

# ANNUAL ENERGY AUDIT REPORT



**Designated Consumer**



**TATA POWER-DDL**

**TATA POWER DELHI DISTRIBUTION  
LIMITED**

**NDPL House, Hudson Lines,  
Kingsway Camp, Delhi-110009**

**FY 2023 -24**

**Conducted by**



**A-Z Energy Engineers Private Limited**

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# Table of Contents

<b>List of Abbreviations</b>	<b>5</b>
<b>Acknowledgement</b>	<b>7</b>
<b>1. Executive Summary</b>	<b>8</b>
1.1. Goals and Objectives	8
1.2. About Energy Audit firm	8
1.3. AT&C losses for FY 2023-24	9
<b>2. Background</b>	<b>10</b>
2.1. Extant Regulations and role of BEE	10
2.2. Purpose of audit and accounting Report	12
2.3. Period of Energy Auditing and accounting	12
<b>3. DISCOM Introduction and Overview</b>	<b>14</b>
3.1. Name and address of DISCOM	14
3.2. Name and contact details of energy manager (BEE Certified, if any) and Authorized signatory of DISCOM (Nodal Officer)	14
3.3. Summary profile of DISCOM	14
3.4. Electrical infrastructure and assets voltage wise	19
3.5. Energy Conservation measures	24
<b>4. Energy flow analysis</b>	<b>28</b>
4.1. Energy flow across 5 Service Levels	28
4.2. Validation of metered data	29
4.3. Validation of energy flow data and losses	39
<b>5. Loss and subsidy computation</b>	<b>40</b>
5.1. Energy accounts analysis for previous year	40
5.2. Energy accounts analysis and performance in current year (based on quarterly data)	42
5.3. Subsidy computation and analysis (based on quarterly data)	54
5.4. Trend analysis and identification of key exceptions	56
<b>6. Energy Audit findings</b>	<b>58</b>
6.1. Review of capacity of DISCOM's energy accounting and audit wing	58
6.2. Critical Analysis	59
6.3. Revised findings based on data validation and field verification	66
6.4. Inclusions and Exclusions	66
<b>7. Conclusion and Action Plan</b>	<b>67</b>
7.1. Summary of critical analysis and way forward proposed by Energy Auditor	67
7.2. Summary of key findings – energy balance and losses	67
7.3. Recommendations and best practices	68
7.4. Action plan for line loss reduction	71
7.5. Action plan for monitoring and reporting	72
7.6. Action plan for automated energy accounting	72
<b>Annexures</b>	<b>74</b>
Annexure I - Introduction of Verification Firm	74
Annexure II - Minutes of Meeting with the DISCOM team	76
Annexure III - Check List prepared by auditing Firm	77
Annexure IV - Brief Approach, Scope & Methodology for audit	78
Annexure V - Infrastructure Details	79
Annexure VI - Electrical Distribution System	81
Annexure VII - Power Purchase Details	82
Annexure VIII - Single Line Diagram (SLD)	85
Annexure IX - Category of service details (With Consumer and voltage-wise)	86
Annexure X - Field Verification data and reports	87
Annexure XI - List of documents verified with each parameter	90

Annexure XII - Brief Description of Unit	91
Annexure XIII - List of Parameters arrived through calculation or formulae with list of documents as source of data	94
Annexure XIV - Detailed Formats	95

## List of Tables

Table 1: Energy Balance& Losses for FY 2023-24.....	9
Table 2: Period of Energy Auditing and Accounting.....	13
Table 3: Name and Address of DISCOM .....	14
Table 4: Details of Energy Manager and Authorized signatory of DISCOM .....	14
Table 5: Details of Energy Manager and Authorized signatory of DISCOM .....	15
Table 6: Administrative hierarchy structure in Tata Power-DDL .....	16
Table 7: Administrative hierarchy in Tata Power-DDL up to section level.....	16
Table 8: Customer Profile for FY 2023-24 .....	17
Table 9: Network Infrastructure details.....	19
Table 10: Input Energy & Infrastructure details.....	19
Table 11: Voltage wise Meter Consumers .....	20
Table 12: Numbers of Distribution Transformers and Metering .....	20
Table 13: Voltage wise numbers of Feeders and Metering .....	21
Table 14: Length of Distribution Lines.....	21
Table 15: Energy Flow details.....	21
Table 16: Consumer category wise consumption pattern.....	22
Table 17: Data of 10% 11kV feeder Meters .....	29
Table 18: 1% Input Energy Points.....	36
Table 19: Data of Rohini Division .....	36
Table 20: Data of Mangolpuri Division.....	37
Table 21: Data of Pitampura Division.....	37
Table 22: Data of Keshav Puram Division .....	38
Table 23: Verified Category wise Consumers and Energy .....	39
Table 24: AT&C losses of previous three years .....	40
Table 25: Division wise Input and Billed Energy FY 2021-22&2022-23.....	41
Table 26: Division wise T&D and AT&C losses in FY 2021-22 & FY 2022-23 .....	41
Table 27: Circle wise Comparison for FY 2023-24 .....	42
Table 28: Division wise input energy & billed energy for FY 2023-24.....	42
Table 29: Energy Input and AT&C Losses for FY 2023-24 .....	44
Table 30: Voltage-wise AT&C Losses for FY 2023-24 .....	44
Table 31: Circle wise consumers, Connected load, Input and Billed Energy in FY 2023-24.....	45
Table 32: Circle wise T&D losses, Collection Efficiency and AT&C losses for FY 2023-24.....	46
Table 33: Division wise T&D losses, Collection Efficiency and AT&C losses for FY 2023-24.....	47
Table 34: Divisions wise connections & energy consumptions .....	51
Table 35: Divisions wise AT&C losses (%) & T&D losses (%).....	51
Table 36: High Loss Feeders .....	53
Table 37: Category wise subsidyDivision wise subsidy details .....	54
Table 38: Comparison of AT&C and T&D losses for last twoYears.....	56
Table 39: AT&C losses Trend for last three Years.....	57
Table 40: Details of energy manager and Authorized signatory of DISCOM .....	58
Table 41: Compliance status w.r.t Timelines and Pre-requisites.....	59
Table 42: Summary of Data gaps.....	64
Table 43: Comments by Energy Auditor and responses of DISCOM management .....	65
Table 44: Energy balance and losses .....	67
Table 45: Infrastructure details .....	79
Table 46: Metering details .....	79
Table 47: Category of service details .....	86
Table 48: Field inspection details .....	87
Table 49: List of documents verified with each parameter .....	90
Table 50: Formulas used to derive the parameters.....	94

## List of Figures

Figure 1: Regulatory framework for Energy Accounting & Audit.....	11
Figure 2: Organogram of Energy accounting in the DISCOM .....	15
Figure 3: Category wise consumer share.....	18
Figure 4: Category wise Load share.....	18
Figure 5: Category wise Billed Units .....	18
Figure 6: Circle wise Energy Input (MU) and Energy Billed (MU) Pattern .....	22
Figure 7: Core Values of TATA Power-DDL.....	23
Figure 8: Energy Flow Diagram.....	28
Figure 9: Comparison of Losses – Last 3 FYs – 20-21/21-22/22-23.....	40
Figure 10: Division wise Input Energy Share .....	43
Figure 11: Division wise Input Energy Share .....	43
Figure 12: Last two years AT&C loss trend.....	56
Figure 13: Last two years T&D loss trend .....	57
Figure 14: Organogram of Energy accounting in the DISCOM .....	58
Figure 15: Single Line Diagram (SLD) of Tata Power DDL.....	85



## List of Abbreviations

ADMS	Advanced Distribution Management System
ADR	Automated Demand Response
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AT&C	Aggregate Technical and Commercial
BDR	Behavioural Demand Response
BEE	Bureau of Energy Efficiency
BLDC	Brushless DC
Ckt	Circuit
CT	Current Transformer
DC	Designated Consumer
DEEP	Discovery of Efficient Electricity Price
DISCOM	Electricity Distribution Company
DMS	Distribution Management System
DT	Distribution Transformer
EA	Energy Auditor
EHT	Extra High Tension
EHV	Extra High Voltage
EM	Energy Manager
ERP	Enterprise Resource Planning
FFA	Field Force Automation
FY	Financial Year
GIS	Geographic Information System
GIUNC	Global Intelligent Utility Network Coalition
HT	High Tension
HVDS	High Voltage Distribution System
IPDS	Integrated Power Development Scheme
kVA	Kilo Volt Ampere
LT	Low Tension
MoP	Ministry of Power
MU	Million Units
M&V	Monitoring & Verification
MW	Mega Watt
NO	Nodal Officer
OA	Open Access
OMS	Outage Management System
PAT	Perform, Achieve and Trade
POC	Point of Connection
PSS	Packaged sub-station
PT	Potential Transformer
PX	Power Exchange
R-APDRP	Re-structured Accelerated Power Development and Reforms Programme
RDSS	Revamped Distribution Sector Scheme
RE	Renewable Energy
RLDC	Regional Load Dispatch Centre
RLB	Rural Local Bodies

RPO	Renewable Purchase Obligation
SCADA	Supervisory Control and Data Acquisition
SDA	State Designated Agency
SLD	Single Line Diagram
SLDC	State Load Dispatch Centre
T&D	Transmission and Distribution
ULB	Urban Local Bodies

## Acknowledgement

We would like to express our heartfelt gratitude to Tata Power Delhi Distribution Limited, Delhi for providing us with the opportunity to conduct Energy Audit of the DISCOM for FY 2023-24, in accordance with Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies) Regulations, 2022 and its Amendments.

We are immensely grateful to the management of Tata Power Delhi Distribution Limited, Delhi, for their invaluable cooperation and providing us with all the relevant information necessary for the successful completion of the Annual Energy Audit FY 2023-24.

We also extend our sincere thanks to the entire working group comprising of:

Mr. Gajanan S. Kale – CEO

Mr. HC Sharma– General Manager (Nodal Officer)

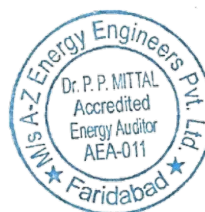
Mr. Davinder Bhatia – DGM, (Energy Manager)

Mr. Hari Om Sharma – Head of Group, Energy Audit Group

Ms. Gagandeep Kaur - Senior Manager, Energy Audit Group

for their immense support and assistance throughout the audit process.

We look forward to a continued partnership with Tata Power Delhi Distribution Limited, Delhi, and we express our gratitude for their continued support in all our future endeavours.



**Signature**

Name: Dr. P.P Mittal

Designation: Director

Registered No: EmAeA-0024

Firm: A-Z Energy Engineers Pvt. Ltd.

## **1. Executive Summary**

Tata Power-DDL, a joint venture between Tata Power Company and the Government of NCT of Delhi with the majority stake being held by Tata Power (51%). It distributes electricity in North & Northwest parts of Delhi. The company started its operations on July 1, 2002, post the unbundling of erstwhile Delhi Vidyut Board to distribute electricity from Delhi Transco Limited end to the end consumers.

The Input energy purchased (from Generation source), Net Input energy (at Discom periphery after adjusting for transmission losses and traded energy) & Total Energy billed by Tata Power-DDL for their customers is 12686.10MU, 10660.43 MU & 10028.15MU respectively, for FY 2023-24, and the average monthly consumption stands at 412.46kWhr/per consumer/month.

Tata Power-DDL caters to network area spread in 5 circles, 12 Divisions across an area of 510 sq.kms.

### **1.1. Goals and Objectives**

Tata Power-DDL is a designated consumer in Discom sector. Being a designated Consumer, Tata Power-DDL ought to have Annual energy audit (Accounting) of their facilities as per BEE notification No. 18/1/BEE/Discom/2021 dated 6<sup>th</sup> October 2021.

The Annual Energy Audit & Accounting at Tata Power-DDL is conducted with the following Objectives:

- Verification of existing pattern of energy distribution across periphery of DISCOM.
- Verification of accounted energy flow submitted by DISCOM at all applicable voltage levels of the distribution network.
- Verification of the accuracy of the data collected, analysis of data with respect to consistency, improvement in accounting and reducing losses of DISCOM.
- Verification of the information submitted by DC to the SDA/BEE about status of Energy Input, Output and Losses for the previous two/three years.
- Access the past performance of the establishment.
- Quantification of Energy Losses and Energy Saving Potential.

### **1.2. About Energy Audit firm**

A-Z Energy Engineers Pvt. Ltd., an Accredited Energy Auditor from BEE and an ISO 9001:2015 certified company that aims to assist all stakeholders in implementing energy efficiency and creating awareness about the merits of implementing energy efficiency and safety practices. They are empanelled by BEE for PAT M & V Audits and Mandatory Energy Audit Projects and have completed more than 1260 projects, including 52 PAT projects.

The founder Director, Shri. Dr PP Mittal, has received several awards and recognitions for his services in the field of energy. We have a pool of experienced BEE Accredited & Certified Energy Auditors, Electrical Engineers, Mechanical Engineers and Technicians having experience of more

than 30 years. The Energy Audits are being carried out with sophisticated instruments namely Power-Analyzer, Flue Gas Analyzer, Ultra-sonic flow meter, Techo-meter, Anemometer, Hego-Meter, Digital Thermometer, Thermographic Camera's, Lux Meter, Leak detectors. Laser gun etc.

### 1.3. AT&C losses for FY 2023-24

The AT&C loss for FY 2023-24 for TATA Power-DDL stands at 5.92%, which is approximately same as the T&D (Transmission and Distribution) losses as the collection efficiency has been close to 100.01%. The AT&C losses for the FY 2023-24 are shown in the table below:

**Table 1: Energy Balance& Losses for FY 2023-24**

Energy Input Details	Formula	UoM	Value
Input Energy Purchase (From Generation Source)	A	MU	12686.10
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	10660.43
Total Energy billed (is the Net energy billed, adjusted for energy traded)	C	MU	10028.15
Transmission and Distribution (T&D) loss Details	D	MU	632.28
	$E = D/B \times 100$	%	5.93%
Collection Efficiency	F	%	100.01%
Aggregate Technical & Commercial Loss	$G = 1 - \{(1-E) \times \text{Min}(F, 100\%)\}$	%	5.92%

## **2. Background**

### **2.1. Extant Regulations and role of BEE**

#### **2.1.1. Objectives of BEE**

- To develop policies and programmes on efficient use of energy and its conservation with the involvement of stakeholders.
- To plan, manage and implement energy conservation programmes as envisaged in the Energy Conservation Act, 2001
- To assume leadership and provide policy framework and direction to national energy efficiency and conservation efforts and programmes.
- To demonstrate energy efficiency delivery mechanisms, as envisaged in the Energy Conservation Act, 2001, through Public-Private Partnership (PPP).
- To establish systems and procedures to measure, monitor and verify energy efficiency results in individual sectors as well as at the national level.
- To leverage multi-lateral, bi-lateral and private sector support in implementation of programmes and projects on efficient use of energy and its conservation.
- To promote awareness of energy savings and energy conservation.

#### **2.1.2. Role of BEE**

- BEE coordinates with designated agencies, designated consumers and other organizations working in the field of energy conservation/efficiency to recognize and utilize the existing resources and infrastructure in performing the functions assigned to the Bureau under the Energy Conservation Act.
- The Act provides regulatory mandate for: standards & labeling of equipment and appliances; energy conservation building code for commercial buildings; and energy consumption norms for energy intensive industries.
- The EC Act was amended in 2010 to incorporate few additional provisions required to better equip BEE to manage ever evolving sphere of energy efficiency in the country.
- Create awareness and disseminate information on energy efficiency and conservation.
- Arrange and organize training of personnel and specialists in the techniques for efficient use of energy and its conservation.
- Strengthen consultancy services in the field of Energy Efficiency.
- Promote research and development.
- Develop testing and certification procedures and promote testing facilities.

- Formulate and facilitate implementation of pilot projects and demonstration projects.
- Promote use of energy efficient processes, equipment, devices and systems.
- Take steps to encourage preferential treatment for use of energy efficient equipment or appliances.
- Promote innovative financing of energy efficiency projects.
- Give financial assistance to institutions for promoting efficient use of energy and its conservation.
- Prepare educational curriculum on efficient use of energy and its conservation.
- Implement international co-operation programmes relating to efficient use of energy and its conservation.

### 2.1.3. Regulatory framework for Energy Accounting & Audit

The Energy Conservation Act 2001 (hereafter referred to as EC Act 2001) was enacted on 29<sup>th</sup> September 2001. The EC Act 2001 empowers BEE to notify regulations regarding energy conservation and efficiency improvement. In accordance with the EC Act 2001, BEE notified the Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit) Regulations, 2021, on 6<sup>th</sup> October 2021. BEE subsequently amended these regulations with the Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit) (Amendment) Regulations, 2022. The Ministry of Power (MoP) issued guidelines on 17<sup>th</sup> January 2023, for energy accounting and auditing of distribution companies, in line with the BEE regulations. Distribution companies and energy audit firms must comply with this regulatory framework when preparing energy accounts and audit reports. The regulatory framework for Energy Accounting and Energy Auditing is shown in the below figure:

**Figure 1: Regulatory framework for Energy Accounting & Audit**



Key highlights of the Regulatory framework are listed below:

- Bureau of Energy Efficiency (BEE) through Ministry of Power, Government of India issued regulations for Conduct of Mandatory Annual Energy Audit and Periodic Energy Accounting in DISCOMs. As per the regulation, all Electricity Distribution Companies are mandated to conduct annual energy audit and periodic energy accounting on quarterly basis.
- Owing to the impact of energy auditing on the entire distribution and retail supply business and absence of an existing framework with dedicated focus on the same, it was imperative to develop a set of comprehensive guidelines that all Distribution utilities across India can follow and adhere to.
- Accordingly, Regulations on Manner and Intervals for Conduct of Energy Audit and Accounting in Electricity Distribution Companies has been framed. Energy Accounting means accounting of all energy inflows at various voltage levels in the distribution periphery of the network, including renewable energy generation and open access consumers, and energy consumption by the end consumers. Energy accounting and a consequent annual energy audit would help to identify areas of high loss and pilferage, and thereafter focus efforts to take corrective action.
- These Regulations for Energy audit in Electricity Distribution Companies provides broad framework for conduct of Annual and Quarterly Periodic Energy Accounting with necessary pre-requisites and reporting requirements to be met.

## **2.2. Purpose of audit and accounting Report**

Tata Power-DDL is a designated consumer in Discom sector. Being a designated Consumer, Tata Power-DDL need to have Annual and Quarterly Energy Audit and Accounting of its facilities as per BEE notification No 18/1/BEE/Discom/2021 dated 6<sup>th</sup> October 2021.

The energy intensity of India is higher with respect to GDP growth and there is an urgent need to address these issues on priority through integrated and comprehensive approach and by adopting latest techniques and technologies with active participation of all stakeholders.

Annual Energy Audit and Accounting will not only help in reducing losses in system, but it also helps DISCOM in sustainable growth. The objective of this energy audit is to reduce T&D loss and AT&C loss of the DISCOM through identification of commercially viable and implementable schemes for reduction of technical and commercial loss in the DISCOM thus leading to sustainable energy cost reductions.

## **2.3. Period of Energy Auditing and accounting**

Energy audit activity was started with a meeting at Head Office of Tata Power-DDL in the month of May & June' 2024. Based on the requirement, visit was made to Division, Subdivision and Grid etc. for data collection and technical discussion. The period of study was from April 2023 to March 2024.



**Table 2: Period of Energy Auditing and Accounting**

Particulars	Energy Accounting				Energy Audit
	Q1	Q2	Q3	Q4	FY 2023-24
Applicable period	01-Apr-23 to 30-Jun-23	01-Jul-23 to 30-Sep-23	01-Oct-23 to 31-Dec-23	01-Jan-24 to 31-Mar-24	01-Apr-23 to 31-Mar-24
Date of Commencement	01-July-23	04-Oct-23	04-Jan-24	05-Apr-24	06-Apr-24
Date of Publishing	13-Oct-23	02-Jan-24	01-Mar-24	02-June-24	-
Officer In charge	Mr. Hari Om Sharma (Head of Group, Energy Audit)				Dr. P P Mittal [AEA 0011] Registration No: EmAEA- 0024

### 3. DISCOM Introduction and Overview

#### 3.1. Name and address of DISCOM

Tata Power-DDL is having its corporate office at NDPL House, Hudson Lines, Kingsway Camp, Delhi – 110009

**Table 3: Name and Address of DISCOM**

Particulars	Details
NameofDC	Tata Power Delhi Distribution Limited
Address	NDPL House, Hudson Lines, Kingsway Camp, Delhi-09, P.O. GTB Nagar, Delhi

#### 3.2. Name and contact details of energy manager (BEE Certified, if any) and Authorized signatory of DISCOM (Nodal Officer)

Energy Accounting/Audit wing is headed by Mr. Gajanan S. Kale (CEO). BEE certified Energy Manager, Mr. Davinder Bhatia (DGM) is leading the energy accounting activities in Tata Power-DDL. Mr. H C Sharma (GM) is Authorized Signatory/ Nodal Officer. The details of DISCOM's energy manager and authorized signatory for this report are shown below:

**Table 4: Details of Energy Manager and Authorized signatory of DISCOM**

Particulars	Details
Energy Manager	Mr. Davinder Bhatia (DGM) EM Mobile: 9599819561 Email: <a href="mailto:davinder.bhatia@tatapower-ddl.com">davinder.bhatia@tatapower-ddl.com</a>
Authorized Signatory	Mr. HC Sharma (General Manager) Ph: 91-1166050595

#### 3.3. Summary profile of DISCOM

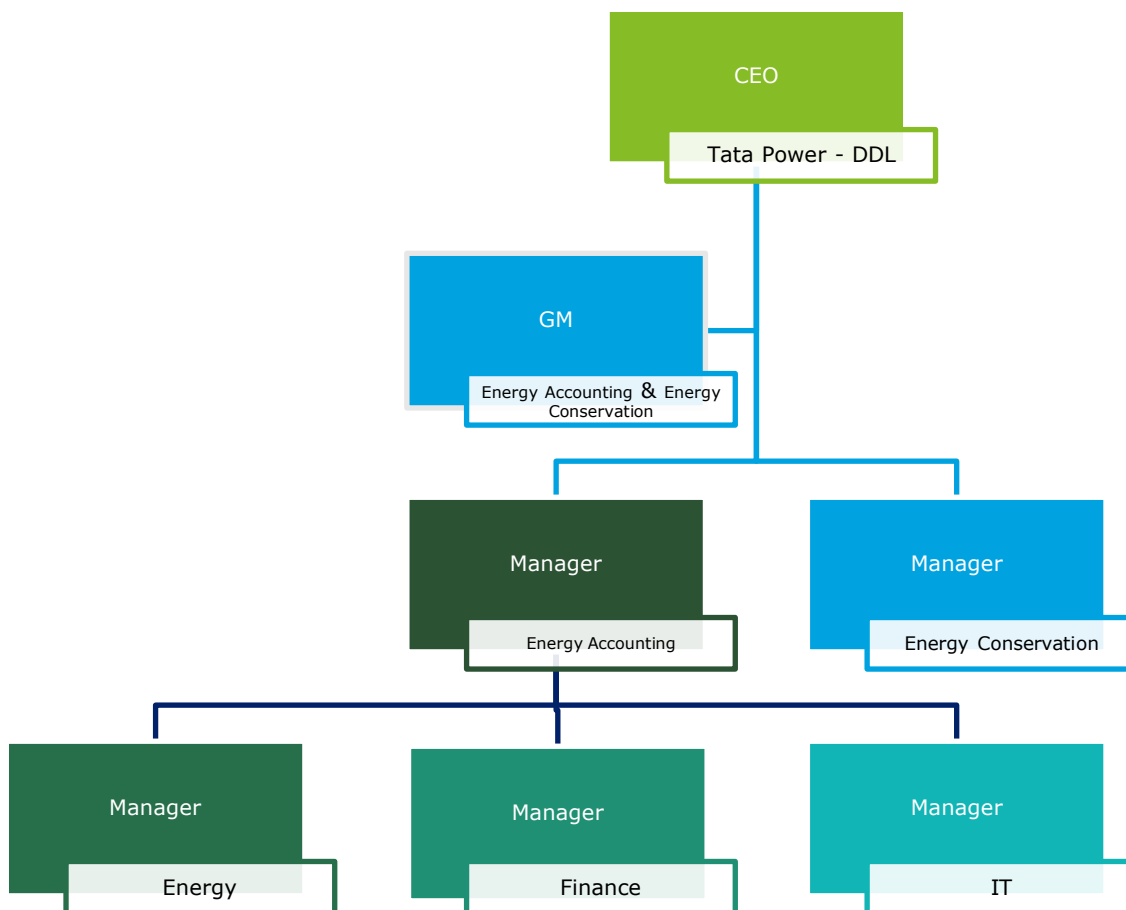
##### 3.3.1. Jurisdiction of DISCOM

Tata Power Delhi Distribution Limited [Tata Power-DDL] is a joint venture between Tata Power and the Government of NCT of Delhi with the majority stake being held by Tata Power Company (51%). Tata Power-DDL is acknowledged for its consumer-friendly practices. Since privatization, the Aggregate Technical & Commercial (AT&C) losses in Tata Power-DDL area have shown a record decline. Tata Power-DDL Strives to Serve Utilities across the globe to improve their standards of performance and create long term value with their strategic partners. Its distribution network is spread over an area of 510 sq. km covering 5 circles, 12 Divisions, catering to a customer base of over 2 million.

### 3.3.2. Energy Accounting/Audit wing in the DISCOM:

The Energy Accounting/Audit wing in the DISCOM has been established on 11-Feb-22. The Organogram of the DISCOM wrt Energy Auditing and Accounting is as shown below:

**Figure 2: Organogram of Energy accounting in the DISCOM**



**Table 5: Details of Energy Manager and Authorized signatory of DISCOM**

Designation	No. of Officers
CEO	Mr. Gajanan S. Kale
General Manager (Nodal Officer)	Mr. HC Sharma
DGM (Energy Manager)	Mr. Davinder Bhatia
Head of Group, Energy Audit	Mr. Hari Om Sharma
Sr. Manager, Energy Audit	Mr. Neeraj Singh
Sr. Manager, Energy Audit	Ms. Gagandeep Kaur
Finance Manager	Mr. Sachin Gupta
IT Manager	Ms. Kamakshi Oberoi

### 3.3.3. Administrative hierarchy

Tata Power-DDL is having its corporate office at NDPL House, Hudson Lines, Kingsway Camp, Delhi-09 and has 5 Circles. These Circles are further divided into Divisions, Sub-Divisions and Sections as shown in the below tables.

**Table 6: Administrative hierarchy structure in Tata Power-DDL**

Parameters	Value
Number of circles	5
Number of divisions	12
Number of sub-divisions	31
Number of sections	-

The Circles are further divided into Divisions, Sub-Divisions and Sections as shown in the table below:

**Table 7: Administrative hierarchy in Tata Power-DDL up to section level**

Circle	Division	Sub-Division	Section
City	Moti Nagar	1301	Not Applicable
		1302	
		1303	
		1304	
Urban	Badli	507	
		516	
		572	
	Rohini	551	
		561	
		571	
		581	
	Shalimar Bagh	414	
		503	
		506	
		531	
		532	
Sub-Urban Circle	Bawana	512	
		521	
		533	
	Narela	511	
		514	
		517	
Town Circle	Civil Lines	522	
		411	
		416	

Circle	Division	Sub-Division	Section
		417	
		418	
		421	
		423	
		424	
	Model Town	402	
		412	
		413	
		415	
		505	
	Keshavpuram	501	
		502	
		509	
		520	
		422	
425			
Metro Circle	Kirari	523	
		513	
	Mangolpuri	515	
		518	
		519	
	Pitam Pura	504	
		508	
		510	
		530	

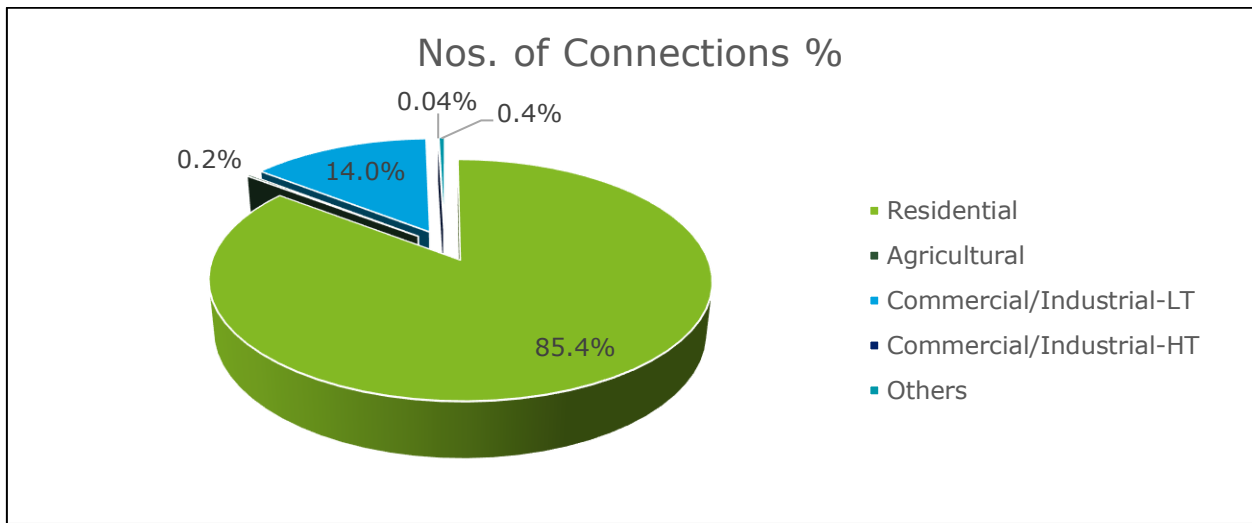
### 3.3.4. Consumer Details

Energy consumption with type of customer is given in the table:

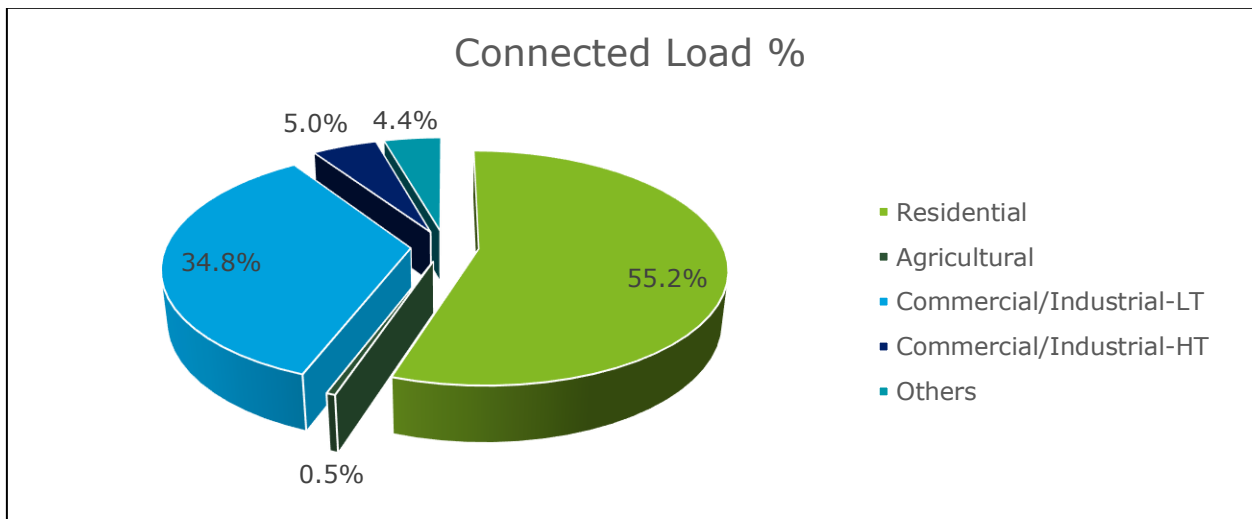
**Table 8: Customer Profile for FY 2023-24**

Category	No. of Connections		Connected Load		Billed Energy		Billed Amount in Rs. Crore	Collected Amount in Rs. Crore
	Nos	%	MW	%	MU	%		
Residential	1729505	85.4%	3752.28	55.2%	4925.85	49%	3359.98	3362.98
Agricultural	4466	0.2%	33.82	0.5%	15.34	0%	11.67	11.95
Commercial/ Industrial-LT	282712	14.0%	2368.41	34.8%	3779.90	38%	5850.22	5848.75
Commercial/ Industrial-HT	802	0.04%	342.50	5.0%	656.16	7%	959.96	960.01
Others	8619	0.4%	300.10	4.4%	650.90	6%	712.44	712.11
<b>Total</b>	<b>2026104</b>	<b>100%</b>	<b>6797.11</b>	<b>100%</b>	<b>10028.15</b>	<b>100%</b>	<b>10894.28</b>	<b>10895.80</b>

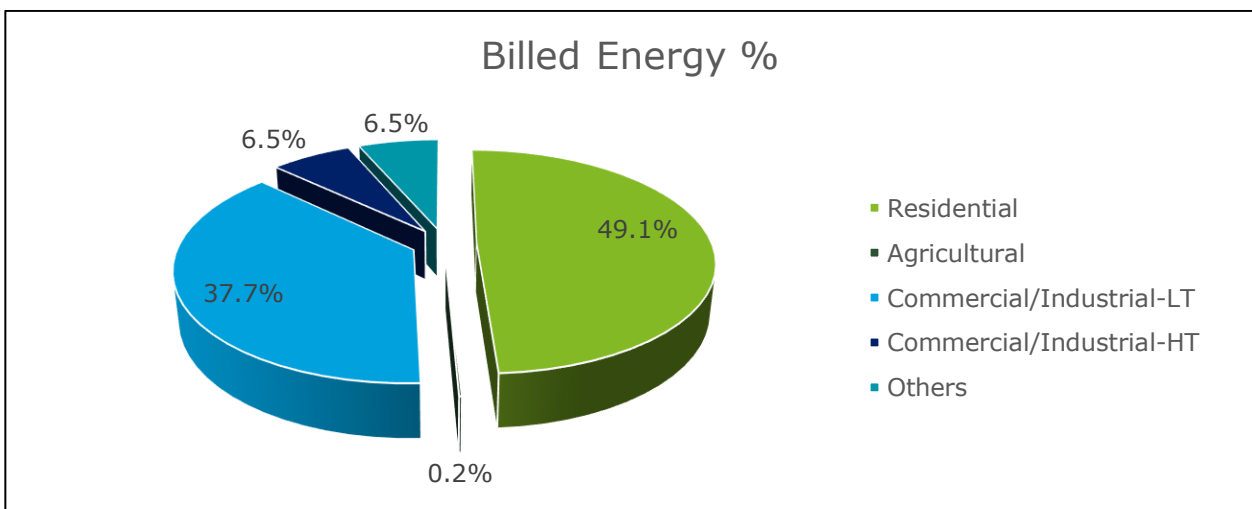
**Figure 3: Category wise consumer share**



**Figure 4: Category wise Load share**



**Figure 5: Category wise Billed Units**



### 3.4. Electrical infrastructure and assets voltage wise

The following table provides the details of network infrastructure owned by Tata Power-DDL:

**Table 9: Network Infrastructure details**

Asset	Particulars	Unit	FY20-21	FY21-22	FY22-23	FY 23-24
66 kV and above	66/ 11 kV Sub station	Nos			42	
	66 kV Feeders	Nos	134	132	137	142
	66 kV Line	Ckt. km	536.92	538.7	554.01	567
33 kV	33/ 11 kV Sub station	Nos			42	
	33 kV Feeders	Nos	108	108	111	115
	33 kV Line	Ckt. km	477.11	477.3	482.19	519.65
11 kV	11 kV Feeders	Nos	1280	1341	1286	1312
	11 kV Overhead Line	Ckt. km	4999.2	5132	5236.9	2209
	11 kV Underground Line	Ckt. km			3028	3154
LT	LT Line	Ckt. km	7354.1	7485	7588	7809.1
PT	Power Transformer	Nos			219	222
	Power Transformer Capacity	MVA	-	-	5143	5267
DT	Distribution Transformer	Nos	Above 250kVA-4594 nos., equal to and less than 250kVA-2654 nos.	Above 250kVA-4744 nos., equal to and less than 250kVA-2804 nos.	Above 250kVA-4986 nos., equal to and less than 250kVA-3171 nos.	Above 250kVA-5210nos., Equal to and less than 250kVA-3481
	Distribution Transformer Capacity	MVA			3421.1	3575.4

The Input energy, consumption, transmission losses and key infrastructure details of Tata Power-DDL are summarized in table below:

**Table 10: Input Energy & Infrastructure details**

Parameters	FY 2023-24
Input Energy purchased (MU)	12686
Transmission loss (%)	4%
Transmission loss (MU)	526.473144
Energy sold outside the periphery (MU)	1501.583217
Open access sale (MU)	85.865
EHT sale	208.938
Net input energy (received at DISCOM periphery or at distribution point)-(MU)	10742.30
Is 100% metering available at 66/33 kV (Select yes or no from list)	Yes
Is 100% metering available at 11 kV (Select yes or no from list)	Yes
% of metering available at DT	70%

Parameters	FY 2023-24
% of metering available at consumer end	100%
No of feeders at 66kV voltage level	142
No of feeders at 33kV voltage level	115
No of feeders at 11kV voltage level	1312
No of LT feeders level	17527
Line length (ckt. km) at 66kV voltage level	567
Line length (ckt. km) at 33kV voltage level	519.65
Line length (ckt. km) at 11kV voltage level	5363
Line length (km) at LT level	7809.1
Length of Aerial Bunched Cables	5822
Length of Underground Cables	6571.7
HT/LT ratio	0.825914638

### 3.4.1. Metering details

The status of meters installed in Tata Power-DDL as on 31-03-24 are given in the below tables:

**Table 11: Voltage wise Meter Consumers**

Parameters	66kV and above	33kV	11/22kV	LT
Number of conventional metered consumers	0	0	0	1593831
Number of consumers with 'smart' meters	0	0	0	394120
Number of consumers with 'smart prepaid' meters	0	0	0	3474
Number of consumers with 'AMR' meters	8	4	897	29849
Number of consumers with 'non-smart prepaid' meters	0	0	0	3921
Number of unmetered consumers	0	0	0	0
<b>Number of total consumers</b>	<b>8</b>	<b>4</b>	<b>897</b>	<b>2025195</b>

### 3.4.2. Distribution Transformer (DT) details

The details of distribution transformers in Tata Power-DDL as on 31-03-24 are given in the below tables:

**Table 12: Numbers of Distribution Transformers and Metering**

Parameters	66kV and above	33kV	11/22kV	LT
Number of conventionally metered Distribution Transformers	-	-	260	-
Number of DTs with communicable meters	-	-	5861	-
Number of unmetered DTs	-	-	2570	-
<b>Number of total Transformers</b>	<b>-</b>	<b>-</b>	<b>8691</b>	<b>-</b>



### 3.4.3. Feeder details

The details of feeders in Tata Power-DDL as on 31-03-24 are given in the below tables:

**Table 13: Voltage wise numbers of Feeders and Metering**

Parameters	66kV and above	33kV	11/22kV	LT
Number of metered feeders	142	115	1312	0
Number of feeders with communicable meters	142	115	1312	0
Number of unmetered feeders	0	0	0	17527
<b>Number of total feeders</b>	<b>142</b>	<b>115</b>	<b>1312</b>	<b>17527</b>

### 3.4.4. Distribution Line details

The details of distribution lines in Tata Power-DDL as on 31-03-24 are given in the below tables:

**Table 14: Length of Distribution Lines**

Particulars	Value(km)
Line length (ckt km)	1865
Length of Aerial Bunched Cables	5822
Length of Underground Cables	6571.7

### 3.4.5. Energy Flow details

Energy flow details for FY 2023-24 are given in the below table:

**Table 15: Energy Flow details**

Parameters	Values
Input Energy purchased (MU)	12686
Transmission loss (%)	4%
Transmission loss (MU)	526.473144
Energy sold outside the periphery(MU)	1501.583217
Open access sale (MU)	85.865
EHT sale	208.938
Net input energy (received at DISCOM periphery or at distribution point)-(MU)	10742.30
Total Energy billed (MU)	10028.15
Transmission and Distribution (T&D) Loss (MU)	632.28
T&D Loss (%)	5.93%

### 3.4.6. Pattern of energy distribution

#### Power Purchase:

During the analyzed period, Tata Power-DDL purchased energy of 12686.10 million units (MUs) in FY 2023-24. The company's energy purchase varies considerably from month to month depending upon seasonal impact.

#### Energy Billed:

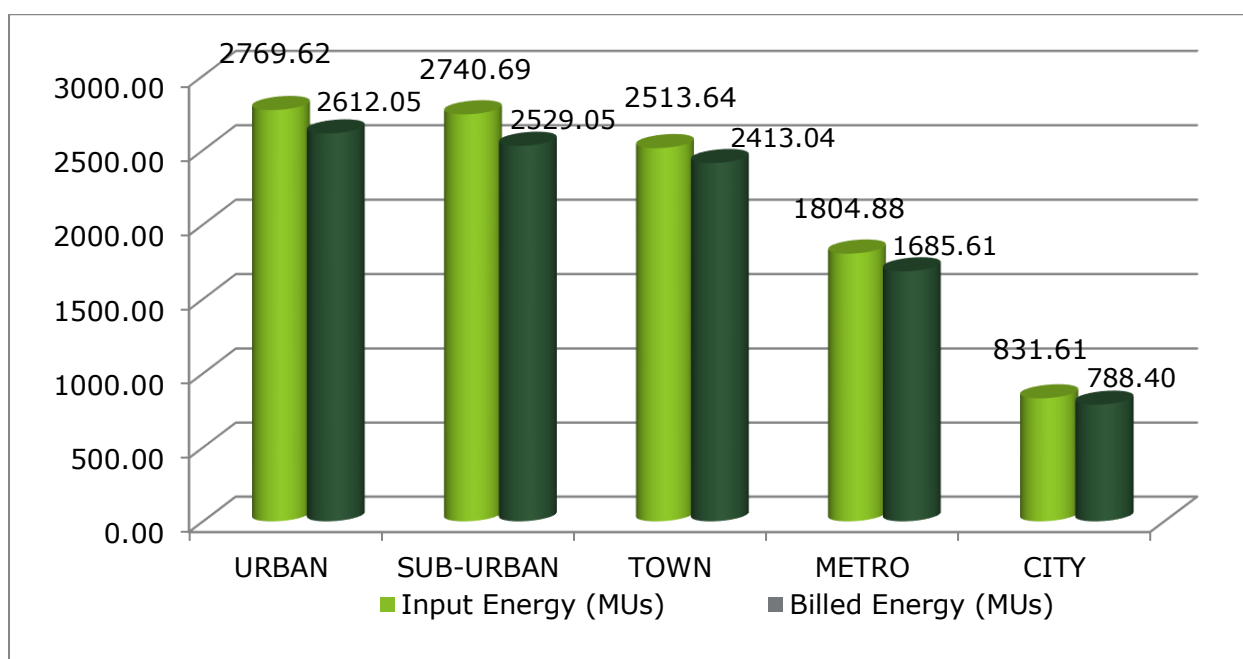
Category wise – consumer count and energy consumption has been provided in table below. Maximum energy consumption has been recorded against domestic consumers.

**Table 16: Consumer category wise consumption pattern**

VoltageLevel	Consumers		Energy Consumption	
	No.	%Share	MUs	%Share
Domestic	1,729,505	85.36%	4,925.85	49.12%
HT Industrial	802	0.04%	656.16	6.54%
LT Industrial	282712	13.95%	3779.9036	37.69%
Agricultural	4466	0.22%	15.341482	0.15%
Others-3 (if any , specify in remarks)	8619	0.43%	650.89633	6.49%
<b>Total</b>	<b>2,026,104</b>	<b>100%</b>	<b>10,028.15</b>	<b>100%</b>

Circle wise Energy Input and Energy Billed has been shown below:

**Figure 6: Circle wise Energy Input (MU) and Energy Billed (MU) Pattern**



### 3.4.7. Salient features

Tata Power-DDL main objectives are to achieve efficiency gains and make necessary changes to make the company commercially viable, progressively self-sustainable, and less dependent on the

government while balancing the interests of consumers with regards to quality of service and economical tariffs.

**a) Vision**

To be the most trusted and admired provider of reliable, competitive and sustainable power and services using technology and innovative solutions and be the utility of choice for all stakeholders.

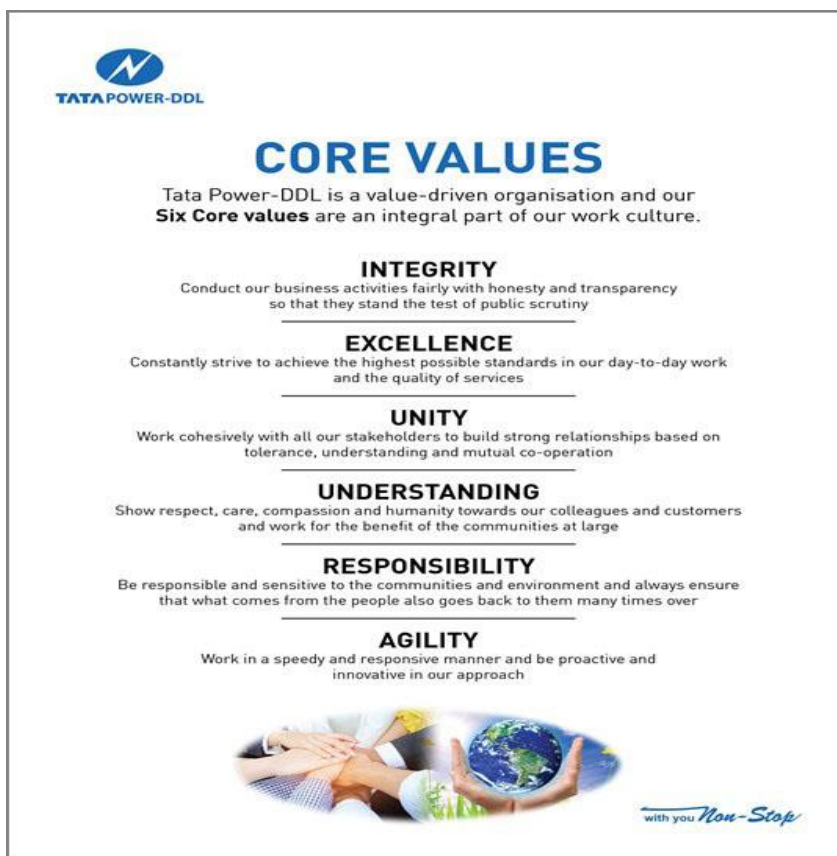
**b) Mission**

- Our mission is **to deliver world class services to the customer** and to create benchmarks to become a global utility leader with energy efficient services and energy solutions. Innovate to Deliver World Class Services to the Consumers.
- Create Benchmarks to become a Global Utility Leader with Energy efficient services and clean energy solutions.
- Achieve Excellence Through Safety, Technology Adoption, Collaborations and Teamwork.
- Reach out and Engage in Community Development Programs and Initiatives.
- Empower Employees, Enrich Creativity and Enhance Learning.

**c) Core Values**

Tata Power-DDL is a value-driven organisation and there are Six Core values as an integral part of its work culture.

**Figure 7: Core Values of TATA Power-DDL**



### 3.5. Energy Conservation measures

Energy conservation is a critical issue in today's world, as the demand for energy continues to increase while the resources available to produce it are finite. Energy conservation measures that have already been taken and proposed for the future are explained below.

#### 1. Energy Conservation Measures taken by Tata Power DDL for Network strengthening and Loss Reduction:

- 1. Sub-Transmission Network Optimization:** Tata Power-DDL has mesh network at 33 & 66 kV level which is operated in a radial manner. The NOPs (Normal Open Points) are decided after conducting thorough loss studies and the most optimal configuration is adopted for minimizing loss while meeting other operational & reliability requirements. The exercise is conducted annually to incorporate benefits from addition of new circuits. Also a separate configuration is adopted for the winter months (Nov to Mar) to take advantage of lower loading levels. The winter reconfiguration result is expected saving of approximately 0.6 GWh annually.
- 2. 11 kV Network Optimization:** The 11kV network is also a mesh network operated in a radial manner. TATA Power-DDL has initiated an internal project in FY23-24 to reconfigure the network for minimizing loss while meeting other operational & reliability requirements. This is expected to contribute to reduction in technical loss by over 0.5 GWh annually.
- 3. Change in Cable Specifications:** Due to operational requirements, the standard rating of service cable catering to single phase consumers with sanctioned load of 6 to 10 kW has been revised from 2x10 sq.mm. Al XLPE to 2x25 sq.mm. Al XLPE. The reduction in resistivity has resulted in reduction of technical losses.
- 4. Energy Management Systems:** The Company has implemented energy management systems to monitor and control energy consumptions in grids, office buildings, to identify areas of energy waste, and optimize energy usage. TATA Power-DDL has already been certified with EnMS Standard ISO 50001:2018.
- 5. Procurement of Renewable Energy:** The Company has increased the use of renewable energy sources, such as solar and wind power to reduce dependency on fossil fuels and contribute to reduce carbon emissions.
- 6. Periodic and Annual Energy Audits:** Regular energy audits are conducted to identify energy waste and implement measures to reduce it. Also 3<sup>rd</sup> party ISO 50001 Audit is being conducted annually prior to re-certification of ISO standard.
- 7. Use of Co-axial co-extruded Cables in 11 kV network:** With use of co-extruded cables in 11 kV network, has resulted in increased life span of cables and efficiency improvement in terms of power reliability and delivery.
- 8. Smart DT Meters with DIDO (Digital Input/Output):** Smart DT meters installed for Distribution transformers, are being installed in network with added feature of DI/DO (digital input and digital output) port. These digital ports in meters can be connected to float sensors installed inside conservation oil tank for monitoring of oil levels of DT. When oil level dips below required level, smart digital ports connected to breaker would trip off the power supply to DT and would prevent from any overheating/ damage to DT. This has

been included by CEA "Guidelines and best practices for Operation and Maintenance of Distribution Transformers".

9. **Li-ion battery with BMS (battery management system):** For providing DC supply in grid sub-stations, conventional batteries used were of lead acid type. Gradually these type of batteries are now replaced with Li-ion batteries. Benefits of Li-ion over conventional are 90% of depth of discharge than 60%, 95% efficiency, non-hazardous disposal, less charging time, high specific energy output etc.
10. **Energy efficient Distribution Transformers:** Loss levels and efficiency levels for distribution and power transformers have been already defined and set in our technical specifications for OEMs (original equipment manufacturers) to comply with.
11. **Mineral oil vs. Ester oil:** Conventionally, petroleum based mineral oil is being used as dielectric medium in transformers. Ester oil has been introduced now with features of High flash point of 330 deg C providing high level of fire safety, Chemical properties of ester oil enhances DT insulation performance and life expectancy, Insulation system of distribution transformer can be run at 20°C warmer conditions, thus increasing the loading capability of transformer for the same life expectancy. Transformer with ester oil can operate better in areas with high ambient temperature.
12. **RF based street light management system:** Radio frequency based remote monitoring and operations of LED street light projects are being implemented. Main features include 'Dimming' of lights during non-peak hours and 'ON/OFF' feature based on Astro timer switch. Energy management through Street light controller would reduce energy consumption and CO2 emission. Unnecessary over-lighting can be prevented by target dimming of sectors of the city, roads or individual luminaires. Thus, the SLC (street light controller) can be used to make effective and consistent energy savings –approximately up to 50% per year.
13. **Sub-station re-designing for space constrained areas:** To cater to ever increasing load requirements, few occurrences of space constraints are part of network designing. For such space constrained areas, new designs of sub-stations are proposed. Few new designs are Vertical double decker sub-station, wherein two DTs would be placed up and down in double tier arrangement; DT installation of single spun pole with LT and HT switches beneath the mounted DT; Drain top based sub-station where no space is available etc.

TATA Power-DDL has always been frontrunner in choosing energy efficiency practices for building a sustainable greener tomorrow. The DISCOM has already undertaken sustainable initiative in scheme named 'Urja Arpan'.

- **Demand Side Management/ behavioural Demand Response Program:** Raising awareness among individuals and organizations about responsible and efficient electricity consumption. Till now, 1 lac + enrolled customers have participated, achieving 560 MW cumulative load shed in 16 BDR events.
- **Energy Efficient Lighting and Fans:** Energy efficient BLDC fan scheme: Tata Power-DDL is offering Energy Efficient Products (EEPs) such as LED Bulbs and LED Tube Lights which have low maintenance and usage costs. These are durable and use up to 75% less

energy than any other incandescent bulbs resulting in the reduction of monthly energy bills.

In addition to lighting, option for BLDC fans at discounted rates is available. BLDC fans provide high cooling efficiency with lower energy consumption and also savings in electricity bills. BLDC motors do not have brushes so they are more reliable, high life expectancy and energy savings as compared to conventional ceiling fans. With the added convenience of remote control, BLDC fan is a financially and environmentally smart choice for customers as it consumes half electrical load as compared to ordinary fans.

- **Launch of Clean Cooling Program with discount based Energy efficient ACs Scheme for Customers:** Tata Power-DDL in association with Voltas, Blue Star, General, Godrej, Hitachi is providing a discount-based scheme with or without Replacement of Old AC for all the customers.
- **Home Automation:** Tata Power-DDL is offering an IoT based solution which allows to operate, schedule, monitor appliances like lighting, fans, ACs, washing machines, geysers, TVs, refrigerators, etc. with phone or with voice control via Google assistant or Alexa.
- **Home Automation (Sensors & Sensor Lights):** With Motion sensors, lights and appliances can be switched on during presence of a person in the area. In absence of motion, automatically turn off the lights. When motion is detected, sensor lights automatically illuminate at full brightness. In the absence of motion automatically dim the area lights to 20%.
- **Air Purifier Scheme:** Tata Power-DDL in association with Voltas has initiated the Air Purifiers scheme at special discounted rates. The Air Purifiers are powered with 6-stage filtration process and removes up to 99.90% airborne pollutants, eliminates impurities with ease.
- **Washing Machine Scheme:** Tata Power-DDL has launched a 5 star rated washing machine scheme at special discounted rates in collaboration with Voltas-Beko.
- **Digitization/ Adoption of digital lifestyle:** By reducing paper consumption, and exploring digital alternatives, TATA Power-DDL contributes to environmental conservation and decreased carbon footprints, thus fostering a greener and eco-friendly workplace. E-billing is being adopted for consumer billing.
- **Supporting green initiatives:** Participation in local environmental programs, such as tree planting and clean-up drives.
- **Celebration of Earth Day on 22<sup>nd</sup> April every year:** As a collective responsibility to nurture and protect Mother Earth, DISCOM is urging consumers to shut down their power for 1 hour on Earth Day.

**Some other Energy Conservation measures planned for future by TATA Power-DDL are mentioned below:**

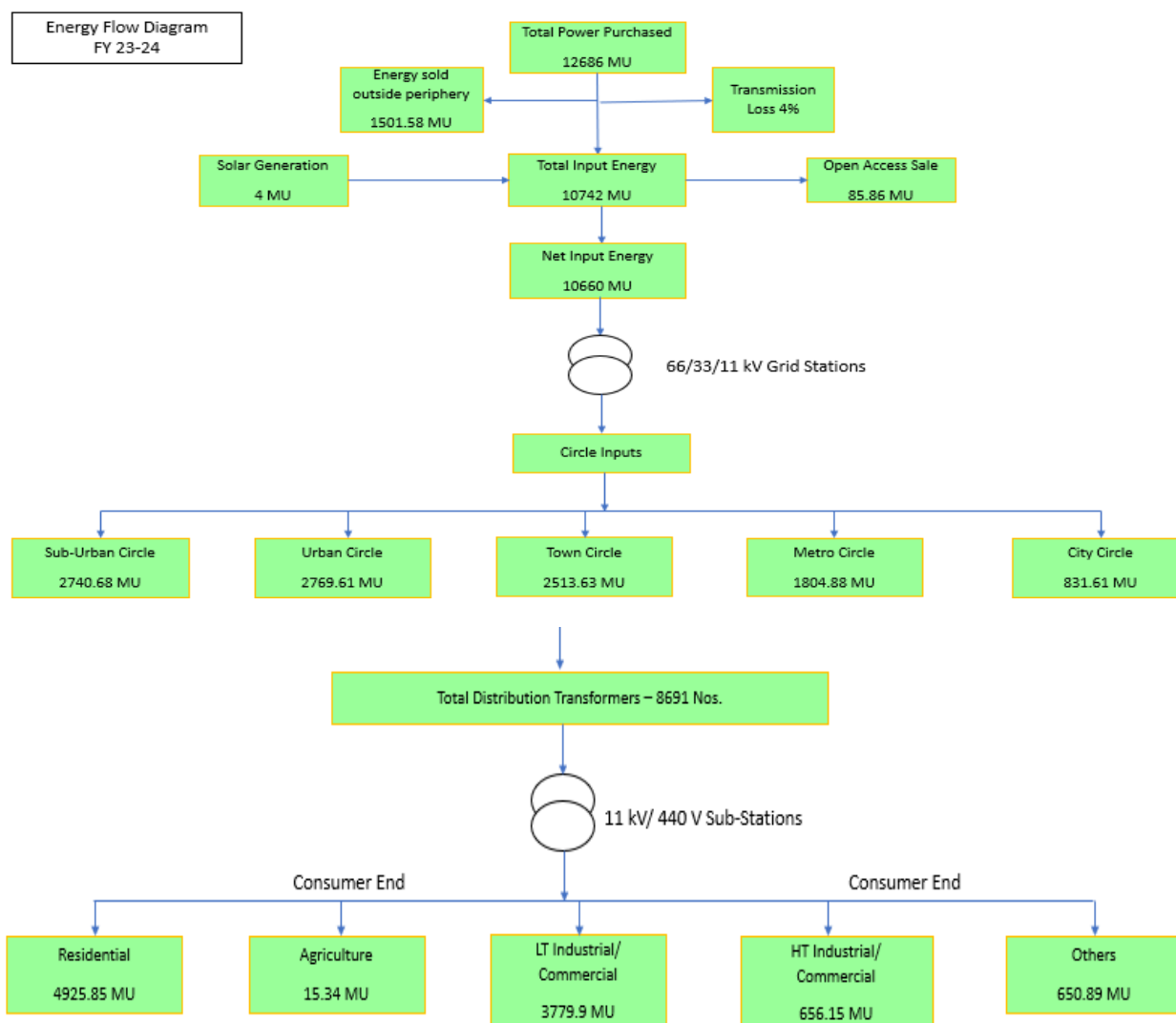
- 1) Solid insulated switchgears
- 2) Dry type Transformers
- 3) Plastic packaging prohibition
- 4) Cobalt free silica gels in transformer breathers
- 5) Water harvesting in grid sub-stations
- 6) Meter plastic box re-usage
- 7) GIS: Apps for route optimization and hence reduction in cable/ line lengths and hence technical losses
- 8) Recycled aggregate made out of construction and demolition waste in concrete mixtures
- 9) Direct delivery of material at site, thus saving in additional transportation requirements, contributing to lowering carbon emissions
- 10) Recycling used carton boxes and plastics through NGO
- 11) Scrapping of meters and then segregation of scrap for re-usage.

## 4. Energy flow analysis

### 4.1. Energy flow across 5 Service Levels

- a) Energy flow between DTL 220KV Grid Substations to Tata Power DDL 66kV/33kV Grid Substation
- b) Energy flow between DTL 220 KV Grid Substations and Tata Power DDL 11kV/6.6 kV Substations
- c) Energy flow between 11kV/6.6kV feeders and distribution transformers, or high voltage distribution system
- d) Energy flow between distribution transformer, or high voltage distribution system to end consumer
- e) Energy flow between Feeders to end-consumer

**Figure 8: Energy Flow Diagram**





## 4.2. Validation of metered data

- a) **Validation of feeder data:** Based on data available for 11 kV Feeder meters at substation, for a sample size of 10% for which documentary evidence has been captured in the audit report.

### Data of 10% of 11 kV Feeder meters:

**Table 17: Data of 10% 11kV feeder Meters**

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
1	402	AZADPUR GRID	AZADPUR GRID TO G-1 G.T.K	1.18	1.94
2	415	AZADPUR GRID	AZADPUR GRID TO D-BLOCK SUBZI MANDI	0.7	2.27
3	412	AZADPUR GRID	AZADPUR GRID TO TAXI STAND	0.2	0.16
4	402	AZADPUR GRID	AZADPUR GRID TO H BLOCK MODEL TOWN	0.56	0.42
5	412	AZADPUR GRID	AZADPUR GRID TO NANIWALA BAGH-3	3.06	2.9
6	415	AZADPUR GRID	AZADPUR GRID TO KEWAL PARK	0.61	0.36
7	402	AZADPUR GRID	AZADPUR GRID TO RAB DA KUTTA	1	0.63
8	415	AZADPUR GRID	AZADPUR GRID TO ADARSH NAGAR POLICE STATION	1.72	-0.51
9	415	AZADPUR GRID	AZADPUR GRID TO INDIRA NAGAR	0.86	0.07
10	402	AZADPUR GRID	AZADPUR GRID TO A-BLK GUJARAWALA TOWN	-2.27	1.32
11	415	AZADPUR GRID	AZADPUR GRID TO JAL BOARD PUMP HOUSE KEWAL PARK	0.58	1.88
12	402	AZADPUR GRID	AZADPUR GRID TO A BLOCK GTK	0.26	0.03
13	415	AZADPUR GRID	AZADPUR GRID TO PANCHWATI	0.32	-0.03
14	415	AZADPUR GRID	AZADPUR GRID TO METRO STATION ADARSH NAGAR S/S	0.92	-0.16
15	505	AZADPUR GRID	AZADPUR GRID TO INTERCONNECTOR 1 & 2 TO JAHANGIRPURI GRID S/S	2.16	2.39
16	412	AZADPUR GRID	AZADPUR GRID TO MODEL TOWN -2	0.21	0.54
17	402	AZADPUR GRID	AZADPUR GRID TO DISTT. OFFICE MODEL TOWN	0.02	-0.72
18	506	SMB - KHOSLA GRID	SMB KHOSLA GRID TO 7B S/S	-0.24	0.11

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
19	531	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO AMBIENCE MALL	0.6	0.63
20	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO AGM OFFICE S/S	0.43	0.21
21	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO DLF MALL	-0.07	-0.03
22	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO 1 B S/S	0.69	0.63
23	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO 5 B S/S	0.33	-0.35
24	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO PRAGYA MALL S/S	-0.15	-0.17
25	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO 10 B S/S	0.66	0.77
26	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO 13 B S/S	1.44	1.41
27	506	SMB - KHOSLA GRID	SHALIMAR BAGH GRID TO 6 B S/S	-0.15	0.29
28	507	BADLI GRID	BADLI GRID TO GALI NO-3 SAMAYPUR (ZONAL OFFICE)	0.44	1.78
29	516	BADLI GRID	BADLI GRID (NW) TO BIA S/S NO-4	0.01	1.39
30	581	BADLI GRID	BADLI GRID TO SECTOR-18 (O/D)	1.06	1
31	507	BADLI GRID	BADLI GRID TO GALI NO-9 SAMAYPUR	2.8	8.81
32	516	BADLI GRID	BADLI GRID (NW) TO B.S.CHEMICAL	2.79	1.47
33	516	BADLI GRID	BADLI GRID (NW) TO BIA S/S NO-3 PH-3	0.33	0.15
34	507	BADLI GRID	BADLI GRID (NW) TO CETP + DTU NO-4 (O/D)	2.29	1.38
35	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO TIKRI SEWAGE PLANT (O/D) S/S	-1.13	-1.58
36	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO BAKHTAWAR PUR - 1	2.48	3.16
37	511	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO ALIPUR -1	0.85	0.61
38	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO NIT FEEDER NO-2	2.05	4.38
39	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO ALIPUR - 2	2.54	-5.75
40	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO RENNY WELL	6.7	4.28
41	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO BAKHTAWAR PUR - 2	1.05	0.38
42	572	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO ALIPUR - 3	1.42	0.58

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
43	415	AZADPUR GRID	AZADPUR GRID TO SUBZI MANDI NO-1 FDR	-0.12	0.28
44	517	AIR KHAM PUR GRID	AIR KHAMPUR GRID TO KHERA KALAN	1.81	1.44
45	520	ROHTAK ROAD GRID	ROHTAK ROAD GRID TO RAMPURA-3	1.04	1.25
46	1301	RAMA ROAD GRID	RAMA ROAD GRID TO SYLVANIA	0.16	0.51
47	1301	RAMA ROAD GRID	RAMA ROAD GRID TO 37 RAMA ROAD	-1.48	-1.27
48	1301	RAMA ROAD GRID	BREAK FAST	-0.29	0
49	1301	RAMA ROAD GRID	RAMA ROAD GRID TO 41 RAMA ROAD FEEDER NO-2	0.47	0.18
50	1301	RAMA ROAD GRID	RAMA ROAD GRID TO 70 RAMA ROAD	0.76	-0.19
51	1301	RAMA ROAD GRID	RAMA ROAD GRID TO 69 NG ROAD S/STN VIA 56-B RAMA ROAD S/S	0.35	1.99
52	1301	RAMA ROAD GRID	RAMA ROAD GRID TO MOTI NAGAR KIOSK	0.33	0.71
53	1301	RAMA ROAD GRID	RAMA ROAD GRID TO 41 RAMA ROAD FEEDER NO-1	0.98	5.35
54	1301	RAMA ROAD GRID	RAMA ROAD GRID TO 58 RAMA ROAD	1.02	0.5
55	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO-32 D-BLOCK	0.17	0.24
56	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO-34 F-BLOCK	0.73	0.38
57	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO-9 A-BLOCK	4.16	4.28
58	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO - 7 B-BLOCK	0.13	-0.13
59	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO-1 B-BLOCK	1.94	-1.05
60	572	DSIDC NARELA-2 GRID	DSIDC NARELA-2 GRID TO NEW S/S HOLAMBI KALAN XING	0	0.08
61	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO 71 FDR-2	2.07	-0.79
62	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO-43-1 F-BLOCK NO-2 (O/D)	0.49	0.99
63	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO S/S NO -11 C-BLOCK	0.08	2.6

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
64	522	DSIDC NARELA-2 GRID	DSIDC-2 GRID TO B-2290 S/S	0.88	0.23
65	521	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO CRPF COMPLEX	-0.63	-1.69
66	514	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO HOLAMBI KALAN O/H CKT	0.17	2.23
67	514	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO SANNOOTH (K) FDR NO-2	0.63	1.35
68	512	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO A BLK JJ COLONY+D BLK JJ COLONY	-1.22	-0.71
69	514	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO GHOGHA (K) FDR NO-2	2.48	2.7
70	514	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO GHOGHA (K) FDR NO-1	6.34	5.67
71	572	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO SANNOOTH (K) FDR NO-1	4.23	4.29
72	514	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO GHOGHA DAIRY COLONY O/H CKT FDR-1	5.25	7.96
73	512	BAWANA CLEAR WATER GRID	BAWANA CLEAR WATER GRID TO DARYAPUR NANGAL S/S (O/D)	9.59	9.04
74	521	POOTH KHURD GRID	POOTH KHURD GRID TO SEC-1 I,H,F BLOCK	0.15	-0.22
75	516	POOTH KHURD GRID	POOTH KHURD GRID TO BARWALA KIOSK	0.75	-0.56
76	521	POOTH KHURD GRID	POOTH KHURD GRID TO MB HOSPITAL FDR-1	0.22	2.69
77	512	POOTH KHURD GRID	POOTH KHURD GRID TO DISTRICT OFFICE BAWANA FDR -2	-1.36	5.08
78	512	POOTH KHURD GRID	POOTH KHURD GRID TO DISTRICT OFFICE BAWANA -1	6.61	7.6

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
79	521	POOTH KHURD GRID	POOTH KHURD GRID TO SEC -1 N,O,P BLOCK	-3.57	-0.05
80	512	POOTH KHURD GRID	POOTH KHURD GRID TO SOS BAWANA	5.97	6.98
81	521	POOTH KHURD GRID	POOTH KHURD GRID TO POOTH KHURD VILLAGE FDR	2.76	3.7
82	521	POOTH KHURD GRID	POOTH KHURD GRID TO SEC -3 D,E BLOCK	2.3	-0.11
83	521	POOTH KHURD GRID	POOTH KHURD GRID TO MB HOSPITAL FDR-2	0.37	0.06
84	561	ROHINI - 6 GRID	11 KV O/G DTC ROHINI-2 EV CHARGING S/S FDR-1	-0.01	-0.02
85	516	ROHINI - 6 GRID	ROHINI - 6 GRID TO SEC-26 NALA NO.1 (O/D)	0.02	2.2
86	561	ROHINI - 6 GRID	ROHINI - 6 GRID TO AMBEDKAR BHAWAN	-0.22	-2.65
87	561	ROHINI - 6 GRID	ROHINI - 6 GRID TO 10/11 S/S	0.36	0.35
88	581	ROHINI - 6 GRID	ROHINI - 6 GRID TO 1/16 (I/D) S/S	0.41	0.92
89	561	ROHINI - 6 GRID	ROHINI - 6 GRID TO SWARN JYANTI PARK STREET LIGHT NO.1	0.46	-0.35
90	581	ROHINI - 6 GRID	ROHINI - 6 GRID TO INTERCONNECTOR 1 & 2 RG-6 TO RG-30	-5.38	-8.51
91	516	ROHINI - 6 GRID	ROHINI - 6 GRID TO ESS-1 B BLOCK SECTOR 26	0.34	0.14
92	581	ROHINI - 6 GRID	ROHINI - 6 GRID TO 17/16 S/S	1.09	1.5
93	581	ROHINI - 6 GRID	ROHINI - 6 GRID TO 320 LIG FLATS SEC-17	0.46	0.48
94	581	ROHINI - 6 GRID	ROHINI - 6 GRID TO MOHALLA CLINIC SEC-17 S/S	-3.55	-0.61
95	561	ROHINI - 6 GRID	ROHINI - 6 GRID TO AMUSEMENT PARK	0.05	0.01
96	581	ROHINI - 5 GRID	ROHINI - 5 GRID TO 2/15 S/S	0.25	0.3
97	581	ROHINI - 5 GRID	ROHINI - 5 GRID TO ARYA APTT.	-0.35	0.58
98	571	ROHINI - 5 GRID	ROHINI - 5 GRID TO 2/13 S/S FDR NO-1	1.38	0.5
99	571	ROHINI - 5 GRID	ROHINI - 5 GRID TO HANS S/S	0.46	0.21

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
100	561	ROHINI - 5 GRID	ROHINI - 5 GRID TO SWARN JYANTI PARK S/S VIA 1 P/M S/S	0.02	0.3
101	561	ROHINI - 5 GRID	ROHINI - 5 GRID TO E.S.I. HOSPITAL	0.05	0.01
102	571	ROHINI - 5 GRID	ROHINI - 5 GRID TO 2/13 S/S FDR NO- 2	-0.74	0.05
103	571	ROHINI - 5 GRID	ROHINI - 5 GRID TO 1/13 S/S FDR NO-2	-0.48	-0.07
104	571	ROHINI - 5 GRID	ROHINI - 5 GRID TO SAI NO-1 S/S	0.15	0.36
105	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO STP-RITHALA S/S NO-1	3.89	-0.48
106	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO SPFA NO-2 S/S FDR NO-2	0.52	0.46
107	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO 1/6 S/S	0.38	-0.56
108	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO TPS RITHALA KIOSK S/S	-0.69	-1.13
109	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO AMBEDKER HOSPITAL S/S	-0.21	0.25
110	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO MURLIWALA KIOSK S/S	0.23	0.14
111	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO SPFA NO-3 S/S	1.28	0.43
112	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO AMUSEMENT PARK	-0.05	-0.21
113	551	ROHINI - 4 GRID	ROHINI - 4 GRID TO 1/4 S/S	-0.26	1.45
114	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO STP-RITHALA S/S NO-2	0.66	0.89
115	561	ROHINI - 4 GRID	ROHINI - 4 GRID TO RAJIV GANDHI HOSPITAL S/S	-0.75	1.82
116	519	ROHINI - 23 GRID	ROHINI - 23 GRID TO PKT-16 SEC-20 S/S NO-1	1.19	0.95
117	561	ROHINI - 23 GRID	ROHINI - 23 GRID TO SPS SEC-23 S/S	0.45	0.37
118	519	ROHINI - 23 GRID	ROHINI - 23 GRID TO PKT-11 SEC-21 RHN FDR NO-2	0.51	-0.27
119	519	ROHINI - 22 GRID	ROHINI - 22 GRID TO BEGUMPUR S/S SEC-22 RHN	-0.39	-0.69
120	523	ROHINI - 22 GRID	ROHINI - 22 GRID TO SHARDA VATS S/S	0.88	-0.32

Sr. No.	Zone	Name of the Station	Feeder Name	FY 23-24 T&D losses (MU)	FY 22-23 T&D losses (MU)
121	523	ROHINI - 22 GRID	ROHINI - 22 GRID TO MITHILA VIHAR FEEDER NO-1	0.88	8.29
122	523	ROHINI - 22 GRID	ROHINI - 22 GRID TO PRATAP VIHAR	0.12	-0.78
123	519	ROHINI - 22 GRID	ROHINI - 22 GRID TO PKT-17 SEC-22 S/S NO.1	-0.66	-0.12
124	523	ROHINI - 22 GRID	ROHINI - 22 GRID TO MITHLA VIHAR NO-2 &3 S/S	1.97	3.25
125	523	ROHINI - 22 GRID	ROHINI - 22 GRID TO AMAN VIHAR NEAR RG-22 GRID S/S	0.88	3.3
126	515	ROHINI - 2 GRID	ROHINI - 2 GRID TO POLICE COMPLEX FEEDER NO-2	0.25	6.97
127	519	ROHINI - 2 GRID	ROHINI - 2 GRID TO Y-BLK BUS STAND	0.28	0.54
128	515	ROHINI - 2 GRID	ROHINI - 2 GRID TO DSIDC WORK CENTRE-2 O/D	0.4	-0.24
129	551	ROHINI - 2 GRID	ROHINI - 2 GRID TO GOPAL VIHAR S/S	0.87	-2.26
130	551	ROHINI - 2 GRID	ROHINI - 2 GRID TO DDA FLAT S/S NO.1 FDR NO-1	1.68	1.57

**b) Validation of energy flow data and losses:** Based on field survey and as per following sample size:

- **Checking functional and communication status of meters etc.:** Min. 10 or 1% (whichever is higher) of DISCOM's input energy metering points at grids i.e. between Transmission and 66kV/33kV/11kV distribution feeders
- Verification for all Divisions with AT&C losses greater than 25% or at-least 1/3<sup>rd</sup> of the total Divisions of DISCOM
- **Checking functional and communication status of meters:** Total of min. 10 or 1% of metering points (whichever is higher) between 220/132/110/66/33 kV outgoing and 11kV/6.6kV feeders/direct end consumer .
- **Checking functional and communication status of DT meters:** In an Urban High Loss Division, checking of min. 5 or 1% of Metering points (whichever is higher) at DTs where communicable meters were installed under other schemes such as R-APDRP and IPDS.
- **Checking functional and communication status of meters between 11kV/6.6kV feeders and DTs:** Total of min. of 10 or 1% of metering points (whichever is higher) . Also conducting of foot survey of feeders to check for thefts/ hooking etc.

- **Checking functional and communication status of consumers meters:**  
Verification of metering and connection status of min. of 10 or 2% consumers of the Division (whichever is higher) of various category of consumers – Agriculture (Metered and Un-metered), Govt. category connection ( and LT Industrial etc.

### 1% of input energy points at (T-D) interface

**Table 18: 1% Input Energy Points**

Exchange point meters	Consumption (FY 22-23)	Consumption (FY 23-24)	MF
Narela T-1	279.85	302.25	1000
Narela T-2	308.34	329.70	500
Narela T-3	180.75	195.80	1000
BWN T-2	221.44	174.43	1000
BWN T-3	178.48	236.06	333.33

### Data of at-least 1/3<sup>rd</sup>of Divisions:-

#### Min 10 nos. of input energy points

**Table 19: Data of Rohini Division**

Zone	District	Name of the Station	Feeder Name	FY 23-24	FY 22-23
				T&D losses (MU)	T&D losses (MU)
581	Rohini	BADLI GRID	BADLI GRID TO SECTOR-18 (O/D)	1.06	1.00
561	Rohini	ROHINI - 6 GRID	11 KV O/G DTC ROHINI-2 EV CHARGING S/S FDR-1	-0.01	-0.02
561	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO AMBEDKAR BHAWAN	-0.22	-2.65
561	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO 10/11 S/S	0.36	0.35
581	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO 1/16 (I/D) S/S	0.41	0.92
561	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO SWARN JYANTI PARK STREET LIGHT NO.1	0.46	-0.35
581	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO INTERCONNECTOR 1 & 2 RG-6 TO RG-30	-5.38	-8.51
581	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO 17/16 S/S	1.09	1.50
581	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO 320 LIG FLATS SEC-17	0.46	0.48
581	Rohini	ROHINI - 6 GRID	ROHINI - 6 GRID TO MOHALLA CLINIC SEC-17 S/S	-3.55	-0.61



**Table 20: Data of Mangolpuri Division**

Zone	District	Name of the Station	Feeder Name	FY 23-24	FY 22-23
				T&D losses (MU)	T&D losses (MU)
519	Mangolpuri	ROHINI - 23 GRID	ROHINI - 23 GRID TO PKT-16 SEC-20 S/S NO-1	1.19	0.95
519	Mangolpuri	ROHINI - 23 GRID	ROHINI - 23 GRID TO PKT-11 SEC-21 RHN FDR NO-2	0.51	-0.27
519	Mangolpuri	ROHINI - 22 GRID	ROHINI - 22 GRID TO BEGUMPUR S/S SEC-22 RHN	-0.39	-0.69
519	Mangolpuri	ROHINI - 22 GRID	ROHINI - 22 GRID TO PKT-17 SEC-22 S/S NO.1	-0.66	-0.12
515	Mangolpuri	ROHINI - 2 GRID	ROHINI - 2 GRID TO POLICE COMPLEX FEEDER NO-2	0.25	6.97
519	Mangolpuri	ROHINI - 2 GRID	ROHINI - 2 GRID TO Y-BLK BUS STAND	0.28	0.54
515	Mangolpuri	ROHINI - 2 GRID	ROHINI - 2 GRID TO DSIDC WORK CENTRE-2 O/D	0.40	-0.24
519	Mangolpuri	ROHINI - 2 GRID	ROHINI - 2 GRID TO RMU NEAR RG-2 GRID	-0.47	0.53
519	Mangolpuri	ROHINI - 2 GRID	ROHINI - 2 GRID TO BUDH VIHAR DBJ S/S	-4.47	-0.07
519	Mangolpuri	ROHINI - 2 GRID	ROHINI - 2 GRID TO BUDH VIHAR PH.1 FRUIT MARKET S/S	0.76	1.01

**Table 21: Data of Pitampura Division**

Zone	District	Name of the Station	Feeder Name	FY 23-24	FY 22-23
				T&D losses (MU)	T&D losses (MU)
510	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO PHOOLARAM NO-2	0.03	0.13
504	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO MAULANA AZAD	0.55	0.90
510	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO LSC MKT.SAINIK VIHAR	1.54	1.62

Zone	District	Name of the Station	Feeder Name	FY 23-24	FY 22-23
				T&D losses (MU)	T&D losses (MU)
510	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO DT WORKSHOP PP-2 GRID	0.24	-0.33
504	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO BALBIR APPT.	0.03	0.18
510	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO TELEPHONE EXCHANGE NEW	0.51	0.75
504	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO VIKASH APPARTMENT	0.42	0.19
504	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO SADBHAVNA APPT.	-0.32	1.48
504	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO SHARDA APPARTMENT O/D S/S	0.11	0.12
504	Pitam Pura	P. P. - 2 GRID	P. P. - 2 GRID TO U.P. SAMAJ FDR NO-1	1.14	0.68

Table 22: Data of Keshav Puram Division

Zone	District	Name of the Station	Feeder Name	FY 23-24	FY 22-23
				T&D losses (MU)	T&D losses (MU)
422	Keshav Puram	ROHTAK ROAD GRID	AMAR PARK S/STN.	0.15	0.00
520	Keshav Puram	ROHTAK ROAD GRID	ROHTAK ROAD GRID TO RAMPURA-3	1.04	1.25
501	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO RAMPURA-1 FDR-1	-2.12	-0.06
520	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO VISHRAM NGR	0.35	0.43
520	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO OLD MOTHER DAIRY RAMPURA	0.38	0.47
501	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO C-34 INDUSTRIAL AREA	-0.16	1.08
501	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO COMMUNITY CENTRE	-1.01	0.54
501	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO C-1	-1.15	-0.17
501	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO B - 38	5.24	6.25
501	Keshav Puram	RAMPURA GRID	RAMPURA GRID TO HIMACHAL COLD STORAGE	-0.24	1.13

**c) Field verification report** of the activities undertaken in a) and b) above to be included as an annexure to the energy audit report.

- The Category wise metered consumers and unmetered consumers are shown in below table, As per the consumers details most of the consumers are residential which is 85.4% and the energy share is 49.1% of total consumers and energy, commercial/industrial LT is 14.0% of total consumers and energy share is 37.7% of total billed energy, commercial/industrial HT is 0.04% of total consumers and energy share is 6.5% of total billed energy.

**Table 23: Verified Category wise Consumers and Energy**

Consumer category	Metered	Un-metered	Total Consumer	% share of Consumer	Metered Energy (MU)	Unmetered Energy	Total Billed Energy (MU)	% Share energy
Residential	1729505	0.0	1729505	85.4%	4925.85	0.00	4925.85	49.1%
Agricultural	4466	0.0	4466	0.2%	15.34	0.00	15.34	0.2%
Commercial/Industrial-LT	282712	0.0	282712	14.0%	3779.90	0.00	3779.90	37.7%
Commercial/Industrial-HT	802	0.0	802	0.04%	656.16	0.00	656.16	6.5%
Others	8619	0.0	8619	0.4%	650.90	0.00	650.90	6.5%
<b>Total</b>	<b>2026104</b>	<b>0.0</b>	<b>2026104.0</b>	<b>100%</b>	<b>10028.15</b>	<b>0.0</b>	<b>10028.15</b>	<b>100%</b>

- Field visit of Substations, DTs and commercial building was done during the audit time.
- It was also observed that 100% of the consumers are metered.
- At the time of field survey it was found that HT feeder meters are communicable.
- It was also observed that average power factor was found in the range of 0.96 to 0.99.
- It was also observed that hourly load parameters are monitored and energy consumption is monitored at every 24hrs.

#### 4.3. Validation of energy flow data and losses

Voltage wise power purchase details are not available, as the invoice of power purchase contains only units purchased and details of power plant voltage not available.

Voltage wise energy flow data is not available, Inputs at different voltage levels are not available.

Majority of feeders are common to LT & HT. So input energy supplied is inseparable.

Cumulated EHT sales MUs for 33kV and above are maintained and therefore bifurcation of same into 66 kV and 33 kV is not available.

## 5. Loss and subsidy computation

### 5.1. Energy accounts analysis for previous year

Performance comparison is done for last 3 years FY 20-21, FY 21-22& FY22-23 to find, where the DISCOM has improved and where it needs improvement, etc.

#### a) Summary of AT&C losses for previous years

The AT&C losses for the FY 2020-21, FY 2021-22, FY 2022-23 are as shown below:

**Table 24: AT&C losses of previous three years**

Technical Details	UoM	FY 2020-21	FY 2021-22	FY 2022-23
Input Energy Purchase (From Generation Source)*	Million kWh	10085.62	11737.11	12741.47
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kWh	8950.12	9424.75	10622.62
Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kWh	8310.43	8752.21	9946.33
Transmission and Distribution (T&D) loss Details	Million kWh	639.68	672.55	676.29
	%	7.15%	7.14%	6.37%
Collection Efficiency	%	100.72%	100.36%	100%
Aggregate Technical & Commercial Loss	%	6.48%	6.80%	6.36%

**Figure 9: Comparison of Losses – Last 3 FYs – 20-21/21-22/22-23**

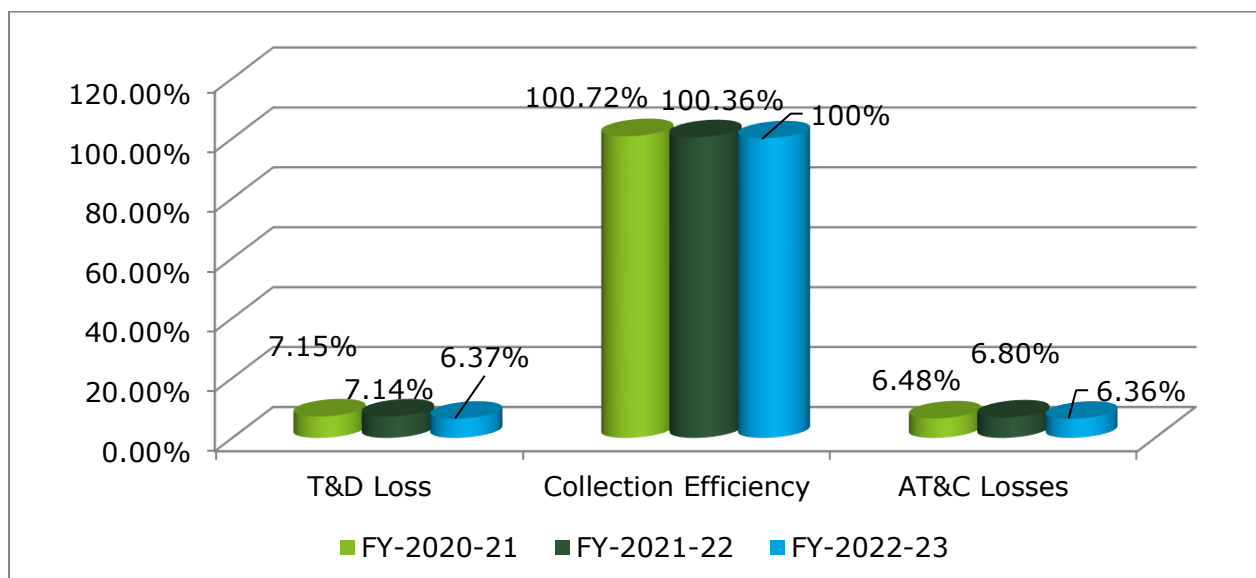


Table shows trend of T&D loss, Collection efficiency and AT&C loss for last 3 years. T&D and AT&C losses have reduced as compare to previous year.

**b) DivisionWise Comparison**

Division wise input Energy, Billed Energy, T&D losses and AT&C losses is given in following table:

**Table 25: Division wise Input and Billed Energy FY 2021-22&2022-23**

Name of Division	FY-2021-22		FY-2022-23	
	Input Energy (MUs)	Billed Energy (MUs)	Input Energy (MUs)	Billed Energy (MUs)
Badli	621.60	553.61	697.77	640.87
Bawana	1302.72	1171.22	1457.23	1323.15
Civil Lines	773.43	750.61	903.66	889.91
Keshav Puram	803.85	754.21	886.18	838.01
Mangolpuri	618.99	576.76	698.77	645.64
Model Town	667.51	626.38	755.87	717.99
Moti Nagar	752.93	711.74	847.33	803.81
Narela	1088.77	994.04	1231.63	1128.62
Pitam Pura	612.37	573.77	677.68	645.99
Rohini	1034.25	984.75	1161.64	1112.30
Kirari	394.40	342.65	437.49	384.56
Shalimar Bagh	753.83	712.46	867.37	815.48
<b>Total</b>	<b>9424.75</b>	<b>8752.21</b>	<b>10622.62</b>	<b>9946.33</b>

**Table 26: Division wise T&D and AT&C losses in FY 2021-22 & FY 2022-23**

Name of Division	FY-2021-22		FY-2022-23	
	T&D LOSS (%)	AT & C LOSS (%)	T&D LOSS (%)	AT & C LOSS (%)
Badli	10.90%	9.77%	8.15%	7.80%
Bawana	10.10%	9.88%	9.20%	8.90%
Civil Lines	3.00%	3.24%	1.52%	2.47%
Keshav Puram	6.20%	7.08%	5.44%	6.35%
Mangolpuri	6.80%	6.14%	7.60%	7.21%
Model Town	6.20%	6.09%	5.01%	5.03%
Moti Nagar	5.50%	5.34%	5.14%	4.91%
Narela	8.70%	8.15%	8.36%	8.34%
Pitam Pura	6.30%	5.83%	4.68%	4.47%
Rohini	4.80%	4.02%	4.25%	4.08%
Kirari	13.10%	11.62%	12.10%	11.83%
Shalimar Bagh	5.50%	4.76%	5.98%	5.83%
<b>At DISCOM level</b>	<b>7.14%</b>	<b>6.80%</b>	<b>6.37%</b>	<b>6.36%</b>

## 5.2. Energy accounts analysis and performance in current year (based on quarterly data)

### 5.2.1. Circle wise Consumer Count, Connected Load, Input Energy, Billed Energy, T&D losses & AT&C loss%

**Table 27: Circle wise Comparison for FY 2023-24**

Name of circle	Total Number of connections (Nos)	Total Connected Load (MW)	Input Energy (MU)	Total Billed energy (MU)	T&D loss (MU)	T&D loss (%)	AT & C loss (%)
URBAN CIRCLE	654525	1843.55	2769.62	2612.05	157.57	5.69%	6.22%
SUB-URBAN CIRCLE	243901	1385.97	2740.69	2529.05	211.64	7.72%	7.74%
TOWN CIRCLE	466706	1676.04	2513.64	2413.04	100.59	4.08%	4.02%
METRO CIRCLE	510569	1280.32	1804.88	1685.61	119.27	7.04%	6.32%
CITY CIRCLE	150403	611.23	831.61	788.40	43.22	5.20%	5.39%
<b>At DISCOM level</b>	<b>2026104</b>	<b>6797.11</b>	<b>10660.43</b>	<b>10028.15</b>	<b>632.28</b>	<b>5.93%</b>	<b>5.92%</b>

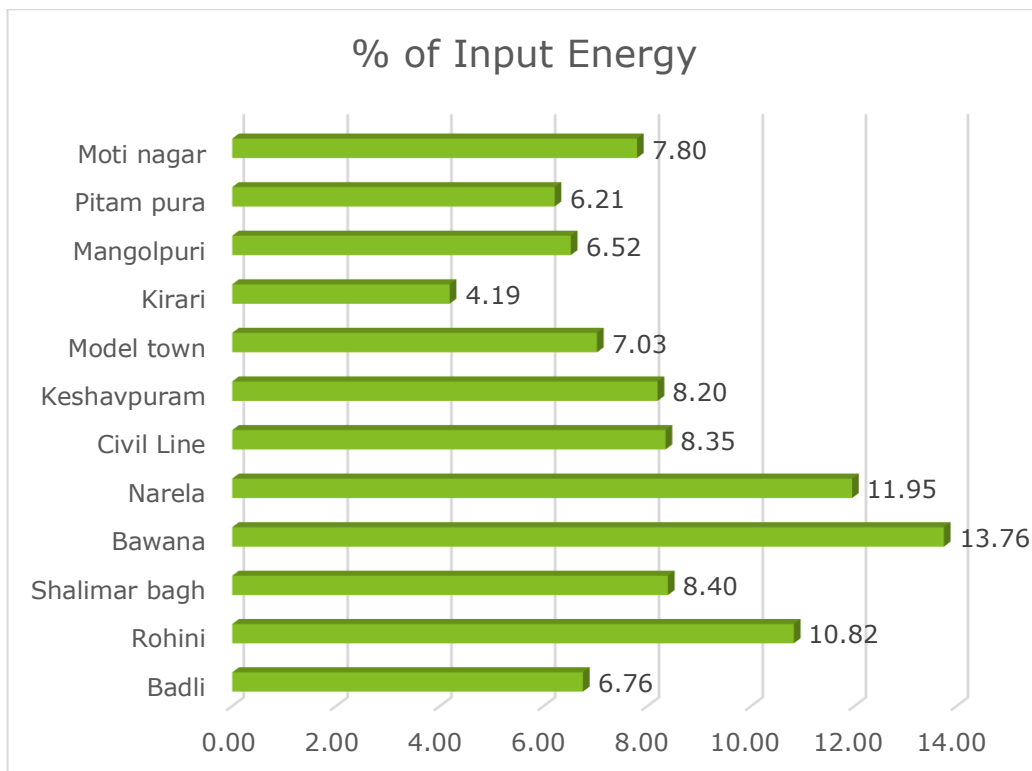
### 5.2.2. Division wise Input energy and billed energy details

The Division wise input energy & billed energy for FY 2023-24 is shown in below table.

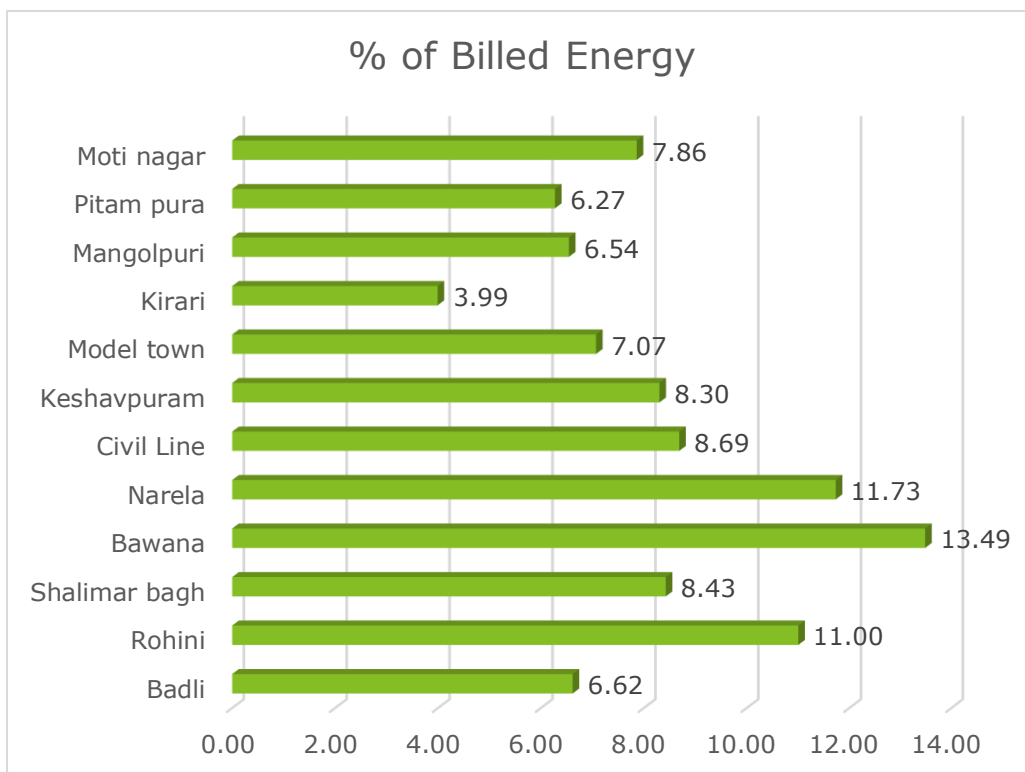
**Table 28: Division wise input energy & billed energy for FY 2023-24**

S.No	Name of Division	Input energy (MU)	% of Input energy consumption	Total Billed energy (MUs)	% of energy consumption
1	Badli	720.57	6.76	663.52	6.62
2	Rohini	1153.93	10.82	1103.40	11.00
3	Shalimar bagh	895.11	8.40	845.13	8.43
4	Bawana	1466.37	13.76	1352.51	13.49
5	Narela	1274.31	11.95	1176.54	11.73
6	Civil Line	890.25	8.35	871.21	8.69
7	Keshavpuram	873.94	8.20	832.66	8.30
8	Model town	749.44	7.03	709.17	7.07
9	Kirari	446.88	4.19	400.30	3.99
10	Mangolpuri	695.58	6.52	656.23	6.54
11	Pitam pura	662.42	6.21	629.08	6.27
12	Moti nagar	831.61	7.80	788.40	7.86
		<b>10660.43</b>	<b>100.0</b>	<b>10028.15</b>	<b>100.0%</b>

**Figure 10: Division wise Input Energy Share**



**Figure 11: Division wise Input Energy Share**



**5.2.3. Quarterly and annual AT&C losses**

The Quarter wise and annual AT&C losses for FY 2023-24 are shown in below table.

**Table 29: Energy Input and AT&C Losses for FY 2023-24**

Energy Input Details	Formula	UoM	Quarterly				Annual
			Q1	Q2	Q3	Q4	FY 2023-24
Input Energy Purchase (From Generation Source)	A	MU	3355.38	3991.98	2664.71	2687.92	12686.10
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	2793.30	3425.41	2227.96	2213.77	10660.43
Total Energy billed (is the Net energy billed, adjusted for energy traded)	C	MU	2385.84	3144.93	2379.07	2117.82	10028.15
Transmission and Distribution (T&D) loss Details	D	MU	407.46	280.48	-151.11	95.95	632.28
	$E = D/B \times 100$	%	14.59%	8.19%	-6.78%	4.33%	5.93%
Collection Efficiency	F	%	93.74%	99.27%	104.56%	102.84%	100.01%
Aggregate Technical & Commercial Loss	$G = 1 - \{(1-E) \times \text{Min}(F, 100\%)\}$	%	19.93%	8.86%	-11.66%	1.62%	5.92%

#### 5.2.4. Voltage wise AT&C losses

Voltage wise power purchase details are not available, as the invoice of power purchase contains only units purchased and details of power plant voltage not available.

Majority of feeders are common to LT & HT. So input energy supplied is inseparable.

Cumulated EHT sales MUs for 33kV and above are maintained and therefore bifurcations of same are not available.

The voltage wise AT&C losses of Tata Power-DDL for FY 2023-24 are as shown in the below table:

**Table 30: Voltage-wise AT&C Losses for FY 2023-24**

S. No.	Particulars	Units	Values
<b>1</b>	<b>Losses in 132 KV System and Connected Equipment</b>		
1.a.	Total Energy delivered into 132 KV Distribution System from EHT SSs	MUs	-
1.b.	Energy consumed by HT consumers at 132KV (Sales + Third Party)	MUs	-
1.c.	Energy Delivered to lower voltage	MUs	-
1.d.	<b>Losses (132 kV System)</b>	MUs	-
1.e.	<b>% Losses (132 kV System)</b>	%	-
<b>2</b>	<b>Losses in 33 KV System and Connected Equipment</b>		-
2.a.	Total Energy delivered into 33 KV Distribution System from EHT SSs	MUs	-
2.b.	Energy consumed by HT consumers at 33KV (Sales + Third Party)	MUs	-
2.c.	Energy Delivered into 11 KV and LT System from 33/11 KV SSs	MUs	-
2.d.	<b>Losses (33 kV System)</b>	MUs	-
2.e.	<b>% Losses (33 kV System)</b>	%	-
<b>3</b>	<b>Losses in 11 KV System and Connected Equipment</b>		-



S. No.	Particulars	Units	Values
3.a.	Total Energy delivered into 11 KV and LT Distribution System	MUs	-
3.b.	Energy consumed by HT consumers at 11KV (Sales + Third Party)	MUs	-
3.c.	Total Output from 11kv to LT	MUs	-
3.d.	<b>Losses (11kV System)</b>	MUs	-
3.e.	<b>% Losses (11kV System)</b>	%	-
<b>4</b>	<b>Losses in LT system and connected equipment</b>		-
4.a.	Energy delivered to LT system from 11/400 V DTRs	MUs	-
4.b.	Energy sold at LT level	MUs	-
4.c.	<b>Losses (LT System)</b>	MUs	-
4.d.	<b>% Losses (LT System)</b>	%	-
<b>5</b>	<b>Total losses in the Distribution System</b>		-
5.a.	Total Input to the distribution system	MUs	-
5.b.	Total Output from the Distribution System	MUs	-
5.c.	<b>Distribution System Losses</b>	%	-
5.d.	<b>% Distribution System Losses</b>	%	-

### 5.2.5. Circle wise AT&C losses analysis

#### 1. Circle wise connections & energy consumptions for FY 2023-24

The circle wise connections, load, input energy & Billed energy with percentage share for different circles is given below.

"Urban Circle" circle having maximum numbers of consumers and "City Circle" having minimum numbers of consumers. "Urban Circle" has maximum input energy as well as billed units and "City Circle" have minimum input energy as well as billed units as shown in table:

**Table 31: Circle wise consumers, Connected load, Input and Billed Energy in FY 2023-24**

Circle	Total Number of connections		Total Connected Load		Input energy		Billed energy	
	Nos.	% Share	MW	% Share	MU	% Share	MU	% Share
URBAN CIRCLE	654525	32.30%	1843.554	27.12%	2769.616	25.98%	2612.05	26.05%
SUB-URBAN CIRCLE	243901	12.04%	1385.97	20.39%	2740.69	25.71%	2529.05	25.22%
TOWN CIRCLE	466706	23.03%	1676.039	24.66%	2513.636	23.58%	2413.043	24.06%
METRO CIRCLE	510569	25.20%	1280.319	18.84%	1804.881	16.93%	1685.611	16.81%
CITY CIRCLE	150403	7.42%	611.23	8.99%	831.61	7.80%	788.4	7.86%
<b>Total</b>	<b>2026104</b>	<b>100.00%</b>	<b>6797.11</b>	<b>100.00%</b>	<b>10660.43</b>	<b>100%</b>	<b>10028.15</b>	<b>100.00%</b>

#### 2. Circle-wise AT&C losses

The circle wise AT&C losses are shown in the table below:

**Table 32: Circle wise T&D losses, Collection Efficiency and AT&C losses for FY 2023-24**

Name of Circle	Input energy (MU)	Billed energy (MU)	T&D loss		Collected Amount (in Rs. Crore)	AT& C loss (%)
			(MU)	(%)		
URBAN CIRCLE	2769.62	2612.05	157.57	5.69%	2552.96	6.22%
SUB-URBAN CIRCLE	2740.69	2529.05	211.64	7.72%	3322.84	7.74%
TOWN CIRCLE	2513.64	2413.04	100.59	4.08%	2559.22	4.02%
METRO CIRCLE	1804.88	1685.61	119.27	7.04%	1543.15	6.32%
CITY CIRCLE	831.61	788.40	43.22	5.20%	917.63	5.39%
<b>Total</b>	<b>10660.43</b>	<b>10028.15</b>	<b>632.28</b>	<b>5.93%</b>	<b>10895.80</b>	<b>5.92%</b>

**Note:** AT&C Loss's calculation as per BEE proforma the calculation is as per actual Collection efficiency.

## Division wise AT&C losses analysis

### 3. Division-wise AT&C losses

The Division wise AT&C losses are shown in the table below:

**Table 33: Division wise T&D losses, Collection Efficiency and AT&C losses for FY 2023-24**

Sr No	Name of Circle	Division	Consumer category	Total Number of connections (Nos)	Total Connected Load (MW)	Input energy (MU)	Total energy	% of energy consumption	T&D loss (MU)	T&D loss (%)	Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	AT&C loss (%)
1	Urban	Badli	Residential	113987	192	720.57	263.29	40%	57.05	7.92%	167.41	167.44	100.02%	
			Agricultural	460	4		2.07	0%			1.42	1.46	102.62%	
			Commercial/Industrial-LT	22000	217		348.91	53%			550.65	549.18	99.73%	
			Commercial/Industrial-HT	51	14		23.59	4%			35.77	37.78	105.62%	
			Others	622	8		25.66	4%			25.19	18.94	75.17%	
<b>Sub-total</b>				<b>137120</b>	<b>434.97</b>	<b>720.57</b>	<b>663.52</b>	<b>100%</b>	<b>57.05</b>	<b>7.92%</b>	<b>780.45</b>	<b>774.80</b>	<b>99.28%</b>	<b>8.59%</b>
2	Sub-Urban	Bawana	Residential	73415	123	1466.37	166.95	12%	113.86	7.76%	103.95	104.14	100.18%	
			Agricultural	1714	10		3.43	0%			3.30	3.41	103.16%	
			Commercial/Industrial-LT	22456	587		1131.61	84%			1696.97	1697.45	100.03%	
			Commercial/Industrial-HT	35	9		18.91	1%			27.04	28.02	103.62%	
			Others	405	9		31.61	2%			35.16	35.60	101.25%	
<b>Sub-total</b>				<b>98025</b>	<b>737.75</b>	<b>1466.37</b>	<b>1352.51</b>	<b>100%</b>	<b>113.86</b>	<b>7.76%</b>	<b>1866.43</b>	<b>1868.62</b>	<b>100.12%</b>	<b>7.66%</b>
3	Town	Civil Line	Residential	113495	312	890.25	410.09	47%	19.04	2.14%	313.12	314.02	100.29%	
			Agricultural	0	0		0.00	0%			0.00	0.00	0.00%	
			Commercial/Industrial-LT	24475	110		133.55	15%			221.71	222.55	100.38%	
			Commercial/Industrial-HT	71	56		90.84	10%			143.61	143.61	100.00%	
			Others	930	76		236.72	27%			243.34	239.81	98.55%	
<b>Sub-total</b>				<b>138971</b>	<b>554.20</b>	<b>890.25</b>	<b>871.21</b>	<b>100%</b>	<b>19.04</b>	<b>2.14%</b>	<b>921.78</b>	<b>920.00</b>	<b>99.81%</b>	<b>2.33%</b>

4	Town	Keshavpuram	Residential	124676	297	873.94	379.38	46%	41.29	4.72%	266.87	268.97	100.79%
			Agricultural	0	0		0.00	0%			0.00	0.00	0.00%
			Commercial/Industrial-LT	27677	237		359.33	43%			559.85	561.87	100.36%
			Commercial/Industrial-HT	101	34		72.32	9%			99.16	98.76	99.60%
			Others	609	23		21.62	3%			21.93	22.30	101.65%
<b>Sub-total</b>			<b>153063</b>	<b>591.26</b>	<b>873.94</b>	<b>832.66</b>	<b>100%</b>	<b>41.29</b>	<b>4.72%</b>	<b>947.81</b>	<b>951.90</b>	<b>100.43%</b>	<b>4.31%</b>
5	Metro	Kirari	Residential	145627	218	446.88	312.57	78%	46.58	10.42%	177.12	177.59	100.26%
			Agricultural	61	0		0.18	0%			0.12	0.12	99.46%
			Commercial/Industrial-LT	16772	53		66.74	17%			109.16	109.21	100.05%
			Commercial/Industrial-HT	8	3		4.82	1%			8.94	8.90	99.52%
			Others	431	19		15.99	4%			23.68	30.98	130.81%
<b>Sub-total</b>			<b>162899</b>	<b>293.34</b>	<b>446.88</b>	<b>400.30</b>	<b>100%</b>	<b>46.58</b>	<b>10.42%</b>	<b>319.03</b>	<b>326.81</b>	<b>102.44%</b>	<b>8.24%</b>
6	Metro	Mangolpuri	Residential	199587	337	695.58	475.57	72%	39.35	5.66%	281.7371804	281.7786603	100.01%
			Agricultural	0	0		0.00	0%			0	0	0.00%
			Commercial/Industrial-LT	23389	106		140.71	21%			221.9652222	222.0692751	100.05%
			Commercial/Industrial-HT	23	9		22.39	3%			30.09591294	29.9294271	99.45%
			Others	652	7		17.56	3%			21.82904272	22.28965653	102.11%
<b>Sub-total</b>			<b>223651</b>	<b>459.27</b>	<b>695.58</b>	<b>656.23</b>	<b>100%</b>	<b>39.35</b>	<b>5.66%</b>	<b>555.63</b>	<b>556.07</b>	<b>100.08%</b>	<b>5.58%</b>
7	Town	Model town	Residential	151563	356	749.44	470.33	66%	40.27	5.37%	336.77	336.80	100.01%
			Agricultural	3	0		0.01	0%			0.00	0.00	99.07%
			Commercial/Industrial-LT	22240	111		132.30	19%			218.39	218.20	99.91%
			Commercial/Industrial-HT	46	16		25.71	4%			41.91	42.06	100.35%
			Others	820	48		80.82	11%			90.62	90.27	99.62%
<b>Sub-total</b>			<b>174672</b>	<b>530.57</b>	<b>749.44</b>	<b>709.17</b>	<b>100%</b>	<b>40.27</b>	<b>5.37%</b>	<b>687.69</b>	<b>687.33</b>	<b>99.95%</b>	<b>5.42%</b>
8	City	Moti nagar	Residential	121043	324	831.61	408.49	52%	43.22	5.20%	301.21	301.39	100.06%
			Agricultural	0	0		0.00	0%			0.00	0.00	0.00%

			Commercial/Industrial-LT	28466	226		282.28	36%			472.83	471.31	99.68%	
			Commercial/Industrial-HT	117	51		81.87	10%			125.41	125.43	100.02%	
			Others	777	10		15.76	2%			20.01	19.51	97.48%	
			<b>Sub-total</b>	<b>150403</b>	<b>611.23</b>	<b>831.61</b>	<b>788.40</b>	<b>100%</b>	<b>43.22</b>	<b>5.20%</b>	<b>919.46</b>	<b>917.63</b>	<b>99.80%</b>	<b>5.39%</b>
9	Sub-Urban	Narela	Residential	123246	206		290.04	25%			181.88	182.19	100.17%	
			Agricultural	2161	19		9.20	1%			6.60	6.74	102.11%	
			Commercial/Industrial-LT	19388	370	1274.31	751.37	64%	97.77	7.67%	1095.33	1094.53	99.93%	
			Commercial/Industrial-HT	141	37		97.54	8%			134.76	132.79	98.54%	
			Others	940	16		28.40	2%			37.90	37.97	100.19%	
			<b>Sub-total</b>	<b>145876</b>	<b>648.22</b>	<b>1274.31</b>	<b>1176.54</b>	<b>100%</b>	<b>97.77</b>	<b>7.67%</b>	<b>1456.47</b>	<b>1454.22</b>	<b>99.85%</b>	<b>7.82%</b>
10	Metro	Pitam pura	Residential	105988	372		419.59	67%			333.60	333.43	99.95%	
			Agricultural	0	0		0.00	0%			0.00	0.00	0.00%	
			Commercial/Industrial-LT	17368	112	662.42	137.13	22%	33.34	5.03%	225.08	224.49	99.74%	
			Commercial/Industrial-HT	76	37		59.46	9%			88.12	88.01	99.87%	
			Others	587	7		12.90	2%			14.15	14.34	101.38%	
			<b>Sub-total</b>	<b>124019</b>	<b>527.71</b>	<b>662.42</b>	<b>629.08</b>	<b>100%</b>	<b>33.34</b>	<b>5.03%</b>	<b>660.95</b>	<b>660.27</b>	<b>99.90%</b>	<b>5%</b>
11	Urban	Rohini	Residential	210495	571		713.74	65%			510.76	510.94	100.03%	
			Agricultural	0	0		0.00	0%			0.00	0.00	0.00%	
			Commercial/Industrial-LT	30872	133	1153.93	154.29	14%	50.53	4.38%	250.73	250.79	100.03%	
			Commercial/Industrial-HT	68	48		92.45	8%			134.62	134.63	100.01%	
			Others	1031	58		142.92	13%			152.12	153.60	100.97%	
			<b>Sub-total</b>	<b>242466</b>	<b>810.03</b>	<b>1153.93</b>	<b>1103.40</b>	<b>100%</b>	<b>50.53</b>	<b>4.38%</b>	<b>1048.23</b>	<b>1049.97</b>	<b>100.17%</b>	<b>4%</b>
12	Urban	Shalimar bagh	Residential	246383	443		615.81	73%			385.55	384.30	99.68%	
			Agricultural	67	0		0.46	0%			0.22	0.22	98.14%	
			Commercial/Industrial-LT	27609	108	895.11	141.69	17%	49.98	5.58%	227.56	227.11	99.80%	
			Commercial/Industrial-HT	65	30		66.25	8%			90.53	90.08	99.51%	

		Others	815	18		20.92	2%			26.50	26.49	99.98%	
<b>Sub-total</b>			<b>274939</b>	<b>598.56</b>	<b>895.11</b>	<b>845.13</b>	<b>100%</b>	<b>49.98</b>	<b>5.58%</b>	<b>730.35</b>	<b>728.19</b>	<b>99.70%</b>	<b>6%</b>
Total		Residential	1729505	3752.28	10660.43	4925.85	49.1%	632.28	6%	3359.98	3362.98	100.09%	
		Agricultural	4466	33.82		15.34	0.2%			11.67	11.95	102.37%	
		Commercial/Industrial-LT	282712	2368.41		3779.90	37.7%			5850.22	5848.75	99.97%	
		Commercial/Industrial-HT	802	342.50		656.16	6.5%			959.96	960.01	100.01%	
		Others	8619	300.10		650.90	6.5%			712.44	712.11	99.95%	
<b>At company level</b>			<b>2026104.00</b>	<b>6797.11</b>	<b>10660.43</b>	<b>10028.15</b>	<b>100%</b>	<b>632.28</b>	<b>5.93%</b>	<b>10894.28</b>	<b>10895.80</b>	<b>100.01%</b>	<b>5.92%</b>

#### 4. Division wise AT&C loss

##### 1. Division wise connections & energy consumptions for FY 2023-24

Division wise connections, connected load, input energy & Billed energy with percentage share in different division is given below. "Shalimar Bagh" Division having maximum numbers of consumers and "Bawana" Division having minimum numbers of consumers. "Bawana" has maximum input energy as well as billed units and "Kirari" has minimum input energy as well as billed units as shown in table:

**Table 34: Divisions wise connections & energy consumptions**

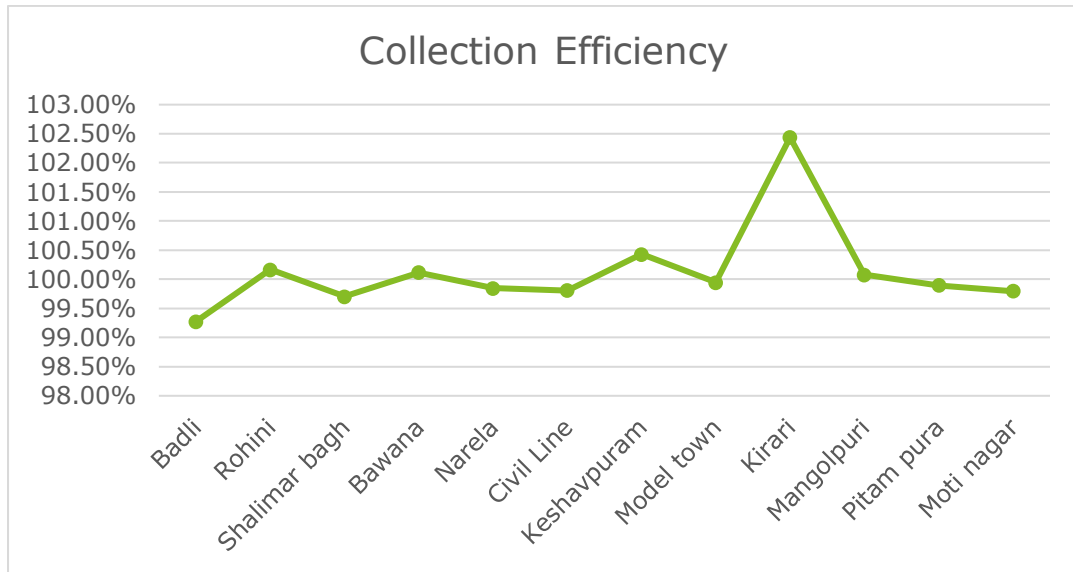
Name of Division	Total Number of connections		Total Connected Load		Input energy		Total Billed energy	
	Number	%	Load (MW)	%	MU	%	MU	%
Badli	137120	6.77	434.97	6.40	720.57	6.76	663.52	6.62
Rohini	242466	11.97	810.03	11.92	1153.93	10.82	1103.40	11.00
Shalimar bagh	274939	13.57	598.56	8.81	895.11	8.40	845.13	8.43
Bawana	98025	4.84	737.75	10.85	1466.37	13.76	1352.51	13.49
Narela	145876	7.20	648.22	9.54	1274.31	11.95	1176.54	11.73
Civil Line	138971	6.86	554.20	8.15	890.25	8.35	871.21	8.69
Keshavpuram	153063	7.55	591.26	8.70	873.94	8.20	832.66	8.30
Model town	174672	8.62	530.57	7.81	749.44	7.03	709.17	7.07
Kirari	162899	8.04	293.34	4.32	446.88	4.19	400.30	3.99
Mangolpuri	223651	11.04	459.27	6.76	695.58	6.52	656.23	6.54
Pitam pura	124019	6.12	527.71	7.76	662.42	6.21	629.08	6.27
Moti nagar	150403	7.42	611.23	8.99	831.61	7.80	788.40	7.86
<b>Total</b>	<b>2026104.0</b>	<b>100.00</b>	<b>6797.11</b>	<b>100.00</b>	<b>10660.43</b>	<b>100.0</b>	<b>10028.15</b>	<b>100.0</b>

**Table 35: Divisions wise AT&C losses (%) & T&D losses (%)**

S.No.	Division	T&D loss (%)	AT&C loss (%)
1	Badli	7.92%	8.59%
2	Rohini	4.38%	4.22%
3	Shalimar bagh	5.58%	5.86%
4	Bawana	7.76%	7.66%
5	Narela	7.67%	7.82%
6	Civil Line	2.14%	2.33%
7	Keshavpuram	4.72%	4.31%
8	Model town	5.37%	5.42%
9	Kirari	10.42%	8.24%
10	Mangolpuri	5.66%	5.58%
11	Pitam pura	5.03%	5.13%
12	Moti nagar	5.20%	5.39%

Further, it was observed that the collection efficiency is more than 100% across all the Divisions as shown below:

**Figure 11: Division wise BilledCollection efficiency (%)**



**5.2.6. Feeder wise AT&C losses analysis**

**1. Feeder wise AT&C losses**

Tata Power-DDL has ring main power distribution network. To provide uninterrupted power, back feeding points/normal operating points (NOP) are usually changed. Due to this dynamic nature of the network, connected consumers to a feeder at a particular point of time gets changed as the NOP changes. Tata Power-DDL is working on to implement technological solutions to capture these dynamic changes.

**2. High loss feeders**

If we compare input energy of feeder and related consumption, in many cases, input is low as compared to consumption. Vis-a- Vis, in some feeders, gap is high on positive side.

Though critical parameters are monitored on monthly basis, substantial difference in the data will not be reflected on quarterly basis. Due to spread over of meter reading and billing in multiple cycle, rollover of consumers takes place from preceding quarter to current quarter and vice-a-versa. Hence, in some of the feeders, the gap between input and consumption may be high on positive side and in some of the feeders it is negative. As the period of consideration widens or on rolling basis, variation gets normalized.

Considering the following feeders individually, it gives an impression that these feeders are having high MU loss. But considering them with the feeders with which these feeders share input energy and consumption, the MU losses gets reduced drastically.



**Table 36: High Loss Feeders**

Name of the Station	Feeder Code/ID	Feeder Name	Type of feeder meter (AMI/AMR/Other)	Received at Feeder (Final in MU)	Feeder Consumption (In MU)	T&D losses
AIR KHAM PUR GRID	21964084	AIR KHAMPUR GRID TO RENNY WELL	AMR	10.90	4.20	6.70
BAWANA CLEAR WATER GRID	21979426	BAWANA CLEAR WATER GRID TO GHOGHA (K) FDR NO-1	AMR	8.71	2.37	6.34
BAWANA CLEAR WATER GRID	21979466	BAWANA CLEAR WATER GRID TO DARYAPUR NANGAL S/S (O/D)	AMR	14.29	4.70	9.59
POOTH KHURD GRID	21979846	POOTH KHURD GRID TO DISTRICT OFFICE BAWANA -1	AMR	15.41	8.80	6.61
POOTH KHURD GRID	21979866	POOTH KHURD GRID TO SOS BAWANA	AMR	11.95	5.98	5.97
CIVIL LINE GRID	21986317	6.6KV CHANDRAWAL WATERWORKS S/S NO-2 FDR-2	AMR	11.85	0.00	11.85
CIVIL LINE GRID	21986367	WAZIRABAD WATER WORKS S/S NO-1	AMR	12.73	0.00	12.73
JAHANGIR PURI GRID	21987777	JAHANGIRPURI GRID TO DDA NO-2 S/S FDR	AMR	11.19	3.08	8.11
HAIDER PUR GRID	21996813	HAIDER PUR GRID TO HAIDER PUR W.W NO-2	AMR	17.15	0.00	17.15
HAIDER PUR GRID	21996883	HAIDER PUR GRID TO HAIDER PUR W.W NO-4	AMR	12.60	0.00	12.60
HAIDER PUR GRID	21996893	HAIDER PUR GRID TO HAIDER PUR W.W NO-3	AMR	17.26	0.00	17.26
DIFR GRID	21998043	DIFR GRID TO SSPL FEEDER NO-1	AMR	13.32	0.23	13.09
BAWANA CLEAR WATER GRID	22000148	BAWANA CLEAR WATER GRID TO A-BLOCK SEC.-2	AMR	13.93	1.78	12.15
WAZIRABAD GRID	22000318	WAZIRABAD GRID TO WAZIRABAD WATER WORKS S/STN-6	AMR	10.71	0.00	10.71
BAWANA-6 GRID	22012174	BWN-6 TO RG-34 INTERCONNECTOR S/S - 1&2	AMR	8.75	0.00	8.75
ROHINI - 24 GRID	22028604	ROHINI - 24 GRID TO RMU NEAR RG-24 S/S	AMR	22.53	14.93	7.60
BAWANA-1 66kV	22030879	BAWANA-1 GRID TO I-19 SEC-2 NEAR GOL CHAKKAR	AMR	17.85	1.92	15.93
BAWANA-1 66kV	22030939	BAWANA-1 GRID TO K-1 BLK.SEC-1	AMR	22.35	13.95	8.40

RANI BAGH CC GRID	22031614	RANI BAGH CC GRID TO COMM. COMPLEX S/S NO-4	AMR	7.29	0.21	7.08
BAWANA-6 GRID	230463344	BWN-6 TO RG-34 INTERCONNECTOR S/S 3&4	AMR	18.53	0.00	18.53

### 5.2.7. Identify overloaded segments/ infrastructure

Count of Overload feeders in Tata Power DDL is Zero.

In TPDDL network planning of feeders/ sections is being done 2-3 years prior to implementation at site, for overcoming any chance of overloading crisis occurrence in future.

### 5.3. Subsidy computation and analysis (based on quarterly data)

The subsidy details during FY 2023-24 are shown in the table below:

**Table 37: Category wise subsidy/Division wise subsidy details**

Consumer Category (Separate for each subsidized consumer category)	Billed Energy			Subsidized Billed Energy			Applicable rate of Subsidy as notified by State Govt.		Subsidy Due from State Govt.			Subsidy Actually Billed/claimed from State Govt. (As against col.12)	Subsidy Received from State Govt. (As against col.13)	Balance Subsidy yet to be Received from State Govt.
	Metered	Un-metered*	Total	Metered (out of col.2)	Un-metered* (Out of col.3)	Total	Metered Energy**	Un-metered Energy**	Metered Energy	Un-metered Energy	Total			
	(In kwh)			(In kwh)			(In Rs/Kwh)		(In Rs. Cr.)					
1	2	3	4=2+3	5	6	7=5+6	8	9	10=5 x8	11=6 x9	12=10 +11	13	14	15=13-14
Opening Balance (01/01/2024)													18.68	
Residential	0-200 units pm	1118451808		1118451808	1118451808	1118451808	Entire current demand					916.87	-872.54	67.82
	201-400 units pm	1605279536		1605279536			Rs. 800 per month							
Agriculture		14609642		14609642			Rs. 105 per kw/month					3.13		
Commercial/Industrial-LT														

Commercial/Industrial-HT															
Other (Specify)													1.68		
<b>Total</b>		<b>273834 0986</b>	<b>0.00</b>	<b>273834 0986</b>	<b>111845 1808</b>	<b>0.00</b>	<b>111845 1808</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>921.68</b>	<b>- 853.8 6</b>	<b>67.82</b>

### 5.4. Trend analysis and identification of key exceptions

Details maybe specified such as performance of DISCOM in FY 2022-23 Vs FY2023-24, annually comparison, circle wise analysis, where the DISCOM has improved and where needs improvement etc.

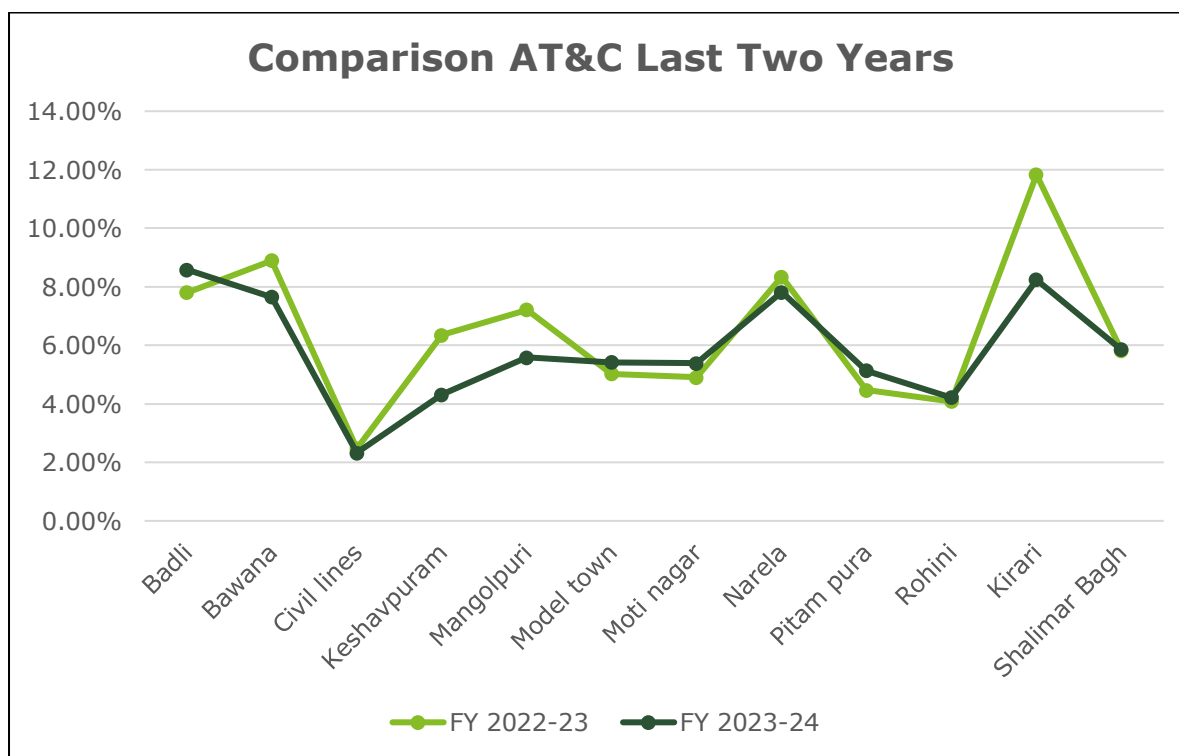
#### a) Summary Comparison of AT&C and T&D losses

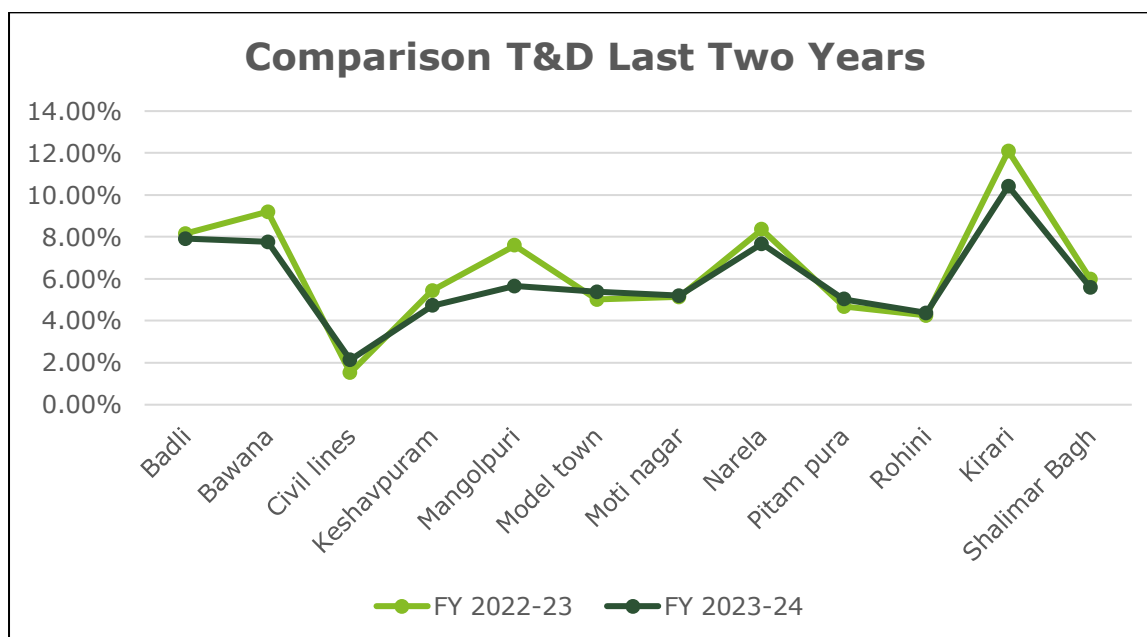
Division Wise Comparison of T&D and AT&C losses For FY 2022-23 & FY 2023-24 are shown in below Table:

**Table 38: Comparison of AT&C and T&D losses for last twoYears**

Name of Division	AT&C Loss		T&D Loss	
	FY 2022-23	FY 2023-24	FY 2022-23	FY 2023-24
Badli	7.80%	8.59%	8.15%	7.92%
Bawana	8.90%	7.66%	9.20%	7.76%
Civil Lines	2.47%	2.33%	1.52%	2.14%
Keshav Puram	6.35%	4.31%	5.44%	4.72%
Mangolpuri	7.21%	5.58%	7.60%	5.66%
Model Town	5.03%	5.42%	5.01%	5.37%
Moti Nagar	4.91%	5.39%	5.14%	5.20%
Narela	8.34%	7.82%	8.36%	7.67%
Pitam Pura	4.47%	5.13%	4.68%	5.03%
Rohini	4.08%	4.22%	4.25%	4.38%
Kirari	11.83%	8.24%	12.10%	10.42%
Shalimar Bagh	5.83%	5.86%	5.98%	5.58%

**Figure 12: Last two years AT&C loss trend**



**Figure 13: Last two years T&D loss trend****b) Summary of AT&C losses for last three Years**

The AT&C losses for FY2021-22, FY 2022-23 & FY 2023-24 are as shown below:

**Table 39: AT&C losses Trend for last three Years**

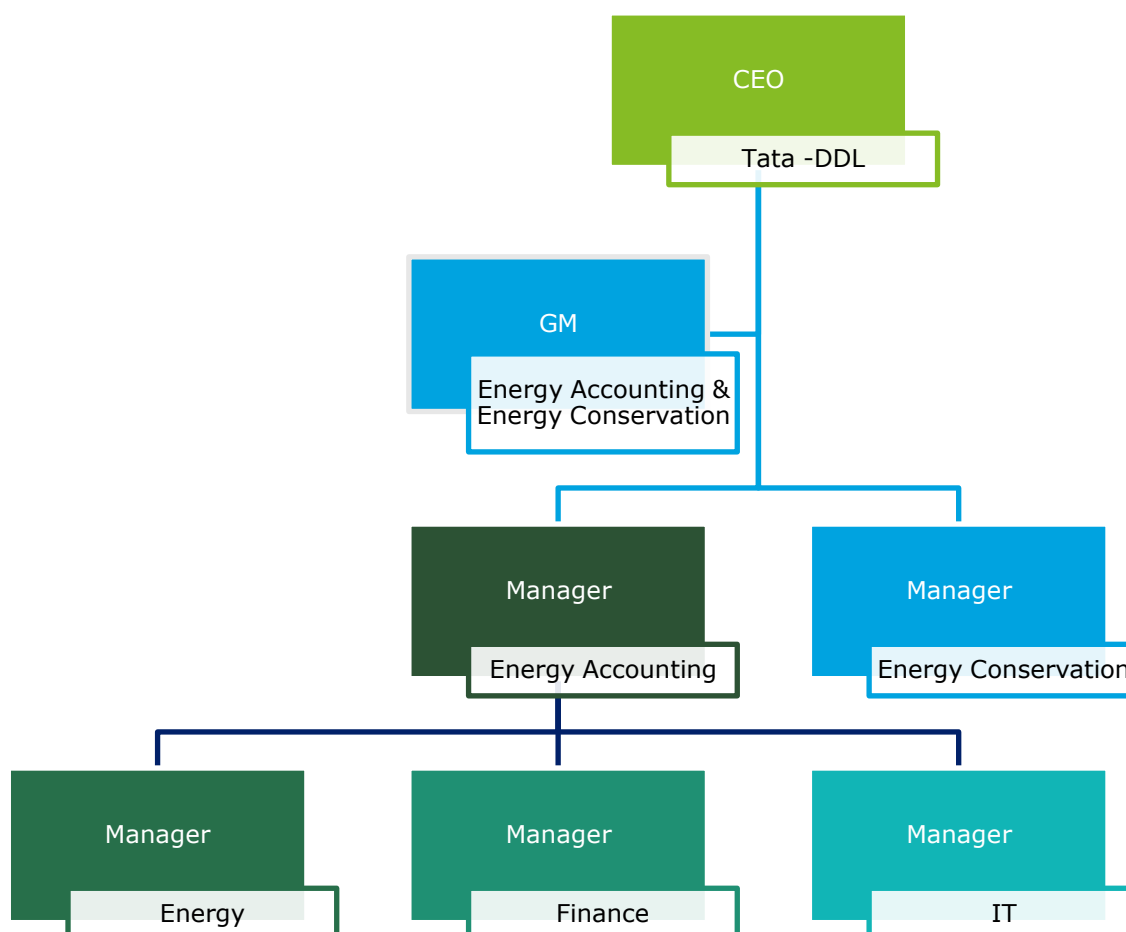
Technical Details	UoM	FY 2021-22	FY 2022-23	FY 2023-24
Input Energy Purchase (From Generation Source)*	Million kWh	11737.11	12741.47	12686.10
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kWh	9424.75	10622.62	10660.43
Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kWh	8752.21	9946.33	10028.15
Transmission and Distribution (T&D) loss	Million kWh	672.55	676.29	632.28
Details	%	7.14%	6.37%	5.93%
Collection Efficiency	%	100.36%	100%	100.01%
Aggregate Technical & Commercial Loss	%	6.80%	6.36%	5.92%

## 6. Energy Audit findings

### 6.1. Review of capacity of DISCOM's energy accounting and audit wing

The Energy Accounting/Audit wing in the DISCOM has been implemented from 11-Feb-22. The Organogram of the DISCOM is as shown below:

**Figure 14: Organogram of Energy accounting in the DISCOM**



**Table 40: Details of energy manager and Authorized signatory of DISCOM**

Designation	No. of Officers
CEO	Mr. Gajanan S. Kale
General Manager	Mr. HC Sharma
DGM (Energy Manager)	Mr. Davinder Bhatia
Head of Group, Energy Audit	Mr. Hari Om Sharma
Sr. Manager, Energy Audit	Mr. Neeraj Singh
Sr. Manager, Energy Audit	Ms. Gagandeep Kaur
Finance Manager	Mr. Sachin Gupta
IT Manager	Ms. Kamakshi Oberoi

## 6.2. Critical Analysis

- The monthly consumption per customer stands at 412.46kWh/Month. Tata Power-DDL caters to area spread in 5 circles, 12 Division, 31 numbers of sub-division, 19096 number of feeders, 8691 number of DTs and 2026104 number of consumers.
- Verified transmission losses, distribution (T&D) losses, collection efficiency & aggregate technical & commercial losses of Tata Power Delhi Distribution Limited for FY23-24 was 4.15%, 5.93 %, 100.01 % &5.92 % respectively.
- The electrical energy is supplied by various interstate and intrastate gene rating stations and same is supplied to customers at 66 KV, 33 KV, 11 KV, 6.6KV, 400V and 230 V single phase.
- Tata Power-DDL has implemented several world-class technologies such as Advance Distribution Management system or ADMS which is designed to replace the conventional SCADA-DMS-OMS system with features like real-time integration of Smart Meter Data / Distributed Generation integration and single data model from GIS , Integrated Geographical Information System (GIS) for instant services, Advanced Metering Infrastructure (AMI), Automated Demand Response (ADR), Smart Street Light Management system, Field Force Automation, Upgraded Network etc.
- Tata Power DDLhas implemented various energy conservation measures under DSM programme i.e., AC Replacement Scheme, BLDC Ceiling Fan, LED Lighting Scheme, Behavioural Demand Response (BDR) etc.
- Tata Power DDL calculation methodology of AT&C Losses calculated as per BEE proforma the calculation is as per actual collection efficiency.
- Tata Power-DDL has 100% metering available at 11/33/66 KV system. However, there is 100% metering at consumer end and 70% metering available at DT.

### 6.2.1. Status and progress in compliance to pre-requisites to energy accounting

It was observed that there has been significant delay in submission of Quarterly Accounts during first two Quarters (i.e., Q1 and Q2 of FY 2023-24) however, the delay has been reduced in Quarter 3 and Quarter 4 of FY 2023-24. DISCOM needs to submit the Quarterly accounts within the timeframe stipulated in the Regulations. Further, the compliance with regards to Regulations and Pre-requisites are tabulated in the table below:

**Table 41: Compliance status w.r.t Timelines and Pre-requisites**

Clause	Details	Sub-Clause	Criteria	Compliance Status
3	Intervals of time for conduct of annual energy	a	Conducted an annual energy audit for every financial year and submitted the annual energy audit report to the Bureau	Yes

Clause	Details	Sub-Clause	Criteria	Compliance Status
	audit		and respective State Designated Agency and also made available on the website of the electricity distribution company within a period of four months from the expiry of the relevant financial year	
4	Intervals of time for conduct of periodic energy accounting.	a	All feeder wise, circle wise and division wise periodic energy accounting is conducted by the energy manager of the electricity distribution company for each quarter of the financial year.	Yes
		b	All feeder wise, circle wise and division wise periodic energy accounting is conducted by the energy manager of the electricity distribution company for each quarter of the financial year.	Yes
		c	Electricity distribution company conducted its first periodic energy accounting, for the last quarter of the financial year immediately preceding the date of such commencement (i.e., 6 <sup>th</sup> October 2021)	Yes
		d	Electricity distribution company conducted its subsequent periodic energy accounting for each quarter of the financial year for a period of two financial years from the date of such commencement and submits the periodic energy accounting report within sixty days from the date of periodic energy accounting.	Yes
5	Pre-requisites for annual energy audit and periodic energy accounting	a	Pre-requisites for annual energy audit and periodic energy accounting	Yes
		b	Identification and mapping of high tension and low-tension consumers	Yes
		c	Development and implementation of information technology enabled energy accounting and audit system, including associated software	Yes
		d	Electricity distribution company ensures the installation of functional meters for all consumers, transformers and feeders. Meter installation is done in a phased	Yes



Clause	Details	Sub-Clause	Criteria	Compliance Status
			manner within a period of three financial years from the date of the commencement of these regulations in accordance with the trajectory set out in the First Schedule	
			d.1. 100% Communicable Feeder Metering integrated with AMI, by 31st December 2022 along with replacement of existing non-communicable feeder meters.	
			d.2. All Distribution Transformers (other than HVDS DT up to 25kVA and other DTs below 25 kVA) shall be metered with communicable meters. Communicable DT Metering for the following areas/ consumers to be completed by December 2023 and in balance areas by December 2025:	NA
			d.2.1. All Electricity Divisions of 500 AMRUT cities, with AT&C Losses > 15%	NA
			d.2.2. All Union Territories (for areas with technical difficulty, non-communicable meters may be installed)	NA
			d.2.3. All Industrial and Commercial consumers	Yes
			d.2.4. All Government offices at Block level and above	Yes
			d.2.5. Other high loss areas i.e., rural areas with losses more than 25% and urban areas with losses more than 15%	Yes
			d.3. Prepaid Smart Consumer Metering to be completed for all directly connected meters and AMR in case of other meters, by December 2023 in the following areas:	NA
			d.3.1. All Electricity Divisions of 500 AMRUT cities, with AT&C Losses > 15%;	
			d.3.2. All Union Territories (for areas with technical difficulty, prepaid meters to be installed);	NA
			d.3.3. All Industrial and Commercial	NA

Clause	Details	Sub-Clause	Criteria	Compliance Status
			consumers;	
			d.3.4. All Government offices at Block level and above;	NA
			d.3.5. Other high loss areas i.e., rural areas with losses more than 25% and urban areas with losses more than 15%.	NA
			d.4. Consumer Metering: 98% by FY 2022-23 99% by FY 2023-24	Yes
			d.5. Targets for functional meters - Meter FY 22-23 FY 23-24 FY24-25 Feeder metering 98.5% 99.5% 99.5% DT metering 90% 95% 98% Consumer metering 93% 96% 98	Yes
		e	e.1. All distribution transformers (other than high voltage distribution system up to 25kVA and other distribution system below 25 kVA) is metered with communicable meters.	
			e.2. And existing non communicable distribution transformer meters is replaced with communicable meters and integrated with advanced metering infrastructure.	
		f	Electricity distribution company has established an information technology enabled system to create energy accounting reports without any manual interference and such systems may be within a period of three years from the date of the commencement of these regulations in case of urban and priority area consumers; and within five years from the date of the commencement of these regulations in case of rural consumers	
		g	Electricity distribution company has a centralized energy accounting and audit cell comprising of (i) a nodal officer, an energy manager and an information technology manager,	Yes

Clause	Details	Sub-Clause	Criteria	Compliance Status
			having professional experience of not less than five years; and (ii) a financial manager having professional experience of not less than five years	
6	Reporting requirements for annual energy audit and periodic energy accounting	a	Electricity distribution company has a nodal officer, who is a full-time employee of the electricity distribution company in the rank of the Chief Engineer or above, for the purpose of reporting of the annual energy audit and periodic energy accounting and communicate the same to the Bureau	Yes
		b	Electricity distribution company ensures that the energy accounting data is generated from a metering system or till such time the metering system is not in place, by an agreed method of assumption as may be prescribed by the State Commission.	Yes
		c	Metering of distribution transformers at High Voltage Distribution System up to 25KVA is done on cluster meter installed by the electricity distribution company	NA
		d	The energy accounting and audit system and software is developed to create monthly, quarterly and yearly energy accounting reports.	
		c	Electricity distribution company has provided the details of the information technology system in place as specified in clause (f) of regulation 5 that ensures minimal manual intervention in creating the energy accounting reports and any manual intervention of any nature, in respect of the period specified therein, shall be clearly indicated in the periodic energy accounting report	Yes

### 6.2.2. Data gaps

The Audit firm has raised the data gaps to the DISCOM. The summary of data gaps raised and response from DISCOM is summarized in the table below:

**Table 42: Summary of Data gaps**

S. No.	Data gaps raised by Energy Auditor	Response shared by DISCOM	Status of data submission by DISCOM
	Net Input Energy is 10660.43 MUs not matching the total energy available in Form Input 10742.30 MUs	Net Input Energy calculation: Net Input Energy received at DISCOM periphery – Open Access + Solar Generation	Submitted
	Voltage wise power purchase is not available as per BEE format as mentioned in Infrastructure sheet.	Voltage wise power purchase details are not available, as the invoice of power purchase contains only units purchased and details of power plant voltage not available.	
	Voltage wise input billed energy not available	Majority of feeders are common to LT & HT. So input energy supplied is inseparable. This comprises of input at 33 & 66 kV as the two can't be mentioned separately.  Cumulated EHT sales MUs for 33kV and above are maintained and therefore bifurcation of same is not available. Same also provided in A.6 of Form-input energy sheet	
	Feeder wise AT&C losses not available.	Tata Power-DDL has ring main power distribution network. To provide uninterrupted power, back feeding points/normal operating points (NOP) are usually changed. Due to this dynamic nature of the network, connected consumers to a feeder at a particular point of time will change as the NOP changes. Tata Power-DDL is working on to implement technological solutions to capture these dynamic changes.  Hence, if we compare input energy of feeder and related consumption, in many cases, input is low as compared to consumption. Vis-a- Vis, in some feeders, gap is high in positive side.  Though critical parameters are monitored on monthly basis, substantial difference in the data will not be reflected on quarterly basis. Due to spread over of meter reading	

S. No.	Data gaps raised by Energy Auditor	Response shared by DISCOM	Status of data submission by DISCOM
		and billing in multiple cycle, rollover of consumers takes place from preceding quarter to current quarter and vice-a-versa. Hence, in some of the feeders the gap between input and consumption may be high on positive side and in some of the feeders it is negative. As the period of consideration widens or on rolling basis, variation gets normalized.	
	POC losses are not available	Generation at Transmission periphery- Point of connection loss (POC) and input voltage level are not available. As the power drawn is supplied through Central Transmission Utility (Power Grid) and State Transmission Utility (Delhi Transco).	

### 6.2.3. Summary of key responses of DISCOM management on Comments by Energy Auditor

The Auditor has identified the key issues with regards to Energy Accounting/Audit and DISCOM's management has responded to the same as summarized in the table below:

**Table 43: Comments by Energy Auditor and responses of DISCOM management**

S. No.	Comments by Energy Auditor	Response of DISCOM's management
	Kindly provide the filled in format as per BEE.	Provided by Tata Power-DDL
	Quarterly format as per BEE	Provided by Tata Power -DDL
	Kindly provide the identification and mapping of all of the electrical network assets	GIS Mapping
	Kindly provide the identification and mapping of high tension and low-tension consumers	GIS Mapping
	Kindly provide the details of the energy accounting data - generated from a metering system or till such time the metering system is not in place, by an agreed method of assumption as may be prescribed by the State Commission	Metering is provided and home grown software is used as per tariff category.
	Whether the Metering of distribution transformers at High Voltage Distribution System up to 25KVA is done on cluster metering? If not what is the action plan	No, HVDS installation
	Energy (Electrical) Purchase report for the year 2023-24	Provided by Tata Power-DDL

S. No.	Comments by Energy Auditor	Response of DISCOM's management
	Open access consumer and their details	Provided by Tata Power-DDL
	Peak Demand of the system	Provided by Tata Power-DDL
	High loss Network segments	The segment identification is not possible due to ring main.
	Energy Conservational Schemes implemented	Provided by Tata Power-DDL
	Power Distribution Transformer	Provided by Tata Power-DDL
	Maintenance practices - Power Substation , HT lines LT lines ,DTR	Provided by Tata Power-DDL
	Average Billing Rate	Category wise consumer and total billed energy of those consumer is provided by Tata Power

### 6.3. Revised findings based on data validation and field verification

Site visits were carried out to ascertain the meter number and the input serial number of the meters. Physical verification along with system data was verified.

At the time of field visit, feeder meters found in working conditions, Logbook is maintained on daily basis including hourly loading pattern, running feeder & energy consumption.

Conducted Raid by Departmental Team and Vigilance also: To catch Theft and Lodge FIR against it, On the basis of inspection Police registered the case of direct theft

Field visit of Substations, DTs and commercial building was done during the audit time.

It was also observed 100% consumers are metered.

### 6.4. Inclusions and Exclusions

Particulars	FY 2022-23	FY 2023-24
Number of circles	5	5
Number of divisions	12	12
Number of sub-divisions	31	31
Number of feeders	18463	19096
Number of DTs	8157	8691
Number of consumers	1959098	2026104

## 7. Conclusion and Action Plan

### 7.1. Summary of critical analysis and way forward proposed by Energy Auditor

The primary energy-consuming areas are the distribution network, office buildings, and fleet of vehicles used for maintenance and repairs. The distribution network accounts for the majority of energy consumption, followed by office buildings and vehicles.

#### 7.1.1. Recommendations:

1. Installation of Smart Meters.
2. Installation of Automatic Power factor controller (Capacitor Bank) at newly constructed PSS.
3. System improvement & automation.
4. Load balancing of distribution transformers.

#### 7.1.2. Cost-Benefit Analysis:

To determine the cost-effectiveness of the recommended measures, a cost-benefit analysis should be conducted. The cost of implementing the measures should be compared to the potential energy savings to determine the return on investment. This analysis will help the company prioritize the implementation of the recommended measures.

### 7.2. Summary of key findings – energy balance and losses

The Energy balance and losses of Tata Power-DDL for FY 2023-24 are as shown in the table below:

**Table 44: Energy balance and losses**

Energy Input Details	Formula	UoM	Value
Input Energy Purchase (From Generation Source)	A	MU	12686.10
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	10660.43
Total Energy billed (is the Net energy billed, adjusted for energy traded))	C	MU	10028.15
Transmission and Distribution (T&D) loss Details	D	MU	632.28
	$E = D/B \times 100$	%	5.93%
Collection Efficiency	F	%	100.01%
Aggregate Technical & Commercial Loss	$G = 1 - \{(1-E) \times \text{Min}(F, 100\%)\}$	%	5.92%

### 7.3. Recommendations and best practices

#### a) Energy accounting

In Accordance to clause 5(g) of Bureau of energy efficiency (Manner and intervals for conduct of Energy audit in Electrical distribution companies) Regulation issued by BEE Ministry of Power (GOI) dated 7th Oct 2021 to conduct Mandatory Annual Energy Audit & periodic Energy Accounting in Electrical Distribution Companies and as per guidelines issued by BEE vide L. No 18/BEE/DISCOM/2021/1348-94 dated 11th Feb 2022,an Energy Audit cell (EAC) is operating in Tata Power-DDL, Delhi.

There is Energy accounting cell to account for all the annual and quarterly energy accounting and audit data as per BEE regulation, vetted by internal energy manager and sent to BEE as per guidelines and Annual Energy Audit is being done by accredited energy auditor.

Energy Accounting is the first step towards identifying areas that need improvement. This will involve reviewing the current processes, systems, and data management practices.

Tata Power-DDL is laying special emphasis on Energy Accounting at all levels. Steps are being taken to account for every unit of energy supplied to consumers. The following measures are being implemented.

- i. 100% Feeder Metering at 66/33/11kV Substations.
- ii. 100% DT Metering by end of FY2023-24 under RDSS.
- iii. 100% Consumer metering for all categories of consumers.

#### b) Loss reduction

TPDDL is a private licensee that distributes power to over seven million consumers in North and North-West Delhi. The Discom was formed in 2002 as a joint venture between Tata Power and the Government of Delhi.

Today, AT&C losses stand at 5.92% (as of FY 2023-24) which is an unprecedented reduction from an opening loss level of 53% in July 2002.

TPDDL leveraged technology to improve its operational efficiency and reduce its losses.

**Tata Power-DDL** has undertaken various initiatives for loss reduction. Some of the initiatives are as follows:

**Renovation in Metering Infrastructure:** Replacement of electromechanical meters, defective meters by electronic meters/ smart meters. Installation of AMR (Automatic Meter Reading) meters and tamper-proof static meters with facility of remote disconnection / reconnection as and when required.

**Theft Control:** Conducting raids in high loss areas for identifying pilferage of electricity.

**Substation automation and distribution automation:** Implementation of SCADA (Supervisory Control and Data Acquisition System) Control System for load management, including GIS mapping of assets.



**Network reconfiguration:** Electrical network designing wrt Standards and Guidelines, also considering network redundancy to increase system reliability.

Power factor improvement by automatic power factor controller.

**Microgrid solutions** to promote energy access to the areas where grid supply has not reached or is not feasible.

**HVDS:** Introduction of high voltage distribution system.

**AB Cable:** Replacement of bare conductor by AB (aerial bunched) Cable for shielding of possibilities of power theft.

**Process re-engineering for improvement of existing customer complaint:** improvement in all sorts of delay in billing, arrangement for spot billing etc. Improved process with IT application development.

**Customer care services:** Customer oriented management approach, like implementation of call center for 24 hours, improving customer care.

### c) Energy conservation

TATA Power-DDL has always been frontrunner in choosing energy efficiency practices for building a sustainable greener tomorrow. The DISCOM has already undertaken sustainable initiative in scheme named 'Urja Arpan'.

- **Demand Side Management/ Behavioural Demand Response Program:** Demand Response (DR) is the reduction in a customer's electric load during periods of peak demand or high market price. Taking a step forward in improving system reliability, Tata Power-DDL initiated Behavioural Demand Response program to review customer's acceptability, adaptability, and its impact for balancing the demand and supply of electricity during the peak hours. Through this program customers were advised to reduce the electricity usage for a specified duration during which overall electricity demand is estimated to reach at the peak and raising awareness among individuals and organizations about responsible and efficient electricity consumption. which further helps to avoid network overloading and also defer CAPEX investment require for augmentation. Cumulative load shed achieved in FY 22 is 7.69 MW and in FY 23 is 85.05 MW. Till now, 1 lac + enrolled customers have participated, achieving 560 MW cumulative load shed in 16 BDR events.

- **Energy Efficient Lighting and Fans**

Scheme: Tata Power-DDL is offering Energy Efficient Products (EEPs) such as LED Bulbs and LED Tube Lights which have low maintenance and usage costs. These are durable and use up to 75% less energy than any other incandescent bulbs resulting in the reduction of monthly energy bills.

In addition to lighting, option for BLDC fans at discounted rates is available. BLDC fans provide high cooling efficiency with lower energy consumption and also savings in electricity bills. BLDC motors do not have brushes so they are more reliable, high life expectancy and energy savings as

compared to conventional ceiling fans. With the added convenience of remote control, BLDC fan is a financially and environmentally smart choice for customers as it consumes half electrical load as compared to ordinary fans.

Ceiling Fan Replacement - Replacement of non-star rated fans with BEE 5 Star rated fans.

Consumption of 50/28 W against 70W conventional fans.

12,000 + items sold Replacement of conventional 70W fans with super-efficient BLDC fans (28W) at discounted price offers. Energy saving of approx.4.74 MUs.

➤ **Launch of Clean Cooling Program with discount based Energy efficient ACs Scheme for Customers:**

Tata Power-DDL in association with Voltas, Blue Star, General, Godrej, Hitachi is providing a discount-based scheme with or without Replacement of Old AC for all the customers.

➤ **Home Automation:**

Tata Power-DDL is offering an IoT based solution which allows to operate, schedule, monitor appliances like lighting, fans, ACs, washing machines, geysers, TVs, refrigerators, etc. with phone or with voice control via Google assistant or Alexa.

➤ **Home Automation (Sensors & Sensor Lights):**

Tata Power-DDL is offering Motion Sensors: With Motion sensors, lights and appliances can be switched on during presence of a person in the area. In absence of motion, automatically turn off the lights.

Sensor Lights: When motion is detected, sensor lights automatically illuminate at full brightness. In the absence of motion automatically dim the area lights to 20%.

➤ **Air Purifier Scheme:**

Tata Power-DDL in association with Voltas has initiated the Air Purifiers scheme at special discounted rates. The Air Purifiers are powered with 6-stage filtration process and removes up to 99.90% airborne pollutants, eliminates impurities with ease.

➤ **Washing Machine Scheme:**

Tata Power-DDL has launched a 5 star rated washing machine scheme at special discounted rates in collaboration with Voltas-Beko.

➤ **AC Replacement Program-** Replacement of non- star rated AC with BEE 5 Star rated/ Inverter Technology AC by Voltas, Blue Star, Sharp & Godrej at discounted prices More than 6000+ items sold. Energy savings of approx. 1 MU.

➤ **Digitization/ Adoption of digital lifestyle:** By reducing paper consumption, and exploring digital alternatives, TATA Power-DDL contributes to environmental conservation and decreased carbon footprints, thus fostering a greener and eco-friendly workplace. E-billing is being adopted for consumer billing. Supporting green initiatives: Participation in local environmental programs, such as tree planting and clean-up drives.

➤ **Celebration of Earth Day on 22<sup>nd</sup>April every year:** As a collective responsibility to nurture and protect Mother Earth, DISCOM is urging consumers to shut down their power for 1 hour on Earth Day.

#### 7.4. Action plan for line loss reduction

Following energy conservation Measures (ECMs) is adopted for line loss reduction

1. Installation of Smart Meters.
2. Installation of Automatic Power factor controller (Capacitor Bank).
3. System improvement & automation.
4. Improvement in metering system.
5. Replacing of conventional/ non star rated transformer into energy efficient transformers.
6. Replacement of all conventional mechanical energy meters with static digital energy meters having less power consumption and more accuracy.
7. Laying of AB cable in theft prone area where losses are in higher side.
8. HVD system to reduce low tension line losses.
9. Replacing worm out /under sized conductors.
10. Increase in HT/LT Ratio.
11. Preventive & Periodic maintenance of line & transformer.
12. Load balancing of distribution transformers.
13. MIS Based periodic reporting of unit wise business parameters.
14. Installation of solar generation plant & solar pumps.
15. Strengthening of energy accounting infrastructure- 100% consumer metering.
16. GIS based asset mapping of all 33/11KV Substations, 11KV Lines and distribution transformers has been completed.
17. 11KV Feeder wise base line technical data i.e., length, Peak load, VR and technical loss calculated by algorithm & published in power BI.
18. Feeder wise baseline commercial loss is being collected by subtracting technical loss for total T&D loss.
19. Selection/priority of area must be made under:
  - I. Feeder having VR more than 15%.
  - II. Feeder having VR more than 9 to 15%.
  - III. High T&D loss feeder.
  - IV. High commercial loss feeder.

## 7.5. Action plan for monitoring and reporting

1. Energy Audit Cell as per BEE Regulation.
2. GIS Based mapping for all feeder monitoring.
3. Substation wise dashboard for all substation monitoring
4. Division dashboard for monitoring all division data.
5. Critical Parameters dashboard for KPI.
6. Customer care help line number.

## 7.6. Action plan for automated energy accounting

Automated energy accounting is a critical component of modern electricity distribution systems. It allows for accurate and efficient tracking of energy usage, which helps identify energy waste, reduce energy consumption, and improve billing accuracy. Mentioned below is an action plan for implementing automated energy accounting in an electricity distribution company.

### **Step 1: Evaluate Current Energy Accounting System**

The first step is to evaluate the current energy accounting system to identify areas that need improvement. This will involve reviewing the current processes, systems, and data management practices. The evaluation should consider the following factors:

- Accuracy of billing and metering
- Timeliness of bill generation
- Data management practices
- Energy usage tracking capabilities
- Customer feedback and complaints

### **Step 2: Identify Automated Energy Accounting System Requirements**

After evaluating the current energy accounting system, the next step is to identify the requirements for an automated energy accounting system. This will involve considering the following factors:

- Energy usage tracking capabilities
- Billing accuracy and timeliness
- Integration with existing systems
- Data management capabilities
- Scalability and flexibility

### **Step 3: Research and Select an Automated Energy Accounting System**

Once the requirements are identified, the next step is to research and select an automated energy accounting system. This will involve reviewing available options and selecting a system that meets the identified requirements. The selected system should have the following features:

- Real-time energy usage tracking
- Automated billing and metering

- Data management and analysis capabilities
- Integration with existing systems
- User-friendly interface

#### **Step 4: Develop Implementation Plan**

After selecting an automated energy accounting system, the next step is to develop an implementation plan. This will involve determining the following:

- Timeline for implementation
- Resource requirements
- Roles and responsibilities
- Training requirements
- Data migration plan

#### **Step 5: Implementation and Testing**

Once the implementation plan is developed, the next step is to implement and test the automated energy accounting system. This will involve the following:

- Installation and configuration of the system
- Data migration from the old system to the new system
- User training
- System testing

#### **Step 6: Rollout and Monitoring**

After successful testing, the next step is to rollout the automated energy accounting system to all customers. This will involve communicating the changes to customers and ensuring a smooth transition. Once rolled out, the system should be continuously monitored to identify any issues and improve the system's performance.

In conclusion, implementing an automated energy accounting system can help Tata Power DDL improve billing accuracy, reduce energy waste, and enhance data management capabilities. The action plan outlined above provides a framework for implementing an automated energy accounting system in an electricity distribution company. By following this plan, the company can successfully implement the system and achieve its energy accounting goals.

## Annexures

### Annexure I - Introduction of Verification Firm

We A-Z Energy Engineers Pvt. Ltd. provides consultancy services in the areas of Energy Management while conducting Energy Audits in all segments of energy sector For conducting detailed Energy Audits, Energy Audits under PAT (Mandatory and M&V), we have a pool of experienced BEE Accredited & Certified Energy Auditors, Electrical Engineers, Mechanical Engineers and Technicians having experience of more than 30 years. The Energy Audits are being carried out with sophisticated instruments namely Power-Analyzer, Flue Gas Analyzer, Ultra-sonic flow meter, Techo-meter, Anemometer, Hego-Meter, Digital Thermometer, Thermographic Camera's, Lux Meter, Leak detectors. Laser gun etc. etc.

#### Objective

- To carry out and take ahead the business of Energy Efficiency and climate change including promotion and dissemination of energy efficient product and services.
- To disseminate the culture of safe manufacturing and Services through safety audits and trainings.
- To facilitate implementation of energy efficiency projects for Demand Side Measures including optimization of energy mix for industries, railways, building sector, lighting, HVAC etc.
- To facilitate implementation of schemes, programs and policies of central and state governments or its agencies applicable for enhancing energy efficiency.
- To provide consultancy services in the field of Clean Development Mechanism and Renewable Energy Certificate projects, Carbon Markets, Demand Side Management, Energy Efficiency, Climate change and other related areas.
- To identify and impart training to build the capacity of stakeholders in the field of Energy Efficiency and safe practices in Industry.
- To act as a resource center in the field of Energy Efficiency and take up the activities of Capacity Building Training and other related activities.

#### Vision

- To make use of energy sustainable.
- To create and sustain markets for energy efficiency in India
- To facilitate energy efficiency improvement through private sector investments in energy efficiency.

#### Mission

- To assist all stakeholders in implementing energy efficiency and realizing savings.
- To create awareness regarding merits of improvement of energy efficiency and safety practices in private and public sector.

We are Accredited Energy Auditor from BEE, also empaneled by BEE for PAT M & V Audits and Mandatory Energy Audit Projects. A-Z Energy Engineers Pvt. Ltd. has been short listed by Bureau of Energy Efficiency as an Energy Service Company (ESCO), it is an ISO 9001:2015 certified company. We have completed more than 1260 nos. projects, including 52 PAT projects.

Dr. P.P. Mittal the Founder Director of A-Z Energy Engineers Pvt. Ltd. was awarded by Govt. of India in National Energy Conservation Award 2013, 2015 & 2016. MSME Ministry Govt. of India awarded "Best Services Providing Company" it was awarded by Hon'ble Prime Minister of India.

**a) Name of the Firm**

Name of Accredited Firm	Accredited Energy Auditor
A-Z energy Engineers Private Limited	Dr P.P Mittal (AEA 011)

**b) Composition of Team**

Sr.No.	Name	Qualification	Registration No	Experience (In Years)/Sector
1	Dr. P.P Mittal	Ph.D, MBA		+45 Years
2	Mr. Vipon Chanda	Sector Expert		30
3	Mr. V.P Sharma	B. Tech,EA		32 Years
4	Mr. Alok Kumar Tiwari	Engineer		6 Years
5	Mr. Pankaj Chauhan	Engineer		8 Years


**c) Registration No.**

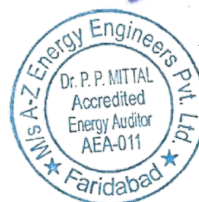
EmAEA 0024

**d) Undertaking**

We A-Z Energy Engineers Pvt. Ltd. hereby confirm that our AEA and any of the audit team member mentioned in this report has conducted mandatory annual energy audit (Accounting) for Tata Power-DDL, Delhi (hereafter called as DC).

We also confirm that none of our team member was in the employment of the DC within the previous four years.

  
**Authorized Signatory**  
 Dr. P.P Mittal



## Annexure II - Minutes of Meeting with the DISCOM team

### Minutes of Meeting with TATA Power Delhi Distribution Ltd., New Delhi & A-Z Energy Engineers Pvt. Ltd., New Delhi

**TATA Power Delhi Distribution Ltd**

**AZ Energy Engineers Pvt. Ltd.**

The Audit team of A-Z Energy Engineers Pvt. Ltd., New Delhi visited EAG office of Tata Power-DDL in month of June 2024. The necessary verifications related to annual energy audit were also carried out at EAG office/ site offices of Tata Power-DDL. The Annual Energy Audit was conducted as per the provisions stipulated under BEE (Manner and Intervals for conduct of Energy Audit in electricity distribution Companies) Regulation 2021 and its amendment.

Following are the key observations during audit.

- BEE Proforma for FY 2023-24 was filled by Tata Power -DDL.
- Tata Power-DDL has provided the documents for Power purchase, Energy Input/Billed i.e. Fact sheet, True Up Petition (FY 22-23), ARR (Annual Revenue Requirement) (FY 24-25) Petition filed.
- Tata Power-DDL has provided details for action plan to reduce losses.
- Verified T&D losses, AT&C losses & Collection Efficiency is 5.93%, 5.92% & 100.01% respectively based on the filled in proforma and verified source documents.
- Tata Power-DDL has 100% metering available at 11/33/66 KV system, 100% metering at consumer end and 70% metering available at DT.

S.No.	Data Required for Annual Energy Audit	Status
1	Complete filled in Proforma for the year 2023-24 (Annually)	Provided
2	Quarter wise report FY 2023-24	Provided
3	Action plan to reduce the T&D and AT&C losses	Provided
4	Assets details matched with the proforma infrastructure sheets	Provided
5	Verified T&D and AT&C losses of previous years	Provided
6	Subsidy category Wise	Provided
7	DT Wise Losses	Provided
8	Feeder wise Losses	Provided
9	Voltage wise Input Energy	Not Available

  
**HARIOM SHARMA**  
 E. Code : 90231  
 AGM- Energy Audit Group  
 Tata Power Delhi Distribution Limited

**Tata Power Delhi Distribution Limited**





**A-Z Energy Engineers Pvt. Ltd.**



### **Annexure III - Check List prepared by auditing Firm**

An annual energy audit checklist has been used to assess the energy efficiency of Tata Power DDL based on equipments, Accredited Energy Audit has developed the checklist to identify opportunities for energy cost reduction and recommend solutions.

► Following information has been collected for T&D system with documentary evidence

- Month wise input and billed energy.
- T&D losses computation approach.
- Un-metered energy consumption
- Internal field audit report of input and billed energy.
- Performance of discom on T&D and AT&C losses.
- Outcome of internal audit.
- Measures taken to reduce losses.
- Zone/circle/Division/Sub-division wise loss computation.
- Reduction achieved, measures adopted for energy conservation and quantity of energy saved.
- Category wise consumers energy input and energy billed details.
- Category wise consumers total no. of connections and connected load and % connected load
- Bifurcation of Input and Billed Energy (Circle & Division Wise).
- Write up on procedure followed for Technical loss analysis.
- Overloaded Feeder data

### **Annexure IV - Brief Approach, Scope & Methodology for audit**

Scope of annual energy accounting is as per guidelines and notification from Bureau of Energy Efficiency, New Delhi dated 6th October, 2021.



## Annexure V - Infrastructure Details

The infrastructure details of the DISCOM are as shown in the table below:

**Table 45: Infrastructure details**

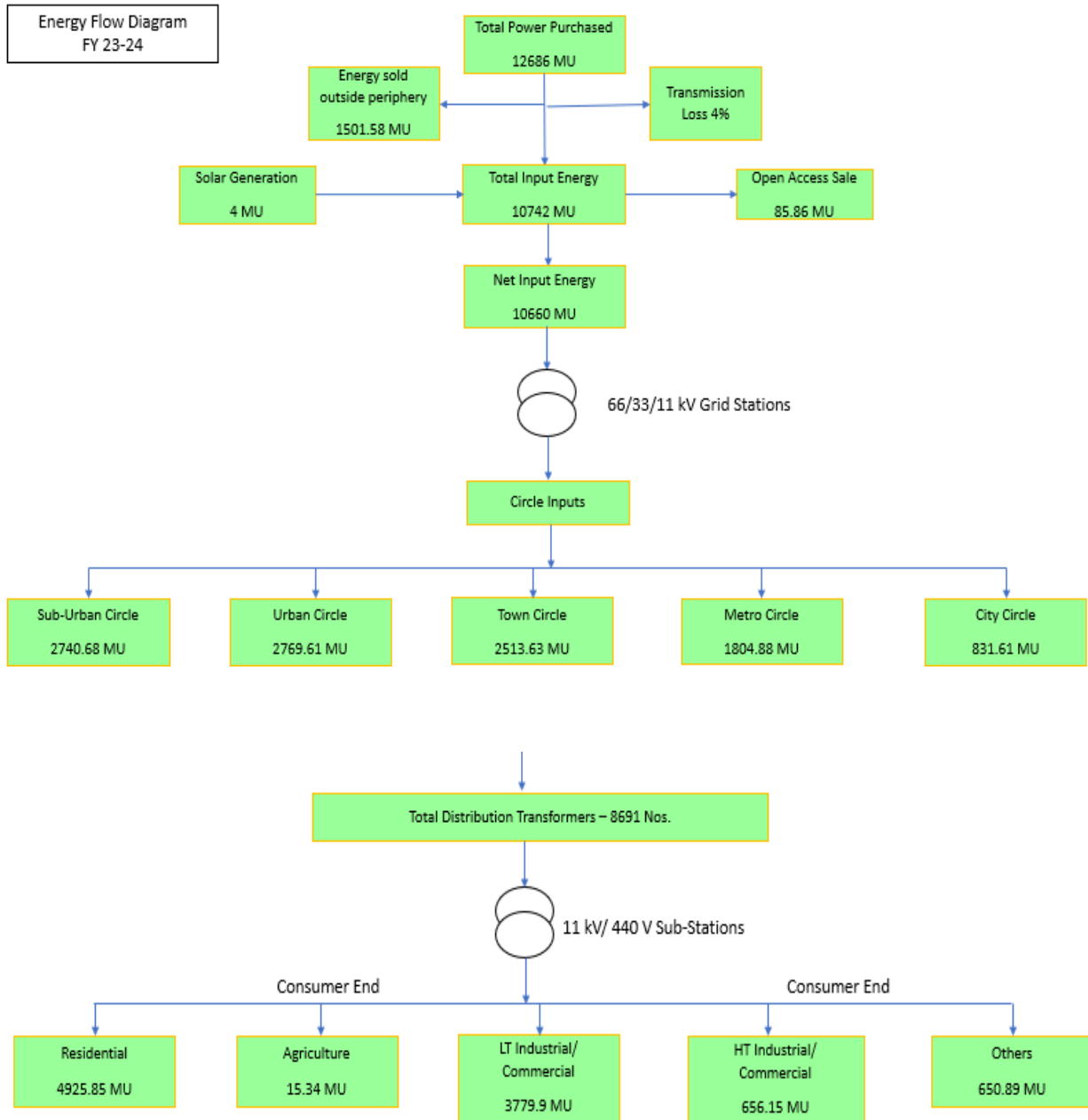
Parameters	Total	Covered during in audit	Verified by Auditor in Sample Check	Remarks (Source of data)
Number of circles	5	5	Sample	
Number of divisions	12	12	Sample	
Number of sub-divisions	31	31	Sample	
Number of feeders	19096	19096	Sample	
Number of DTs	8691	8691	Sample	
Number of consumers	2026104	2026104	Sample	

**Table 46: Metering details**

Parameters	66kV and above	33kV	11/22kV	LT
Number of conventional metered consumers	0	0	0	1593831
Number of consumers with 'smart' meters	0	0	0	394120
Number of consumers with 'smart prepaid' meters	0	0	0	3474
Number of consumers with 'AMR' meters	8	4	897	29849
Number of consumers with 'non-smart prepaid' Meters	0	0	0	3921
Number of unmetered consumers	0	0	0	0
<b>Number of total consumers</b>	8	4	897	2025195
Number of conventionally metered Distribution Transformers	NA	NA	260	NA
Number of DTs with communicable meters	NA	NA	5861	NA
Number of unmetered DTs	NA	NA	2570	NA
<b>Number of total Transformers</b>			8691	NA

<b>Parameters</b>	<b>66kV and above</b>	<b>33kV</b>	<b>11/22kV</b>	<b>LT</b>
Number of metered feeders	142	115	1312	No meters on LT feeders
Number of feeders with communicable meters	142	115	1312	No meters on LT feeders
Number of unmetered feeders	0	0	0	17527
<b>Number of total feeders</b>	142	115	1312	17527
Line length(cktkm)	1865			
Length of Aerial Bunched Cables(cktkm)	5822			
Length of Underground Cables(cktkm)	6571.7			

## Annexure VI - Electrical Distribution System



**Annexure VII - Power Purchase Details****a) Input Purchase Power generating station for FY 2023-24**

Source wise/generating station wise power purchase, contracted capacity, RPO obligation met by the DISCOM, etc.

S.No.	Name of Generation Station	Generation Capacity (In MW)	Type of Station Generation	Type of Contract	Type of Grid
1	NTPC AravaliJhajjar	613	Coal	25 Years	Inter State
2	NTPC Dadri NCTPS(Th.) Stage II	9	Coal	25 Years	Inter State
3	NTPC Kahalgaon II	48	Coal	25 Years	Inter State
4	NTPC Singrauli STPS	46	Coal	30 Years	Inter State
5	NTPC Rihand STPS-II	39	Coal	25 Years	Inter State
6	NTPC Rihand STPS-I	31	Coal	28 Years	Inter State
7	NTPC Dadri GPS	28	Gas	25 Years	Inter State
8	NTPC Auriya GPS	22	Gas	35 Years	Inter State
9	NTPC Kahalgaon I	16	Coal	Till change of allocation by MoP in lieu of Tala	Inter State
10	NTPC ANTA GPS	14	Gas	25 Years	Inter State
11	NTPC Unchahaar-II TPS	14	Coal	25 Years	Inter State
12	NTPC Unchahaar-III TPS	9	Coal	25 Years	Inter State
13	NTPC Unchahaar-I TPS	7	Coal	27 Years	Inter State
14	NTPC Farakka	7	Coal	Till change of allocation by MoP in lieu of Tala	Inter State
15	NTPC Singrauli Small Hydro	2	RE	35 Years	Inter State
16	NHPC Dulhasti	15	Hydro	35 Years	Inter State
17	NHPC Parbati III	20	Hydro	40 Years	Inter State
18	NHPC Bairasiul	6	Hydro	25 Years	Inter State
19	NHPC Tanakpur	3	Hydro	35 Years	Inter State
20	NHPC Chamera -I	13	Hydro	35 Years	Inter State
21	NHPC Chamera-II	12	Hydro	35 Years	Inter State
22	NHPC Chamera-III	9	Hydro	35 Years	Inter State
23	NHPC URI-I	16	Hydro	35 Years	Inter State
24	NHPC Uri-II	10	Hydro	40 Years	Inter State
25	NHPC Dhauliganga	11	Hydro	35 Years	Inter State
26	NHPC Sewa II	5	Hydro	35 Years	Inter State

S.No.	Name of Generation Station	Generation Capacity (In MW)	Type of Station Generation	Type of Contract	Type of Grid
27	Narora APS	14	Nuclear	15 Years	Inter State
28	RAPP 5&6	17	Nuclear	15 Years	Inter State
29	CLP Jhajjar	132	Coal	25 Years	Inter State
30	Maithon Power Limited	300	Coal	30 Years	Inter State
31	SECI Solar (Renewable)	20	RE	25 Years	Inter State
32	Tala HEP	9	Hydro	As per MoP/NRPC order	Inter State
33	CTPS 7	92	Coal	25 Years	Inter State
34	CTPS 8		Coal	25 Years	Inter State
35	MTPS 6	31	Coal	25 Years	Inter State
36	Sasan	27 MW to 136 MW	Coal	25 Years	Inter State
37	NathpaJhakri HPS	44	Hydro	35 Years	Inter State
38	Tehri HPP	19	Hydro	35 Years	Inter State
39	Koteshwar HEP	12	Hydro	35 Years	Inter State
40	Pragati- I	64	Gas	25 Years	Intra State
41	Pragati III	298	Gas	25 Years	Intra State
42	IPGCL GT	27	Gas	10 Years	Intra State
43	Delhi Municipal Solid Waste Solutions Ltd. (Bawana) (Renewable)	7	RE	20 Years	Intra State
44	Nanti Hydro Power Pvt. Ltd. (Renewable)	14	RE	20 Years	Inter State
45	SuryakantaHydroenergiesPvt. Ltd. (Renewable)	14	RE	20 Years	Inter State
46	Timarpur Okhla Waste management co. Ltd. (Renewable)	6	RE	20 Years	Intra State
47	Sun Edison	180	RE	20 Years	Inter State
48	Taranda	13	RE	20 Years	Inter State
49	SECI WIND	50	RE	25 Years	Inter State
50	SECI 200 MW (SBSR)*	100	RE	25 Years	Inter State
51	Tehkhand Waste to Electricity Project Ltd	9	RE	25 Years	Intra State
52	Cosmos Hydro	20	RE	20 Years	Inter State
53	Medium Term 200 MW (Kameng HEP)	200	Hydro	5 Years	Inter State

Remarks:-

1. \*SBSR 200 MW: - Out of total allocation of 200 MW, only 100 MW has been commissioned till Jun 2023
2. Contract period beyond useful life may depend upon agreement/Regulatory orders.
3. NTPC >25 years few stations under litigation before various forums.

**b) Embedded Power generation for FY 2023-24**

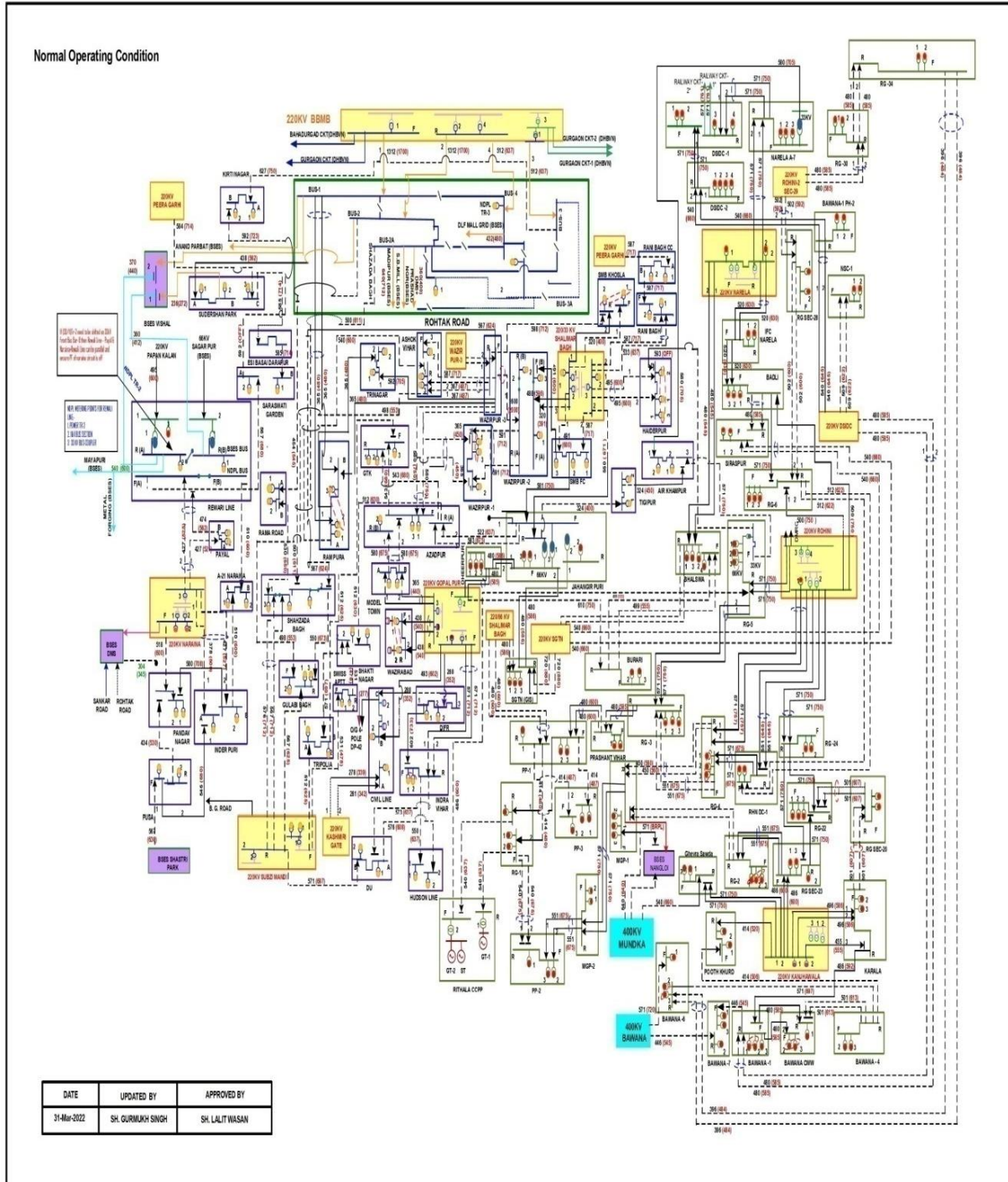
S. No	Name of Generation Station	Generation Capacity (In MW)	Type of Station	Type of Contract	Type of Grid	Voltage Level (KVA)	Received at Circle (In MU)
1	Poothkhurd 54KW SPV PLANT	1	Renewable	Captive Generation	On-Grid System	11 kV	0.041192
2	Cenpeid	0.225	Renewable	Captive Generation	On-Grid System	415 V	0.008212
3	Corporate Office	0.06	Renewable	Captive Generation	On-Grid System	415 V	0.003177
4	Cennet	0.055	Renewable	Captive Generation	On-Grid System	415 V	0.016685
5	KPM	0.054	Renewable	Captive Generation	On-Grid System	415 V	0.856832
6	Narela A-7	0.05	Renewable	Captive Generation	On-Grid System	415 V	0.028187
7	BAWANA Clear Water (45 KWp)	0.049	Renewable	Captive Generation	On-Grid System	415 V	0.031553
8	DSIDC-2 Narela	0.043	Renewable	Captive Generation	On-Grid System	415 V	0.010988
9	GTK solar	0.02112	Renewable	Captive Generation	On-Grid System	415 V	0.026311
10	RG-2	0.025	Renewable	Captive Generation	On-Grid System	415 V	0.027706
11	RG-24	0.025	Renewable	Captive Generation	On-Grid System	415 V	0.024903
12	RG-5	0.024	Renewable	Captive Generation	On-Grid System	415 V	0.223723
13	RG-22	0.015	Renewable	Captive Generation	On-Grid System	415 V	0.03862
14	RG-23	0.004	Renewable	Captive Generation	On-Grid System	415 V	0.03567
15	Net Metering						2.63



### Annexure VIII - Single Line Diagram (SLD)

The SLD of the DISCOM is as shown below:

Figure 15: Single Line Diagram (SLD) of Tata Power DDL



### Annexure IX - Category of service details (With Consumer and voltage-wise)

Type of consumers as per different voltage levels & number of consumers are shown in below table:

**Table 47: Category of service details**

Type of Consumers	Category of Consumers (EHT/HT/LT/Others)	Voltage Level	No of Consumers	Total Consumption (InMU)
Domestic			1729505	4925.85
Commercial				
Water Supply				
Public Lighting				
HT Industrial			802	656.16
Industrial (Small)			282712	3779.90
HT Commercial				
Agricultural			4466	15.34
EV				
Others-3 (if any , specify in remarks)			8619	650.896335
<b>TOTAL</b>			<b>2026104</b>	<b>10028.15</b>

### Annexure X - Field Verification data and reports

The field inspection details are shown in the below table:

**Table 48: Field inspection details**









**Annexure XI - List of documents verified with each parameter**

The documents verified are listed in the below table:

**Table 49: List of documents verified with each parameter**

S. No	Data Required for Annual Energy Audit as per BEE regulation	Status	Remark
1	Complete filled in Proforma for the year 2023-2024 (Annually)	Provided	Data Attached
2	Supporting Data with Month wise breakup	Month wise Not Available	NA
A	Purchase Energy		
B	Net Input in Discom		
C	Billed Energy		
D	Billed Revenue		
E	Revenue Collected		
F	Energy Export to other		
G	Transmission loss calculation Methodology	NA	NA
3	Feeder wise input,Billed Energy, T&D & AT&C losses	Sample Provided	Data Attached
4	Action plan to reduce the T&D and AT&C losses	Provided the various schemes	Action plan to reduce AT&C losses& payback of RDSS Schemes
5	Assets details matched with the proforma infrastructure sheets	Provided	Data Attached
6	DT Wise loss provided	provided	Proforma Attached
7	Energy Flow Diagram	Data Attached	Data Attached
8	Subsidy category Wise (BEE Guideline proforma)	Format Provided	Data Attached in BEE Guideline proforma
9	High Loss area T&D & AT&C action plan to reduce losses	Provided	Data Attached
10	Power Map	Provided	Data Attached
11	Current status of Metering status at Various Voltage level of Discom	Functional &Non Functional meter details provided	100 % metered (operational)
12	Status of default meter (non-functional meters)	Provided	Data Attached

## **Annexure XII - Brief Description of Unit**

Tata Power Delhi Distribution Limited [Tata Power-DDL] is a joint venture between Tata Power and the Government of NCT of Delhi with the majority stake being held by Tata Power Company (51%).

Tata Power-DDL is acknowledged for its consumer-friendly practices. Since privatization, the Aggregate Technical & Commercial (AT&C) losses in Tata Power-DDL areas have shown a record decline.

To ensure reliable power supply and to provide best in class service to its consumers, Tata Power-DDL has implemented several world-class technologies such as Advanced Distribution Management system or ADMS which is designed to replace the conventional SCADA-DMS-OMS system with features like real-time integration of Smart Meter Data / Distributed Generation integration and single data model from GIS , Integrated Geographical Information System (GIS) for instant services, Advanced Metering Infrastructure (AMI), Automated Demand Response (ADR), Smart Street Light Management system, Field Force Automation, Upgraded Network, Integrated Toll Free Helpline No. 19124, etc.

Tata Power-DDL is the first Indian utility to be a member of Global Intelligent Utility Network Coalition (GIUNC) which is a coalition of 14 power utilities worldwide and is working towards accelerating the development of common standards, technology solutions and processes for intelligent networks.

Tata Power-DDL provides various facilities and services to its consumers for their ease and convenience such as 24X7 Integrated Helpline, Mobile Application for both iOS and Android users, bilingual website, Multiple Payment Avenue, End to End online services for New Connection, etc.

Tata Power-DDL's contribution towards improving the ease of getting electricity connection through process simplification under 'Ease of doing Business' has contributed to raise India's ranking in 'Getting Electricity' , from 137<sup>th</sup> ranking in 2015 to an impressive 22<sup>nd</sup> ranking in 2019.

TATA Power-DDL has also added solar generation as a part of its sustainable initiatives since 2008, and has installed 14Nos. of Rooftop Grid Interactive Solar PV Generation Power Plants in its Licensed Area with a total generation capacity of 1.65 MWp, and total generation of 2.8 MUs in FY 23-24. Wherein for Rooftop Solar panel installations, TATA Power-DDL has almost 3000 nos. (out of which 2000 nos. are of domestic consumers) of Consumer Solar rooftop plants with installed capacity of 67 MWp. The company is already working on setting up Smart Grid with the integration of Roof Top Solar, Energy Storage, E-charging of Electric Vehicles, Home Automation etc. in its network.

Tata Power-DDL's change management experience, distributed leadership system, adoption of latest technologies; robust competence development process and innovative & open work

culture are the key strategic boosters which helped in building and sustaining competitive advantage in the changing business scenario. A journey which began 2 decades ago for empowering the consumers in Delhi now holds the potential to transform the distribution sector in India and similarly help utilities across the globe. Tata Power-DDL has a presence in India in nearly 20+ States and working with 30+ Discoms including Goa, Haryana, Uttar Pradesh, Chhattisgarh, Odisha, Ajmer etc. as well as in International cities such as Benin, Eko, Kaduna, Kano in Nigeria etc.

Tata Power-DDL is focused and committed to the road ahead and is exploring new opportunities to replicate its experience of distribution reforms both in India and abroad. It is leveraging its unique learning and skillsets solely and in collaboration with leading utilities and technology providers like GE, IBM, Enel, Omron, 3M, Panasonic, AES, Mitsubishi etc. in the areas of communications & smart grid technology, change management, consumer service delivery and business process re-engineering. Tata Power-DDL has also collaborated with leading international and national Institutions like Harvard, MIT, Ryerson University, IIT Delhi, Punjab Engineering College, Delhi University, Netaji Subhas Institute of Technology etc. to carry out research activities in energy space.

<b>World Class Technologies , Tata Power DDL</b>	
Advanced Distribution Management System (ADMS)	<p>Advance Distribution Management System (ADMS) is a single integrated system which facilitates advanced monitoring, analysis, as well as control and planning, thereby enabling to enhance the reliability, safety and efficiency of the power for the consumers. This system has advanced features of reporting outages and intimating to customers upfront.</p> <p>This system facilitates system controller as well as maintenance team for faster restoration of supply.</p>
Geographical information System (GIS)	<p>Geographical Information System (GIS) is a foundational technology and single source to have repository of network, asset and consumer indexing for Tata Power-DDL. The data of this system gets integrated with ADMS, FFA, ERP, AMI, etc. for successful functioning of respective systems.</p> <p>This system enables delivering of results in terms of reliable &amp; quality power along with advanced services and timely information to the consumers.</p>
Smart Meter	<p>Smart Meters are basic building blocks of Smart Grid. This technology encompasses Communication System (RF/ NB-IoT/ 4G based)and Data Handling Technologies (Meter Data Management System).</p> <p>Tata Power-DDL is implementing Smart Metering Technology (Advanced Metering Infrastructure-AMI) to bring operational efficiency in different IT and OT domains. This technology will bring transparency to consumers in terms of their consumption per month and monitoring of other critical parameters like MDI and PF on an instant basis. For Tata Power-DDL, it enables easy detection of pilferage and loss reduction. This last mile link will complete Smart Grid implementation by Tata Power-DDL.</p>



<b>World Class Technologies , Tata Power DDL</b>	
Smart Street Light Management system	<p>Tata Power-DDL jointly is working on a project for achieving a reduction in the demand of street lighting which coincides with peak load, thereby reducing the overall peak demand, improving the lux levels, improving the power factor and checking the carbon foot print as a responsibility to the society. This will translate into considerable saving to the exchequers. This system is entirely managed through a Smart Centralized Control &amp; Monitoring System which can identify partially or completely affected streetlight circuits on a real-time basis and the type/nature of fault, thereby alerting the maintenance team without any requirement of consumer complaints for such purpose. This will enhance safety &amp; security of general public. It can also detect pilferage from street light circuits and generate alerts.</p>
Field Force Automation	<p>Customer service through mobile workforce is the key to exceed the expectations of the consumer. Field Force Automation (FFA) is a system which optimizes the various tasks in hand and schedules &amp; dispatches the nearest Crew to provide faster service to the consumers. This system not only enhances the service level but also completely tracks the allocation of workforce.</p>

### Annexure XIII - List of Parameters arrived through calculation or formulae with list of documents as source of data

Ideally, reduction of technical losses should be the parameter for evaluation of performance of Discom's sector. However, the technical losses of the Discoms are not available and it involves a cumbersome process to calculate the technical losses, which varies based on various factors like loading pattern etc.

Now, only the T&D losses and AT&C losses are available as the performance parameter for achieving energy efficiency by DISCOMs.

**Table 50: Formulas used to derive the parameters**

Parameter	Formula	Data Source
AT&C Losses %	$\{1 - (\text{Billing Efficiency} \times \text{Collection Efficiency})\} \times 100$	Commercial
T&D Losses %	$\{1 - (\text{Total energy Billed} / \text{Total energy Input in the system})\} \times 100$	Commercial
Billing Efficiency	Total Energy Billed to Consumers (kWh) / Total Energy Input (kWh)	Commercial
Collection Efficiency	Revenue Collected (In Rupees) / Billed Amount (In Rupees)	Commercial

**Annexure XIV - Detailed Formats**

<b>General Information</b>			
<b>1</b>	<b>Name of the DISCOM</b>	TATA POWER DELHI DISTRIBUTION LIMITED	
<b>2</b>	<b>i) Year of Establishment</b>	2002-03	
	<b>ii) Government/Public/Private</b>	Joint venture between Delhi Government and TATA Power	
<b>3</b>	<b>DISCOM's Contact details &amp; Address</b>		
<b>i</b>	City/Town/Village	New Delhi	
<b>ii</b>	District	Delhi	
<b>iii</b>	State	Delhi	Pin 110009
<b>iv</b>	Telephone	011-66112202	Fax 011-27468042
<b>4</b>	<b>Registered Office</b>		
<b>i</b>	Company's Chief Executive Name	Mr. Gajanan S. Kale	
<b>ii</b>	Designation	CEO	
<b>iii</b>	Address	NDPL House, Hudson Lines, Kingsway Camp, Delhi-09	
<b>iv</b>	City/Town/Village	Delhi	P.O. GTB Nagar
<b>v</b>	District	Civil Lines	
<b>vi</b>	State	Delhi	Pin 110009
<b>vii</b>	Telephone	011-66112202	Fax 011-27468042
<b>5</b>	<b>Nodal Officer Details*</b>		
<b>i</b>	Nodal Officer Name (Designated at DISCOM's)	Mr. HC Sharma	
<b>ii</b>	Designation	General Manager	
<b>iii</b>	Address	NDPL House, Hudson Lines, Kingsway Camp, Delhi-09	
<b>iv</b>	City/Town/Village	Delhi	P.O. GTB Nagar
<b>v</b>	District	Civil Lines	
<b>vi</b>	State	Delhi	Pin 110009
<b>vii</b>	Telephone	91-1166050595	Fax
<b>6</b>	<b>Energy Manager Details*</b>		
<b>i</b>	Name	Mr Davinder Bhatia	
<b>ii</b>	Designation	DGM	Whether EA or EM EM
<b>iii</b>	EA/EM Registration No.	EA-7419	
<b>iv</b>	Telephone		Fax
<b>v</b>	Mobile	9599819561	E-mail ID <a href="mailto:davinder.bhatia@tatapower-ddl.com">davinder.bhatia@tatapower-ddl.com</a>
<b>7</b>	<b>Period of Information</b>		
	Year of (FY) information including Date and Month (Start & End)	1st April 2023 - 31st Mar 2024	

**Performance Summary of Electricity Distribution Companies**

<b>1</b>	Period of Information Year of (FY) information including Date and Month (Start & End)	1st April 2023 - 31st Mar 2024	
<b>2</b>	<b>Technical Details</b>		
<b>(a)</b>	<b>Energy Input Details</b>		
(i)	Input Energy Purchase (From Generation Source)	Million kwh	12686.10
(ii)	Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kwh	10660.43
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kwh	10028.15
<b>(b)</b>	<b>Transmission and Distribution (T&amp;D) loss Details</b>	Million kwh	632.28
		%	5.93%
	Collection Efficiency	%	100.01%
<b>(c)</b>	<b>Aggregate Technical &amp; Commercial Loss</b>	%	5.92%

I/We undertake that the information supplied in this Document and Pro-forma is accurate to the best of my knowledge and if any of the information supplied is found to be incorrect and such information result into loss to the Central Government or State Government or any of the authority under them or any other person affected, I/we undertake to indemnify such loss.

Authorised Signatory and Seal

*H.C. Sharma*  
**H.C. SHARMA**  
 Name of Authorised Signatory  
 Name of the DISCOM: 90299  
 E. Code : 90299  
 Full Address:-  
**Chief- TS, PM, PSC, Quality & Sustainability,**  
**BD & Collaboration**  
**Tata Power Delhi Distribution Limited**

Seal

*Hariom Sharma*  
**HARIOM SHARMA**  
 E. Code : 90231  
 AGM- Energy Audit Group  
 Tata Power Delhi Distribution Limited

Signature:-  
 Name of AEA\*:  
 Registration Number:

*Davinder Bhatia*  
 Davinder Bhatia  
 EA-7419

*Pushpendra Kumar*  
 Pushpendra Kumar  
 E. Code : 94669  
 HoD- Energy Audit Group  
 Tata Power Delhi Distribution Limited

**Details of Division Wise Losses (See note below)\*\***

Division Wise Losses																						
S.No	Name of circle	Circle code	Name of Division	Period: 1st April 2023 - 31st Mar 2024																	AT & C loss (%)	
				Consumer profile				Energy parameters				Losses		Commercial Parameter								
				Consumer category	No of connection metered (Nos)	No of connection Un-metered (Nos)	Total Number of connections (Nos)	% of number of connections	Connected Load metered (MW)	Connected Load Un-metered (MW)	Total Connected Load (MW)	% of connected load	Input energy (MU)	Metered energy	Unmetered/assessment energy	Total energy	% of energy consumption	T&D loss (MU)	T&D loss (%)	Billed Amount in Rs. Crore		Collected Amount in Rs. Crore
1	Badli		Residential	113987	0	113987	83%	192.364		192.364	44%		263.2898	0	263.2897539	40%	720.5697	57.05436	8%	167.413789	167.44228	100.02%
			Agricultural	460	0	460	0%	3.833		3.833	1%		2.066701	0	2.066700591	0%				1.42359449	1.46089554	102.62%
			Commercial/Industrial-LT	22000	0	22000	16%	216.637		216.637	50%		348.9067	0	348.9067415	53%				550.654372	549.177532	99.73%
			Commercial/Industrial-HT	51	0	51	0%	14.17		14.17	3%		23.58742	0	23.587421	4%				35.7693022	37.7795004	105.62%
			Others	622	0	622	0%	7.963		7.963	2%		25.66469	0	25.66468811	4%				25.1920694	18.9378815	75.17%
<b>Sub-total</b>				<b>137120</b>	<b>0</b>	<b>137120</b>	<b>100%</b>	<b>434.967</b>	<b>0</b>	<b>434.967</b>	<b>100%</b>	<b>720.5697</b>	<b>663.5153</b>	<b>0</b>	<b>663.5153051</b>	<b>100%</b>	<b>57.05436</b>	<b>8%</b>	<b>780.453128</b>	<b>774.79809</b>	<b>99.28%</b>	<b>9%</b>
2	Bawana		Residential	73415	0	73415	75%	122.669	0	122.669	17%	1466.371	166.9503	0	166.950317	12%	1466.371	113.8633	8%	103.951921	104.141435	100.18%
			Agricultural	1714	0	1714	2%	10.426	0	10.426	1%		3.427664	0	3.427664284	0%				3.30480874	3.40935658	103.16%
			Commercial/Industrial-LT	22456	0	22456	23%	586.585	0	586.585	80%		1131.609	0	1131.608509	84%				1696.96578	1697.44778	100.03%
			Commercial/Industrial-HT	35	0	35	0%	8.692	0	8.692	1%		18.90681	0	18.906807	1%				27.0448571	28.0244294	103.62%
			Others	405	0	405	0%	9.378	0	9.378	1%		31.61468	0	31.614681	2%				35.1596678	35.5981605	101.25%
<b>Sub-total</b>				<b>98025</b>	<b>0</b>	<b>98025</b>	<b>100%</b>	<b>737.75</b>	<b>0</b>	<b>737.75</b>	<b>100%</b>	<b>1466.371</b>	<b>1352.508</b>	<b>0</b>	<b>1352.507978</b>	<b>100%</b>	<b>113.8633</b>	<b>8%</b>	<b>1866.42704</b>	<b>1868.62116</b>	<b>100.12%</b>	<b>8%</b>
3	Civil lines		Residential	113495	0	113495	82%	312.08	0	312.08	56%	890.2493	410.0911	0	410.0910876	47%	890.2493	19.03644	2%	313.119436	314.022995	100.29%
			Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%				0	0	0.00%
			Commercial/Industrial-LT	24475	0	24475	18%	109.902	0	109.902	20%		133.5539	0	133.5539459	15%				221.707537	222.546235	100.38%
			Commercial/Industrial-HT	71	0	71	0%	55.756	0	55.756	10%		90.84456	0	90.8444562	10%				143.606233	143.613131	100.00%
			Others	930	0	930	1%	76.466	0	76.466	14%		236.7233	0	236.7233165	27%				243.343307	239.813449	98.55%
<b>Sub-total</b>				<b>138971</b>	<b>0</b>	<b>138971</b>	<b>100%</b>	<b>554.204</b>	<b>0</b>	<b>554.204</b>	<b>100%</b>	<b>890.2493</b>	<b>871.2129</b>	<b>0</b>	<b>871.212912</b>	<b>100%</b>	<b>19.03644</b>	<b>2%</b>	<b>921.776514</b>	<b>919.99581</b>	<b>99.81%</b>	<b>2%</b>
4	Keshavpuran		Residential	124676	0	124676	81%	297.127	0	297.127	50%	873.9449	379.3759	0	379.3758737	46%	873.9449	41.28856	5%	266.867382	268.969742	100.79%
			Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%				0	0	0.00%
			Commercial/Industrial-LT	27677	0	27677	18%	237.285	0	237.285	40%		359.3328	0	359.3327789	43%				559.845251	561.872209	100.36%
			Commercial/Industrial-HT	101	0	101	0%	34.174	0	34.174	6%		72.32394	0	72.323942	9%				99.1599364	98.7636028	99.60%
			Others	609	0	609	0%	22.676	0	22.676	4%		21.62376	0	21.623758	3%				21.9346931	22.2970036	101.65%
<b>Sub-total</b>				<b>153063</b>	<b>0</b>	<b>153063</b>	<b>100%</b>	<b>591.262</b>	<b>0</b>	<b>591.262</b>	<b>100%</b>	<b>873.9449</b>	<b>832.6564</b>	<b>0</b>	<b>832.6563527</b>	<b>100%</b>	<b>41.28856</b>	<b>5%</b>	<b>947.807263</b>	<b>951.902558</b>	<b>100.43%</b>	<b>4%</b>
5	Kirari		Residential	145627	0	145627	89%	218.094	0	218.094	74%	446.8846	312.5652	0	312.5652374	78%	446.8846	46.58009	10%	177.121538	177.587838	100.26%
			Agricultural	61	0	61	0%	0.341	0	0.341	0%		0.184299	0	0.18429933	0%				0.12291599	0.12225624	99.46%
			Commercial/Industrial-LT	16772	0	16772	10%	52.908	0	52.908	18%		66.74326	0	66.74326413	17%				109.161375	109.214786	100.05%
			Commercial/Industrial-HT	8	0	8	0%	3.251	0	3.251	1%		4.824355	0	4.824355	1%				8.94336859	8.90030475	99.52%
			Others	431	0	431	0%	18.742	0	18.742	6%		15.98738	0	15.987381	4%				23.684907	30.9830922	130.81%
<b>Sub-total</b>				<b>162899</b>	<b>0</b>	<b>162899</b>	<b>100%</b>	<b>293.336</b>	<b>0</b>	<b>293.336</b>	<b>100%</b>	<b>446.8846</b>	<b>400.3045</b>	<b>0</b>	<b>400.3045368</b>	<b>100%</b>	<b>46.58009</b>	<b>10%</b>	<b>319.034105</b>	<b>326.808277</b>	<b>102.44%</b>	<b>8%</b>
6	Mangolpuri		Residential	199587	0	199587	89%	336.853	0	336.853	73%	695.5794	475.5652	0	475.5651506	72%	695.5794	39.34943	6%	281.73718	281.77866	100.01%
			Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%				0	0	0.00%
			Commercial/Industrial-LT	23389	0	23389	10%	105.768	0	105.768	23%		140.7071	0	140.7071312	21%				221.965222	222.069275	100.05%
			Commercial/Industrial-HT	23	0	23	0%	9.211	0	9.211	3%		22.39497	0	22.394973	3%				30.0959129	29.9294271	99.45%
			Others	652	0	652	0%	7.441	0	7.441	2%		17.56267	0	17.56266885	3%				21.8290427	22.2896565	102.11%
<b>Sub-total</b>				<b>223651</b>	<b>0</b>	<b>223651</b>	<b>100%</b>	<b>459.273</b>	<b>0</b>	<b>459.273</b>	<b>100%</b>	<b>695.5794</b>	<b>656.2299</b>	<b>0</b>	<b>656.2299237</b>	<b>100%</b>	<b>39.34943</b>	<b>6%</b>	<b>555.627358</b>	<b>556.607019</b>	<b>100.08%</b>	<b>6%</b>
7	Model town		Residential	151563	0	151563	87%	356.04	0	356.04	67%	749.4413	470.3345	0	470.3345273	66%	749.4413	40.26722	5%	336.768079	336.796355	100.01%
			Agricultural	3	0	3	0%	0.007	0	0.007	0%		0.006661	0	0.006661	0%				0.00326479	0.00323449	99.07%
			Commercial/Industrial-LT	22240	0	22240	13%	110.955	0	110.955	21%		132.3014	0	132.3014374	19%				218.387891	218.195745	99.91%
			Commercial/Industrial-HT	46	0	46	0%	15.832	0	15.832	3%		25.7113	0	25.7113	4%				41.9144451	42.0604796	100.35%
			Others	820	0	820	0%	47.739	0	47.739	9%		80.82018	0	80.82017827	11%				90.6175386	90.2698308	99.62%
<b>Sub-total</b>				<b>174672</b>	<b>0</b>	<b>174672</b>	<b>100%</b>	<b>530.573</b>	<b>0</b>	<b>530.573</b>	<b>100%</b>	<b>749.4413</b>	<b>709.1741</b>	<b>0</b>	<b>709.174104</b>	<b>100%</b>	<b>40.26722</b>	<b>5%</b>	<b>687.691219</b>	<b>687.325644</b>	<b>99.95%</b>	<b>5%</b>
8	Moti nagar		Residential	121043	0	121043	80%	324.364	0	324.364	53%	831.6149	408.494	0	408.4939772	52%	831.6149	43.21673	5%	301.214778	301.388172	100.06%
			Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%				0	-3.751E-09	0.00%
			Commercial/Industrial-LT	28466	0	28466	19%	225.981	0	225.981	37%		282.2775	0	282.2775235	36%				472.827361	471.306203	99.68%
			Commercial/Industrial-HT	117	0	117	0%	50.571	0	50.571	8%		81.8704	0	81.870396	10%				125.407683	125.427206	100.02%
			Others	777	0	777	1%	10.311	0	10.311	2%		15.75632	0	15.75632	2%				20.0144531	19.5110413	97.48%
<b>Sub-total</b>				<b>150403</b>	<b>0</b>	<b>150403</b>	<b>100%</b>	<b>611.227</b>	<b>0</b>	<b>611.227</b>	<b>100%</b>	<b>831.6149</b>	<b>788.3982</b>	<b>0</b>	<b>788.3982167</b>	<b>100%</b>	<b>43.21673</b>	<b>5%</b>	<b>919.464275</b>	<b>917.632623</b>	<b>99.80%</b>	<b>5%</b>
9	Narela		Residential	123246	0	123246	84%	206.436	0	206.436	32%	1274.314	290.0383	0	290.0383096	25%	1274.314	97.77485	8%	181.884423	182.189332	100.17%
			Agricultural	2161	0	2161	1%	18.764	0	18.764	3%		9.195373	0	9.195372728	1%				6.59642428	6.73561942	102.11%
			Commercial/Industrial-LT	19388	0	19388	13%	370.193	0	370.193	57%		751.3653	0	751.3653327	64%				1095.33334	1094.52831	99.93%
			Commercial/Industrial-HT	141	0	141	0%	36.544	0	36.544	6%		97.53881	0	97.538811	8%				134.758176	132.793369	98.54%
			Others	940	0	940	1%	16.279	0	16.279	3%		28.40155	0	28.401548	2%				37.900613	37.9708419	100.19%
<b>Sub-total</b>				<b>145876</b>	<b>0</b>	<b>145876</b>	<b>100%</b>	<b>648.216</b>	<b>0</b>	<b>648.216</b>	<b>100%</b>	<b>1274.314</b>	<b>1176.539</b>	<b>0</b>	<b>1176.539374</b>	<b>100%</b>	<b>97.77485</b>	<b>8%</b>	<b>1456.47298</b>	<b>1454.21748</b>	<b>99.85%</b>	<b>8%</b>
10	Pitam pura		Residential	105988	0	105988	85%	372.306	0	372.306	71%	662.4167	419.5878	0	419.5878021	67%	662.4167	33.34023	5%	333.597548	333.431231	99.95%
			Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%				0	0	

12	halimar bag			Residential	246383	0	246383	90%	442.626	0	442.626	74%	895.115	615.8139	0	615.8139092	73%	49.98175	6%	385.546755	384.295374	99.68%
				Agricultural	67	0	67	0%	0.448	0	0.448	0%		0.460784	0	0.460784	0%			0.22265061	0.21851453	98.14%
				Commercial/Industrial-LT	27609	0	27609	10%	107.82	0	107.82	18%		141.6888	0	141.6888403	17%			227.560841	227.109035	99.80%
				Commercial/Industrial-HT	65	0	65	0%	29.605	0	29.605	5%		66.24835	0	66.248348	8%			90.5282566	90.0811664	99.51%
				Others	815	0	815	0%	18.059	0	18.059	3%		20.92136	0	20.92135565	2%			26.495175	26.4901913	99.98%
Sub-total				274939	0	274939	100%	598.558	0	598.558	100%	895.115	845.1332	0	845.1332372	100%	49.98175	6%	730.353679	728.194281	99.70%	6%
13				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
14				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
15				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
16				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
17				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
18				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
19				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
20				Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0%	0	0	0.00%
				Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
21				Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0%	0	0	0.00%
				Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
22				Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0%	0	0	0.00%
				Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
23				Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0%	0	0	0.00%
				Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%
24				Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0%	0	0	0.00%
				Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
				Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!		0	0	0	#DIV/0!			0	0	0.00%
Sub-total				0	0	0	100%	0	0	0	100%	0	0	0	0	100%	0	0%	0	0	0.00%	100%

103			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
104			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
105			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
106			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
107			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
108			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
109			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
110			Residential	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Agricultural	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-LT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Commercial/Industrial-HT	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
			Others	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0	#DIV/0!	0	0	0.00%			
Sub-total			0	0	0	100%	0	0	0	100%	0	0	0	100%	0	0%	0	0	0.00%	100%	
76	Total		Residential	1729505	0	1729505	85%	3752.279	0	3752.279	55%	4925.849	0	4925.848869	49%	3359.98387	3362.97927	100.09%			
			Agricultural	4466	0	4466	0%	33.819	0	33.819	0%	15.34148	0	15.34148193	0%	11.6736589	11.9498768	102.37%			
			Commercial/Industrial-LT	282712	0	282712	14%	2368.41	0	2368.41	35%	3779.904	0	3779.903556	38%	5850.21828	5848.75094	99.97%			
			Commercial/Industrial-HT	802	0	802	0%	342.496	0	342.496	5%	656.1591	0	656.159121	7%	959.963736	960.011789	100.01%			
			Others	8619	0	8619	0%	300.101	0	300.101	4%	650.8963	0	650.896335	6%	712.440635	712.107286	99.95%			
Sub-total			2026104	0	2026104	100%	6797.105	0	6797.105	100%	10660.43	10028.15	0	10028.14936	100%	632.2837	6%	10894.2802	10895.7992	100.01%	6%
77	At company level																				

\*Note - It shall be mandatory to record the energy supplied separately for each category of consumers which is being provided a separate rate of subsidy in the tariff, by the state government, so that the subsidy due for the electricity distribution company is quarterly calculated by multiplying the energy supplied to each of such category of consumers by the applicable rate of subsidy notified by the state government.

Color code	Parameter
	Please enter name of circle
	Please enter circle code
0	Please enter numeric value or 0
	Formula protected

I/We undertake that the information supplied in this Document and Pro-forma is accurate to the best of my knowledge and if any of the information supplied is found to be incorrect and such information result into loss to the Central Government or State Government or any of the authority under them or any other person affected, I/we undertake to indemnify such loss.

Authorised Signatory and Seal

Name of Authorised Signatory:


Name of the DISCOM:

Full Address:-

Seal

**HARIOM SHARMA**  
E. Code : 90231  
AGM- Energy Audit Group  
Tata Power Delhi Distribution Limited

Signature:-  
Name of Energy Manager:  
Registration Number:

  
Davinder Bhatia  
EA7419





