.

In the Performance Audit Report of 2016 at paragraph 2.1.19, Audit pointed out that ITIA/DISCOMs did not update GIS data of any of the towns with respect to the changes caused due to release of new connections, disconnections, construction of new sub-stations and lines. In absence of updated data, the objective of correct energy accounting and auditing could not be ensured.

Chart 2.2: GIS Mapping of Consumers



Source: Based on analysis of data provided by the Company

(62.53 per cent), out of a total of 66,86,222 consumers available as of March 2019 as depicted in **Chart 2.2**.

During the present audit, it was again noticed that despite being commented upon in the Performance Audit Report of 2016 and even after a lapse of five years¹⁰ from Go-live of towns the consumer indexing against GIS data of electrical network was not updated as it was done only for 41,80,837 consumers

⁸ A Differential Global Positioning System (DGPS) is an enhancement of Global Positioning System (GPS) which provides improved location accuracy.

⁹ In December 2013, Ministry of Power (MoP) circulated a White Paper on post Go-live requirement to be performed by State Power Utilities.

¹⁰ From the Go-live date of the last town *i.e.* June 2015 upto March 2019.

The audit findings related to consumer indexing and assets mapping are discussed as under:

(i) Consumer Indexing:

GIS indexing of all the consumers of R-APDRP area, upto Go-live date, were in the scope of ITIA and thereafter, indexing of new consumers was to be done by the Company either by itself or through outsourcing. But the GIS indexing of 38,90,691 consumers (74.29 per cent) out of total 52,36,819 consumers were completed by ITIA, upto Go-live date (June 2015). Further, during July 2015 to March 2019, 14,49,384 new connections were released, but GIS data of only 2,90,134 (20.02 per cent) consumers were captured by the divisions ignoring 11,59,250 consumers (79.98 per cent), as mentioned in **Table 2.1:**

Table 2.1: Year-wise status of new connections released and consumer indexing

Year	Connections released	Consumer indexing performed	Remaining consumers
2015 (from July 2015)	1,83,273	56,052	1,27,221
2016	3,26,961	89,620	2,37,341
2017	4,48,912	69,270	3,54,104
2018	4,23,374	73,611	3,75,301
2019 (upto March 19)	66,864	1,581	65,283
Total	14,49,384	2,90,134	11,59,250

Source: Based on analysis of data provided by the Company

Audit noticed that the Company was unable to update consumer indexing of the remaining consumers and consumers added after July 2015 to March 2019. As a result, the gap between the indexed and non-indexed consumers increased from 25.71 per cent in June 2015 to 37.47 per cent upto March 2019. For updating consumer indexing, the divisions had also neither sought any assistance from the Executive Engineer/IT or Assistant Engineer/IT¹¹ nor instructed the spot billing machine (SBM) vendor for the same.

(ii) Assets Mapping:

In respect of electrical assets of R-APDRP towns, the Company failed to provide information as on Go-live date and additions therein during the period 2015-16 to 2018-19 along with GIS database containing mapping of all its electrical assets, on the basis of which it can be concluded that the Company did not have the complete information of its electrical assets of R-APDRP towns along with respective GIS database.

Further, during a visit by audit to seven divisions of R-APDRP towns having consumers of only R-APDRP billing system it was observed that the complete electrical assets of the divisions were not updated in the IT system and no efforts were made by the divisions in updating GIS database and maintaining modems installed at meters for getting meter data automatically on the system as out of total available 64 sub-stations, 326 feeders and 8,988 DTs, only 40 sub-stations, 223 feeders and 4,623 DTs were mapped in the system. Out of mapped electrical assets, the meter data of only 34 sub-stations, 154 feeders and 468 DTs were fetched automatically during March 2019 (**Appendix-2.2**).

¹¹ One Executive Engineer/IT at zone level and one Assistant Engineer/IT at circle level are posted by the Company for assisting field divisions on IT-related issues.

Due to non-indexing of consumers with the GIS data of the electrical assets, non-updating GIS data of existing electrical assets and lack of automatic fetching of meter data, the Company failed to assess the capacity of the network while releasing new connections, identifying location of the consumer from unique pole ID, performing correct energy accounting and audit and calculating AT&C loss correctly using the system.

The Company accepted (July 2020) the fact and stated that earlier GIS implementation did not have provision of change management, hence the GIS data could not be updated timely and continuously after its completion. Further, in the Exit Conference (March 2021), the Government also acknowledged the deficiencies pointed out and stated that these were being sought to be appropriately addressed.

Failure in using Assets Management module

2.4 The Asset Management (AM) module of the R-APDRP billing system was to provide the Company a centralised database of the entire asset records (purchase information and assets specification) along with its maintenance history, insurance, warranty, depreciation, and disposal records. Using AM module, maintenance & replacement of assets was to be handled effectively thereby reducing O&M cost for the Company and help in organising the maintenance schedules and evaluation of replacement decisions.

In the Performance Audit Report of 2016 at paragraph 2.1.16, Audit pointed out the non-rectification of the shortcoming/deficiency noticed during User Acceptance Testing (UAT) conducted in May 2012 of the Assets Management module.

During the present audit, it was noticed that despite being commented upon in the Performance Audit Report of 2016 and even after lapse of seven years¹², the Company could not rectify the shortcoming/deficiency noticed during UAT and the AM module has never been used as no information related to electrical assets were ever entered into the system by the Company. The reasons analysed during audit were that the Company does not maintain any centralised record related to its electrical assets installed in the field *i.e.* purchase date & time, warranty period, validity of insurance, specifications of installed assets and its maintenance history. Due to non-using of AM module, the Company failed in analysing the life cycle of the assets, managing various depreciation policies, budget for replacement, extensive reporting and compliance of statutory requirements.

The Company accepted (July 2020) the fact and stated that since there was no change management agency and no stores modules available, hence, it failed in utilising the modules earlier.

Failure in using Network Analysis module

2.5 The Company was to utilise the capability of GIS-based Network Analysis (NA) Module in conjunction with other modules/applications, like GIS-based Consumer Indexing and Assets Mapping, Assets Management, MBC, MDAS

¹² From the scheduled date of completion of Part-A of R-APDRP *i.e.* July 2011 upto March 2019.

and Energy Audit, to perform various actions¹³ required on the electrical network for network optimisation, loss reduction and network operation with greater efficiency. Using NA module, the Company was to prepare estimates and diagrams for releasing new connections and calculating technical loss for any of the sections of the network to separate out technical and commercial losses.

In the Performance Audit Report of 2016 at paragraph 2.1.16, Audit pointed out non-rectification of the shortcoming/deficiency noticed during UAT conducted in May 2012 of the Network Analysis module.

During the present Audit, it was noticed that despite being commented upon in the Performance Audit Report of 2016 and even after lapse of seven years¹⁴ the Company could not rectify the shortcoming/deficiency noticed during UAT and also failed in utilising the NA module for performing efficient management of the electrical assets, checking network capabilities, preparing network diagrams and estimates while releasing new connections and calculating technical loss of any of R-APDRP area. Reasons analysed during audit were non-maintenance of up-to-date GIS repository of electrical assets and non-indexing of consumers, non-updation of entire electrical assets' database in AM module, non-mapping of rates of Cost Data Book and Rural Electrification & Secondary System Planning Organisation (RESSPO) schedule and non-maintenance of modem for communicating meter data at MDAS of sub-stations, feeders and DTs by the Company.

The Company accepted (July 2020) the fact and stated that the NA module was developed at the stage when State Utilities were starting to adopt online processes for the first time and it is very hard to imagine and expect new users who are experiencing a green field implementation for the first time to be able to adopt all the processes at once over a short period of time.

Ineffective Meter Data Acquisition System (MDAS)

2.6 The White Paper provided that the Company needs to carry out regular maintenance of meter/modem to minimise/avoid failure rates which will increase the life of equipment as well as reduce the chances of failure in severe conditions prevailing in the field and will ultimately reduce the maintenance cost.

In the Performance Audit Report of 2016 at paragraphs 2.1.14 and 2.1.15, Audit pointed out that in 43 test checked towns, the objective of MDAS to acquire meter data automatically without human intervention was defeated as 18 per cent sub-stations were not communicating data automatically and eight per cent feeders and 57 per cent DTs were not updated in MDAS as of March 2016. Further, data of only 16 per cent of DTs were being received on

¹³ Creation and editing of network, load flow and voltage drop analysis, fault analysis and protection coordination, optimisation studies (*like* capacitor placement, network reconfiguration, conductor up-gradation, express feeder, load balancing and load allocation), network design reports, cost estimates, financial analysis, integration with new connection module for checking the network capability, augmentation requirement on upstream side, creating extensive "what-if" studies and calculating technical loss for any section.

¹⁴ From the scheduled date of completion of Part-A of R-APDRP *i.e.* July 2011 upto March 2019.

MDAS. Due to deficient data communication, the DISCOMs were compelled to fill the gaps in energy data through manual entries which defeated the objective of eliminating human intervention in energy accounting/auditing.

During the present audit, it was noticed that the deficiencies pointed out in the Performance Audit Report of 2016 still existed as only 70 per cent meters were available on MDAS and only 19.71 per cent meters were communicating the meter data. On analysis of MDAS report of March 2019, Audit noticed that the availability and readability of meters installed at DTs, Feeders and Ring fencing was still very poor, as a result of which data from these meters could not be acquired through IT system. The summary of system metering and availability at MDAS is mentioned in **Table 2.2**:

Table 2.2: Summary of Status of system metering available at MDAS

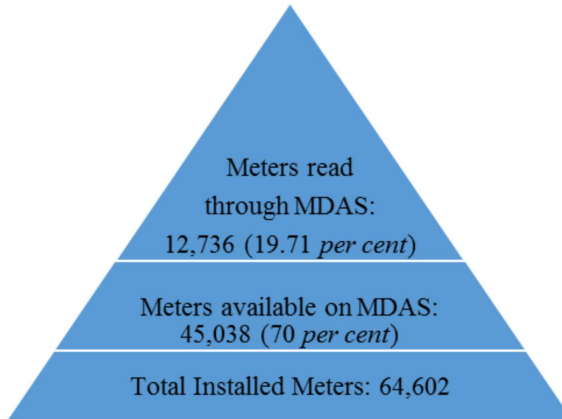
DISCOM	System Meter	Installed under R-APDRP (as per final closure)	Available on MDAS	Ping Status (Blanks): non-Read Meters	Last Read during 2011-2018	Last Read 2019	Last Reading Percentage
DVVNL	DT	10,035	8,626	1,602	4,595	2,429	28.16
	Feeder	1,457	962	139	137	686	71.31
	Ring Fencing	72	21	3	16	2	9.52
	Total	11,564	9,609	1,744	4,748	3,117	32.44
MVVNL	DT	10,586	5,486	1,224	2,804	1,458	26.58
	Feeder	2,701	1,349	616	208	525	38.92
	Ring Fencing	166	0	0	0	0	0.00
	Total	13,453	6,835	1,840	3,012	1,983	29.01
PVVNL	DT	22,984	17,226	5,596	7,667	3,963	23.01
	Feeder	11,939	3,153	675	812	1,666	52.84
	Ring Fencing	0	0	0	0	0	0.00
	Total	34,923	20,379	6,271	8,479	5,629	27.62
PUVNL	DT	4,175	7,263	1,048	4,654	1,561	21.49
	Feeder	237	948	461	41	446	47.05
	Ring Fencing	250	4	2	2	0	0.00
	Total	4,662	8,215	1,511	4,697	2,007	43.05
Grand Total		64,602	45,038	11,366	20,936	12,736	19.71

Source: Based on analysis of data provided by the Company

From the above MDAS report Audit noticed that:

- Out of total 64,602 system meters installed under R-APDRP, only 45,038 meters (70 per cent) were available on MDAS.

Chart 2.3: Meter installed and read through MDAS



Source: Based on analysis of data provided by the Company

- Out of total 64,602 installed meters, only 12,736 meters (19.71 per cent) were readable through MDAS system.

- Out of total 45,038 meters available at MDAS, 11,366 meters (25 per cent) was never read through the system.

- Further, the meter data of only 1,52,561 HT/LT consumers, out of total 66,86,222 consumers were being read remotely.



Meter installed at Distribution Transformer under EDD, Chibramau not connected to modem

Despite incurring expenditure of ₹ 27.80 crore for installation of modems at feeders and DTs, the Company failed to acquire complete meter data automatically and remotely to avoid human intervention in calculating AT&C loss accurately and generating MIS report of exceptions to monitor important distribution parameters¹⁵ for planning, monitoring and taking corrective actions on the business activities.

The Company stated (July 2020) that DT metering is a tough field job and maintaining it remained a huge challenge due to reasons of frequent DT outages, changes and maintenance requirements. It further stated that modem failure was rectified by M/s HCL Technologies Limited whenever required.

The reply is not convincing as the Company failed to synchronise its activities of meter repair/replacement with the reconnection and repair/replacement of modem. Further, the ITIA failed to maintain connections of 11,366 meters, as the reading of these meters were never fetched by MDAS.

¹⁵ MIS report of overload and underload DTs, Sub-station wise DT unbalance report, feeder to DT- Technical & Distribution losses etc.

Loss of grant as reliable Base Line Data system was not established

2.7 The Part-A (IT) of R-APDRP was scheduled to be completed (June 2012) within three years from the sanction (June 2009) of the project but the same was extended upto March 2019. Under Part-A (IT), 100 *per cent* funds for the project were to be provided in the form of interest bearing loan from Ministry of Power (MoP), Government of India (GoI) to be converted into grant once the establishment of reliable and automated sustainable system for collection of baseline data was achieved and verified by an independent agency¹⁶ appointed (March 2013) by MoP through the Nodal Agency¹⁷.

In the Performance Audit Report of 2016 at paragraph 2.1.10, Audit pointed out that ITIA could not establish the IT-enabled system under Part-A within the stipulated period of 18 months from award (January 2010) and only 90 *per cent* work was completed despite completion of five years upto June 2015. Further, in paragraph 2.1.12, Audit also commented on the remote chances of conversion of loan of ₹ 474.50 crore into grant due to non-completion of Part-A of R-APDRP and non-verification of baseline data by TPIEA.

During the present audit, it was noticed that the Company executed Part-A of R-APDRP at a cost of ₹ 662.75 crore out of which ₹ 474.68 crore in the form of loan was provided by MoP upto March 2019 whereas the remaining fund of ₹ 188.07 crore was managed from own source. The Power Finance Corporation (PFC) restricted (June 2019) the conversion of interest accrued on loan into grant upto September 2017 due to non-completion of the project within the stipulated time and verification of the same by the TPIEA. This may result into financial burden on the Company as the chances of release of the remaining amount of ₹ 188.07 crore and conversion of total released fund *i.e.* ₹ 474.68 crore along with interest accrued upto September 2017 into grant remained remote. Further, the DISCOMs had to bear the financial burden of interest after September 2017 to March 2019.

The Company stated (July 2020) that delay in TPIEA audit cannot be attributed to the DISCOMs alone. Final fund requirement and closure report have already been submitted to PFC which is in the process of finalising it.

The reply is not acceptable as due to delay in completion of Part-A (IT) of R-APDRP by the Company, the TPIEA verification was delayed. Also, the audit finding confirmed the lack of progress towards a reliable and automated sustainable system for collection of baseline data without which such TPIEA verification is not feasible.

Incorrect submissions before Power Finance Corporation

2.8 PFC obtained declarations from the DISCOMs in Annexure-C related to 'Completion of Part-A (IT) Project' wherein the following declarations were made by the DISCOMs:

¹⁶ National Thermal Power Corporation Limited was appointed (March 2013) as Third Party Independent Evaluation Agency by Power Finance Corporation (PFC).

¹⁷ PFC was the 'Nodal Agency' for the operationalisation and implementation of the R-APDRP, under the guidance of the MoP.

(i) The installed IT system in the towns is linked with all consumers of the towns and captures revenue and energy data for all of them.

(ii) All the new connections are released and disconnection made through IT system and delta updates in assets and consumers are being done on continuous basis in the IT system.

(iii) GIS survey has been carried out by ITIA by following DGPS methodology.

(iv) The system has the capability to generate Energy Audit Report upto DT level and AT&C loss report of the town from the IT system.

Audit noticed that the DISCOMs have made incorrect certification/declaration of completion of IT project before PFC as discussed below:

(i) LMV-3, 7, 8, 9 & 10 categories of consumers were not linked with the installed IT system and were being billed manually as discussed in paragraph 4.2.11.

(ii) New connections were issued without indexing of consumer against the GIS of electrical assets as discussed in paragraph 2.3 (i).

(iii) Due to non-updation of GIS database and improper communications from meters/modems installed at Sub-stations/Feeders/DTs, the Energy Audit Report and AT&C loss report generated were erratic and meaningless as discussed in paragraph 2.2.

In the Exit Conference (March 2021), the Company accepted the audit observation and stated that unmetered connections of various Government departments or units like street light, State tube wells (STW) etc. were yet to be fully updated in the IT system. The Government stated that the percentage of these consumers vis-a-vis the total consumers is small.

Non R-APDRP billing systems

2.9 Unlike R-APDRP billing system, the modules like Energy Audit, MDAS, GIS based consumer and electrical assets mapping were not provided in the non R-APDRP billing system.

Audit noticed that in absence of these modules the Company could not automate the IT billing system based Energy Audit and calculation of AT&C losses of the areas where Non R-APDRP billing system is implemented. Thus, lack of IT billing system based automated Energy Audit and calculation of AT&C losses also encouraged human intervention.

Conclusion

Despite being commented in CAG's Performance Audit Report No. 06 of 2016 and even after lapse of seven years from the scheduled date of completion of Part-A of R-APDRP, the Company failed to complete/update the baseline data of consumers, electrical assets and automated metering. Hence, the Company could not utilise GIS based Consumer Indexing & Assets Mapping module, Assets Management module, Network Analysis module, Meter Data Acquisition System and Energy Audit module. As a result, the system generated AT&C loss report was highly erratic defeating the primary objective of automated calculation of the AT&C loss without human intervention. Further, in the Non R-APDRP billing system, there is no automated system of energy accounting, auditing and for generating AT&C loss report.

Recommendations		
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Recommendation Number	Recommendation	Response of Government
1	The Company should complete and update the baseline data of consumers and electrical assets on priority basis in a strict time bound manner so that accurate AT&C loss report is generated automatically without human intervention.	Accepted
2	Automated reading through MDAS should be specifically improved from the abysmally low level of 19.71 <i>per cent.</i> Without automated metering the objective of acquiring accurate, reliable data for baselining, measuring and billing electricity consumption and AT&C losses cannot be achieved.	Response awaited

CHAPTER–III

General Controls

Chapter III

General Controls

3. General controls are the foundation of the IT control structure. These are concerned with the general environment in which the IT systems are developed, operated, managed and maintained. General IT controls establish a framework of overall control for the IT activities and provide assurance that the overall control objectives are satisfied.

Non-constitution of Steering Committee

3.1 All IT organisations should have an IT Steering Committee comprising members of top and senior management which has the responsibility for reviewing, endorsing and committing funds for IT investments. The Steering Committee should be instrumental in devising business decisions for which technology should be provided to support business investments as well as approving how to acquire technology.

Audit noticed that the Company, despite deployment of IT billing systems catering to such a huge consumer base, had not constituted an IT Steering Committee. Absence of such a committee having top level representation resulted in improper monitoring of IT activities of the Company.

The Company stated (July 2020) that an empowered committee comprising MD, UPPCL, MD, DISCOMs and relevant Directors was formed to take important policy decisions with respect to the project since the beginning.

The reply is not convincing as the Company does not have any participation of top level management for effectively monitoring the management of IT related issues.

Non-formulation and adoption of IT related Policies

3.2 The policies lay down the framework for daily operations in order to meet the goals set by the governing body. Some of the key policies that guide the IT governance within the organisation include human resource policy, outsourcing policy, documentation and document retention policies and IT security policy.

Audit noticed that the Company developed an IT policy in 2012 but it was neither approved nor adopted by the Board of the Company. In absence of a defined adopted procedure, the Company could not adhere to an IT structure in the organisation to carry out uninterrupted process flow related to IT. The Company also failed to deploy field specific qualified manpower for managing IT operations as the IT cell of the Company and DISCOMs' Headquarters were headed by Superintending Engineers/Executive Engineers. Further, the Company could not manage proper documentation of IT assets created under the Company/DISCOMs and audit trail of the change management executed during the audit period.

The Company stated (July 2020) that an IT Policy has been formulated and implemented but the same has not been adopted by its Board. Further, an Outsourcing Policy is also there in the shape of FMS contract entered with M/s HCL Technologies Limited.

The reply is not convincing as the said policies should be adopted and implemented after the Board's approval and any type of contract entered with

any party cannot be treated as a policy. Further, the Company did not frame the HR Policy and Document Retention Policy.

Non-implementation of Business Continuity and Disaster Recovery Plan

3.3 Business Continuity and Disaster Recovery Plan (BC & DR Plan) should be in place so that the organisation can continue to function in the event of interruption or disaster leading to temporary or permanent loss of computer facilities. Such plans ensure that the organisation does not lose the capability to process, retrieve and protect the data.

Audit noticed that the Company did not have a Business Continuity and Disaster Recovery Plan outlining the actions to be taken immediately after a disaster. Key configuration items *viz.* hardware, software, personnel and other assets required for business continuity had not been identified and documented by the Company.

The Company stated (July 2020) that to take over business continuity, a separate IT unit was created at Noida. Initially, Business Continuity Plan (BCP) was developed in 2014-15 which was very basic and were followed in Data Centre-Disaster Recovery Centre (DC-DRC) drill in 2015 and 2016. Accordingly, a business continuity plan suitable for the current and future requirement was developed.

The reply is not convincing as the unit created at Noida is for monitoring purpose only whereas basic activities were performed by staff of M/s HCL. Further, the Business Continuity Plan submitted by the Company is merely a draft submitted for analysis and evaluation by the Company which could not be completed and approved till date (March 2021).

Management of IT assets of R-APDRP billing system

3.4 Asset management includes maintaining an accurate inventory of IT equipment, knowing what licences are for associated equipment and the maintenance and protection of equipment. IT asset management also includes managing the software and process documentation that are valuable to an entity.

Annual Maintenance Contract of IT assets

3.4.1 General Condition of the Contract 26.3, entered with M/s HCL Technologies Limited, provides that the period of validity of the warranty of IT equipment supplied under R-APDRP shall be 36 months from the date of commissioning and 42 months from the date of delivery, whichever is earlier. Further, the White Paper provides that the Company needs to enter into separate Annual Maintenance Contract (AMC) for all the hardware supplied and Annual Technical Support (ATS) for all the software solutions supplied under R-APDRP for smooth and continuous operations of the R-APDRP billing system.

Audit noticed the following irregularities:

(i) The Company, without following tendering process *i.e.* two bid system (technical and financial), awarded (June 2014) the work of AMC/ATS of IT infrastructure under R-APDRP system to M/s HCL Technologies Limited (AMC/ATS vendor) at ₹ 71.58 crore on request basis. Moreover, it

continuously renewed the work valuing ₹ 203.60 crore in their favour from June 2014 to June 2018.

(ii) Despite awarding the work of the AMC/ATC at the cost charged by Original Equipment Manufacturer (OEM) plus 15 *per cent* of that as facilitation fee of the AMC/ATS vendor, the Company neither checked the reasonability and genuineness of the rates claimed by the AMC/ATS vendor for OEM charges nor checked facilitation charges in practice for such type of work. Even after the suggestion of IT consultant of R-APDRP¹ the Company did not seek any confirmation/clarification in respect of OEM charges directly from the OEMs and failed to verify the OEM rates claimed by the AMC/ATS vendor. Further, it was noticed that during 2018-19, open tender for AMC/ATS work was invited by the Company and the same was awarded at rates below 31.26 *per cent*² of the AMC/ATS rates awarded during previous years (*i.e.* June 2014 to June 2018), which also indicated that the rates awarded to the AMC/ATS vendor were unreasonably high.

In the Exit Conference (March 2021), the Company, stated that after clarification (June 2014) from MoP that the cost of AMC beyond three years was not covered under R-APDRP programme, an immediate decision was taken by Board to continue the AMC by existing system implementing agency (SIA). It further stated that rate reasonability was checked as per standard OEM practices and also ratified by M/s Infosys, the consultant. Moreover, in 2018 several equipment had fallen out of OEM priority support and therefore the same was supported by the OEM partners due to which rates of AMC were reduced. However, the Government took note of the observation of Audit.

The reply is not convincing as the fact which was clarified by MoP was already provided in the contract. Further, the Company also did not consider the suggestion of the IT consultant to ensure genuineness of the AMC charges of OEMs. The equipment falling out of the OEM priority support has already been excluded while calculating the above percentage of 31.26 *per cent*.

(iii) Audit noticed that the AMC contract for end locations/DISCOMs was entered into by January 2015 assuming that IT systems at end locations were delivered by July 2011 and installed and commissioned by January 2012. However, it was noticed from the information furnished by the Company that the IT systems at several end locations were installed after January 2012 leading to delays ranging from 18 to 27 months. Due to delay in installation & commissioning of IT equipment in these end locations, the Company not only failed to utilise the equipment well in time but also the period of warranty for the period during which the IT equipment remained unutilised, elapsed. Out of a total 56 R-APDRP towns in PVVNL, at 40 locations/towns the date of installation of IT systems was beyond January 2012 as a result, the warranty period got elapsed and the Company had to bear AMC charges.

In the Exit Conference (March 2021), the Company stated that period of AMC of equipment at the end location was defined as 42 months of supply or

¹ M/s Infosys Limited was appointed (March 2009) by the Company as Information Technology Consultant (ITC) under R-APDRP.

² AMC awarded cost 2017-18: ₹ 22.78 crore *minus* AMC awarded cost 2018-19: ₹ 15.29 crore = ₹ 7.49 crore *minus* AMC cost of end of life/ support items: ₹ 0.37 crore = ₹ 7.12 crore (*i.e.* 31.26 percent of AMC awarded cost 2017-18).

36 months from commissioning, whichever is earlier. As all the deliveries had been completed by July 2011, AMC start date was considered as January 2015. However, the Government took note of the observation of Audit.

The reply is not acceptable as the Company failed to furnish reasons for delay in installation and consequently failed to utilise the warranty period and had to bear the AMC charges.

Establishment of Disaster Recovery Centre

3.4.2 In the Performance Audit Report of 2016 at paragraph 2.1.18, Audit pointed out that the functioning of Disaster Recovery Centre (DRC) in correlation with Data Centre (DC) was not tested. As a result, the billing data of consumers faced the high risk of loss in case of any contingency/disaster.



Disaster Recovery Centre, Noida

The Disaster Recovery Centre (DRC) was installed & commissioned on June 2011 and as per the provision, DRC should have been successfully available within 90 days *i.e.* by September 2011, whereas Audit noticed that the DRC was successfully available after completion of User Acceptance Test (UAT) in September 2016 *i.e.* after lapse of more than five years from the date of installation. As the DRC was considered to be

installed in June 2011, the warranty period of three years commenced from June 2011 and ended in June 2014, after that the AMC of the DRC was commenced.

The Company had incurred an expenditure amounting to ₹ 22.21 crore towards AMC charges of the DRC for the period from June 2014 to September 2016. Frontloading of hardware delivery and delayed rollout by the Company resulted in the entire warranty period (June 2011 to June 2014) becoming unproductive without any fruitful utilisation of DRC.

In the Exit Conference (March 2021), the Government noted the audit observation and assured to examine the terms of the contract.

Deployment of manpower under R-APDRP

3.5 The White Paper provided that the Facility Management Services (FMS) for a period of five years was under the scope of ITIA for the purpose of managing IT system created under R-APDRP and handholding the Company. The operation of IT system was beyond the scope of FMS and was to be done by the Company staff itself. The ITIA was required to train the staff as per the provisions of the contract. Geographic Information System (GIS) updation, Meter Data Acquisition System (MDAS) monitoring for initiating timely action for replacement of faulty meters and modems, network bandwidth service monitoring and provisioning database retention and ownership, Data

Centre/Disaster Recovery (DC/DR) operation management etc. is to be done by the Company for stable upkeep and operation of the system. Audit noticed the following:

(i) The Company had the responsibility to manage the system and undertake database administration owing to data ownership and security issues. For the purpose of day-to-day operations of Data Centre, to be performed by the Company, posts like Data Centre Manager, Database Administrator, System Administrator, Administration/HR, with respective pre-defined duties in the White Paper, were required to be created by the Company.

But even after lapse of more than five years since June 2015 (last Go-live date of the town), no such arrangement has been made by the Company and the work of Data Centre management, database administration and system administration was done by the ITIA. Further, due to lack of required manpower, the process documentation, database & application change management with proper documentation and mapping of business rules/provisions could not be done by the Company. Despite several reminders, it failed in providing the documents related to changes made in view of revision of Rate Schedule/Cost Data Book, amendments in the Code and on request of HQ/DISCOMs/Field Offices.

The Company accepted (July 2020) the fact and stated that as far as database administration is concerned the Company engineers do not undertake direct Database Administration (DBA) since the systems was in production and the necessary specialised DBA skills for complex system was not available with them. However, separate database servers (test and report instances) were built and available to the IT officers of the Company on which all releases were demonstrated and tested prior to production release by ITIA.

(ii) The Company had to designate at least one officer in each sub-division/town (as per requirement of the Company), who would be responsible for monitoring GIS/MDAS/SDO equipment operation on regular basis and carry out operation management service in the field.

Audit noticed that the Company did not assess the requirement of IT staff at the field offices, *i.e.* Zone, Circle, Divisions and Sub-divisions, and could deploy one IT personnel at each zone and Circle only. Thus, although having an enormous consumer base and deploying a huge IT infrastructure under the R-APDRP, the Company ignored the directions of deployment of IT personnel upto root level *i.e.* sub-division.

The Company stated (July 2020) that considering the requirement at field level posting of IT officers was done at circle level, who handhold with the field officers of Division and Sub-division and train them to manage the operation. Failure of the systems in capturing DT/Feeder energy cannot be attributed to non-availability of monitoring personnel, it is failure caused by non-maintenance of DT modems.

The reply is not convincing as the assessment of requirement of IT personnel in the field offices was never done and the Company also did not submit any document supporting the reply.

Non-conduct of Security Audit

3.6 The White Paper at Point C11 'Information Security Policy and Audit' provided that the Company should get the information security audited by third party expert periodically, once in six months and as and when there is a significant up-gradation of systems.

Audit noticed that the Third Party Audit by M/s AKS was conducted only once (December 2016 of DC and April 2017 of DR) since Go-live date of DC and DRC in contravention of the provisions contained in the White Paper. Such security audit of Customer Care Centre and other end locations were never got conducted by the Company.

The Company stated (July 2020) that further security testing was not initiated till essential upgrades could be finalised. It further stated that in 2019-20, several security equipment had been replaced with latest and secured equipment and once execution is completed, the Company will be able to cater to all latest security monitoring standards.

The reply confirms that the Company could not conduct security audit at regular intervals.

Deployment of additional Information Technology billing system

3.7 Clause Sf 15 of SRS of R-APDRP billing system provided that the application portfolio and the IT infrastructure should be vertically and horizontally scalable in size, on demand with virtualisation capacity and functionality to meet changing business and technical requirements, thereby enabling the Company to be adaptable to change. Further, Para 7 of the RFP provided that the respective DISCOM would be at liberty to deploy the IT solution anywhere within the state of Uttar Pradesh. In future, if any entity emerges in the state of Uttar Pradesh, such solution would also be deployed there at no additional cost to the DISCOM.

The Company had been using (since February 2013) R-APDRP billing system, developed under R-APDRP, for revenue billing in 168 selected towns. Despite the fact that the Company becoming well-versed with operation and management of such an enterprise wide comprehensive solution suite for revenue billing, the Company further deployed (February/July 2016) a new cloud computing web-based online billing system (Non R-APDRP) for areas other than those covered by R-APDRP.

Audit noticed that the Company did not explore any possibility of revenue billing of the consumers of Non R-APDRP area through the existing R-APDRP billing system or carry out any cost benefit analysis before deploying the additional billing system *i.e.* mPower and it committed to incur an expenditure of ₹ 2.89 *plus* applicable taxes per consumer per bill. Due to deployment of this additional billing system, the Company not only failed in utilising the exposure of the existing system but also forced the field staff of 141 hybrid divisions (divisions having consumers of both the IT billing systems) to handle two different IT billing systems simultaneously. Further, the Company also did not schedule training for its staff to deal with both the IT billing systems as evidenced by the fact that no training schedules were provided to Audit and the issue was also confirmed during field visit at sampled divisions.

The Company stated (July 2020) that R-APDRP billing system had been scaled vertically in R-APDRP area by adding consumers since its rollout and horizontally also by adding up and integrating with the huge number of functionalities and other systems. When in 2015, the requirement arose to develop same or similar system for Non R-APDRP area also, it was understood that the conditions of billing, collection and consumer data are very different for the Non R-APDRP areas and it was felt that several components of the R-APDRP were not viable to be repeated for Non R-APDRP area, at least for the first phase. It further added that a heavy capex cost covering software license, hardware, infrastructure implementation and end location readiness expenditure would have been required to be borne by the DISCOMs from their internal funds. Moreover, until that time Third Party Independent Evaluation Agency-Information Technology (TPIEA-IT) verification had not been initiated by MoP and therefore, it was too complex to consider all-out expansion of the current R-APDRP billing system till the TPIEA-IT process was completed. It finally stated that although detailed analysis was done by the Management to form the above comprehensive view, the cost comparison as mentioned by Audit could not be done because there were very few common parameters to compare the two models as the technology as well as requirements were different.

The reply is not convincing in view of the fact that the business requirement of IT billing was same for both urban and rural consumers. The Company had been effectively using similar modules³ of the R-APDRP billing system under the later deployed Non R-APDRP billing system. Additionally, having enterprise wide software licenses, the Company was to assess only augmentation cost of DC and DRC as an additional cost in comparison to the new IT billing system. Further, there was no complexity in expansion as there was provision of proper ring fencing of the selected towns under the R-APDRP. So, expansion of R-APDRP billing system in Non R-APDRP area would have not been affected by TPIEA-IT verification. Thus, the view formed by the Company to opt for an additional IT billing system without doing cost comparison with the existing R-APDRP billing system was not justified as detailed above which the Company itself accepted in the reply.

Undue favour in award of IT billing system of Non R-APDRP area

3.8 A Request for Proposal (RFP) for Implementation of Cloud based online Billing System in Non R-APDRP areas was circulated (March 2015) by the Company. Only one bid by a consortium of M/s Infinite Computer Solutions (India) Limited and M/s Phoenix IT Solutions Limited and M/s Sify Technologies Limited as Network Bandwidth Service Provider (the bidder) was submitted and the contract was awarded to the consortium at ₹ 4.15 per consumer billed on per month basis and ₹ 7,583/- per month per location for providing network bandwidth to end locations.

Audit noticed that:

(i) despite clear directions (January 2002) of the Central Vigilance Commission (CVC) to avoid single bid tender in absence of detailed justification, the lone bidder was extended undue favour by award of work of deployment of online billing system in Non R-APDRP area.

³ New connection, Metering, Billing, Collection, Customer Service and Disconnection.

(ii) three leading IT parties showed their interest and requested the Company for extending last date of submission of bid (*i.e.* M/s Tech Mahindra: upto 27 June 2015, M/s Accenture: upto 20 June 2015 and M/s SAP India Pvt. Ltd.: upto 10 June 2015). But the Company quoting urgency of work allowed extension of last date from 20 May 2015 to 2 June 2015 only and the lone bidder M/s Infinite Computer Solutions (India) Ltd submitted its bid on 2 June 2015. However, the Company could award the work only after 248 days from the date of bid opening (as detailed below) which itself contradicts the ground of urgency of work. Thus, the Company deprived itself of getting the best competitive rates. The statement showing date-wise activity performed by the Company during 248 days is depicted in **Table 3.1**:

Table 3.1: Statement showing delay in award of contract

Date	Chronology of event
02.06.15	Last date of bid submission.
	Date of Opening of submitted bid.
	Only one bid was submitted by the consortium of M/s Phoenix and M/s Infinite. Bid Evaluation Committee decided to put up the matter to BoD for decision of opening of the bid submitted.
03.06.15	BoD directed for opening and evaluation of the single bid received.
20.06.15	Tender was opened by Bid Opening Committee.
22.06.15	Bid Opening Committee handed over Technical part of the bid to consultant (M/s Infosys).
26.06.15	Bid evaluation committee was formed.
04.08.15	The Consultant forwarded Technical Evaluation Report awarding score of 61.39/100.
07.08.15	Director (Commercial) returned the evaluation report to the consultant for considering the point wise clarification submitted by the bidder.
26.08.15	The Consultant responded on the clarification submitted and revised the score to 62.54/100.
18.09.15	Bid Evaluation Committee increased the score from 62.54/100 to 70.19/100 without proper point-wise justification and decided to open the financial bid.
23.09.15	Financial Bid was opened by Bid Evaluation Committee.
09.12.15	Corporate Purchase Store Committee (CSPC) gave final approval on the rates approved by Bid Evaluation Committee.
18.01.16	BoD approved selection of Bidder on the recommendation of CSPC.
05.02.16	UPPCL issued Letter of Intent (LoI) for appointment of implementing agency for online billing system in Non R-APDRP area (for MVVNL and PuVVNL).
14.07.16	UPPCL issued LoI for appointment of implementing agency for online billing system in Non R-APDRP area (for PVVNL and DVVNL).

In the Exit Conference (March 2021), the Company stated that detailed justification and importance of work was elaborated in the proposal to the BoD. The purchase on single tender basis was approved by BoD.

The reply is not acceptable because the Company, instead of elaborating justification of rate, reasonability or industry practice in such type of contract to the BoD, only apprised the receipt of single bid and urgency of award of tender.

(iii) Clause 3.6.3 related to eligibility criteria of RFP document provides that the bidder or any consortium/OEM partner should not have been blacklisted by any of the Government Departments or publicly listed agencies in the past. Audit noticed that the consortium partner of the sole bidder, M/s Sify Technologies Limited was blacklisted (September 2013) by the Government of Maharashtra but the same was not disclosed by the bidder while placing its bid.

In the Exit Conference (March 2021), the Company stated that the blacklisting of M/s Sify was revoked by Government of Maharashtra in January 2014 before the bid submission.

The reply of the Company is not acceptable as RFP document clearly stipulated that the bidder or any consortium/ OEM partner should not have been blacklisted by any of the Government Departments or publicly listed agencies in the past. Further, the Company could not provide documentary support related to revoking of blacklisting of the partner.

(iv) Clause 3.7.1 of the RFP provides that the minimum qualifying marks for a bidder shall be more than 70 *per cent* of maximum technical score. Initially, M/s Infosys, the IT consultant of the project, awarded score of 61.39 *per cent* to the bidder and after getting clarification on some issues, increased it to 62.52 *per cent*. Finally, the Bid Evaluation Committee⁴ increased the marks of the sole bidder to 70.19 *per cent* without detailed justification on record. It appears that marks were increased to make the sole bidder eligible who otherwise could not have technically qualified.

The Company stated (July 2020) that the high-level evaluation committee formed for the purpose noticed that the consultant did not consider the documents, clarifications submitted by the bidder in response to their queries and requirements and awarded less marks. The Committee took cognisance of the same and reviewed the consultant's marking in the light of available additional facts and gave their final assessed marks.

The reply is not convincing as the consultant awarded less marks for reasons indicated/enumerated by them point-wise whereas the Committee arbitrarily awarded qualifying marks to the bidder without any detailed justification on record. Further, the bidder also failed to provide complete clarification to the Company.

The Company must ensure strict compliance of the directions of CVC, exercise necessary checks to ensure the credentials of the bidders and ensure robust time management in award of contracts.

Undue favour to Non R-APDRP billing system implementation agency

3.9 The consortium of M/s Infinite Computer Solution (India) Limited and M/s Phoenix IT Solutions Limited was Issued Letter of Intent⁵ (LoI) for the implementation of online billing system in Non R-APDRP and rural areas of DISCOMs. The work entailed providing Oracle CC&B solution hosted on cloud by the Company at ₹ 4.15 per consumer billed on per month basis.

⁴ Bid Evaluation Committee was formed (26 June 2015) consisting of Managing Director, UPPCL, Director (Finance), UPPCL, Director (Commercial), UPPCL and Staff Officer to Chairman, UPPCL.

⁵ For MVVNL and PuVVNL in February 2016 and for DVVNL and PVVNL in July 2016.

Later, vide 142 BoD decision of the Company, the above rates were revised to ₹ 2.89 per consumer on per month basis on the same terms and conditions of original agreement and LoI.

Audit noticed that the Company while issuing the revised LoI to M/s Infinite Computer Solution (India) Limited changed the payment clause from per billed consumer per month to per billable consumer per month contrary to the Board's approval. As a result, the Company made irregular payment of ₹ 2.16 crore to M/s Infinite Computer Solution (India) Limited during 2018-19 (*Appendix-3.1*).

In the Exit Conference (March 2021), the Company stated that earlier the rate accepted through bid was factored on bi-monthly billing basis of billed consumers by the vendor. Subsequently, on change from bi-monthly to monthly billing basis it was factored to downward revision. The rates as well as the conditions proposed by the vendor were accepted and approved by the BoD after assessing reasonability of proposed rates and terms. The Government took note of the audit observation.

The reply is not acceptable as the change in payment terms was not approved by the BoD and was inserted without authorisation while issuing the revised LoI.

Login to multiple system simultaneously using same ID

3.10 The model document⁶ of both the IT billing systems provide that the system default shall limit each user ID to one simultaneous logon session. The system shall provide a mechanism to administratively disable user IDs and a mechanism for re-enabling or deleting a disabled user ID after a specified period of time. Audit noticed that:

- both the IT billing systems were allowing multiple logon sessions using same user ID, simultaneously at the same time on different systems.
- total 450 IDs (R-APDRP: 122 and Non R-APDRP: 328) out of 5,383 IDs (R-APDRP: 1,131 and Non R-APDRP: 4,252) under both the IT billing systems, belonging to retired/transferred/deceased employees of the division, remained active even after being discharged from duties of the concerned divisions. The IT system does not have any mechanism to identify such user IDs and disable them after a specified period. As such, the misuse of these IDs by unauthorised persons could not be ruled out.

The above indicate that the systems are not secured from external threats and lacked confidentiality and security.

The Company stated (July 2020) that restrictions have been re-designed to permit multiple sessions to a single user, but essentially at a single location/machine only at time. In absence of request from users/controlling divisions the ID continues to be in use. It further stated that the requirement is now in the process of being fulfilled through ERP in which the above shortcomings of Identity and Access Management (IDAM) system is planned to be addressed within the year.

The reply is inaccurate as the system allows multiple logon sessions into different systems at the same time. Further, the fact remains that the user ID

⁶ R-APDRP: IDM3.8 & IDM3.12 of SRS and Non R-APDRP: IAM.43 & IAM47 of RFP.

belonging to the retired/transferred/deceased employees could not be de-activated by the Company.

Conclusion

- The Company did not formulate and adopt essential IT policies with respect to Human Resource responsible for managing IT activities, Document Retention, IT Security, Business Continuity and Disaster Recovery Plan.
- The Company failed to ensure genuineness/ reasonableness of the rates of Original Equipment Manufacturers charged by AMC/ATS vendor and the Company also did not carry out annual maintenance of IT assets in a prudent manner.

Further, the Company neither analysed the possibility of extending the existing R-APDRP system in non R-APDRP areas nor undertook cost benefit analysis while awarding the contract of additional IT billing system.

- The Company did not undertake the responsibility to manage the system as well as the work of database administration of R-APDRP billing system even after lapse of five years from the Go-live date. Confidentiality in the IT system was compromised as the Company failed to restrict the logon sessions and also to disable login IDs of deceased/transferred/retired employees on time.

Recommendations

Recommendation Number	Recommendation	Response of Government
3	The Company should consider participation of top level management for effectively monitoring the management of IT related issues. Further, the Company should formulate and implement clear and comprehensive IT policies related to various aspects and periodically review them according to the changing business environment.	Accepted
4	Necessary due diligence in maintenance of IT assets and undertaking cost benefit analysis before procurement of new system through a transparent process of tendering should be scrupulously followed.	Accepted
5	The Company should monitor the user IDs of the employees and undertake the work of system management and database administration for maintaining data confidentiality and security.	Accepted

CHAPTER–IV

Application Controls

Chapter IV

Application Controls

4. Application Controls are specific controls unique to each computerised application. When business processes are automated into an IT application, the business rules are also built into the application in the form of application controls. These controls ensure that the input and output data are complete, accurate and authorised so that data is processed, as envisaged, in a time-bound manner by the IT system and there also exists a correct and comprehensive record of the entire process *i.e.* from input to storage and to external output.

Incorrect mapping of Business Rules

4.1 The discrepancies noticed due to incorrect mapping of business rules in both the IT billing systems are discussed in succeeding paragraphs:

Due date for payment of bills by the consumers

4.1.1 Clause 6.1 (g) of Chapter 6 of the Code provides that the Licensee¹ shall dispatch the bills giving at least 15 days' time to the consumer for making payment prior to the due date of payment. In cases, where the bills are served to the consumer through hand held system, the consumer shall deposit the same within seven days.

Audit noticed (on analysis of data of March 2019) that:

(i) In R-APDRP system, out of 51,84,106 consumers (read through SBM), 1,36,575 consumers were allowed due dates which were less than seven days from the billing date in cases where the bills were served through hand-held systems; and

(ii) In non R-APDRP system, out of 1,50,83,088 consumers (read through SBM), 6,38,573 consumers were allowed due dates which were more than seven days from the billing date in cases where the bills were served through hand-held systems.

Thus, due to improper mapping of due date margin in both the IT billing systems:

(i) the consumers of R-APDRP billing system were deprived of due time for making payment of their monthly bills and rebate in case of bill paid within the due time provided by the Code.

(ii) the consumers of non R-APDRP system were unduly benefited by extended due time for making payment of their monthly bill and rebate in case of bill paid beyond the due time provided by the Code.

The Company stated (July 2020) that in a few cases the due date may be less than seven days as the due date is upper ceiled to month end. It further stated that due date is accordingly changed in the cases of bill revision, generation from counter and various other reasons (*e.g.* extreme weather).

The reply is not convincing as the fact remains that the IT systems failed to

¹ 'Licensee' means a distribution licensee who holds a licence to distribute electricity *i.e.* DISCOMs'

allow the prescribed span of due date to the consumers. Further, audit analysis was done excluding the cases of bill revision and bill generated from counter.

Non-recording of Maximum Demand by spot billing machine

4.1.2 Clause 6 of the Rate Schedule provides that the billable demand during a month shall be the actual maximum demand as recorded by the meter or 75 per cent of the contracted load/demand, whichever is higher. In case the Licensee's meter reader does not note the actual maximum demand, the Licensee will raise the bill at 75 per cent of the contracted load.

Audit noticed that due to absence of input control in both the IT billing systems to ensure the entry of Maximum Demand (MD) data in each monthly bill and lack of monitoring of the same at division level, the actual MD was recorded either null or zero by the SBM vendor in 3,07,28,342 instances of monthly billing (R-APDRP: 25,32,558 and non R-APDRP: 2,81,95,784) during April 2018 to March 2019.

(i) In Non R-APDRP billing system due to non-recording of MD by the SBM vendor, the divisions failed to identify the consumers who exceeded their demand from their contracted load and levy the charges accordingly. During 2018-19, in 2,69,386 cases the possibility of exceeding the demand² from the respective contracted load cannot be ruled out. This includes ₹ 5.55 crore towards charges for exceeded demand by these consumers.

(ii) Further, in the absence of MD data in both the IT billing systems, the consumers were billed at 100 per cent of their contracted load instead of 75 per cent in contravention to the provisions of the Code. This resulted in excess charge of fixed charges of ₹ 44.42 crore (R-APDRP: ₹ 16.91 crore and non R-APDRP: ₹ 27.51 crore) from the consumers during 2018-19.

The Company stated (July 2020) that meters of multiple makes have been installed and each meter has multiple MDI reading like instantaneous MD/current MD/previous MD, cumulative MD and due to non-standardisation of MDI reading sequence, the meter readers quite often are not able to identify the correct MD.

The reply confirms the non-recording of MD by the meter readers but the reply is silent on excess charging of fixed charges from consumers. The Company must standardise the meters of multiple makes before installing them.

Non-charging of Electricity Duty

4.1.3 The notification number 276/24-P-32018 dated 05 February 2018 of GoUP provides that industrial units and pioneer units, established before issuance of notification dated 21.01.2010 and after enforcement (February 2004) of Industrial and Service Sectors Policy, 2004, will be allowed benefits of exemption from Electricity Duty (ED) of 10 years and 15 years, respectively, from the date of notification.

Audit noticed on analysis of the billing data of both the IT billing systems that:

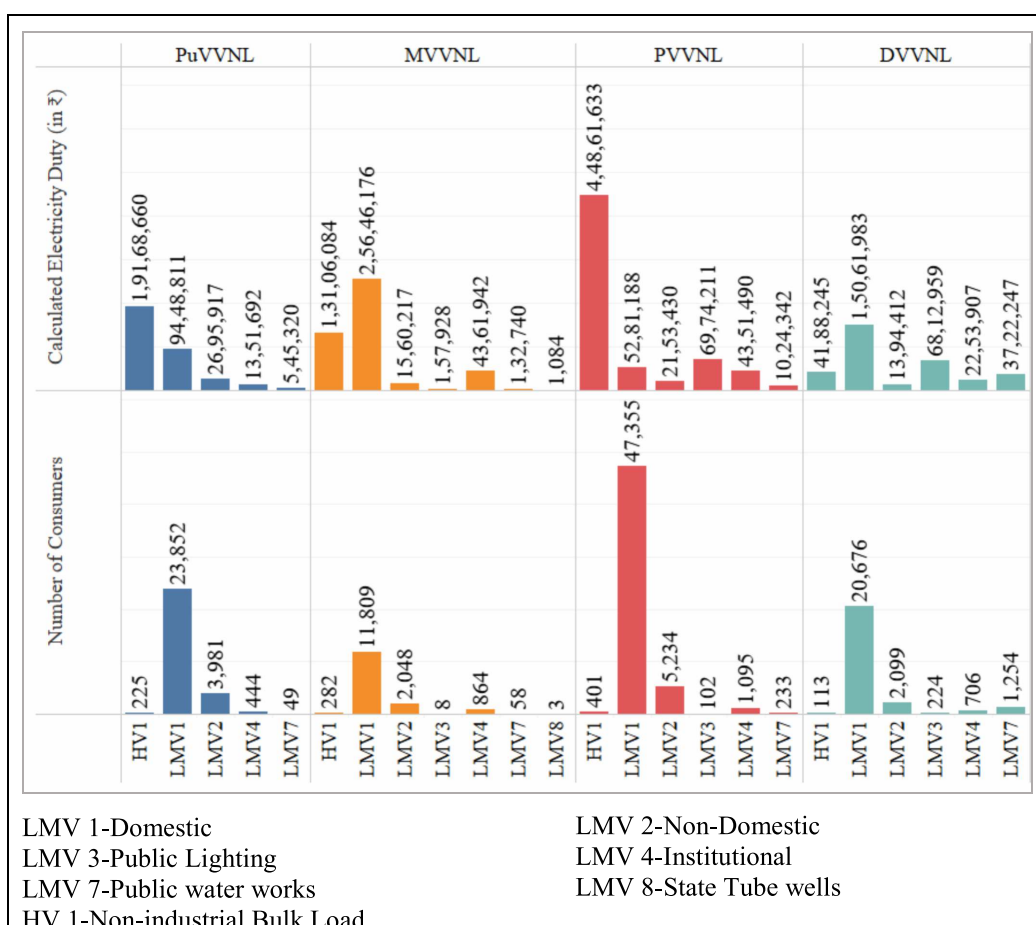
(i) the exemption of ED valuing ₹ 26.21 crore to 255 consumers (R-PAPDRP: ₹ 8.43 crore to 153 consumers and non R-APDRP: ₹ 17.78 crore to

² Considering that 720 units can be consumed by a consumer having contracted load of 1 kW and using electricity during all 30 days of the month and 24 hours in a day.

102 consumers) of industrial category was allowed during the period 2018-19 whose date of connection mentioned in the data was prior to the specified period *i.e.* prior to 2004.

(ii) ED was required to be levied on every consumer except industrial consumers to whom the exemption of ED was allowed as per the applicable Industrial Policy. Audit noticed that the ED of ₹ 17.62 crore was not levied on 1,23,114 billing instances from 22,198 consumers (R-APDRP: ₹ 15.41 crore from 20,519 consumers and non R-APDRP: ₹ 2.21 crore from 1,579 consumers) during the period 2018-19. The category-wise ineligible consumer to whom ED exemption was allowed is depicted in **Chart 4.1**:

Chart 4.1: Electricity Duty exemption to ineligible category of consumers



Source: Based on analysis of data provided by the Company

Further, the IT systems do not have the mandatory field to capture the date of allowance of ED exemption and time period to be allowed (10/15 years) for such exemption. Due to not specifying the date of allowance of exemption and in absence of validation check of the period up to which the exemption was to be allowed resulted in improper control in allowing ED exemption to eligible consumers for the defined period.

In the Exit Conference (March 2021), the Government directed the Company to look into the matter of cases related to irregular exemption of ED to ineligible consumers.

Security deposit

4.1.4 The model documents³ of IT billing systems provide that the system should have provision of managing Security Deposit (SD) like auto-debit of incremental SD in bill(s), *i.e.* in case of load enhancement, refund of SD by adjustment in final bill, interest pay out on SD through auto-debit in bills or lump sum pay out separately and adjustment of SD in prepaid charges for any consumer shifting from post-paid to prepaid regime. Further, Cost Data Book provides the rates of security to be deposited by the consumers getting new electricity connection. Thereafter, Clause 4.20 (e) of the Code provides that the licensee may issue notice to a consumer for deposit of additional security, if the security deposited falls short of covering the estimated power consumption bill equal to two months based on consumer's average monthly consumption in the preceding financial year.

Audit noticed that the rules related to security deposit and requirement of additional security deposit were not mapped in both the IT billing systems. Further, the IT systems were also deficient to check or restrict deposit of inappropriate security amount from the respective consumers. On analysis of consumers billing data as on March 2019 of both the IT billing systems, Audit noticed that:

(i) during 2014-15 to 2018-19, under both the IT billing systems 1,31,97,068 new connections (R-APDRP: 21,09,486 and non R-APDRP: 1,10,87,582) were released. In 7,12,909 cases (R-APDRP: 2,32,965 and non R-APDRP: 4,79,944), the initial security deposit reflected in the IT system was not as per the prevailing rates and thus security was short deposited by ₹ 308.53 crore (R-APDRP: ₹ 210.10 crore and Non R-APDRP: ₹ 98.43 crore). During the field visit of the sampled divisions by audit, cases related to short deposit of security were also noticed.

(ii) in absence of in-built mechanism of inclusion of amount of additional security required, in the energy bills of the consumers after completion of each financial year in both the IT billing systems, additional security required or any excess thereof could not be calculated and included in the energy bills of the consumers, regularly. An analysis of billing data for the year 2018-19 of R-APDRP billing system revealed that additional security deposit from 7,329 large & heavy consumers⁴ (R-APDRP: 5,365 and non R-APDRP: 1,964) valuing ₹ 2,315.03 crore (R-APDRP: ₹ 1,742.12 crore and non R-APDRP: ₹ 572.91 crore) could not be raised.

Thus, due to non-mapping of provisions related to deposit of security and requirement of additional security deposit from the consumers the DISCOMs were deprived of ensuring security of ₹ 2,623.56 crore (₹ 308.53 crore as security deposit from new consumers and ₹ 2,315.03 crore against additional security deposit).

The Company stated (July 2020) that the system has explicit provisions to capture correct security and additional security amount. It further stated that inadequate security in the system cannot be construed as short security and

³ R-APDRP: Clause B21 of Billing Module of SRS and Non R-APDRP Sub-clause B17 under Clause 7.10.3 Billing logic as per the Company's Supply Code and Supply Tariff, Bill Correction of RFP.

⁴ The query was raised only for large and heavy consumers.

additional security notices have been issued automatically by both the IT billing systems.

The reply is not convincing as results extracted from data analysis are based on defined criteria. Further, passing of interest on security deposit to consumers (every year in the month of April/May/June) and raising of additional security (raised in August 2019 for the first time since implementation of IT system) was done on the basis of security deposit reflected in the database. Further, due to inadequate or short security deposit in the database, the amount of interest and requirement of additional security deposit cannot be ascertained correctly.

Additional charges to consumers having HT loads but metering at LT

4.1.5 Clause 5.3 (d) of the Code provides that in case of existing consumers having HT loads upto 250 kW and metering at LT, the HT reading for billing purposes shall be computed by adding two *per cent* to the maximum demand reading and three *per cent* to the kVAh reading recorded on the LT meters, if not given in the Rate Schedule.

Audit noticed that both the IT systems lacked specific controls as they should not allow cases until they qualify all the prescribed provisions of the Code. During 2018-19, 2,003 consumers having load between 50 kW and 250 kW metered at LT, were not charged such additional charges under R-APDRP billing system, which was also verified during visit by audit of sampled divisions. Thus, in absence of such specific controls and setting up flags against these consumers at division level, the applicable additional charges of ₹ 4.72 crore could not be levied. In Non R-APDRP billing system, such consumers could not be identified due to absence of related field in the database.

The Company stated (July 2020) that the functionality is available in the system and LT metering surcharge is levied by adding three *per cent* to billed units and extra two *per cent* to demand charges. The fact remains that due to absence of any specific control and setting such flags at divisional level respective charges could not be levied from the consumer.

Non-processing of request of Web Self-Service

4.1.6 The model document⁵ of Non R-APDRP billing system provides that a user friendly portal was to be developed to make it easy to consumers to communicate with the Company through the web instead of direct phone calls or visits. This in turn was to improve customer satisfaction and reduce work load on the employees.

Audit noticed that during the period 2017-18 to 2018-19, a total of 13,984 service requests were lodged using WSS portal by the consumers for various services like new connection, disconnection, load change, name change, category change, meter shifting and any other complaints under the different divisions. But it was noticed in the field divisions that no request reached the concerned division and these remained unprocessed. Thus, non-disposal of request raised through WSS resulted in defeating the basic objective of providing high quality experience, user friendly portal to communicate with the Company and consumer satisfaction.

⁵ Clause 4.5, integration requirement of RFP of Non R-APDRP billing system.

The Company accepted (July 2020) the fact and stated that due to operational and practical issues this module could not meet the expected objectives.

Non-mapping of Business Rules

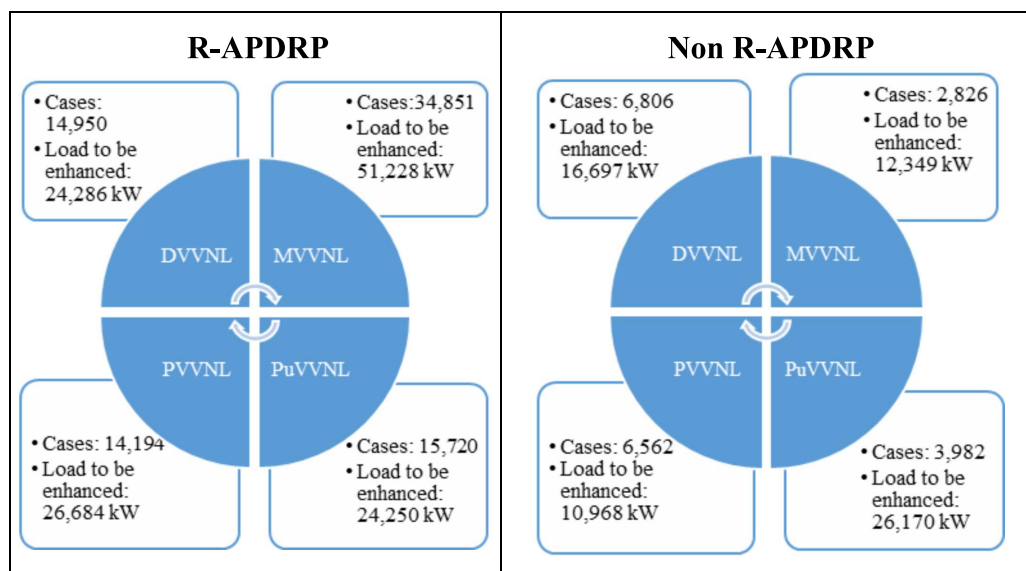
4.2 The discrepancies noticed due to non-mapping of business rules in both the IT billing systems are discussed in succeeding paragraphs:

Non-enhancement of contracted load

4.2.1 Clause 7 (ii) of General provisions of Rate Schedule provides that if the consumer is found to have exceeded his load from contracted load/demand for continuous previous three months, the consumer shall be served a notice of one month advising him to get the contracted load enhanced. The licensee shall merge the excess load with previously sanctioned load, and levy additional charges calculated as per the provisions of the Code along with additional security.

Audit noticed that in 99,891 cases (R-APDRP: 79,715 and non R-APDRP: 20,176) despite exceeding maximum demand against the respective contracted load continuously during the four preceding months from March 2019, the Company failed to enhance the contracted load/demand by 1,92,632 kW (R-APDRP: 1,26,448 kW and non R-APDRP: 66,184 kW), which led to non-recovery of the amount of additional security of ₹ 1.92 crore (R-APDRP: ₹ 1.26 crore and non R-APDRP: ₹ 0.66 crore) and system loading charges of ₹ 0.96 crore (R-APDRP: ₹ 0.63 crore and non R-APDRP: ₹ 0.33 crore) from the consumers. The DISCOM-wise consumers (who consumed excess maximum demand more than their contracted load) along with the load required to be enhanced is depicted in **Chart 4.2:**

Chart 4.2: DISCOM-wise consumers vis-à-vis contracted load required to be enhanced



Source: Based on analysis of data provided by the Company

The Company stated (July 2020) that the load enhancement of consumers depends on site feasibility. Due to this, functionality of auto load enhancement cannot be implemented in the IT billing systems. Further, it also stated that in case of increased load, the system automatically levies demand penalty.

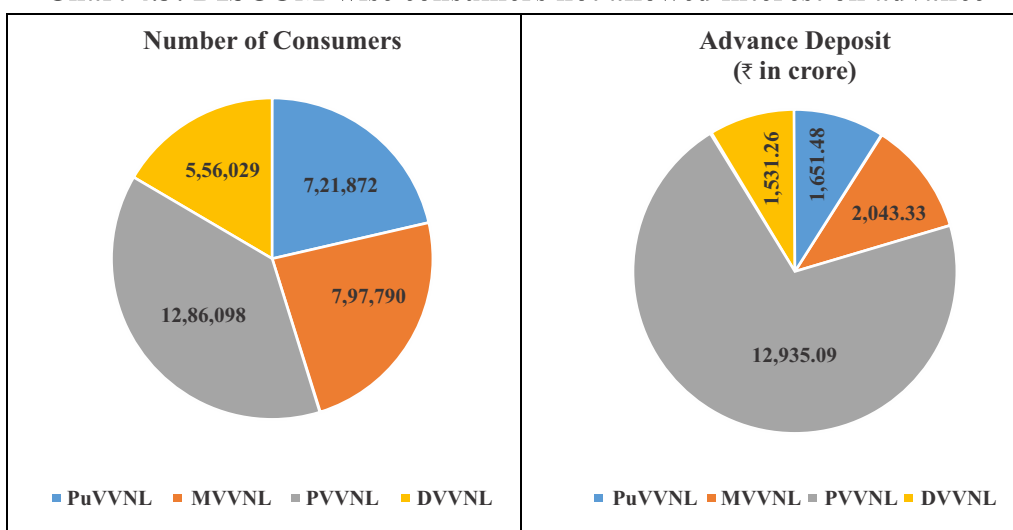
The reply is not convincing as levying mere penalty for increased load is not sufficient and the Company needs to take corrective action as per the provisions of Rate Schedule.

Credit of interest on advance deposit of consumers

4.2.2 Clause 18 of General Provisions of Rate Schedule provides that in case of advance deposit against future monthly energy bills, interest shall be paid by the Licensee for the period during which such advance exists for each month and interest amount so accrued shall be adjusted in the electricity bill. Further, Clause 22 provides that dues arising out of rectification/adjustment/settlement of bill(s), payable by the licensee to the consumer, will also be entitled to get interest for the period during which such pending amounts exist and such interest will be adjusted towards the future monthly bills of consumers. The details of such interest amount and adjustment made during the month was also to be shown separately in the bill.

Audit noticed that in both the IT billing systems, neither the rules regarding allowance of such interest to entitled consumers were mapped nor was any flag marked to identify such consumers for separate reporting to be done as provided. On analysis of consumers billing data of 2018-19, it was noticed that there were 33,61,789 cases (R-APDRP: 4,34,589 and non R-APDRP: 29,27,200) having negative arrear balance of ₹ 18,161.16 crore (R-APDRP: ₹ 16,919.06 crore and non R-APDRP: ₹ 1,242.10 crore) on which applicable interest was not credited. Thus, due to non-mapping of rules regarding credit of interest against advance deposit and unadjusted balances, the consumers were deprived of interest of ₹ 94.59 crore (R-APDRP: ₹ 88.12 crore and non R-APDRP: ₹ 6.47 crore) on advance/unadjusted balance during 2018-19 and this adversely affected consumer satisfaction. The DISCOM-wise consumers to whom interest was not allowed is depicted in **Chart 4.3**:

Chart 4.3: DISCOM-wise consumers not allowed interest on advance



Source: Based on analysis of data provided by the Company

The Company stated (July 2020) that this provision does not exist in the system as on date but it is also a fact that no request of consumers to deposit the advance amount had been reported.

The reply is not convincing as the provision is clear that interest shall be paid by the Licensee for the period during which advance exists either due to revision/adjustment of monthly bills or advance received from the consumers.

Rebate to solar water heating system and rooftop solar plant

4.2.3 Clause 15 of General Provisions of Rate Schedule provides that if a consumer installs and uses solar water heating system of 100 litres or more, a rebate of ₹ 100/- per month or actual bill for that month whichever is lower shall be given. Further, Clause 21 provides that if a consumer of LMV-2 category installs a rooftop solar plant under the provisions of UPERC (Rooftop Solar PV Grid Interactive Systems Gross/Net Metering) Regulations, 2015 with maximum peak capacity of the grid connected rooftop solar PV system not exceeding 100 *per cent* of the sanctioned load/demand of the consumer, such consumer shall be exempted from payment of monthly minimum charges. Such exemption shall be in force till the time the solar plant remains fully operational.

Audit noticed that in both the IT billing systems neither were the rules regarding allowance of such rebate to entitled consumers under the above category mapped nor was any flag was marked to identify such consumers.

The Company accepted (July 2020) that solar water heater rebate had not been implemented in both the IT billing systems and stated that due to various operational constraints in certifying installation of water heater system at consumers' premises, the provision was not provisioned in the IT billing systems.

Protective load

4.2.4 Clause 9 of General Provisions of Rate Schedule provides that consumers getting supply on independent feeder at 11 kV and above voltage, emanating from sub-station, may opt for the facility of protective load and avail supply during the period of schedule rostering imposed by the licensee except emergency rostering. An additional charge at the rate of 100 *per cent* of base demand charges fixed per month shall be levied on the contracted protective load each month. During the period of rostering, the load shall not exceed the sanctioned protective load, otherwise the consumer shall be liable to pay twice the prescribed charges for such excess load as penalty.

In the Performance Audit Report of 2016 at paragraph 2.1.18, Audit pointed out that the provision of protective load charges was not made in the R-APDRP billing system.

During the present audit, it was noticed that in both the IT billing systems neither was the provision to levy the protective load charge mapped nor was any flag to identify such consumers provisioned. During visit to the sampled divisions Audit noticed that 11 consumers (R-APDRP: 06 and non R-APDRP: 05) of six divisions⁶ (R-APDRP: 04 and non R-APDRP: 02) were sanctioned protective load. These six divisions were compelled to raise

⁶ EDD-I, Basti, EDD-II Ballia, EDD-III, Meerut, EUDD-I, Gorakhpur, EDD-I, Mirzapur and EDD-II, Varanasi.

demand of protective load charges manually by revising monthly bills of consumers and thus affected the integrity of data. Further, due to absence of any flag, the divisions failed to identify the defaulting consumers which consequently resulted in non-levy of prescribed charges on occurrence of instances of such violations.

The Company accepted (July 2020) the fact and stated that the provision of protective load cannot be implemented in the system due to various operational constraints. It further stated that they pass it to the consumers by revising the bills as this provision cannot be implemented in the IT system till parameters are fixed and systems are developed to capture the supply events of consumers.

Deduction of Tax at Source against interest on Security Deposit

4.2.5 The model document⁷ of the IT billing system provides that the system should link the consumer to the rate applicable to his category. The rate applicable is calculated on the basis of fixed charges, consumed energy, capacity (power consumption limit) taxes applicable, subsidy or support from the government, etc. Further, Section 194A of the Income Tax Act, 1964, provides that any person (consumer) is liable to pay Income Tax⁸ to whom any income by way of interest of securities deposit is credited or paid (in cash/by cheque/by draft or through any other mode). The tax is required to be deducted when the aggregate amount of interest, credited or paid to any consumer is likely to exceed ₹ 5,000 during the financial year. Under section 203 of the Income Tax Act, Tax Deducted at Source (TDS) certificate is also required to be provided to the consumer in Form 16A. Further, there are penal provisions for levy of interest and penalty on such non-compliance.

Audit noticed that the rule related to TDS on credit of interest on security deposit from the consumers was not mapped in both the IT billing systems. Further, the non R-APDRP billing system did not have the provision to capture the Permanent Account Number (PAN) of the consumers. The details of DISCOM-wise interest allowed to the consumers are depicted in **Table 4.1**:

Table 4.1: Details of interest passed on and TDS to be deducted at source
(₹ in crore)

DISCOM	No. of consumers to whom interest on security passed in excess of ₹ 5,000			Amount of interest on security deposit passed in excess of ₹ 5,000			TDS to be deducted at the rate of 20 per cent
	R-APDRP	Non R-APDRP	Total	R-APDRP	Non R-APDRP	Total	
PuVVNL	712	350	1,062	2.65	1.46	4.11	0.82
MVVNL	656	435	1,091	5.56	1.10	6.66	1.33
PVVNL	4,704	363	5,067	21.72	1.83	23.55	4.71
DVVNL	1,453	1,220	2,673	1.69	3.98	5.67	1.13
Total	7,525	2,368	9,893	31.62	8.37	39.99	7.99

Source: Based on analysis of data provided by the Company

On analysis of the consumers' data of 2018-19, Audit noticed that the DISCOMs credited interest on security deposit of ₹ 39.99 crore (RAPDRP: ₹ 31.62 crore and non R-APDRP: ₹ 8.37 crore) to 9,893 consumers (RAPDRP: 7,525 and non R-APDRP: 2,368), where the consumers were

⁷ R-APDRP: Clause B19 of Billing Module of SRS, Non R-APDRP: sub-clause B15 under Clause 7.10.3 Billing logic as per the Company's Supply Code and Supply Tariff, Bill Correction.

⁸ At the rate of 10 per cent, if PAN number is furnished, otherwise 20 per cent.

getting interest in excess of ₹ 5,000, through the system but due to non-mapping of the above provision the deduction of ₹ 7.99 crore towards TDS and deposit thereof to the tax authorities could not be ensured.

The Company accepted (July 2020) that the TDS had not been deducted using the implemented IT billing systems and stated that it was handled manually by the Divisions. But the Company/DISCOMs failed in providing the consolidated status of TDS deducted by the Divisions and deposited to the tax authorities.

Preparation of estimate

4.2.6 The model document⁹ of both the IT billing systems provide that the system should be able to prepare an estimate for new connection, temporary connection, load extension/reduction, shifting of meter and/or service line with details as per the Company defined criteria which may change from time to time.

Audit noticed that both the IT billing systems lacked mapping of the Company defined provisions of estimate preparation and in absence of the same, estimates were being prepared manually by the divisions. During visit to the sampled divisions by audit, seven cases (R-APDRP: four and non R-APDRP: three) were noticed where applicable charges as per relevant provisions of Cost Data Book were not levied. This resulted in loss of ₹ 1.01 crore (R-APDRP: ₹ 0.55 crore and non R-APDRP: ₹ 0.46 crore) to DISCOMs.

The Company accepted (July 2020) the fact and stated that estimates are being prepared manually and they are in the process of implementing automatic systems for calculating estimates.

Inaccessibility of meter

4.2.7 Clause 6.2 (b) of the Code provides that if the meter is not read as it was not accessible in two consecutive billing cycles, a notice shall be issued to the consumer to keep the meter accessible for reading on the date specified in the notice. Further, clause 3 of General Provision of Rate Schedule provides that a penalty of ₹ 50/kW shall be levied on the consumer, if the meter is not made accessible even on the due date.

Audit noticed that in non R-APDRP billing system, in case of 12,78,203 consumers in 39,06,410 billing instances during 2018-19, the meter readers issued remarks of NA (not accessible)/NR (reading not furnished) continuously on three billing cycles because the meter was not made accessible to them. Due to non-mapping of the rule in the system, the Company failed to levy penalty of ₹ 21.71 crore on the above-mentioned consumers during 2018-19.

Further, the R-APDRP billing system does not contain such provision of mentioning remarks of non-availability of meter for reading, due to which the compliance of said provision could not be commented upon.

The Company stated (July 2020) that provision of penalty has not been implemented as it is very difficult to identify the consumer who has refused reading. It further stated that NR is the case where bills could not be generated

⁹ R-APDRP: NC 14 of 3.0 New Connection Module of SRS, Non R-APDRP: NC 13 of 7.11.1 of New Connection of RFP.

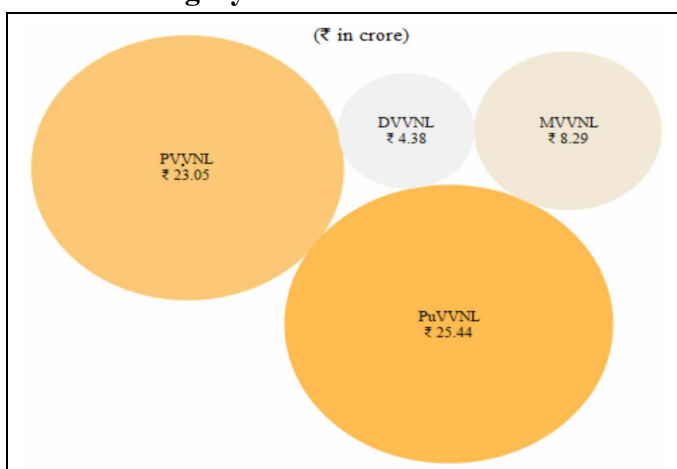
and NA is the term used by meter readers to identify the cases where the premises were locked.

The reply is not convincing as the agreement entered with meter readers provided that NA and NR remarks shall be given in cases of no access/no reading/premises locked. Therefore, in all such cases where the meter was not made accessible, the prescribed penalty should have been levied.

Allowance of rebate to consumers who shifted from unmetered to metered category

4.2.8 Clause 17 of General Provision of Rate Schedule provides that any rural consumer shifted from unmetered to metered category, shall be entitled to a rebate of 10 *per cent* on the rate which shall be applicable from the date of installation of meter till the end of that particular financial year.

Chart 4.4: DISCOM-wise rebate not allowed to consumers who converted from unmetered to metered category



Source: Based on analysis of data provided by the Company

to the sampled divisions, it was noticed that the divisions also did not allow applicable rebate to these consumers. Thus, due to non-mapping of the above, 12,99,083 consumers were deprived of the benefit of ₹ 61.16 crore during 2018-19, as depicted in **Chart 4.4**, and thus were adversely affected which defeated the very objective of consumer satisfaction.

In the Exit Conference (March 2021), the Company stated that the provisions are applicable in case of a consumer who on its own, applies to change the category from unmetered to metered.

The reply is not convincing as the Rate Schedule approved by the Commission clearly provides that the rebate shall be allowed to any consumer who shifted from unmetered to metered category. Further, the Company could not provide any documents to support its views.

The Government during the Exit Conference directed the Company to furnish the correspondence done with UPERC in this regard.

Manual Bill revision

4.2.9 The model documents¹⁰ of both the IT billing systems provide that the system should have provision for bill correction/amendment manually to update/modify the customer billing database, with reasons for the same. Such bill amendments should be limited to specific logins. The system shall employ separate accounting process for bill amendments, which result in reversal of sales (unit and amount) booked (bill raised) in past financial years, *i.e.* prior to start of the current year.

Audit noticed that the divisions revised the bills by calculating various adjustments and feeding the meter readings into both the IT billing systems manually in each case thereby affecting data integrity. During 2018-19, the bills of ₹ 3,86,992.63 crore (R-APDRP: ₹ 3,75,717.29 crore and non R-APDRP: ₹ 11,275.34 crore) of 30,01,997 consumers (R-APDRP: 7,75,929 and non-R-APDRP: 22,26,068) were manually revised to ₹ 46,363.05 crore (R-APDRP: ₹ 35,911.26 crore and non R-APDRP: ₹ 10,451.79 crore) by the DISCOMs. Thus, there was a downward revision of bills by ₹ 3,40,629.58 crore (R-APDRP: ₹ 3,39,806.03 crore and non R-APDRP: ₹ 823.55 crore). Audit further noticed that both the IT billing systems lacked mapping of multi-year Rate Schedule which resulted into erroneous system-based bill revision. Thus, in absence of proper mapping of provisions related to bill revisions in both the IT billing systems, the divisions were compelled to exercise bill revisions manually.

The Company stated (July 2020) that role based authorisation was already in place in both the IT billing systems wherein bill revisions are done online considering the actual reading, consumption and adjustments.

The reply is not convincing as due to lack of mapping of multi-year Rate Schedule, calculations for bill revision were done manually and thereafter, the same were entered in both the IT billing systems for authorisation which defeated the basic purpose of automation of billing system.

Manual preparation of Penal billing

4.2.10 The model documents¹¹ of both the IT billing systems provide that the system should have provision to compute penal billing for unauthorised use of electricity as per Electricity Act and based on parameters defined by State Electricity Regulatory Commission (SERC).

Audit noticed that both the IT billing systems lacked mapping of provisions related to penal billing in case of unauthorised use of electricity. During 2014-15 to 2018-19, there were 37,544 number of cases of unauthorised use of electricity with assessed amount of ₹ 98.06 crore in the sampled divisions. Further, it was noticed that despite prescribed norms for assessment, the assessment was varied in terms of factor, supply hours, days for calculation etc. from division to division. Thus, in absence of applicable provisions related to penal billing in case of unauthorised use of electricity, the use of discretion and manual intervention in the IT billing systems cannot be avoided.

¹⁰ R-APDRP: Clause B14 of Billing Module of SRS, Non R-APDRP: Sub-clause B10 under Clause 7.10.3 Billing logic as per the Company's Supply Code and Supply Tariff, Bill Correction of RFP.

¹¹ R-APDRP: Clause B18 of Billing Module of SRS, Non R-APDRP: Sub-clause B14 under Clause 7.10.3 Billing logic as per the Company's Supply Code and Supply Tariff, Bill Correction of RFP.

The Company stated (July 2020) that earlier theft cases were handled manually as they were non-consumers but since last year all manual receipt work has been stopped and all collections have been provisioned in both the IT billing systems.

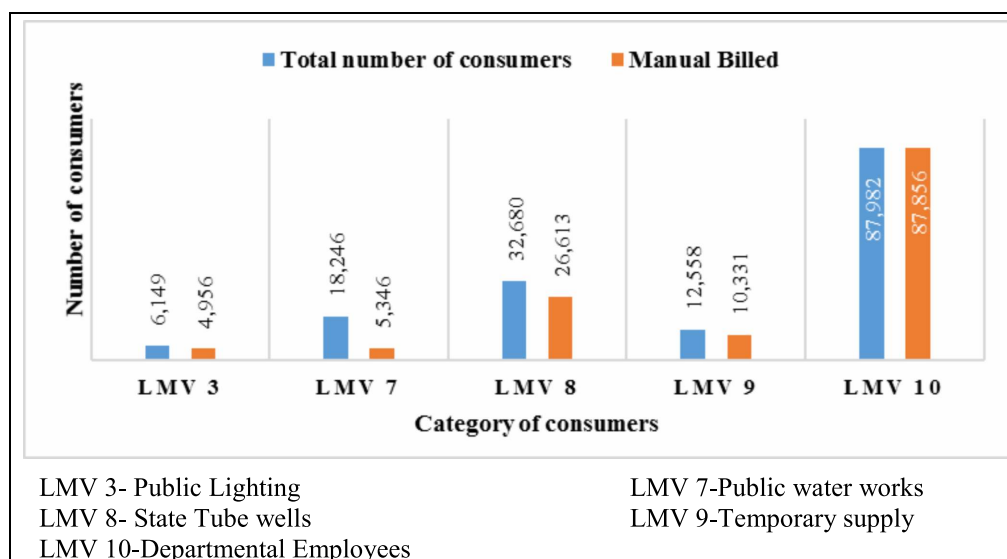
The reply does not address the audit observation as the system should have provision to compute penal billing for unauthorised use of electricity for consumers as well as non-consumers.

Manual Billing of Consumers

4.2.11 The model documents¹² of both the IT billing systems provide that all the consumers were required to be covered under the online billing system.

Audit noticed that as of March 2019, the percentage of manual billing of several categories of consumers viz. LMV- 3, 7, 8, 9 & 10 was 80.60 per cent, 29.30 per cent, 81.44 per cent, 82.27 per cent and 99.86 per cent, respectively and total number of consumers billed manually was 1,35,102, as depicted in **Chart 4.5:**

Chart 4.5: Consumers billed manually



Source: Based on analysis of data provided by the Company

The above table indicates that out of 1,35,102 consumers billed manually, 87,856 consumers (65.03 per cent) belonged to LMV-10 category (i.e. Departmental Employees). Further, the manual billing under LMV-10 category constituted 99.86 per cent of total consumers under this category. It is unclear why bills for personnel of UPPCL & DISCOMs continue to be generated manually, when 99.48 per cent of total 2.59 crore consumers are now being billed through the IT billing systems. Due to manual billing, there is a possibility of lack of monitoring of metering status, monthly billing and realisation and issue of duplicate connections to the departmental employees.

Thus, there is incomplete coverage of all consumers in the IT billing system.

The Company stated (July 2020) that the bills have to be raised collectively to the Department or Ministry as a whole and paid through RTGS by the Department or through release from the treasury.

¹² Non R-APDRP: Clause 4.1.1 of RFP.

The reply is not convincing as instead of raising system generated monthly bill against each electricity connection, raising collective bills on manual basis defeated the purpose of billing automation.

Automatic creation of books of accounts

4.2.12 The model document¹³ of both the IT billing systems provide that the system should have provision for automatic creation of books of accounts based on Balance Sheet and Profit & Loss Statement as per General Accepted Accounting Principles (GAAP) and the Companies Act.

Audit noticed that the due to manual billing of consumers not available on the IT system, lack of system generated network analysis and estimate preparation while allowing new connection/change in contracted load and charging offline penalty and other charges in case of unauthorised usage of electricity, the Company failed to prepare system generated books of accounts as was provided. This resulted in defeating the purpose of restricting human intervention in the IT billing system.

The Company stated (July 2020) that the system has the capability of generating MIS reports automatically but difference between online and offline reports are being mitigated through extensive exercise over the last one year.

The reply of the Company was silent on the issue of non-creation of books of accounts using implemented IT system.

Conclusion

Mapping of pertinent and correct business rules to such processes/systems is of utmost importance. If the business rules are not mapped correctly or mapped inadequately, then the output of business processes/application systems will be deficient as well as defective. Such anomaly is there in both the IT billing systems of the Company which adversely affected the interests of the stakeholders such as:

- **the Government, with respect to non-levy of electricity duty and non-deduction of tax at source against interest on security deposit.**
- **the Company, with respect to mapping of due date, calculation of fixed charges in absence of maximum demand, short/non-deposit of security deposit, enhancement of contracted load and penalty for inaccessibility of meter; and**
- **the consumers, with respect to interest on advance deposit of consumers, rebate on solar water heating plant and rebate to rural consumers who shifted from unmetered to metered category.**

Manual intervention in cases of charging for protective load, preparation of estimate, bill revisions, preparation of penal billing, billing of consumers defeated the purpose of automated billing.

¹³ R-APDRP: Clause C13, Finance & Accounting of collection module of SRS and Non R-APDRP: C13 Finance & Accounting of collection module of RFP.

Recommendation		
Recommendation Number	Recommendation	Response of Government
6	The Company should ensure mapping of all business rules in accordance with the Supply Code and rates in accordance with the Rate Schedule and Cost Data Book in the IT billing systems to avoid manual intervention for safeguarding the interests of all the stakeholders (i.e. the Government, the Company and the consumers) and should periodically review and update them.	Accepted

CHAPTER–V

Input Controls and Validation Checks

Chapter V

Input Controls and Validation Checks

5. To ensure correctness, completeness and reliability of the database, it is necessary to ensure appropriate input controls and data validation during data entry. This helps in reduction of duplication of efforts and redundancy.

Lack of system alerts

5.1 Having a system that can send notifications automatically to large lists of contents can help in reducing time to be spent on collecting information and initiating timely action against the exceptions. Audit noticed following deficiencies in both the IT billing systems:

Failure in ceiling abnormal consumption

(i) A load of one kW can consume a maximum of 24 kWh (units) of energy in 24 hours and 720 units in a month of 30 days. Audit noticed from March 2019 data that 27,012 consumers (R-APDRP: 7,715 and non R-APDRP: 19,297) having load of one kW or below were monthly consuming more than 800 units *i.e.* ranging from 801 units to 93,475 units and 10,04,458 units in R-APDRP and non R-APDRP billing systems, respectively. This pattern of energy consumption was abnormal and the system should have an inbuilt mechanism to alert the Management to address such abnormal patterns.

The Company stated (July 2020) that the system has the provision of categorising the consumers under the ceiling defective if per kW consumption is violated.

The reply is not correct as the data analysis revealed that consumers having exorbitant consumptions were having healthy meter status.

Stop Billing of consumers against the provision of the Code

(ii) The Code contains provisions related to Temporary Disconnection and thereafter Permanent Disconnection (PD) if the causes of disconnection are not removed within the number of days provided in the notice. Further, the Code does not contain any provision on the basis of which the connection status on any consumer can be flagged under 'Stop Billing'.

Audit noticed from the data of March 2019 that there were 16,49,992 consumers (R-APDRP: 7,78,440 and non R-APDRP: 8,71,552) with contracted load of 43,43,541.22 kW (R-APDRP: 20,00,676.59 kW and non R-APDRP: 23,42,864.63 kW) under 'Stop Billing'. The Company failed to monitor the cases of 'Stop Billing' along with the period of its existence and acted against the provision contained in the Code. Due to lack in application control in both the IT billing systems, it allowed the field divisions to act in contradiction to the provisions of the Code.

The Company accepted (July 2020) the fact and stated that earlier the users had a tendency of doing PD in offline mode and posting the same as stop billing which increased the stopped billing in large numbers. This provision has been totally blocked as technically there seems to be no requirement of stopped billing.

New Connection Pending

(iii) There were 1,41,827 consumers in R-APDRP billing system, depicted in the category of 'New Connection (NC) Pending' in March 2019 data. Registration of these consumers had not been completed in the system due to migration of incomplete data of the existing consumers and entry of particulars of new consumers without completing the prescribed procedure for releasing new connections. Dates of connection of these consumers as per R-APDRP fall between the years 1911 and 2019.

Audit noticed that 2,910 out of 1,41,827 'NC Pending' consumers were last billed during the years 1901 to 2019 and there were 1,38,917 consumers, whose revenue billing was yet to be started.

Billing of consumers under 'NC Pending' status and existence of these consumers for such a lengthy period in R-APDRP billing system indicated lack of application controls. Further, these cases were also not flagged for periodical review by the system and resulted in lack of monitoring at Division level, due to which the numbers of such cases could not be reduced by the Company.

While accepting the audit observation, the Company stated (July 2020) that the consumers who have not completed all the new connection formalities are designated as new connection pending and billing cannot be started till completion.

Completeness of data

5.2 Audit noticed the following deficiencies in both the implemented IT billing systems:

Absence of vital details in the database

(i) UPERC, vide seventh amendment (May 2016) in the Code, made it mandatory to register mobile number/e-mail address/Aadhaar number of each consumer, within six months from the notification date. Audit noticed that out of 2,58,04,464 in-service consumers (R-APDRP: 66,86,222 and non R-APDRP: 1,91,18,242) on March 2019:

Mobile Numbers

In 1,48,58,455 cases (R-APDRP: 24,11,055 and non R-APDRP: 1,24,47,400), no phone number/mobile number was mentioned and in 27,945 cases (R-APDRP: 27,371 and non R-APDRP: 574) the mobile numbers mentioned were incorrect *i.e.* less than 10 digits.

The Company stated (July 2020) that it was mandatory on the part of the consumer to submit the above-mentioned details and consumers who voluntarily submitted the details were entered in the billing system.

The reply is not convincing as the Company failed to register the consumer details even after four years of notification which is quite essential for an IT-enabled system.

Consumers' personal data

The basic data of consumers like name, father's name and address were found incomplete in the data of the IT system as discussed hereunder:

- In 4,793 cases (R-APDRP: 01 and non R-APDRP: 4,792) the address field was found blank in the database.
- In 54 cases of Non R-APDRP billing system, the field of name, father's name and address all were found blank and in 787 cases of non R-APDRP billing system, the field of name and father's name were found blank.

Due to incomplete data, the purpose of IT billing systems and the attendant benefits which automation offered in terms of billing efficiency, revenue collection, reduction of losses etc. could not be achieved.

The Company stated (July 2020) that address field or name field left blank in the system are only cases in which connection formalities have not been completed by the consumer.

The reply is not correct as the cases pointed out are of active consumers whose billing is being done by the Company.

Inappropriate security deposit

In 29,06,592 cases (R-APDRP: 11,14,076 and non R-APDRP: 17,92,516), under both the IT billing systems as mentioned in the **Table 5.1**, security deposit was either blank, zero or less than 100 and needed to be updated/reconciled or charged from the consumers:

Table 5.1: Abnormal security deposits of in-service consumers

Security Amount	No. of Consumers	
	R-APDRP	Non R-APDRP
Zero or Blank	39,527	2,08,314
0.01 to 0.99	8,63,479	0
1-99	2,11,070	15,84,202
Total	11,14,076	17,92,516

Source: Based on analysis of data provided by the Company

Audit further noticed that interest on security deposit of ₹ 147.11 crore was provisioned in the annual accounts of 2018-19 by the Company, whereas, interest of ₹ 87.98 crore only was passed on to the consumers through both the IT billing systems. Due to non-updation/reconciliation of security deposit, the interest of ₹ 59.13 crore could not be passed on to the consumers due to which the consumers were deprived from benefit of interest on their deposited amount of security.

The Company stated (July 2020) that new connections are released under various Government schemes where zero or lower security was charged and there is no security for domestic below poverty line consumers. Additionally, there are some old migrated consumers having low security to whom notices are sent from time to time to furnish old receipts so that the security can be updated.

The reply is not convincing as during data analysis, the below poverty line consumers and connections issued under any Government scheme were excluded.

Supply type

In 2,427 cases of R-APDRP billing system, no supply type was mentioned, which is the essential basis for billing of consumers under appropriate category.

The Company accepted the fact by stating that these are a few legacy cases migrated from old systems for which correctness of data can no longer be ascertained.

Duplication of entries in the database

(ii) Out of 2,58,04,464 in-service consumers (R-APDRP: 66,86,222 and Non R-APDRP: 1,91,18,242) of both the IT billing systems as on March 2019, Audit noticed the following deficiencies in the billing database:

- In 32,580 cases of R-APDRP billing system, the combination of consumer name, supply type and address were found duplicate. In 6,86,347 cases, of Non R-APDRP billing system, the combination of consumer name, father's name, supply type and address field 1, 2, 3 & 4 were found duplicate (*i.e.* appearing more than one time in the data).
- In 15,57,381 cases (R-APDRP: 484 and Non R-APDRP: 15,56,897), meter numbers were mentioned in duplicate. Since most of these cases relate to Non R-APDRP system, the Company should review and remove this shortcoming.
- In 244 cases (R-APDRP: 19 and Non R-APDRP: 225), the dates of connection were future dates *i.e.* after March 2019. Further, in 8,56,983 cases (R-APDRP: 6,50,625 and Non R-APDRP: 2,06,538), the dates of connection were prior to the date of establishment of Uttar Pradesh State Electricity Board *i.e.* before 1959.

Incomplete/incorrect entries of the consumers in the database have affected data integrity, as a result of which the Company failed in adjusting arrears from security deposit, allowing interest on security deposits, delivering demands/notices through electronic messages and finding the address of the consumers.

The Company accepted (July 2020) the fact and stated that as multiple legacy billing systems were migrated in both the IT billing systems, some data got duplicated and such cases are being checked on a case-to-case basis. Further, it also stated that meter numbers are unique to the division only and in many cases dummy meter numbers are fed against unmetered consumers. In respect of dates of connection falling in future date, the Company stated that these consumers are not live consumers. It further stated that in cases where RCs is issued, the divisions cannot ascertain whether the consumer is alive or not. Similarly, the District Authority needs to check such cases on a case-to-case basis.

The reply is not correct to the extent as all the data analysis was done by Audit on in-service consumers' data. Duplication in meter numbers was found within the divisions. Further, due to incomplete/incorrect entry of consumers' details, the Company could not trace many defaulting consumers.

The Company may consider using an IT-based business analysis tool to identify and correct these inconsistencies.

Incorrect categorisation of consumers

5.3 Clause 3.7 of the Code provides that the Licensee may classify or reclassify consumers into various categories from time to time and may fix different tariffs for different categories of consumers with the approval of the Commission. Applicable Rate Schedule, approved by UPERC from time to time, should be applied on the consumers after classifying them into appropriate category as provided in the Code.

Audit noticed that out of 4,214 incorrectly classified connections under both the IT billing systems, 3,569 connections (R-APDRP: 2,290 and non R-APDRP: 1,279) remained classified at lower tariff due to which the Company had to suffer revenue loss of ₹ 18.02 crore (R-APDRP: ₹ 16.60 crore and non R-APDRP: ₹ 1.42 crore) during the year 2018-19 (*Appendix-5.1*).

The Company accepted (July 2020) the fact and stated that routine rigorous field activity for data sanitisation and various drives are conducted in the field to check whether consumers are migrated to the right category or not and corrected on a regular basis. Further, the Company has accepted that some cases are still pending and will be taken up for correction.

Conclusion

In the present audit it has been found that the Company did not ensure validation checks for various data inputs. This resulted in deficient consumers' database and duplicate entries against already existing consumers causing blocking of revenue due to non-traceability of consumers in cases where dues are to be recovered. Further, non-linking of consumers to their respective categories of Rate Schedule caused loss of substantial revenue to the DISCOMs.

Recommendation

Recommendation Number	Recommendation	Response of Government
7	The Company should have robust in built input controls to ensure completeness and correctness of data in order to ensure integrity of database.	Accepted

CHAPTER–VI

Other Issues

Chapter VI

Other Issues

Non-generation of IT system based meter read plan

6.1 The model document¹ of both the IT billing systems provide that the system should generate meter reading plan for day/week/fortnight by meter readers and provide it to the respective authorities. For generating the meter reading plan, the system should take care of the number of meter readers available with the customer and their productivity for coverage of all meters before the due date. The business logic shall be provided by the owner and the owner should have flexibility to modify the same. After generation of the plan the same shall be sent to the respective offices by e-mail/other mode, so that the meter reader can download the site/premise addresses of the meters to be read on that day.

Audit noticed that no such meter reading plan was generated as no records related to system based planning of meter reading was furnished to Audit. During field visit to the sampled divisions, it was also noticed that in every division the meter readers were deployed randomly for consumers' meter reading. On analysis of consumer data of March 2019, the following were observed:

(i) In R-APDRP billing system, the meter readings were recorded ranging from 1 to 3,801 meter reads by meter readers during the month of March 2019 of urban areas against prescribed 1,500 meter reads by each meter reader. Further, in the data of non R-APDRP billing system, no identical field was found incorporated to identify the ID of meter readers;

(ii) Against 2,58,04,464 in-service consumers (R-APDRP: 66,86,222 and non R-APDRP: 1,91,18,242) of both the IT billing systems, only 2,02,67,194 consumers (R-APDRP: 51,84,106 and non R-APDRP: 1,50,83,088) were billed by meter readers *i.e.* 78.54 per cent; and

(iii) Against 2,02,67,194 meter reading (R-APDRP: 51,84,106 and non R-APDRP: 1,50,83,088) by the deployed meter readers, in 6,74,134 cases (R-APDRP: 62,451 and non R-APDRP: 6,11,683) the meter readings were faulty and were shown under the status of 'Read Defective' remark.

Thus, due to non-availability of system-based meter read plan the meter readers were deployed randomly. Further, the deficient coverage of billable consumers and higher percentage of inaccurate billing adversely affected the billing and collection efficiency resulting in increase in AT&C losses of the DISCOMs.

The Company stated (July 2020) that billing agencies normally bill using their own developed area code and walking sequence. Each month meter readers follow the same billing sequence. In cases where meter readers generate abnormally high readings, it is due to bunch of connections at multi-storied buildings. It further stated that billing shortage is primarily due to shortage of meter readers and duplicate/ghost consumers and penalty for the same is being levied.

The reply is not acceptable as the fact remains that the meter read plan was not generated through the implemented IT billing systems and followed for

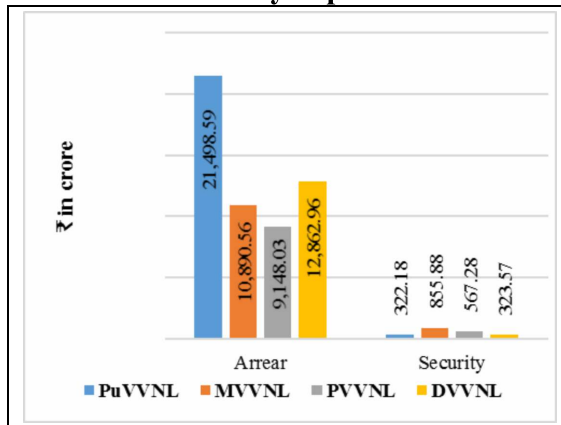
¹ R-APDRP: Clause M8 of SRS and Non R-APDRP: Clause M.7 of RFP.

covering maximum consumer meters. Further, the Company itself accepted the fact of shortage of meter readers which adversely affected the billing of the consumers.

Non-realisation of outstanding amount from ‘in-service’ consumers

6.2 Clause 4.36 of the Code provides that the supply shall be disconnected temporarily, only after due diligence, if electricity bills on account of charges of electricity or any sum other than a charge for electricity are not paid within the number of days indicated in the notice served, on the disconnection date indicated in the notice served to the consumer but not less than 15 days. Further, Clause 4.20 provides that the Company shall maintain a security deposit equal to two months estimated power consumption of all the consumers to safeguard the interests of the licensee.

Chart 6.1: Consumer Arrears vis-a-vis Security deposits



Source: Based on analysis of data provided by the Company

₹ 2,068.91 crore (R-APDRP: ₹ 739.82 crore and non R-APDRP: ₹ 1,329.09 crore), as depicted in **Chart 6.1**.

Out of total 2,26,15,303 (R-APDRP: 52,34,532 and non R-APDRP: 1,73,80,771) defaulting consumers, 1,04,95,188 consumers (R-APDRP: 52,10,071 and non R-APDRP: 52,85,117) (46.41 per cent of total defaulting consumers) with arrears of ₹ 15,775.39 crore (R-APDRP: ₹ 10,068.62 crore and non R-APDRP: ₹ 5,706.77 crore) (29 per cent of total arrears), were having last payment date and the remaining 1,21,20,115 consumers (R-APDRP: 24,461 and non R-APDRP: 1,20,95,654) (53.59 per cent of total defaulting consumers) with arrears of ₹ 38,624.74 crore (R-APDRP: ₹ 31.20 crore and non R-APDRP: ₹ 38,593.54 crore) (71 per cent of total arrears) were not having any last payment date mentioned in the data of both the IT billing systems. In absence of any last payment date the position of 1,21,20,115 defaulting consumers (R-APDRP: 24,461 and non R-APDRP: 1,20,95,654) could not be analysed by Audit. Further, age-wise analysis of consumers’ arrears, where the last payment date was found in the data, are detailed in **Appendix-6.1**.

Out of 1,04,95,188 defaulting consumers (R-APDRP: 52,10,071 and non R-APDRP: 52,85,117) having last payment date, 40,63,580 consumers (R-APDRP: 14,37,549 and non R-APDRP: 26,26,031) with arrears of ₹ 11,064.43 crore (R-APDRP: ₹ 6,714.98 crore and non R-APDRP: ₹ 4,349.45 crore) continued defaulting payments of their monthly bills for more than three consecutive months (ranging from 3 months to more than 12 months) against which, the available security was ₹ 263.13 crore (R-APDRP: ₹ 97.15 crore and Non R-APDRP: ₹ 165.98 crore) only (*i.e.* 2.38 per cent). As the Company maintains two months' security deposit and 15 days are provided for disconnection, a maximum period of three months could have been considered for making temporary disconnection. In order to safeguard business interest, the Company should have initiated timely action of temporary disconnection against these defaulting consumers so that default in payment of ₹ 11,064.43 crore could have been minimised. Audit noticed that the Company failed to make temporary disconnection of these 40,63,580 consumers in violation of the provisions of the Code. In addition to this, the Company also did not charge reconnection and disconnection charges (at the rate of ₹ 600 per case) of ₹ 243.81 crore (R-APDRP: ₹ 86.25 crore and non R-APDRP: ₹ 157.56 crore) from these consumers.

The Company stated (July 2020) that there are many consumers in both the IT billing systems whose security deposit is wrong or deficient and the major portion of arrears is in the rural areas. It further stated that reconnection/disconnection charges are levied in offline manner by the concerned divisions. In case of non R-APDRP, it stated that in many cases the last payment date was not found in the data of the IT billing system mainly due to the fact that prior to 2017 the batch mode billing was in practice in which there was provision of last payment date but during the transitional phase the data has not come up on the Non R-APDRP system.

The reply is not correct as out of total arrears of ₹ 11,064.43 crore (arrear for more than three months), ₹ 6,714.98 crore, *i.e.* 60.69 per cent pertains to urban consumers only. The Company had accepted that the system is deficient to charge reconnection/disconnection charges online. Further, it was the basic requirement to migrate complete consumer data to the Non R-APDRP system, but the Company failed to migrate the crucial data related to the consumers.

In the Exit Conference (March 2021), the Government stated that the issue had been in its knowledge and remedial action was being taken.

Non-execution of permanent disconnections

6.3 Clause 4.38 (b) of the Code provides that the supply shall be disconnected permanently if the cause for which the supply was temporarily disconnected is not removed within a six-month period.

Audit noticed that as on March 2019, there were 5,20,772 consumers (R-APDRP: 3,73,306 and non R-APDRP: 1,47,466) under both the IT billing systems, having outstanding dues amounting to ₹ 3,441.21 crore (R-APDRP: ₹ 2,808.63 crore and non R-APDRP: ₹ 632.58 crore) under temporary disconnected (TD) status from last six months continuously against whom permanent disconnection (PD) could not be initiated as per provisions. Further, both the IT billing systems were also not able to generate system

alerts for such consumers as despite lapse of more than six months' period the status of such consumers still reflected under TD. Thus, in absence of system alert and proper monitoring at the division level, timely action against such consumers could not be initiated which has resulted in avoidable piling up of dues of ₹ 3,441.21 crore (R-APDRP: ₹ 2,808.63 crore and non R-APDRP: ₹ 632.58 crore).

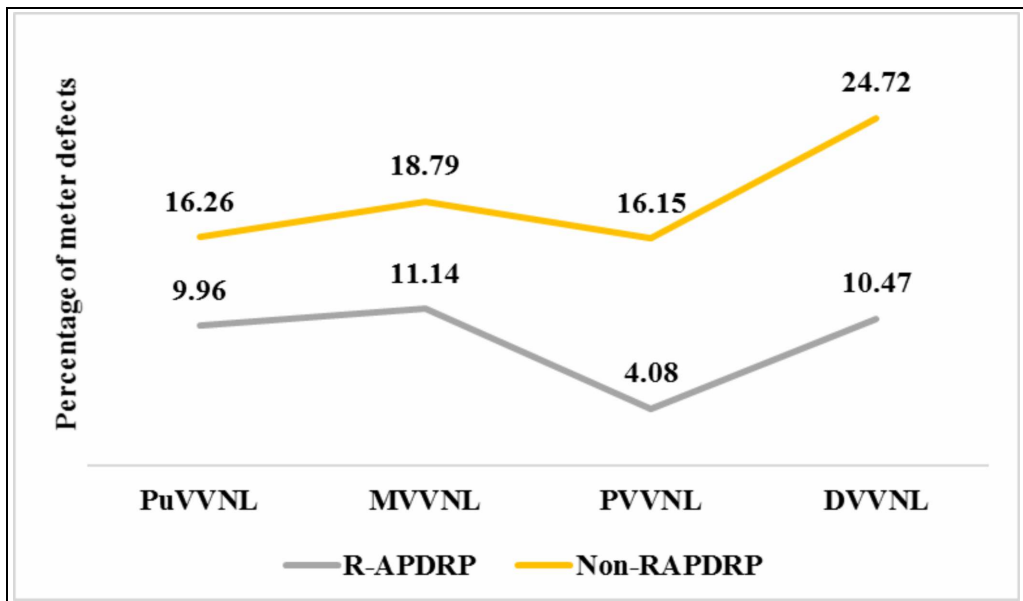
The Company stated (July 2020) that the system generates TD and reconnection reports and by this, connections disconnected for more than six months can be monitored. It further stated that the TD in the system does not imply that consumers PD has not been initiated earlier, since PD through the system was complex which has now been simplified. The fact remains that the Company failed to permanently disconnect the TD consumers within the stipulated six-month period.

High percentage of meter defects

6.4 Clause 7.18 of the Code provides that the Licensee shall maintain the percentage of defective meters to the total number of meters in-service, at a value not greater than three *per cent*.

Audit noticed on analysis of billing data for the month of March 2019, that out of 2,58,04,464 in-service consumers (R-APDRP: 66,86,222 and non R-APDRP: 1,91,18,242) under both the IT billing systems, the billing status of 41,04,994 consumers (R-APDRP: 5,47,833 and non R-APDRP: 35,57,161) were ADF, CDF, IDF & RDF² and the defect percentage was 15.91 *per cent* which was much higher than the provided limit. The DISCOM-wise meter defects as on March 2019 is depicted in **Chart 6.2**:

Chart 6.2: DISCOM-wise Meter Defects as of March 2019



Source: Based on analysis of data provided by the Company

² ADF: Appear defective, CDF: Ceiling defective, IDF: Identified defective, RDF: Read defective.

Thus, such a higher percentage of meter defects adversely affected the billing and collection efficiency which not only resulted in defective billing but also ultimately affected the AT&C losses.

In the Exit Conference (March 2021), the Government, while accepting the fact of large number of defective meters, assured that suitable provisions would be made to address the meter defects. It further stated that the number of IDF meters against total in service consumers for the financial year 2020-21 has substantially reduced.

Non-installation of pre-paid metering

6.5 The Board of Directors resolved (129th meeting dated June 2017) to install prepaid meters in the connections of Government consumers falling under LMV-4(A) category in order to avoid issues like non-availability of sufficient fund, defective meters, non-adjustment of delayed payment of outstanding dues and non-passing of invoices timely.

Audit noticed that as on March 2019, the total number of LMV-4(A) consumers was 69,794, whereas only 39 consumers (R-APDRP) were having prepaid meters installed as per billing data. The outstanding dues against these consumers were ₹ 554.32 crore. The Company failed to install pre-paid meters for 69,755 LMV-4(A) consumers due to delay in providing technical details for mapping of rules like delay in providing detailed scope and design documents (on 20 January 2016), migration of backend customer data (17 May 2017) and integration of technical specification (on 1 May 2017). Thus, non-installation of pre-paid meters resulted in delayed verification of bills by consumers, delayed collection of revenue from consumers of ₹ 554.32 crore as on March 2019 and increase in AT&C losses. In addition, Government consumers were also deprived of benefits of rebate to be allowed to prepaid metered consumers of ₹ 120.61 crore (***Appendix-6.2***).

The Company accepted the audit observation and stated (July 2020) that Government consumers do not lie only in LMV-4A category but many are in LMV-1 also. Prepaid meters on a total of 11,000 consumers have already been installed. Now the installed Smart Meters have been configured and integrated with the billing systems with user-friendly recharge options. Hence from now onwards, large scale prepaid meters are going to be installed on Government connections.

The reply is not convincing as personal residential connection of government employees which do fall under LMV-1 cannot be said to be government connection. Further, the fact remains that the Company could not install prepaid meters at all government connections as was directed. The Company must devise an actionable plan consisting of suitable milestones and timelines for installing prepaid meters for all the Government consumers in the State of Uttar Pradesh.

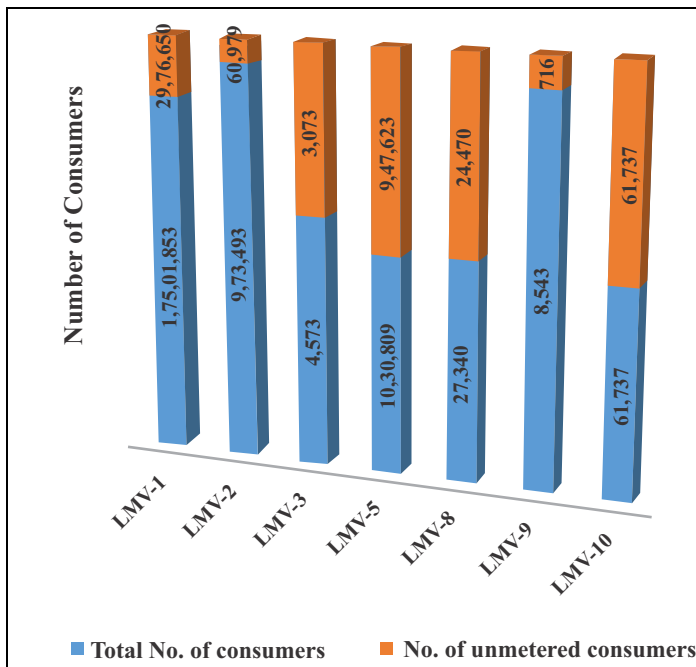
Assessment based consumption

6.6 Section 55 of the Electricity Act provides that no licensee shall supply electricity after the expiry of two years from the appointed date except through installation of a correct meter. Further, Chapter 5 of the Code also provides that the Licensee shall not supply electricity to any person except through installation of a correct meter.

UPERC also issued directions³ regarding achievement of 100 per cent metering by March 2018 and in case of unsatisfactory progress, directed to fix responsibility of the concerned officers.

In the Performance Audit Report of 2016 at paragraph 2.1.20, Audit pointed out that the Company defaulted in attaining the objective of 100 per cent metering of all the connections in the towns covered under the R-APDRP.

Chart 6.3: Unmetered Consumers as on March 2019



Source: Based on analysis of data provided by the Company

During the present Audit, it was again noticed that the DISCOMs were having unmetered connections in categories of LMV-1, 2, 3, 5, 8, 9 and 10 during the period 2014-15 to 2018-19, ranging from 40,75,248 to 71,16,742 (i.e. 5.39 per cent to 100 per cent in respect of total number of consumers of particular category). As depicted in **Chart 6.3**, out of the total 1,96,08,348 consumers as on March 2019, of categories mentioned above, 40,75,248 unmetered connections with contracted load of 11,092.72 MW were still present in the system, the consumption of which during 2018-19 was 24,118.89 MU (calculated on assessment basis by the Company) (**Appendix-6.3**). During field visit to sampled divisions, Audit also noticed that despite receiving the meter cost from LMV-5 category of consumers, the divisions did not install any meter on the connections. Further, no efforts were made by the divisions for converting the existing unmetered connections into metered connections. This resulted in inaccurate calculation of consumption and increase in AT&C loss.

The Company accepted (July 2020) the fact and stated that as on date there are around 15-20 lakh unmetered connections which was 65-70 lakh two years back.

Conclusion

In the present audit it has been found that the Company's internal controls leave much to be desired as evidenced by the failure of the Company to deploy IT billing systems in generation of meter-read plan for optimisation of billing, monitoring of realisation of arrears, execution of permanent disconnection and raising bills on actual consumption basis. The continued and increasing level of commercial losses of the


³ vide orders dated October 6, 2016 and November 28, 2016.

Company/DISCOMs is testimony of the inadequacy/failure in controls of the entities.

Recommendation		
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Recommendation Number	Recommendation	Response of Government
8	The Company should strengthen the internal control mechanism with respect to proper monitoring of the billing systems including proper issuance of bills and recovery of energy charges from defaulters/permanently disconnected consumers to safeguard the interest of the Company/DISCOMs.	Accepted

Lucknow
The **30 July 2021**


(JAYANT SINHA)
Principal Accountant General
(Audit-II),
Uttar Pradesh

Countersigned

New Delhi
The **23 AUG 2021**

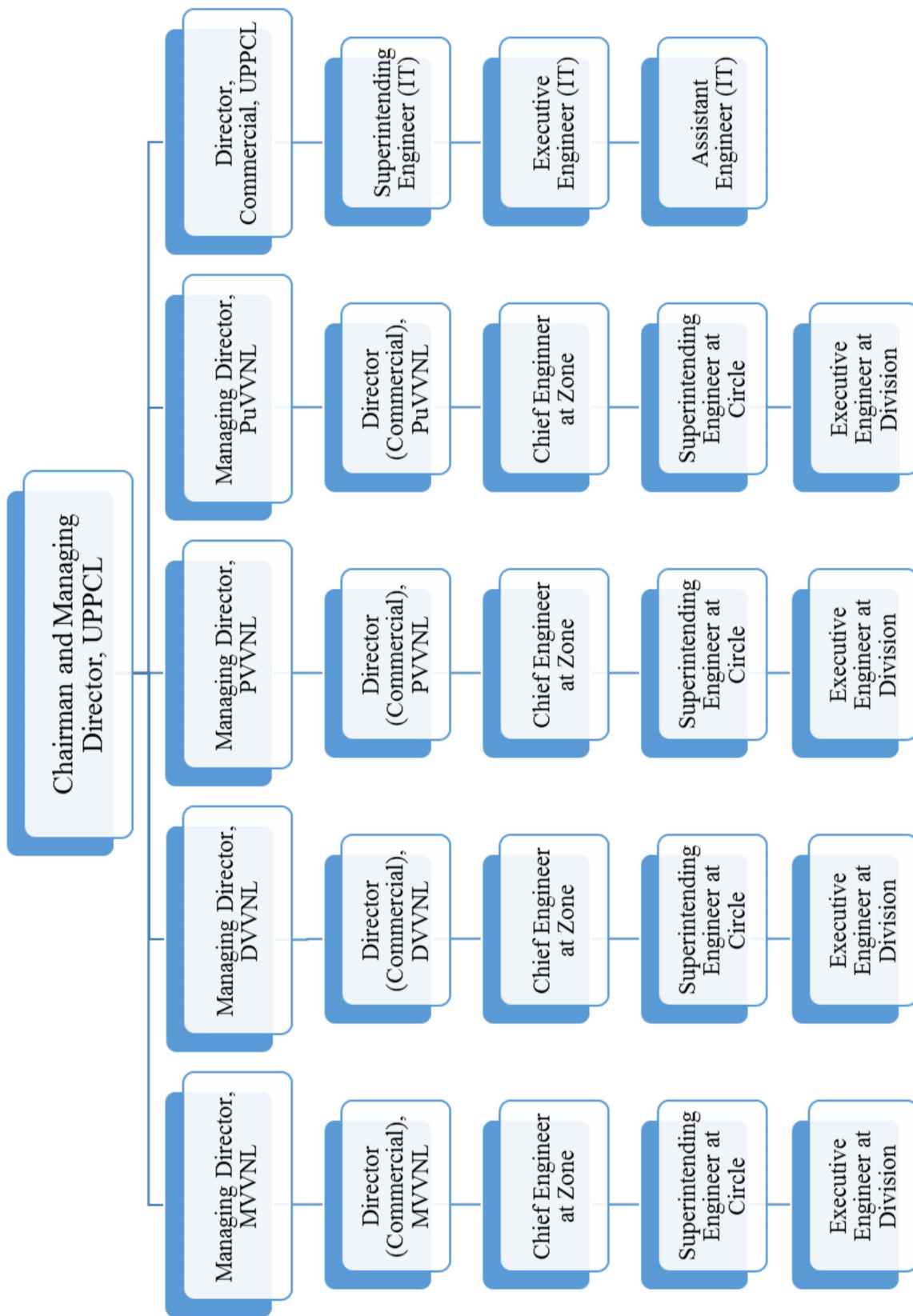

(GIRISH CHANDRA MURMU)
Comptroller and Auditor General of India

List of abbreviations

Abbreviations	Full form
AT&C	Aggregate Technical & Commercial
AMC/ATS	Annual Maintenance Contract/Annual Technical Support
BoD	Board of Directors
CE (IT)	Chief Engineer (Information Technology)
DISCOM	Distribution Company
DGPS	Differential Global Positioning System
DRC	Disaster Recovery Centre
DC	Data Centre
DAs	District Authorities
EDSMS	Energy Distribution and Service Management System
EDD	Electricity Distribution Division
EUDD	Electricity Urban Distribution Division
EE	Executive Engineer
ED	Electricity Duty
FMS	Facility Management Services
GoUP	Government of Uttar Pradesh
GIS	Geographic Information System
IDAM	Identity and Access Management
ITIA	Information Technology Implementing Agency
LoI	Letter of Intent
MDAS	Meter Data Acquisition System
MBC	Metering, Billing and Collection
MD	Maximum Demand
MDI	Maximum Demand Indicator
NC	New Connection
OEM	Original Equipment Manufacturer
PD	Permanent Disconnection
PFC	Power Finance Corporation
R-APDRP	Restructured Accelerated Power Development and Reforms Programme
RFP	Request for Proposal
RCs	Recovery Certificates
SIA	System Implementing Agency
SE	Superintending Engineer
SLA	Service Level Agreement
SBM	Spot Billing Machine
SRS	System Requirement Specification
UPERC	Uttar Pradesh Electricity Regulatory Commission
TD	Temporary Disconnection
UPPCL	Uttar Pradesh Power Corporation Limited
MVVNL	Madhyanchal Vidyut Vitan Nigam Limited
PuVVNL	Purvanchal Vidyut Vitan Nigam Limited
PVVNL	Paschimanchal Vidyut Vitan Nigam Limited
DVVNL	Dakshinanchal Vidyut Vitan Nigam Limited

APPENDICES

Appendix-1.1
(Referred to in paragraph 1.3)
Organisational Chart



Appendix-2.1
(Referred to in paragraph 2.2)

Statement showing expenses on components mentioned in paragraph at Data Centre and Disaster Recovery Centre along with cost of ATS support

Data Centre						
Name of Software/ Hardware	Qty as per BOM	Cost of acquisition	Cost of Annual Technical support (ATS)			
			2014-15	2015-16	2016-17	2017-18
DC Software			(₹ In lakh)			
Energy Audit Software	1	567.98	138.17	138.17	138.17	138.17
GIS Application software	1	227.82	55.42	55.42	55.42	55.42
GIS based Integrated Network Analysis	1	265.71	64.64	64.64	64.64	64.64
Asset Management System Software	1	419.72	92.34	92.34	92.34	92.34
DC Hardware						
Database Server for GIS in cluster fail over Mode	2	37.56	5.08	5.08	5.08	5.08
GIS Application Server	2	19.65	2.66	2.66	2.66	2.66
Total (A)		1538.44	358.31	358.31	358.31	358.31
Disaster Recovery Centre						
DRC Software						
GIS Application software	1	227.82	55.42	55.42	55.42	55.42
GIS based Integrated Network Analysis	1	265.71				
Energy Audit Software	0		140.88	140.88		
DRC Hardware						
Database Server for GIS in cluster fail over Mode	2	37.56	5.08	5.08	5.08	5.08
GIS Application Server	2	19.56	2.66	2.66	2.66	2.66
Total (B)		550.65	204.04	204.04	63.16	63.16
Total cost of acquisition of software and Hardware		2,089.09				
Total cost of AMC/ ATS of software and Hardware				1,967.64		

Appendix-2.2
(Referred to in paragraph 2.3 (ii))
Position of Sub-station, Feeder & DT and its availability in the IT system (March 2019)

Division name	Sub station			Feeder			Distribution Transformer				
	Actual availability	Mapped in the IT system	Data availability on the IT system	Actual availability	Mapped in the IT system	Data availability on the IT system	Actual availability	Mapped in the IT system	Data availability on the IT system	Data availability on the IT system	Percentage of availability of DT
1	2	3	4	5	6	7	8	9	10	11	{(10/9)*%}
EUDD- I, Gorakhpur	10	5	3	50	30	13	615	524	69		13.17
EDD- III, Jaunpur	4	3	2	15	9	2	540	519	52		10.02
EUDD, Basti	7	3	1	22	11	1	394	220	40		18.18
Bakshi ka Talab	13	7	7	56	33	25	3,714	1,622	55		3.39
EUDD, Kanpur Road	5	4	3	40	29	17	356	305	3		0.98
EUDD- II, Aligarh	9	5	5	45	30	26	942	719	71		9.87
EUDD-I, Ghaziabad	16	13	13	98	81	70	2,427	714	178		24.93
Total	64	40	34	326	223	154	8,988	4,623	468		10.12

Appendix-3.1
(Referred to in paragraph 3.9)
Statement showing excess payment to the billing agency

(Amount in ₹)

Month	Total billable consumers	Billed consumers	Payment made on the basis of billable consumers	Payment required to be made on the basis of billed consumers	Excess payment
1	2	3	4	5	6
DVVNL					
Apr-2018	26,81,443	25,44,692	77,49,370	73,54,160	3,95,210
May-2018	27,30,612	26,42,952	78,91,469	76,38,131	2,53,337
Jun-2018	27,88,248	27,03,973	80,58,037	78,14,482	2,43,555
Jul-2018	28,47,649	26,53,709	82,29,706	76,69,219	5,60,487
Aug-2018	29,91,665	28,31,474	86,45,912	81,82,960	4,62,952
Sep-2018	32,86,943	31,30,677	94,99,265	90,47,657	4,51,609
Oct-2018	35,75,146	33,09,617	1,03,32,172	95,64,793	7,67,379
Nov-2018	37,45,439	35,77,716	1,08,24,319	1,03,39,599	4,84,719
Dec-2018	38,60,961	37,28,590	1,11,58,177	1,07,75,625	3,82,552
Jan-2019	39,18,650	38,14,605	1,13,24,899	1,10,24,208	3,00,690
Feb-2019	39,53,528	38,85,318	1,14,25,696	1,12,28,569	1,97,127
Mar-2019	39,87,124	37,44,589	1,15,22,788	1,08,21,862	7,00,926
Total	4,03,67,410	3,85,67,915	11,66,61,809	11,14,61,266	52,00,543
PuVVNL					
Apr-2018	45,35,175	43,08,405	1,31,06,656	1,24,51,290	6,55,365
May-2018	46,14,331	45,49,499	1,33,35,417	1,31,48,052	1,87,364
Jun-2018	47,16,026	46,55,613	1,36,29,315	1,34,54,722	1,74,594
Jul-2018	48,33,821	47,26,056	1,39,69,743	1,36,58,302	3,11,441
Aug-2018	50,86,579	48,99,235	1,47,00,213	1,41,58,789	5,41,424
Sep-2018	55,73,855	52,64,150	1,61,08,441	1,52,13,394	8,95,047
Oct-2018	60,33,729	57,90,626	1,74,37,477	1,67,34,909	7,02,568
Nov-2018	63,33,005	61,44,228	1,83,02,384	1,77,56,819	5,45,566
Dec-2018	66,96,422	65,09,861	1,93,52,660	1,88,13,498	5,39,161
Jan-2019	67,61,420	61,09,400	1,95,40,504	1,76,56,166	18,84,338
Feb-2019	68,06,260	67,21,856	1,96,70,091	1,94,26,164	2,43,928
Mar-2019	68,57,764	57,35,448	1,98,18,938	1,65,75,445	32,43,493
Total	6,88,48,387	6,54,14,377	19,89,71,838	18,90,47,550	99,24,289
PVVNL					
Apr-2018	29,18,601	28,30,565	84,34,757	81,80,333	2,54,424
May-2018	29,57,138	28,97,112	85,46,129	83,72,654	1,73,475
Jun-2018	30,23,950	29,27,791	87,39,216	84,61,316	2,77,900
Jul-2018	30,69,086	30,12,592	88,69,659	87,06,391	1,63,268
Aug-2018	31,85,723	31,01,980	92,06,739	89,64,722	2,42,017
Sep-2018	33,20,851	32,41,255	95,97,259	93,67,227	2,30,032

Month	Total billable consumers	Billed consumers	Payment made on the basis of billable consumers	Payment required to be made on the basis of billed consumers	Excess payment
1	2	3	4	5	6
Oct-2018	34,59,532	33,63,648	99,98,047	97,20,943	2,77,105
Nov-2018	35,20,638	34,54,846	1,01,74,644	99,84,505	1,90,139
Dec-2018	35,72,727	35,18,647	1,03,25,181	1,01,68,890	1,56,291
Jan-2019	36,06,056	35,52,970	1,04,21,502	1,02,68,083	1,53,419
Feb-2019	36,45,243	36,00,869	1,05,34,752	1,04,06,511	1,28,241
Mar-2019	36,77,130	36,37,619	1,06,26,906	1,05,12,719	1,14,187
Total	3,99,56,675	3,91,39,894	11,54,74,791	11,31,14,294	23,60,497
MVVNL					
Apr-2018	34,20,440	33,51,071	98,85,072	96,84,595	2,00,476
May-2018	34,84,577	34,31,818	1,00,70,428	99,17,954	1,52,474
Jun-2018	35,67,259	35,17,206	1,03,09,379	1,01,64,725	1,44,653
Jul-2018	36,63,337	35,39,737	1,05,87,044	1,02,29,840	3,57,204
Aug-2018	38,71,363	37,64,876	1,11,88,239	1,08,80,492	3,07,747
Sep-2018	41,26,284	39,50,982	1,19,24,961	1,14,18,338	5,06,623
Oct-2018	45,09,394	42,43,842	1,30,32,149	1,22,64,703	7,67,445
Nov-2018	46,97,885	45,62,100	1,35,76,888	1,31,84,469	3,92,419
Dec-2018	49,90,853	47,83,720	1,44,23,565	1,38,24,951	5,98,614
Jan-2019	50,80,172	49,99,483	1,46,81,697	1,44,48,506	2,33,191
Feb-2019	51,69,973	50,97,074	1,49,41,222	1,47,30,544	2,10,678
Mar-2019	52,86,828	52,11,501	1,52,78,933	1,50,61,238	2,17,695
Total	5,18,68,365	5,04,53,410	14,98,99,575	14,58,10,355	40,89,220
Grand Total	20,10,40,837	19,35,75,596	58,10,08,013	55,94,33,464	2,15,74,549

Appendix-5.1
(Referred to in paragraph 5.3)
Statement showing loss due to incorrect categorisations of consumers in both the IT billing systems

Particulars	R-APDRP billing system											
	MUVVNL		PUVVNL		PAVVNL		DVVNL		Total			
	Cases	Amount	Cases	Amount	Cases	Amount	Cases	Amount	Cases	Amount		
LMV1 to 4B	72	27,98,292	35	13,69,186	90	20,39,767	46	31,79,914	243	93,87,159		
LMV2 to 4B	440	86,17,249	375	18,41,517	369	70,22,644	212	22,29,655	1,396	1,97,11,065		
LMV2 to HV1	125	2,48,03,965	60	1,83,38,217	63	74,21,323	27	50,59,305	275	5,56,22,810		
LMV 4A to HV1	98	3,21,05,184	65	1,31,85,000	63	1,63,59,465	83	1,71,09,329	309	7,87,58,978		
LMV 4B to HV1	19	8,55,067	18	6,13,439	10	5,05,499	20	5,75,068	67	25,49,073		
TOTAL	754	6,91,79,757	553	3,53,47,359	595	3,33,48,697	388	2,81,53,271	2,290	16,60,29,084		
Non-RAPDRP billing system												
LMV1 to 4B	180	3,03,168	2	3,762	3	7,257	9	1,58,850	194	4,73,037		
LMV2 to 4B	241	9,53,354	370	26,72,253	260	14,96,117	122	18,01,698	993	69,23,422		
LMV2 to HV1	3	63,308	9	3,86,527	0	0	5	5,94,318	17	10,44,153		
LMV4A to HV1	19	6,68,058	10	6,37,533	7	4,20,019	19	31,69,912	55	48,95,522		
LMV 4B to HV1	4	87,618	7	6,01,247	4	37,120	5	91,039	20	8,17,024		
TOTAL	447	20,75,506	398	43,01,322	274	19,60,513	160	58,15,817	1,279	1,41,53,158		
Grand Total	1,201	7,12,55,263	951	3,96,48,681	869	3,53,09,210	548	3,39,69,088	3,569	18,01,82,242		

Note: LMV 1-Domestic, LMV 2-Non-Domestic, LMV 4A-Public Institution, LMV 4B-Private Institution and HV 1-Non-industrial bulk load.

Appendix-6.1
(Referred to in paragraph 6.2)
Statement showing age-wise analysis of consumer arrear of both the IT billing systems

(₹ in crore)

Particular	R-APDRP billing system			Non R-APDRP billing system			Total		
	Number	Arrear	Security	Number	Arrear	Security	Number	Arrear	Security
Arrear of consumers having last payment date in the data	52,10,071	10,068.62	739.78	52,85,117	5,706.77	480.07	1,04,95,188	15,775.39	1219.85
A. Less than 3 months	37,72,522	3,353.64	642.64	26,59,086	1,357.32	314.08	64,31,608	4,710.96	956.72
B. More than 3 months	14,37,549	6,714.98	97.15	26,26,031	4,349.45	165.98	40,63,580	11,064.43	263.13
3 months to 6 months	4,91,104	785.12	35.99	7,91,745	745.42	46.59	12,82,849	1,530.54	82.58
6 months to 9 months	2,10,898	377.49	14.17	4,52,044	541.07	26.95	6,62,942	918.56	41.12
9 months to 12 months	1,20,867	249.25	8.99	3,68,080	545.17	33.78	4,88,947	794.42	42.77
More than 12 months	6,14,680	5,303.12	37.99	10,14,162	2,517.80	58.66	16,28,842	7,820.92	96.65
Arrear of consumers not having last payment date in the data	24,461	31.20	0.04	1,20,95,654	38,593.54	849.02	1,21,20,115	38,624.74	849.06
Total	52,34,532	10,099.82	739.82	1,73,80,771	44,300.31	1,329.09	2,26,15,303	54,400.13	2068.91

Appendix-6.2
(Referred to in paragraph 6.5)

Rebate to be allowed to prepaid metered Government consumers

Year	No. of consumers under LMV 4(A) Category	Energy charges billed			Rebate due at the rate of 1.25 per cent of Energy charges due to prepaid metering (₹ in crore)
		Rate/unit (₹)	Units Sold (in MU)	Energy Charges (₹ in crore)	
Apr-2017	65,975	6.62	99.75	63.61	0.79
May-2017	66,363	6.68	202.33	129.45	1.62
Jun-2017	66,698	6.62	309.10	194.69	2.43
Jul-2017	66,719	6.60	409.18	255.53	3.19
Aug-2017	66,938	6.59	509.00	316.41	3.95
Sep-2017	66,848	6.59	615.12	381.72	4.77
Oct-2017	68,046	6.56	717.76	442.90	5.54
Nov-2017	67,396	6.57	807.99	499.01	6.24
Dec-2017	67,005	6.57	895.16	552.49	6.91
Jan-2018	9,83,132	0.85	8,751.16	553.28	6.92
Feb-2018	9,86,209	0.87	9,630.57	621.79	7.77
Mar-2018	10,11,383	0.89	10,537.25	695.70	8.70
Apr-2018	67,250	7.13	92.00	59.63	0.75
May-2018	68,651	7.33	187.10	123.73	1.55
Jun-2018	68,167	7.65	288.48	196.35	2.45
Jul-2018	68,930	7.73	385.09	265.21	3.32
Aug-2018	69,364	7.75	476.43	329.38	4.12
Sep-2018	68,894	7.78	567.25	394.40	4.93
Oct-2018	68,955	7.77	651.23	452.14	5.65
Nov-2018	68,580	7.77	724.11	501.88	6.27
Dec-2018	68,876	7.78	799.05	553.71	6.92
Jan-2019	69,070	7.80	875.75	607.41	7.59
Feb-2019	67,805	7.84	944.73	656.99	8.21
Mar-2019	69,794	8.54	1,050.98	801.66	10.02
Total			40,526.57	9,649.07	120.61

Appendix-6.3
(Referred to in paragraph 6.6)
Statement showing year wise total number of unmetered consumers with contracted load and consumption

Year/ Category	Particulars	LMV-1	LMV-2	LMV-3	LMV-5	LMV-8	LMV-9	LMV-10	Total
2014-15	Total No. of consumers	1,33,08,124	12,20,365	7,494	9,50,666	32,275	6,367	86,950	1,56,12,241
	No. of unmetered consumers (UM)	56,71,510	1,10,978	6,582	8,56,688	29,080	476	86,950	67,62,264
	Contracted Load (kW)	85,63,891	2,20,907	89,522	47,70,729	4,75,112	1,316	2,63,295	1,43,84,772
	Unit Sold (Assessed)	8,605.46	214.98	292.35	6,528.93	2,400.42	4.27	410.02	18,456.43
	Percentage of UM to Total Consumers	42.62	9.09	87.83	90.11	90.10	7.48	100.00	43.31
2015-16	Total No. of consumers	1,39,79,931	12,17,382	6,958	10,11,852	32,980	7,353	88,104	1,63,44,560
	No. of unmetered consumers (UM)	59,24,251	1,03,248	6,231	9,06,311	30,136	402	88,104	70,58,683
	Contracted Load (kW)	85,46,249	2,17,458	1,05,999	48,89,521	5,78,749	1,999	2,81,028	1,46,21,003
	Unit Sold (Assessed)	9,683.62	232.89	375.88	7,049.50	2,538.29	3.97	455.96	20,340.11
	Percentage of UM to Total Consumers	42.38	8.48	89.55	89.57	91.38	5.47	100.00	43.19
2016-17	Total No. of consumers	1,46,99,736	12,68,014	5,449	10,65,735	33,397	8,534	88,188	1,71,69,053
	No. of unmetered consumers (UM)	59,56,932	89,394	4,702	9,47,083	29,983	460	88,188	71,16,742
	Contracted Load (kW)	87,44,395	1,80,908	1,14,501	52,51,041	5,32,830	2,440	2,96,014	1,51,22,129
	Unit Sold (Assessed)	12,182.90	259.19	391.38	8,903.51	3,261.09	6.33	503.30	25,507.70
	Percentage of UM to Total Consumers	40.52	7.05	86.29	88.87	89.78	5.39	100.00	41.45
2017-18	Total No. of consumers	1,64,87,271	12,85,816	3,945	11,39,814	33,064	32,029	89,993	1,90,71,932
	No. of unmetered consumers (UM)	50,87,209	80,498	727	1,01,794	7,196	29,945	89,993	53,97,362
	Contracted Load (kW)	74,57,438	1,65,575	77,831	7,88,330	61,694	1,18,791	3,11,556	89,81,215
	Unit Sold (Assessed)	12,970.01	271.84	271.46	2,091.78	138.63	126.26	544.48	16,414.47
	Percentage of UM to Total Consumers	30.86	6.26	18.43	8.93	21.76	93.49	100.00	28.30
2018-19	Total No. of consumers	1,75,01,853	9,73,493	4,573	10,30,809	27,340	8,543	61,737	1,96,08,348
	No. of unmetered consumers (UM)	29,76,650	60,979	3,073	9,47,623	24,470	716	61,737	40,75,248
	Contracted Load (kW)	40,61,189	1,23,828	81,355	61,20,726	4,18,462	3,220	2,83,936	1,10,92,716
	Unit Sold (Assessed)	8,642.67	235.78	381.29	11,592.72	2,714.74	16.00	535.70	24,118.89
	Percentage of UM to Total Consumers	17.01	6.26	67.20	91.93	89.50	8.38	100.00	20.78

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