

ANNUAL ENERGY AUDIT REPORT



Designated Consumer

Electricity Department, Puducherry

UT of Puducherry
Puducherry- 605001

FY 2022 -23

Conducted by



A-Z Energy Engineers Private Limited

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Table of Contents

List of Abbreviations	6
Acknowledgement	7
1. Executive Summary	8
1.1. Goals and Objectives	8
1.2. About Energy Audit firm	9
1.3. AT&C losses for FY 2022-23	9
2. Background	10
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	13
3. DISCOM Introduction and Overview	14
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	16
3.5. Energy Conservation measures	21
4. Energy flow analysis	23
4.1. Energy flow across 5 Service Levels	23
4.2. Validation of metered data	24
4.3. Validation of energy flow data and losses	24
5. Loss and subsidy computation	27
5.1. Energy accounts analysis for previous year	27
5.2. Energy accounts analysis and performance in current year (based on quarterly data)	27
5.3. Subsidy computation and analysis (based on quarterly data)	36
5.4. Trend analysis and identification of key exceptions	37
6. Energy Audit findings	38
6.1. Critical Analysis	38
6.2. Revised findings based on data validation and field verification	42
6.3. Inclusions and Exclusions	42
7. Conclusion and Action Plan	43
7.1. Summary of critical analysis and way forward proposed by Energy Auditor	43
7.2. Summary of key findings – energy balance and losses	44
7.3. Recommendations and best practices	45
7.4. Action plan for line loss reduction	45
7.5. Action plan for monitoring and reporting	46
7.6. Action plan for automated energy accounting	47
Annexures	49
Annexure I - Introduction of Verification Firm	49
Annexure II - Minutes of Meeting with the DISCOM team	51
Annexure III - Check List prepared by auditing Firm	53
Annexure IV - Brief Approach, Scope & Methodology for audit	54
Annexure V - Infrastructure Details	55
Annexure VI - Electrical Distribution System	56
Annexure VII - Power Purchase Details	57
Annexure VIII - Single Line Diagram (SLD)	58
Annexure IX - Category of service details (With Consumer and voltage-wise)	61
Annexure X - Field Verification data and reports	62
Annexure XI - List of documents verified with each parameter	65

Annexure XII - Quarter Wise Subsidy Details	66
Annexure XIII - Brief Description of Unit	67
Annexure XIV - List of Parameters arrived through calculation or formulae with list of documents as source of data	68
Annexure XV - Detailed Formats	69

List of Tables

Table 1: Energy Balance& Losses for FY 2022-23	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: Administrative hierarchy structure in PED	15
Table 6: Administrative hierarchy in PED upto Division level.....	15
Table 7: Customer Profile for FY 2022-23.....	15
Table 8: Network Infrastructure details	16
Table 9: Input Energy & Infrastructure details	16
Table 10: Voltage wise Meter Consumers.....	17
Table 11: Numbers of Distribution Transformers	17
Table 12: Voltage wise numbers of Feeders.....	17
Table 13: Length of Distribution Lines	17
Table 14: Energy Flow details	18
Table 15: Input Energy for FY 2022-23.....	20
Table 16: Billed Energy for FY 2022-23.....	20
Table 17: Voltage wise consumption pattern	21
Table 18: Energy Flow at different Voltage level Losses for FY 2022-23.....	23
Table 19: AT&C losses of previous year	27
Table 20: Month wise Energy Purchase at Ex bus & Energy at state Periphery for FY 2022-23.....	27
Table 21: Energy Input and AT&C Losses for FY 2022-23.....	28
Table 22: Voltage-wise T&D Losses for FY 2022-23	28
Table 23: Circle wise No. of consumers, Input energy and Sales in FY 2022-23	29
Table 24: Circle wise T&D losses, Collection Efficiency and AT&C losses for FY 2022-23	29
Table 25: Division wise T&D losses, Collection Efficiency and AT&C losses for FY 2022-23	31
Table 26: Top Divisions with higher AT&C losses (%) & T&D losses (MU).....	33
Table 27: AT&C loss Comparison for last Years	37
Table 28: Compliance status w.r.t Timelines and Pre-requisites	39
Table 29: Summary of Data gaps	41
Table 30: Comments by Energy Auditor and responses of DISCOM management	41
Table 31: Energy balance and losses.....	44
Table 32: Infrastructure details.....	55
Table 33: Metering details.....	55
Table 34: Month wise power purchase.....	57
Table 35: Monthly Input energy (MU).....	57
Table 36: Category of service details.....	61
Table 37: Field inspection details.....	62
Table 38: List of documents verified with each parameter.....	65
Table 39: Quarter wise subsidy details	66
Table 40: Formulas used to derive the parameters	68

List of Figures

Figure 1: Regulatory framework for Energy Accounting & Audit	11
Figure 2: Monthly Energy Input pattern	19
Figure 3: Circle wise Energy Input (MU) and Energy billed (MU) pattern.....	19
Figure 4: Circle wise AT&C Losses (%) Vs T&D losses (%)	30
Figure 5: Division wise T&D losses (%) Vs AT&C losses (%).....	33
Figure 6: Division wise Collection efficiency (%).....	34
Figure 7: Single Line Diagram (SLD) of PED	58

List of Abbreviations

AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AT&C	Aggregate Technical and Commercial
BEE	Bureau of Energy Efficiency
ckt	Circuit
CT	Current Transformer
DC	Designated Consumer
DEEP	Discovery of Efficient Electricity Price
DISCOM	Electricity Distribution Company
DT	Distribution Transformer
EA	Energy Auditor
EHT	Extra High Tension
EHV	Extra High Voltage
EM	Energy Manager
FY	Financial Year
HT	High Tension
HVDS	High Voltage Distribution System
KVA	Kilo Volt Ampere
LT	Low Tension
MoP	Ministry of Power
MU	Million Units
MW	Mega Watt
NO	Nodal Officer
OA	Open Access
POC	Point of Connection
PT	Potential Transformer
PX	Power Exchange
RE	Renewable Energy
RLDC	Regional Load Dispatch Centre
SDA	State Designated Agency
SLD	Single Line Diagram
SLDC	State Load Dispatch Centre
T&D	Transmission and Distribution

Acknowledgement

We would like to express our heartfelt gratitude to the Electricity Department, Puducherry for providing us with the opportunity to conduct the Energy Audit of their DISCOM for FY 2022-23, in accordance with the Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies) Regulations, 2021 and its Amendments.

We are immensely grateful to the management of Electricity Department, Puducherry, for their invaluable cooperation and providing us with all the relevant information necessary for the successful completion of the Annual Energy Audit.

We also extend our sincere thanks to the entire working group, especially to Sh. T. Chanemougam– Superintending Engineer Cum HoD, Shri Thiru M Ramesh–Executive Engineer (EM), Shri. Umesh Chandara, Assistant Engineer and Smt M Lalithalochana– Junior Engineer, for their immense support and assistance throughout the audit process.

We look forward to a continued partnership with Electricity Department, Puducherry and we express our gratitude for their continued support in all our future endeavours.



Signature

Name: Dr. P.P Mittal

Designation: Director

Registered No: AEA-011

Firm: A-Z Energy Engineers Pvt. Ltd.

1. Executive Summary

Bureau of Energy efficiency (BEE) notified the Bureau of Energy Efficiency (Manner and intervals for conduct the energy audit (Accounting) in Electricity Distribution Companies) Regulations, 2021 on 6th October 2021. As per regulation, all Electricity Distribution Companies are Mandate to conduct annual energy audit and periodic energy accounting on quarterly basis.

The Union Territory of Puducherry is spread over an area of 492 Sq.Km., which constitutes of the four erstwhile French establishments of Puducherry, Karaikal, Mahe and Yanam. The total population of the UT of Puducherry is 16,08,849 as per the 2021 census. The city of Puducherry located in the Puducherry region serves as the capital of the Union Territory. The Union Territory has semi-arid type of climate, with a mean annual temperature of around 30° C and 70-85% relative humidity, is prevalent in the Union Territory. While Puducherry, Karaikal and Yanam region receive rain mostly through North - East monsoon, Mahe region benefits from the South-West monsoon.

While the energy Purchase at generation End, Net Input & billed Unit PED for the customer is 3374.02 MU, 3263.92 MU & 2908.14 MU. The monthly consumption per consumer stands at 480.34 KWH/annum/month. PED caters to area spread in 3 circles, 10 Division & 60 Subdivision.

1.1. Goals and Objectives

Electricity Department, Puducherry is a designated consumer in Discom sector. Being a designated Consumer PED need to have Annual energy audit (Accounting) of their facilities as per BEE notification No 18/1/BEE/Discom/2021 dated 6th October 2021.

The Annual Energy Audit (Accounting) at Electricity Department, Puducherry is conducted with the following Objectives:

- Verification of existing pattern of energy distribution across periphery of electricity Distribution Company.
- Verification of accounted energy flow submitted by electricity Distribution Company at all applicable voltage levels of the distribution network.
- Verification of the accuracy of the data collected and analyses and processes the data with respect to consistency, improvement in accounting and reducing loss of DISCOM.
- Verification of the information submitted by DC to the SDA/BEE about status of energy input, Output and loss for the previous two year.
- 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. is 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 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 1654 projects, including 65 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 is 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.

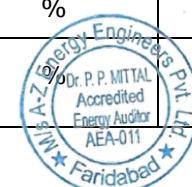
1.3. AT&C losses for FY 2022-23

Electricity Department, Puducherry supplies power to Karaikal, Mahe and Yanam region of Puducherry. Distribution area of PED, Puducherry is divided into three circles, ten divisions & the overall purchased Energy, consumption and AT &C losses for the FY-2022-23 is shown in table below.

The AT&C loss for FY2022-2023 is 14.57% & the Distribution loss of the sector is 10.88%. The AT&C loss for the FY 2022-23 are shown in the table below:

Table 1: Energy Balance& Losses for FY 2022-23

Energy Input Details	Formula	UoM	Value
Input Energy Purchase (From Generation Source)	A	MU	3374.02
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	3263.92
Total Energy billed (is the Net energy billed, adjusted for energy traded))	C	MU	2,908.14
Transmission and Distribution (T&D) loss	D	MU	355.00
Details	$E = D/B \times 100$	%	10.88%
Collection Efficiency	F	%	95.88%
Aggregate Technical & Commercial Loss	$G = 1 - \{(1-E) \times \text{Min}(F, 100\%)\}$		14.57%



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2. Background

2.1. Extant Regulations and role of BEE

2.1.1. The 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 EC Act.
- 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 EC Act, 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

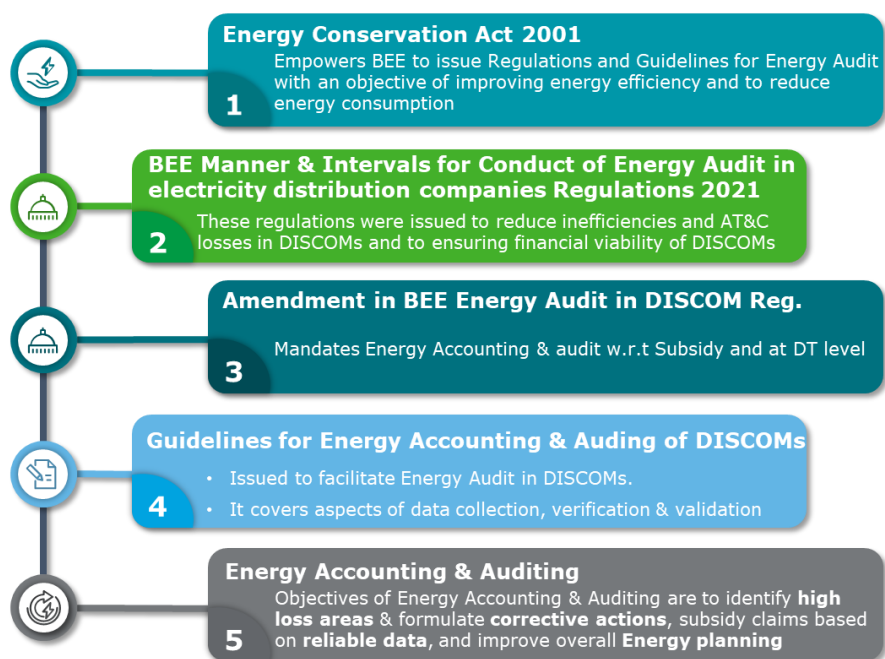
- BEE coordinates with designated agencies, designated consumers and other organization working in the field of energy conservation/efficiency to recognize and utilize the existing resources and infrastructure in performing the functions assigned to the Bureau under the Energy Conservation Act.
- The 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 29th 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 6th 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 17th 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 Energy Audit though and Quarterly Periodic Energy Accounting with necessary Pre-requisites and reporting requirements to be met.
- The Central Government may issue the energy savings certificate to the designated consumer whose energy consumption is less than the prescribed norms and standards in accordance with the procedure as may be prescribed.
- The designated consumer whose energy consumption is more than the prescribed norms and standards shall be entitled to purchase the energy savings certificate to comply with the prescribed norms and standards
- The Central Government may, in consultation with the Bureau, prescribe the value of per metric ton of oil equivalent of energy consumed

2.2. Purpose of audit and accounting Report

Electricity Department, Puducherry is a designated consumer in Discom sector. Being a designated Consumer PED need to have Annual energy audit (Accounting) of their facilities as per BEE notification No 18/1/BEE/Discom/2021 dated 6thOctober 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.

Sensing the need of the hour Government of India initiated a mechanism for all energy intensive large industries and facilities (designated consumer) known as PAT Scheme which is "A market-based mechanism to enhance cost effectiveness of improvements in energy efficiency in designated consumers, through certification of energy savings that could be traded."

Annual Energy audit (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 scheme for reduction of technical and commercial loss in the DISCOM thus leading to sustainable energy cost reductions.

The Annual Energy Audit (Accounting) at PED is conducted with the following Objectives:

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

2.3. Period of Energy Auditing and accounting

Energy audit activity was started with a meeting at Head Office of PED, Puducherry in the month of May. 2024. Based on the requirement visit was made to Division, Subdivision, Grid etc. for data collection and technical discussion. The period of study was from April 2022 to March 2023.

Table 2: Period of Energy Auditing and accounting

Particulars	Energy Accounting				Energy Audit
	Q1	Q2	Q3	Q4	FY 2022-23
Applicable period	1-Apr-22 to 30-Jun-22	1-Jul-22 to 30-Sep-22	1-Oct-22 to 31-Dec-22	1-Jan-23 to 31-Mar-23	1-Apr-22 to 31-Mar-23
Date of Commencement	-	-	-	-	
Date of Publishing	-	-	-	-	
Officer In charge					Dr.PP Mittal [AEA 0011]
					Registration No: EmAEA-0024



3. DISCOM Introduction and Overview

3.1. Name and address of DISCOM

Electricity Department, Puducherry is having its corporate office at Electricity Department, Main Office, No.137, NSJ Bose Salai, Puducherry-605001

Table 3: Name and Address of DISCOM

Particulars	Details
Name of DC	Electricity Department Puducherry (PED)
Address	Electricity Department, Main Office, No.137, NSJ Bose Salai, Puducherry-605001

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

The Energy Accounting/Audit wing is headed by Mr. T. Chanemougam Superintending Engineer Cum HOD and Thiru. M. Ramesh -Executive Engineer is leading the energy accounting activities in PED. 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	Thiru M Ramesh- Designation-Executive Engineer Electricity Department, Puducherry Cell No-9489080400
Authorized Signatory	T. Chanemougam, Superintending Engineer Cum HoD, Electricity Department, Puducherry Cell No-9489080301

3.3. Summary profile of DISCOM

3.3.1. Jurisdiction of DISCOM

The Union Territory of Puducherry is spread over an area of 492 Sq.Km., which constitutes of the four erstwhile French establishments of Puducherry, Karaikal, Mahe and Yanam. The total population of the UT of Puducherry is 16, 08,849 as per the 2021 census. The city of Puducherry located in the Puducherry region serves as the capital of the Union Territory. The Union Territory has semi-arid type of climate, with a mean annual temperature of around 30° C and 70-85% relative humidity, is prevalent in the Union Territory. While Puducherry, Karaikal and Yanam region receive rain mostly through North - East monsoon, Mahe region benefits from the South-West monsoon. While the energy Purchase at generation End, Net Input & billed Unit PED for the customer is 3374.02 MU, 3263.92 MU

& 2908.14 MU. The monthly consumption per consumer stands at 480.345 KWH/Month. PED caters to area spread in 3 circles, 10 Division & 60 Subdivision.

3.3.2. Administrative hierarchy

Electricity Department, Puducherry is having its corporate office at UT of Puducherry and has 3 Circles. These Circles are further divided into Divisions, Sub-Divisions and Sections as shown in the below tables.

Table 5: Administrative hierarchy structure in PED

Parameters	Total
Number of circles	3
Number of divisions	10
Number of sub-divisions	49

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

Table 6: Administrative hierarchy in PED upto Division level

Circle	DIVISION
Circle-1	Puducherry
Circle-2	Karaikal
	Mahe
	Yanam

3.3.3. Consumer Details

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

Table 7: Customer Profile for FY 2022-23

Category	No. of Connections		Connected Load		Energy Billed		Billed Amount in Rs. Crore	Collected Amount in Rs. Crore
	Nos	%	MW	%	MU	%		
Residential	379088	75%	663.841	50%	780.4067	27%	0	0
Agricultural	7109	1%	60.602	5%	59.33132	2%	0	0
Commercial/Industrial-LT	63430	13%	291.565	22%	371.5566	13%	0	0
Commercial/Industrial-HT	512	0%	262.06	19%	1043.651	36%	0	0
Others	54383	11%	53.59	4%	653.1888	22%	0	0
Total	504522	100%	1331.739	100%	2908.134	100%	1822.43	1747.274

3.4. Electrical infrastructure and assets voltage wise

The following table provides the details of network infrastructure owned by PED:

Table 8: Network Infrastructure details

Asset	Particulars	Unit	FY20-21	FY21-22	FY22-23
66 kV and above	66/ 11 kV Sub station	Nos	0	0	0
	66 kV Feeders	Nos	0	0	0
	66 kV Line	Ckt. km	0	0	0
33 kV	33/ 11 kV Sub station	Nos	1	1	1
	33 kV Feeders	Nos	2	2	2
	33 kV Line	Ckt. km	19	19	19
11 kV	11 kV Feeders	Nos	53	53	53
	11 kV Overhead Line	Ckt. km	445.281	450.905	458.913
	11 kV Underground Line	Ckt. km	107.502	107.552	109.335
22 kV	22 kV Feeders	Nos	72	72	72
	22 kV Overhead Line	Ckt. km	1788.685	1792.445	1800.523
LT	OH Line	Ckt. km	3553.737	3593.122	3659.579
LT	UG Cable	Ckt km	551.486	554.166	557.766
PTR	Power Transformer	Nos	21	21	21
	Power Transformer Capacity	MVA	1484	1484	1484
DTR	Distribution Transformer	Nos	2796	3123	3176
	Distribution Transformer Capacity	MVA	653.48	782.553	793.93

The Input energy, consumption, transmission losses and key infrastructure details of the Electricity Department, Puducherry are summarized in table below:

Table 9: Input Energy & Infrastructure details

Parameters	FY 2022-23
Input Energy purchased (MU)	3374.02
Transmission loss (%)	3%
Transmission loss (MU)	110
Energy sold outside the periphery (MU)	0.00
Open access sale (MU)	0.00
EHT sale	630.50
Net input energy (received at DISCOM periphery or at distribution point)-(MU)	3263.92
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	86%
% of metering available at consumer end	96%
No of feeders at 66kV voltage level	0
No of feeders at 33kV voltage level	2
No of feeders at 22kV voltage level	72
No of feeders at 11kV voltage level	53
No of LT feeders' level	6352
Line length (ckt. km) at 66kV voltage level	0
Line length (ckt. km) at 33kV voltage level	19
Line length (ckt. km) at 22kV voltage level	1800.523
Line length (ckt. km) at 11kV voltage level	568.268
Line length (km) at LT level	3659.58
Length of Aerial Bunched Cables	0

Parameters	FY 2022-23
Length of Underground Cables	557.766
HT/LT ratio	0.566

3.4.1. Metering details

The status of meters installed in PED as on 31-03-2023 are given in the below tables:

Table 10: Voltage wise Meter Consumers

Parameters	>66kV	33kV	11/22kV	LT
Number of conventional metered consumers	0			460893
Number of consumers with 'smart' meters	0			36000
Number of consumers with 'smart prepaid' meters	0			0
Number of consumers with 'AMR' meters	11	0	0	0
Number of consumers with 'non-smart prepaid' meters	0	0	512	0
Number of unmetered consumers				7106
Number of total consumers	11		512	503999

3.4.2. Distribution Transformer (DT) details

The details of distribution transformers in PED as on 31-03-2023 are given in the below tables:

Table 11: Numbers of Distribution Transformers

Parameters	>66kV	33kV	11/22kV	LT
Number of conventionally metered Distribution Transformers	0			
Number of DTs with communicable meters				2477
Number of unmetered DTs				699
Number of total Transformers				3176

3.4.3. Feeder details

The details of feeders in PED as on 31-03-2023 are given in the below tables:

Table 12: Voltage wise numbers of Feeders

Parameters	>66kV	33kV	11/22Kv	LT
Number of metered feeders	0	2	125	6352
Number of feeders with communicable meters	0	2	125	
Number of unmetered feeders	0	0	0	
Number of total feeders	0	2	125	6352

3.4.4. Distribution Line details

The details of distribution lines in PED as on 31-03-2023 are given in the below tables:

Table 13: Length of Distribution Lines

Parameters	>66kV	33kV	11/22Kv	LT
Line length(ctkm)	6028.37			
Length of Aerial Bunched Cables	0			
Length of Underground Cables	997.349			

3.4.5. Energy Flow details

Energy flow details for FY 2022-23 are given in the below table:

Table 14: Energy Flow details

EnergyInput Details	Formula	UoM	Value
Input Energy Purchase (From Generation Source)	A	MU	3374.02
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	3263.92
Total Energy billed (is the Net energy billed, adjusted for energy traded)	C	MU	2,908.14
Transmission and Distribution (T&D) loss Details	D	MU	355.00
	$E = D/B \times 100$	%	10.88%

3.4.6. Pattern of energy distribution

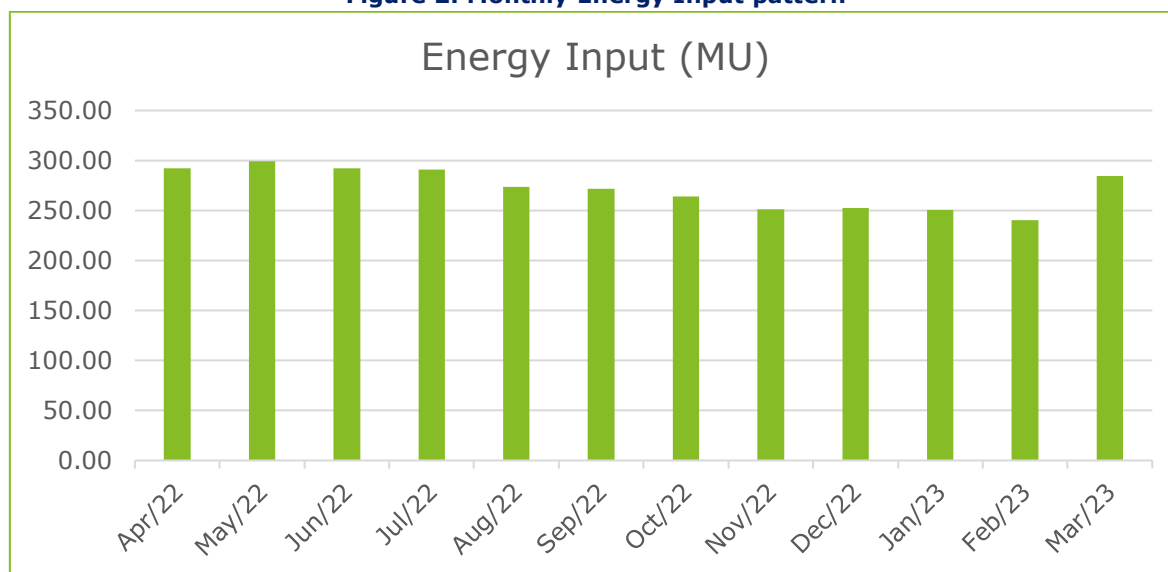
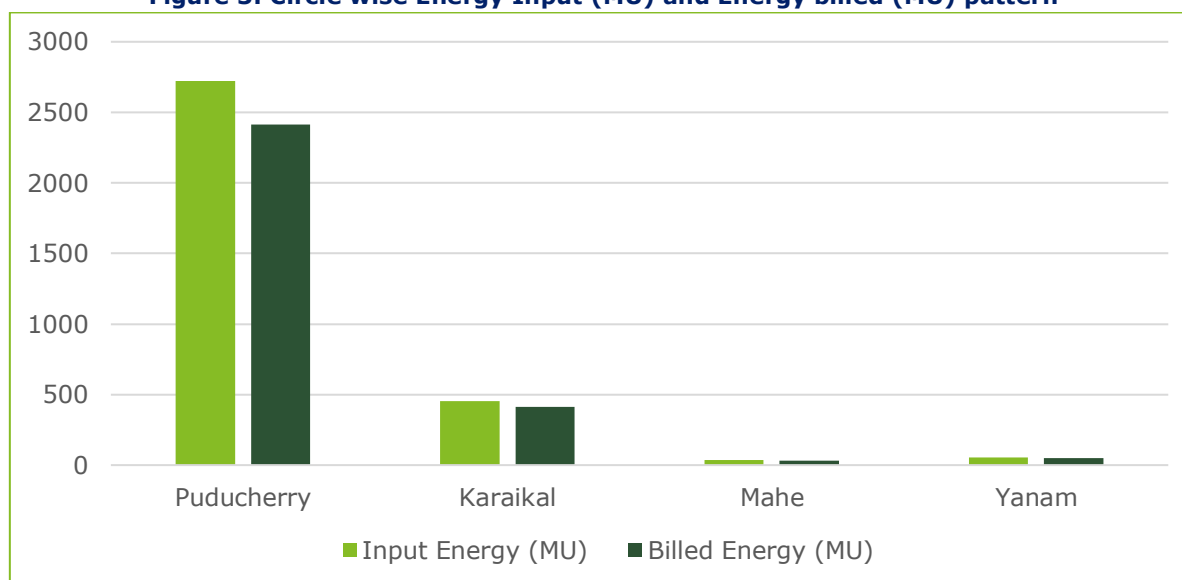
PURCHASE OF POWER IN RESPECT OF U.T. OF PUDUCHERRY FOR THE YEAR 2022-23 (SALE OF POWER AND NON-PLAN)

During the analyzed period, Electricity Department, Puducherry purchased a maximum energy of 316.54 million units (MUs) in May 2022, while the least energy of 263.55 MUs was purchased in Feb 2023. This shows that the company's energy purchase varies considerably from month to month irrespective of the seasonal impact.

Energy Input:

The energy Input by Electricity Department, Puducherry showed a minor increasing trend from April 2022 to March 2023. But slightly bump in month of May-22 This indicates that the company's energy consumption has increased gradually over the analyzed period.

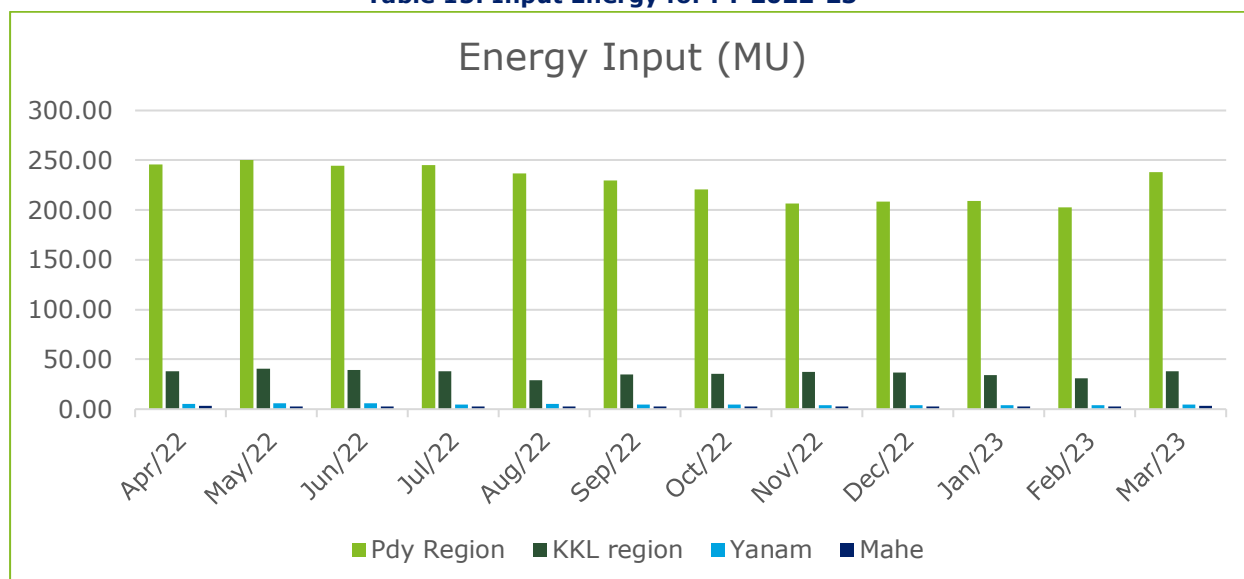
The chart below shows PED energy purchase pattern from April 2022 to March 2023:

Figure 2: Monthly Energy Input pattern**Figure 3: Circle wise Energy Input (MU) and Energy billed (MU) pattern**

In conclusion, Electricity Department, Puducherry energy purchase pattern shows considerable variation from month to month. While the maximum energy was purchased in May 2022, the least energy was purchased in Feb 2022. The energy billed shows a minor increasing trend from April 2022 to March 2023, indicating a gradual increase in energy consumption. The chart shows that the energy purchase pattern fluctuates considerably, which may pose challenges for the company in managing its energy supply and demand.

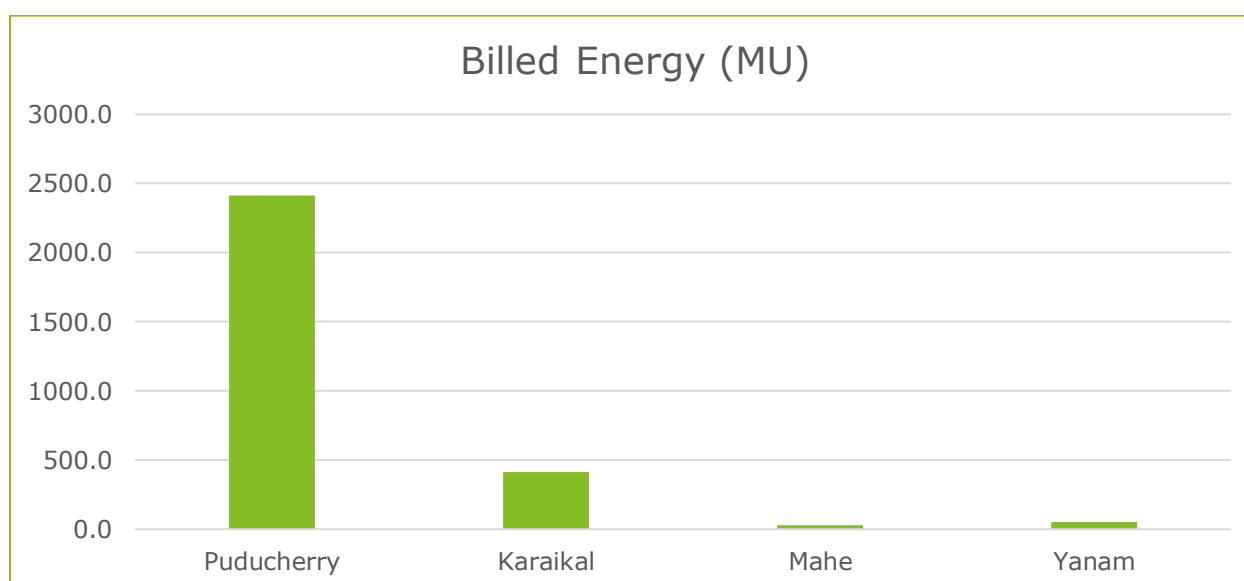
The Circle wise break up of input energy (MU) parameter for all the circle is given below:

Table 15: Input Energy for FY 2022-23



The Circle wise break up of billed energy (MUs) parameter for all the circle is given below:

Table 16: Billed Energy for FY 2022-23



The voltage wise consumption pattern is given below:

Table 17: Voltage wise consumption pattern

Voltage Level	Consumers		Energy Consumption	
	No.	%Share	Mus	%Share
LT	503999	99.89	1237.75	42.56
HT	512	0.10	1039.89	35.75
EHT	11	0.00	630.50	22.00
Total	504522	100%	2908.14	100%

3.4.7. Salient features

Electricity Department, Puducherry 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.

- To undertake the activities of distribution to all consumers irrespective of the voltage, provision, supply, wheeling, purchase, sale, import, export and trading of electricity, introduce open access in distribution as per the Electricity Act 2003 and/or the directions of the regulator.
- To plan, develop, acquire, establish, construct, erect, lay, hire, lease, buy, sell, operate, run, manage, maintain, enlarge, alter, renovate, modernize, work and use power distribution system network in all its aspects including amongst others various voltage lines and associated sub-stations, including distribution centers, cables, wires, accumulators, plants, motors, meters, apparatus, computers and materials connected with sub-transmission, distribution, supply of electrical energy, ancillary services, telecommunication and telemetering equipment's.
- To tender, finalise and execute Power Purchase Agreements and other agreements for sale or purchase of electricity with generating companies, trading companies, other distribution companies, Central and State generating authorities, departments or companies, societies, other States, utilities, Independent Power Producers and other Persons.
- To undertake Rural Electrification schemes in the licensed area.
- Any other work incidental to the objectives & functions of the company.

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. The energy conservation measures that have already been taken and propose some measures for the future are explained below.

Energy Conservation Measures taken by the DISCOM:

Several energy conservation measures have already been implemented to reduce energy consumption and promote sustainable energy use. Some of these measures are:

At present the ratio of HT: LT ratio is 1:1.5 and on implementation of RDSS scheme (Loss Reduction Program) for an amount of sanction Rd.83.21 CRs it is expected the HT: LT ratio will come down to progressively to 1:1.4 ratio by the end of the year 2024-25. The technical loss under LT distribution will come down considerably.

Similarly, under Smart Prepaid Metering Project through RDSS scheme, it is proposed to provide Smart pre-paid Energy meters to all class of consumers at the UT of Puducherry through M/s.PFC Consulting Limited (PFCCL) under TOTEX model. On implementation of the scheme, real time energy flow could be observed and the commercial loss pockets could be identified through software and therefore significant reduction in commercial loss could be achieved by the department by the end of 2024-25.

The details of anticipated progressive reduction in AT&C loss by end of FY-2024-25 is detailed below:

S.No	Result Parameter	AT&C loss Trajectory under RDSS		
		FY23	FY24	FY25
1	AT&C Loss	14.34%	14.00%	12.00%

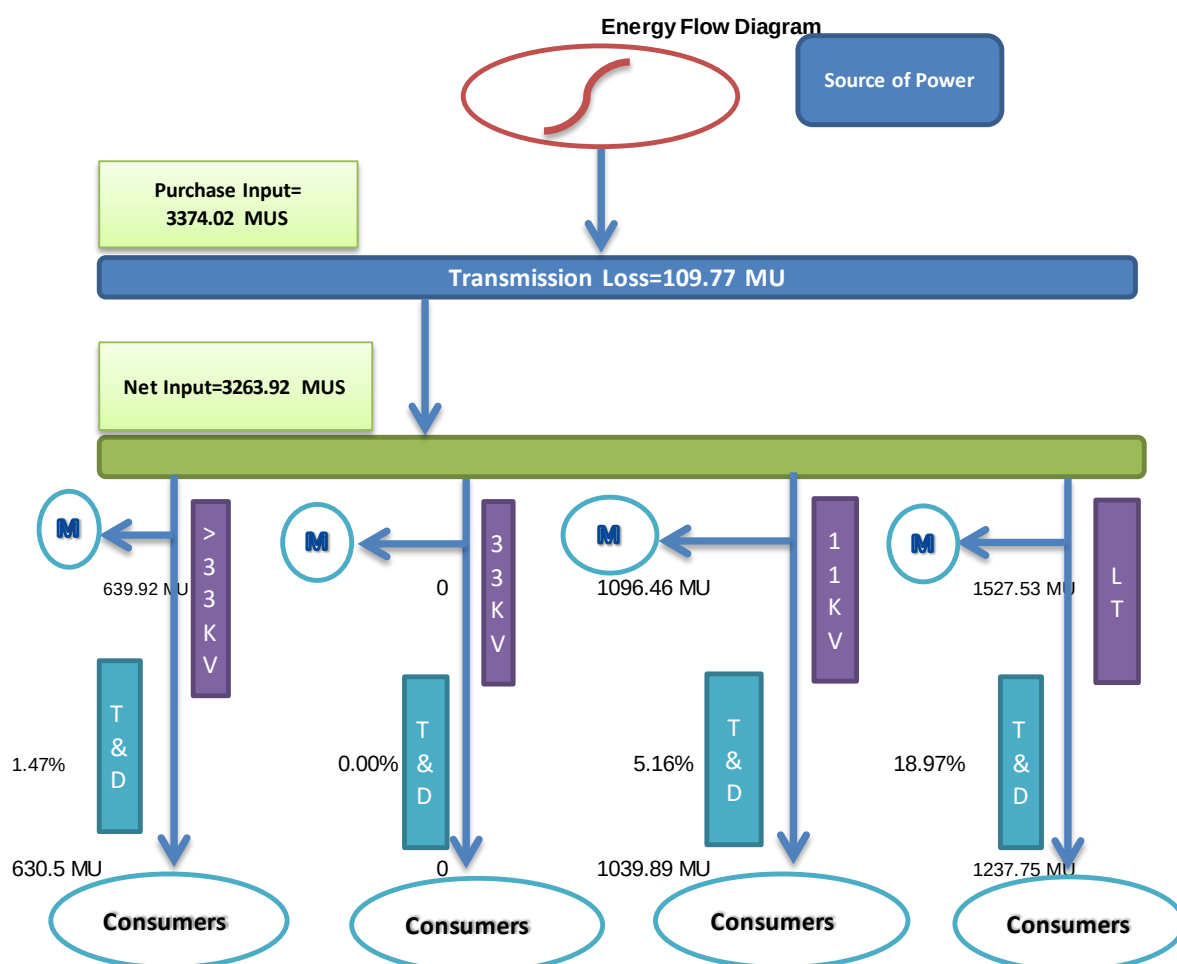
4. Energy flow analysis

4.1. Energy flow across 5 Service Levels

The Energy at different voltage levels and the losses at different levels are shown in below table long term energy, short term energy and renewable energy wise details are given below:

Table 18: Energy Flow at different Voltage level Losses for FY 2022-23

DISCOM	Input (in MU)	Sale (in MU)	Loss (in MU)	Loss %
LT	1527.53	1237.75	289.78	18.97
11 Kv	1097.46	1039.89	56.57	5.16
33 kv	0	0	0	0
> 33 kv	639.92	630.50	9.42	1.47



4.2. Validation of metered data

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 75% and the energy share is 27% of total consumers and energy, commercial/industrial LT is 13% of total consumers and energy share is 13% of total billed energy, commercial/industrial HT is 0.0% of total consumers and energy share is 36% of total billed energy.

Consumer category	Metered	Un-metered	Total Consumer	% share of Consumer	Metered Energy (MU)	Unmetered Energy	Total Billed Energy (MU)	% Share energy
Residential	379088	0	379088	75%	780.4067	0	780.4067	27%
Agricultural	3	7106	7109	1%	0	59.33	59.33132	2%
Commercial/Industrial-LT	63430	0	63430	13%	371.5566	0	371.5566	13%
Commercial/Industrial-HT	512	0	512	0%	1043.651	0	1043.651	36%
Others	54383	0	54383	11%	653.1888	0	653.1888	22%
Total	497416	7106	504522	100%	2848.803	59.33	2908.14	100%

It was also observed that most of the consumers are metered.

It was also observed that some of the meter CT/PT is not in working condition.

At the time of field visit it was observed that capacitor banks are installed.

It was also observed that average power factor was found in the range of .9 to 0.95.

It was also observed that hourly load parameters are monitored in the logbook and energy consumption is monitored at every 24hr.

4.3. Validation of energy flow data and losses

The Energy at different voltage levels and the losses at different levels are shown in below table long term energy, short term energy and renewable energy wise details are given below:

Voltage level		Particulars	MU
I	66kV and above	Long-Term Conventional	3374.02
		Medium Conventional	NA
		Short Term Conventional	NA
		Banking	NA
		Long-Term Renewable energy	NA
		Medium and Short-Term RE	NA
		Captive, open access input	NA
		Sale of surplus power	
		Quantum of inter-state transmission loss	110
		Power procured from inter-state sources	3,374.02

		Power at state transmission boundary	3,263.92
Ii	33kV	Long-Term Conventional	
		Medium Conventional	0
		Short Term Conventional	
		Banking	0
		Long-Term Renewable energy	0
		Medium and Short-Term RE	0
		Captive, open access input	
		Sale of surplus power	
		Quantum of intra-state transmission loss	0
		Power procured from intra-state sources	0
Iii		Input in DISCOM wires network	3,263.92
Iv	33 kV	Renewable Energy Procurement	0
		Small capacity conventional/ biomass/ hydro plants Procurement	
		Captive, open access input	0
v	11 kV	Renewable Energy Procurement	
		Small capacity conventional/ biomass/ hydro plants Procurement	
		Sales Migration Input	
Vi	LT	Renewable Energy Procurement	
		Sales Migration Input	
Vii		Energy Embedded within DISCOM wires network	0
Viii		Total Energy Available/ Input	3,263.92
Voltage level		Energy Sales Particulars	MU
I	LT Level	DISCOM' consumers	1,237.75
		Demand from open access, captive	
		Embedded generation used at LT level	
		Sale at LT level	1,237.75
		Quantum of LT level losses	289.36
		Energy Input at LT level	1,527.53
Ii	11/22 kV Level	DISCOM' consumers	1,039.89
		Demand from open access, captive	0
		Embedded generation at 11 kV level used	0
		Sales at 11 kV level	1,039.89
		Quantum of Losses at 11 kV	56.57
		Energy input at 11 kV level	1,096.46
Iii	33 kV Level	DISCOM' consumers	0
		Demand from open access, captive	
		Embedded generation at 33 kV or below level	
		Sales at 33 kV level	0
		Quantum of Losses at 33 kV Level	0
		Energy input at 33kV Level	0
Iv	> 33 kV	DISCOM' consumers	630.50

		Demand from open access, captive	
		Cross border sale of energy	
		Sale to other DISCOMs	
		Banking	
		Energy input at > 33kV Level	639.92
		Sales at 66kV and above (EHV)	630.50
Total Energy Requirement			3,263.92
Total Energy Sales			2,908.14



5. Loss and subsidy computation

5.1. Energy accounts analysis for previous year

Previous cycle of audit is energy accounting base on the notification No. 18/1/BEE/DISCOM/2021 from Bureau of Energy Efficiency dated 6th October 2021.

a) Summary of AT&C losses for previous year

The AT&C losses for the FY 2021-22 are as shown below:

Table 19: AT&C losses of previous year

Technical Details	UoM	FY 2021-22
Input Energy Purchase (From Generation Source)	Million kWh	3231.04
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kWh	3129.49
Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kWh	2783.65
Transmission and Distribution (T&D) loss Details	Million kWh	345.84
	%	11.05
Collection Efficiency	%	100.00%
Aggregate Technical & Commercial Loss	%	11.05%

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

5.2.1. Month wise Input energy and billed energy details

The Month wise input energy & billed energy for FY 2022-23 of the Discom periphery is shown in below table.

Table 20: Month wise Energy Purchase at Ex bus & Energy at state Periphery for FY 2022-23

Months	Purchase Units at Ex-Bus (MU)	Input Energy at Periphery (MU)
Apr-22	307.35	292.48
May-22	316.54	299.51
Jun-22	305.97	292.36
Jul-22	306.92	290.97
Aug-22	295.51	273.86
Sep-22	286.09	272.00
Oct-22	287.61	263.81
Nov-22	265.85	251.17
Dec-22	268.06	252.19
Jan-23	273.37	250.74
Feb-23	263.55	240.49
Mar-23	311.58	284.33
Total	3,488.40	3263.92

Note: Details Sheet Attached in Annexure

5.2.2. Quarterly and annual AT&C losses

The Quarter wise and annual AT&C losses for FY 2022-23 are shown in below table.

Table 21: Energy Input and AT&C Losses for FY 2022-23

Energy Input Details	Formula	UoM	Quarterly				Annual
			Q1	Q2	Q3	Q4	FY 22-23
Input Energy Purchase (From Generation Source)	A	MU	910.67	869.43	791.38	802.14	3374.02
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	884.86	836.85	767.00	775.14	3263.92
Total Energy billed (is the Net energy billed, adjusted for energy traded)	C	MU	771.69	748.35	691.18	697	2,908.14
Transmission and Distribution (T&D) loss Details	D	MU	113.17	88.50	75.82	78.13	355.00
	$E = D/B \times 100$	%	12.79	10.58	9.88	10.08	10.88%
Collection Efficiency	F	%	86.27	98.89	93.28	105.06	95.88
Aggregate Technical & Commercial Loss	$G = 1 - \{(1-E) \times \text{Min}(F, 100\%)\}$	%	24.76	11.57	15.94	5.53	14.57

5.2.3. Voltage wise AT&C losses

The voltage wise AT&C losses of PED for FY 2022-23 are as shown in the below table:

Table 22: Voltage-wise T&D Losses for FY 2022-23

S. No.	Particulars	Units	Values
1	Losses in >33 KV System and Connected Equipment		
1.a.	Total Energy delivered into 132 KV Distribution System from EHT SSs	MUs	639.92
1.b.	Energy consumed by HT consumers at 132KV (Sales + Third Party)	MUs	630.50
1.c.	Energy Delivered to lower voltage	MUs	
1.d.	Losses (>33 kV System)	MUs	9
1.e.	% Losses (>33 kV System)	%	1.47%
2	Losses in 33 KV System and Connected Equipment		
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.	Losses (33 kV System)	MUs	
2.e.	% Losses (33 kV System)	%	
3	Losses in 11/22 KV System and Connected Equipment		
3.a.	Total Energy delivered into 11 KV and LT Distribution System	MUs	1096.46
3.b.	Energy consumed by HT consumers at 11KV (Sales + Third Party)	MUs	1039.891
3.c.	Total Output from 11kV to LT	MUs	
3.d.	Losses (11kV System)	MUs	56.57
3.e.	% Losses (11kV System)	%	5.16%
4	Losses in LT system and connected equipment		
4.a.	Energy delivered to LT system from 11/400 V DTRs	MUs	1527.53
4.b.	Energy sold at LT level	MUs	1237.75
4.c.	Losses (LT System)	MUs	289.78
4.d.	% Losses (LT System)	%	18.97%
5	Total losses in the Distribution System		

S. No.	Particulars	Units	Values
5.a.	Total Input to the distribution system	MUs	3263.92
5.b.	Total Output from the Distribution System	MUs	2908.14
5.c.	Distribution System Losses	MUs	355
5.d.	% Distribution System Losses	%	10.88%

5.2.4. Circle wise AT&C losses analysis

1. Circle wise connections & energy consumptions for FY 2022-23

The circle wise connections, load, input energy & Billed energy with percentage share in different circle is given below the "Puducherry" circle having maximum numbers of consumers and "Yanam" circle having minimum numbers of consumers. "Puducherry" have maximum input energy as well as billed units and "Mahe" have minimum input energy as well as billed units as shown in table:

Table 23: Circle wise No. of consumers, Input energy and Sales in FY 2022-23

Circle	Total Number of connections		Total Connected Load		Input energy		Billed energy	
	Nos.	% Share	MW	% Share	MU	% Share	MU	% Share
Puducherry	366447	72.63%			2720.18	83.3%	2412.47	83.0%
Karaikal	100241	19.87%			451.96	13.8%	413.58	14.2%
Mahe	19077	3.78%			35.61	1.1%	30.82	1.1%
Yanam	18757	3.72%			56.17	1.7%	51.27	1.8%
Total	504522	100%	1331.74	100%	3263.92	100%	2908.14	100%

2. Circle-wise AT&C losses

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

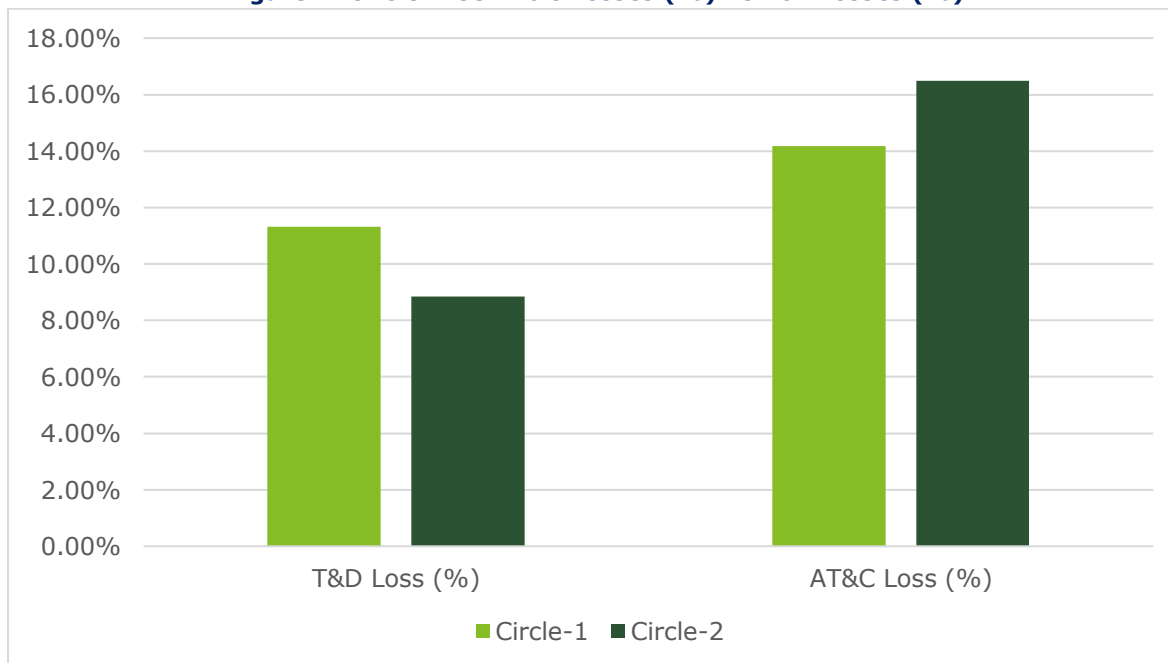
Table 24: Circle wise T&D losses, Collection Efficiency and AT&C losses for FY 2022-23

Name of Circle	Input energy (MU)	Billed energy (MU)	T&D loss		Collection Efficiency	AT& C loss (%)
			(MU)	(%)		
Puducherry	2720.11	2412.46	307.65	11.3%	96.76	
Karaikal	451.96	413.58	38.38	8.5%	90.70	
Mahe	35.61	30.82	4.79	13.5%	94.94	
Yanam	56.17	51.27	4.9	8.7%	93.80	
Total	3263.85	2908.13	355.00	10.88%	95.88%	14.57%

3. High loss Circles

Circle-3 (Puducherry region) had the highest T&D loss quantum of 307.6 MUs and Circle-2 had the highest T&D loss percentage of 16.49%. However, when T&D losses (MU) and T&D losses (%) are seen together then reducing T&D losses in "Circle-1" Circle must be prioritized in order to have overall reduction in AT&C losses of the DISCOM. Further, the circles with high loss that needs to be prioritized can be identified from the below chart:

Figure 4: Circle wise AT&C Losses (%) Vs T&D losses (%)



Division wise AT&C losses analysis

4. Division-wise AT&C losses

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

Table 25: Division wise T&D losses, Collection Efficiency and AT&C losses for FY 2022-23

S. No	Name of circle	Name of Division	Consumer category	Total Number of connections (Nos)	Total Connected Load (MW)	Input energy (MU)	Total Billed energy	T&D loss (MU)	T&D loss (%)	Billing efficiency	Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	AT & C loss (%)
1	Circle-1	Puducherry	Residential	283278		2720.11	606.78	307.6	11%		0	0	0.00%	
			Agricultural	6211			50.02				0	0	0.00%	
			Commercial/Industrial-LT	43593			314.98				0	0	0.00%	
			Commercial/Industrial-HT	425			859.14				0	0	0.00%	
			Others	32940			581.54				0	0	0.00%	
				366447		2720.11	2412.46	307.6	11%	88.69	1508.301	1459.498	96.76	14.18
2	Circle-2	Karaikal	Residential	70778	0	451.96	127.79	38.4	8%		0	0	0.00%	
			Agricultural	838	0		8.96				0	0	0.00%	
			Commercial/Industrial-LT	12922	0		38.37				0	0	0.00%	
			Commercial/Industrial-HT	75	0		168.61				0	0	0.00%	
			Others	15628	0		69.84				0	0	0.00%	
				100241	0	451.96	413.58	38.4	8%	91.51	266.85	242.03	90.70	17.00
3	Circle-2	Mahe	Residential	10924	0	35.61	23.07	4.8	13%		0	0	0.00%	
			Agricultural	3	0		0.00				0	0	0.00%	
			Commercial/Industrial-LT	5045	0		5.53				0	0	0.00%	
			Commercial/Industrial-HT	4	0		1.76				0	0	0.00%	
			Others	3101	0		0.46				0	0	0.00%	
				19077	0	35.61	30.82	4.8	13%	86.56	17.28	16.406	94.94	17.82
4	Circle-2	Yanam	Residential	14108	0	56.17	22.77	4.9	9%		0	0	0.00%	
			Agricultural	57	0		0.35				0	0	0.00%	
			Commercial/Industrial-LT	1870	0		12.67				0	0	0.00%	
			Commercial/Industrial-HT	19	0		14.14				0	0	0.00%	
			Others	2703	0		1.34				0	0	0.00%	
				18757	0	56.17	51.27	4.9	9%	91.28	29.999	29.3402	97.80	10.73

S. No	Name of circle	Name of Division	Consumer category	Total Number of connections (Nos)	Total Connected Load (MW)	Input energy (MU)	Total Billed energy	T&D loss (MU)	T&D loss (%)	Billing efficiency	Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	AT & C loss (%)
5		U.T of Puducherry	Residential	379088	663.84	3263.85	780.41	355.7	11%		0	0	0.00%	
			Agricultural	7109	60.60		59.33				0	0	0.00%	
			Commercial/Industrial-LT	63430	291.57		371.56				0	0	0.00%	
			Commercial/Industrial-HT	523			1043.65				0	0	0.00%	
			Others	54372	47.25		653.19				0	0	0.00%	
				504522	1063.26	3263.85	2908.13	355.7	10.88%	89.10	1822.43	1747.274	95.88	14.57

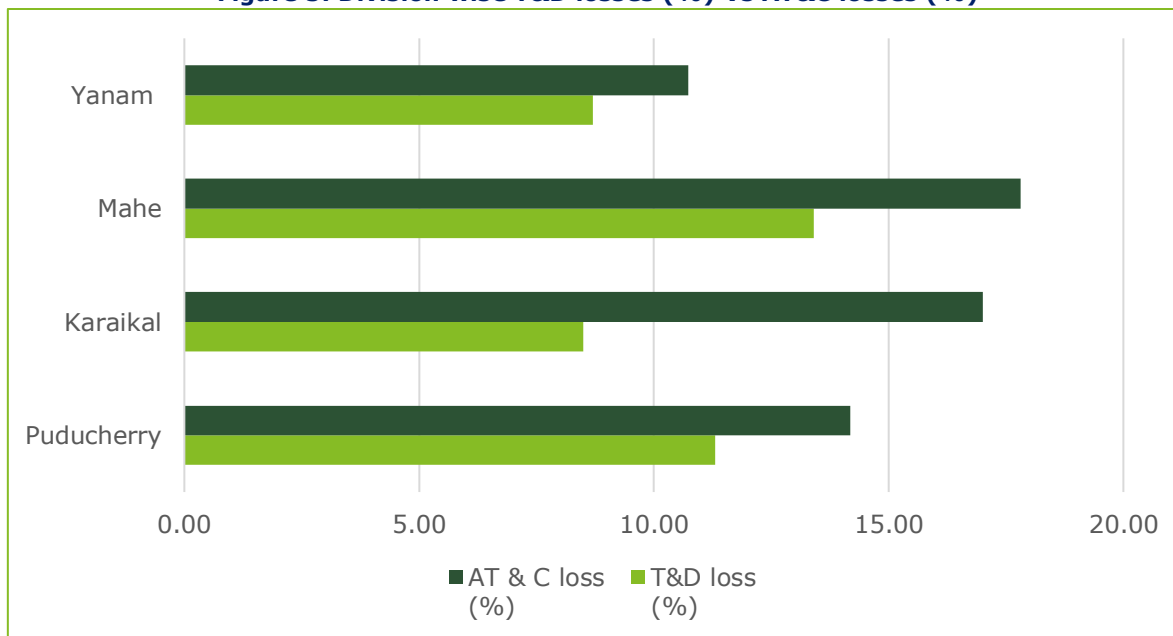


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5. High loss divisions

“Mahe” had the highest T&D loss quantum of 4.78 MU and Mahe had the highest AT&C loss percentage of 17.82%. Further, the divisions with high loss that needs to be prioritized can be identified from the below chart:

Figure 5: Division wise T&D losses (%) Vs AT&C losses (%)



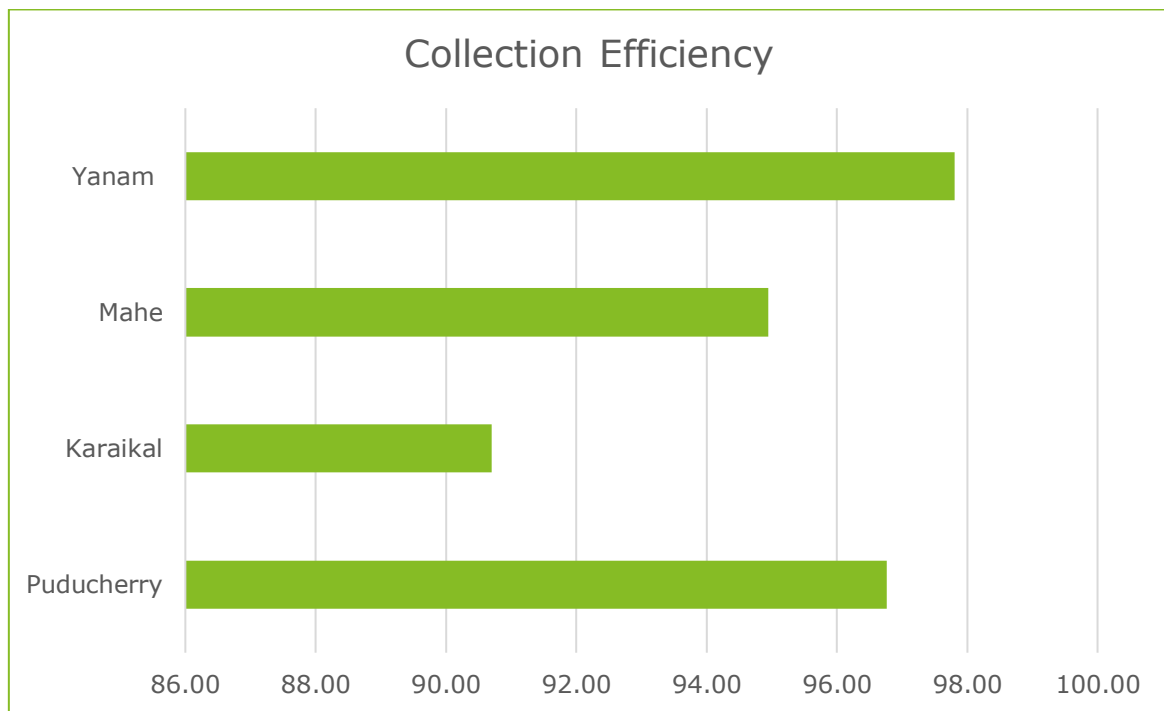
The list of top Divisions with higher AT&C losses (%) & T&D losses (MU) identified from the above chart are tabulated below:

Table 26: Top Divisions with higher AT&C losses (%) & T&D losses (MU)

Name of Division	T&D loss (MU)	T&D loss (%)	AT & C loss (%)
Puducherry	307.647	11.3%	14.18
Karaikal	38.38308	8.5%	17.00
Mahe	4.785851	13.4%	17.82
Yanam	4.899851	9.0%	10.73
Total	355.72	10.88%	14.57%

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

Figure 6: Division wise Collection efficiency (%)



5.2.5. Feeder wise AT&C losses analysis

1. Feeder wise ATC losses

Feeder-wise/unit-wise losses are not available due to:

The entire EHT/HT/LT system is in Ring Main. For ring-main connectivity, the electrical connection keeps changing in fault conditions, maintenance purpose and optimization of asset. Thus, feeder-wise energy accounting will not be correct; it is calculated as a whole.

100% consumer indexing is not in place; thus, feeder wise /DTR wise energy accounting or loss calculation is not possible.

5.2.6. Identify overloaded segments/ infrastructure

Energy meters are installed at each voltage level for energy consumption. The readings are taken manually. Some of the places there are online monitoring system.

The energy reading of commercial and Industrial consumers, Distribution transformer readings are downloaded by the appropriate software for billing and analysis.

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

S.N.	Division Name	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 MU)			(In MU)			(In Rs/Kwh)		(In Rs. Cr.)					
		1	2	3	4=2+3	5	6	7=5+6	8	9	10=5x8	11=6x9	12=10+11	13	14	15=13-14
1	UT of Puducherry	Residential (upto 100 Units/month)	781.91	0.00	781.91	41.78	0.00	41.78	Rs.1.90/Kwh	0.00	3.97	0.00	3.97	3.97	3.97	0.00
		Agriculture	0.00	59.34	59.34	0.00	59.34	59.34			0.00	5.29	5.29	5.29	5.29	0.00
		Commercial/Industrial-LT	372	0	371.56											
		Commercial/Industrial-HT	1044	0	1043.66											
		Other (Specify) WW	652	0	651.59											
		Total	2848.72	59.34	2908.06	41.78	59.34	101.12	0.00	0.00	3.97	5.29	9.26	9.26	9.26	0.00
2																
3																
Total for DISCOM																
Note: The Government of Puducherry has granted subsidy of 50% to Domestic Consumers in the UT of Puducherry for those consuming below 100 units per month for the financial years FY 2022-23.																

5.4. Trend analysis and identification of key exceptions

Performance of DISCOM in previous FY 2021-22 to FY2022-23 annually comparison, where the DISCOM has improved and where needs improvement, etc.

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

Table 27: AT&C loss Comparison for last Years

Particulars	2021-22	2022-23
Input (MU)	3129.49	3263.92
Units Sold (MU)	2783.65	2908.14
Billing Efficiency (%)	88.95%	89.10%
Collection Efficiency (%)	100.00%	95.88%
AT&C Losses (%)	11.05%	14.57%
T&D Losses (%)	11.05%	10.88%



The trend of reduction in distribution loss has reached a trough during the past few years. Marginal rate of reduction of distribution loss becomes extremely low. Further reduction will involve significant capital and operational expenditure and may prove to be counter-productive for the consumers

As we compare the losses for last three years it was found that T&D losses is decreasing trend as compare to first two years and collection efficiency is also increasing trends, hence AT&C losses is increasing.

6. Energy Audit findings

6.1. Critical Analysis

- Verified transmission losses, distribution (T&D) losses, collection efficiency & aggregate technical & commercial losses of PED for FY22-23, i.e., 1st April 2022 to 31st March 2023 is 3.00%, 10.88%, 95.88% & 14.57% respectively.
- Details of received source data is provide because power purchase for DISCOM is done by PED. They have only provided monthly Purchased bills.
- PED has 100 % metering available at 11/33/66 KV system. However, there is 86% metering at consumer end and 96% metering available at DT.
- PED is a very small distribution network having 3 numbers of circles, 10 numbers of divisions, 49 numbers of sub-division, 127 numbers of feeders, 3176 number of DTs and 504522 numbers of consumers.
- PED furnished the Feeder wise Input Energy, Feeder wise billed energy furnished after completion of mapping at each feeder.
- At the time of field visit it was found that at majority of substation the average power factor is above 0.95, which is satisfactory.
- 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.
- Some of the meters were found faulty and CT/PT ratio is at a working condition.
- Capacitor bank is already installed at some of the substation.

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

This Energy Audit report is being issued within the timeline stipulated in Regulations and hence no further comments from Energy Auditor with regards to this aspect.

It was observed that there has been significant delay in submission of Quarterly Accounts during four Quarters (i.e., Q1, Q2, Q3, and Q4 FY 2022-23) submitted. 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 28: 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 audit	A	Conducted an annual energy audit for every financial year and submitted the annual energy audit report to the Bureau 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	Yes
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., 6th 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 submit 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	being done
		d	Electricity distribution company ensures the installation of functional meters for all consumers, transformers and feeders. Meter installation is done in a phased 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	being done
			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:	being done
			d.2.1. All Electricity Divisions of 500 AMRUT cities, with AT&C Losses > 15%	Yes
			d.2.2. All Union Territories (for areas with technical difficulty, non-communicable meters may be installed)	N.A.
			d.2.3. All Industrial and Commercial consumers	Yes
			d.2.4. All Government offices at Block level and above	being done
			d.2.5. Other high loss areas i.e., rural areas with losses more than 25% and urban areas with losses more than 15%	being done
			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:	No
			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);	N.A.
			d.3.3. All Industrial and Commercial consumers;	Yes
			d.3.4. All Government offices at Block level and above;	being done
			d.3.5. Other high loss areas i.e., rural areas with losses more than 25% and urban areas with losses more than 15%.	being done
			d.4. Consumer Metering: 98% by FY 2022-23 99% by FY 2023-24	being done
			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	being done
		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.	being done
			e.2. And existing non communicable distribution transformer meters is replaced with communicable meters and integrated with advanced metering infrastructure.	being done
		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	being done
		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, having professional experience of not less than five years; and (ii) a financial manager having professional experience of not less than five years	Yes
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	N.A.
		d	The energy accounting and audit system and software is developed to create monthly, quarterly and yearly energy accounting reports.	being done
		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	being done

6.1.2. 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 29: Summary of Data gaps

S. No.	Data gaps raised by Energy Auditor	Response shared by DISCOM	Status of data submission by DISCOM
1	DT Wise losses are not in account.	DT wise mapping is under process.	Under Progress
2	Feeder wise losses	Feeder wise monitoring is under process	Under Progress
3	Voltage wise consumer & Input Energy & Sold Energy	Voltage wise Energy Data is not available	Under Progress

6.1.3. 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 30: Comments by Energy Auditor and responses of DISCOM management

S. No.	Comments by Energy Auditor	Response of DISCOM's management
1	Kindly provide the identification and mapping of all of the electrical network assets.	Division Wise schematic was shown
2	Kindly provide the identification and mapping of high tension and low-tension consumers	Schematic maps for 11kV feeder were Shown.
3	DT wise losses is not in account	DT wise metering is under process.
4	Energy (Electrical) Purchase report for the year 2022-23	Provided by PED
6	Energy sold outside the discom	Energy sold outside Provided
7	Energy Conservation Schemes implemented	Provided
8	Energy conservation Schemes to be implemented	Provided
9	Quarter wise report	Provided
10	Voltage wise losses are available	Provided
12	Feeder wise losses	Under Progress
13	Assets Details	Provided
14	DT wise losses are not monitored	Under Progress

6.2. Revised findings based on data validation and field verification

Electricity Department, Puducherry officials responded to the data gaps and the plan for the site visit with Accredited Energy Auditor was prepared. The field visits were conducted in the month of May 2024. The schedule of the visits is as follows. Details along with Photo are enclosed in annexure

1. During field interaction & on-site visit auditor wanted to know the status of identification and mapping status of all of the electrical network assets, status of identification and mapping of high tension and low-tension consumers, status of the development and implementation of information technology status enabled energy accounting and audit system, including associated software, installation status of functional meters for consumers, transformers and feeders, status of adoption of an information technology enabled system to create energy accounting report reports without any manual interference and status of formation of cell for centralized energy accounting etc.
2. During field interaction & on-site visit auditor observed that PED possessed communicable meters connected with feeders of PED for capturing loss data, having system for identification and mapping of all high-tension consumers, but not having for low tension consumers. Still, during verification processes in their conference hall, PED was unable to show the loss figures in details for feeders (Sample feeder wise mapping and losses are shown)/DTRs in their records.
3. Management response for action plan of PED was found to be very positive and PED was agreed upon to implement it with top priority within the target stipulated in pre-requisites of BEE's regulation.
4. The condition of the conductor and the reason for the loss were discussed.
5. The input point meter serial number validation is carried out.
6. The sending end voltage level. It is injection point of the PED
7. The energy accounting process validated for each circle.
8. Input energy data cross verification.
9. It was also observed that most of substation power factor is not in operation.
10. At the time of field visit it was found that at maximum substation the average power factor is above 0.95, which is satisfactory.
11. Some of the meters were found faulty and CT/PT ratio is at a working condition.

6.3. Inclusions and Exclusions

NA

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, the office buildings, and the agriculture & industries. The distribution network accounts for the majority of energy consumption, followed by office buildings and vehicles.

7.1.1. Areas of Inefficiencies:

- **Distribution Network:** The energy consumption of the distribution network is higher than industry standards. The primary reasons for this are the aging infrastructure and lack of modern technology.
- **AT&C Loss:** it is less (14.57%) as compared to national average of 15.0%. The main reason of less AT&C losses is billing efficiency, which is good around 89%.
- **LT/HT Ratio:** Increasing HT lines can help in reducing both line losses and voltage drops. Efforts should be made to achieve a low LT/HT ratio, which would be very beneficial for improving efficiency of power distribution in the PED.

7.1.2. Recommendations:

- The division wise excel sheet shall be automated via some software and the respective changes in the field in order to maintain the supply and meter faults, etc. shall be updated in the software on timely basis.
- 33/11kV Substation monitoring system shall be implemented. It shall monitor the loading of Transformer, Substations Battery and Feeders. It shall have the capability to show online data.
- Normal high loss distribution transformers should be replaced with star rating distribution transformer in phase manner.
- Normal conventional meter should be replaced with communicable prepaid smart meters.
- Augmentation of existing transformers at overloaded segments.
- Replacement or strengthening of conductor at overloaded segments is recommended.
- Recommended to provide aerial bunch conductor at theft prone area.
- Recommended to provide AMR meters for all HT installations.
- The DTR meter reading shall be AMR based and shall be increased. Proper Monitoring of the DTR meters shall be done.

Revamped Distribution Sector Scheme (RDSS):

(a) Smart Pre-paid metering project under RDSS Scheme:

Under this scheme, it is proposed to provide 4.07 lakh Smart pre-paid Energy meters to all the existing consumers in the UT of Puducherry through M/s. PFC Consulting Limited (PFCCL) under

TOTEX model. The Govt of Puducherry has sanctioned the project cost of Rs.393.63 crores. Further, Contract agreement with M/s. PFCCL was signed on 20.01.2023. As the L1 bidder has not extended bid validity, M/s. PFCCL has called for revised RFP on 26.02.2024. The revised RFP is opened on 06.05.2024. On finalizing the e tender, the letter of award will be issued to the L1 bidder. The project is expected to be completed within 27 months from the date of Award of work.

(b) Strengthening of Distribution infrastructure under RDSS scheme

Under this scheme, it is proposed to strengthen the existing Distribution system networks in the UT of Puducherry at a project cost of Rs.83.14 crores. The GoI will provide 60% of the approved Project cost as Gross Budgetary support (GBS) and the Government of Puducherry is required to fund the balance 40% funds through counterpart loan from Financial institutions. A Tripartite Agreement was signed between the Govt. of Puducherry, the Electricity Department, Puducherry and the Nodal Agency on behalf of Ministry of Power. e-tender for 4 nos of packages was floated out and approval of Government sanction is sought for award of work in respect of packages 1&2. Tender floated for Package -3 & 4 was cancelled since no eligible offer was received. The works has been combined into single package and re-tendered on 6-2-2024. Entire work is targeted to be completed by March 2025 as RDSS guidelines.

(c) Modernization & System Augmentation works under RDSS scheme:

Under this scheme, it is proposed to Modernize, renovate & augment the existing Distribution system networks in the UT of Puducherry for which DPR has been prepared at a total cost of Rs. 404.19 crores The Govt of India will provide 60% of the approved DPR cost as Gross Budgetary support (GBS) and the Government of Puducherry is required to fund the balance 40% funds through counterpart loan from Financial institutions. The Detailed Project Report (DPR) is to be submitted to the Ministry of Power, GoI The project will be executed within 24 months from the date of sanction.

7.2. Summary of key findings – energy balance and losses

The Energy balance and losses of PED for FY 2022-23 are as shown in the table below:

Table 31: Energy balance and losses

Energy Input Details	Formula	UoM	Value
Input Energy Purchase (From Generation Source)	A	MU	3374.02
Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	B	MU	3263.92
Total Energy billed (is the Net energy billed, adjusted for energy traded))	C	MU	2,908.14
Transmission and Distribution (T&D) loss Details	D	MU	355.78
	$E = D/B \times 100$	%	10.88%
Collection Efficiency	F	%	95.88%
Aggregate Technical & Commercial Loss	$G = 1 - \{(1-E) \times \text{Min}(F, 100\%)\}$	%	14.57%

7.3. Recommendations and best practices

a) Energy accounting

The Bureau of Energy Efficiency (BEE), through Ministry of Power, Government of India, notified the regulations viz. 'Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit in Electricity Distribution Companies) Regulations, 2021' vide Notification No.18/1/BEE/DISCOM/2021 dated 6th October 2021, and amendment issued thereof on 28th Oct. 2022. The extant regulations specify the following key aspects related to energy accounting and audit for electricity distribution companies.

- a) Intervals of time for conduct of periodic energy accounting and annual energy audit and report submission thereof.
- b) Pre-requisites for annual energy audit and periodic energy accounting
- c) Reporting requirements for annual energy audit and periodic energy accounting,
- d) Manner of annual energy audit and periodic energy accounting
- e) Prioritization and preparation of action plan and
- f) Structure of annual energy audit report

These regulations have been issued under the ambit of Energy Conservation Act, 2001, with an overall objective to reduce inefficiencies and losses in distribution sector thereby ensuring financial and economic viability of DISCOMs.

b) Loss reduction

- Replacement of Electronic Meter to Smart Meters in Urban areas having loss more than 40%. In RDSS scheme.
- DT meterization of Urban areas having loss more than 40%.
- Augmentation of DTR and PTRs
- Augmentation of Conductor of 33 & 11 KV lines.
- Construction of New Substations.
- Installation of New Capacitor Bank on 11 KV feeders.
- LT underground cabling etc.
- Replacement of Bare LT Conductor with AB cable.
- Improving HT: LT ratio.

c) Energy conservation

- Awareness camps organised at Sub-Divisional level to advice consumers to use 5-star rated energy efficient appliances.
- Encouraging Consumers to opt roof top solar energy panels.

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 loss is 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. Feeder having peak load more than 100 Amp. & length more than 30KM.
 - IV. High T&D loss feeder.
 - V. High commercial loss feeder.

7.5. Action plan for monitoring and reporting

1. Online monitoring of month wise energy data of various Division of PED.
2. The division wise excel sheet shall be automated via some software and the respective changes in the field in order to maintain the supply and meter faults, etc. shall be updated in the software on timely basis.

3. 33/11kV Substation monitoring system shall be implemented. It shall monitor the loading of Transformer, Substations Battery and Feeders. It shall have the capability to show online data.
4. Most of the Feeder Meters are having communication facility through AMR and MRI Data (generally, more than feeder meter data is received through AMR or MRI.). The DTR meter reading shall be AMR based and shall be increased. Proper Monitoring of the DTR meters shall be done.
5. During off-peak periods, PED is expected to minimize the no load losses by maintaining optimal loading of transformers by configuring its network in such a manner that reliability of supply is also not compromised.

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. In this report, we will outline 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 a PED 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 input. 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 is 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.

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 (InYears)/ Sector
1	Dr. P.P Mittal	Ph.D, MBA		+45 Years
2	Mr. Vipon Chanda	DISCOM Sector		30
3	Mr. V.P Sharma	B. Tech		32 Years
4	Mr. Alok Kumar Tiwari	B. Tech		7 Years
5	Mr. Pankaj Chauhan	Team Member		8 Years

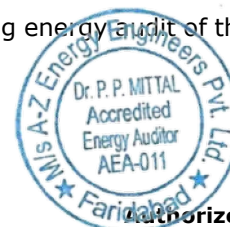
c) Registration No.

EmAEA0024

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 conduct mandatory annual energy audit (Accounting) for Electricity Department, Puducherry (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, and was not involved in undertaking energy audit 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 Electricity Department Puducherry., Puducherry & A-Z Energy Engineers Pvt. Ltd., New Delhi

Electricity Department Puducherry.

AZ Energy Engineers Pvt. Ltd.

A-Z Energy Engineers audit team visited EDP during Month of May and conducted the energy audit accounting with reference to the Electricity department Puducherry work order vide No.2055/ED/SE-HoD/Tech-I/F-10-BEE/23-24/ Dated 22.12.2023 and based on the notification from the Bureau of Energy Efficiency dated 6th October 2021 for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies).

Following are the key observations during audit.

- Filled in proforma (Region wise) for FY 2022-23 was filled by PED available Audit team.
- Client has provided the following documents for Purchase of input Energy i.e. bill copies from GENCOs & Internal Department Sheet.
- Client has provided details for action plan to reduce losses
- Verified T&D losses, AT&C losses & Collection Efficiency and observed as 10.88%, 14.57% & 95.88% respectively based on the filled in proforma and verified from source documents.
- Region wise connected load is not available Hence UT total connected load is furnished.
- Month wise breakup & Category Wise Billed and collected Amount is not available, Hence entire UT circle wise is furnished.
- Feeder wise /DTR wise energy accounting or loss calculation is not provided.
- Voltage wise consumer & Consumption is not available.

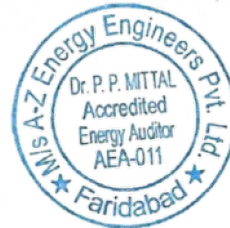
- Month wise billed energy is not available. Hence UT has provided the total Billed annualized and category wise energy .



Electricity Department Puducherry.

M. RAMESH
EXECUTIVE ENGINEER - GENERAL
GENERAL DIVISION
ELECTRICITY DEPARTMENT
PUDUCHERRY.

AZ Energy Engineers Pvt. Ltd.



Annexure III - Check List prepared by auditing Firm

An annual energy audit checklist is used to assess the energy efficiency of PED based on equipment, appliances, design, and usage. Accredited Energy Auditor develops this checklist to identify opportunities for energy cost reduction and recommend solutions.

Documentary evidence for T & D system related data voltage-wise energy input data, sale data, feeder-wise loss data, collection efficiency etc.

► List of Measures adopted for energy conservation and quantity of energy saved with proper document support.

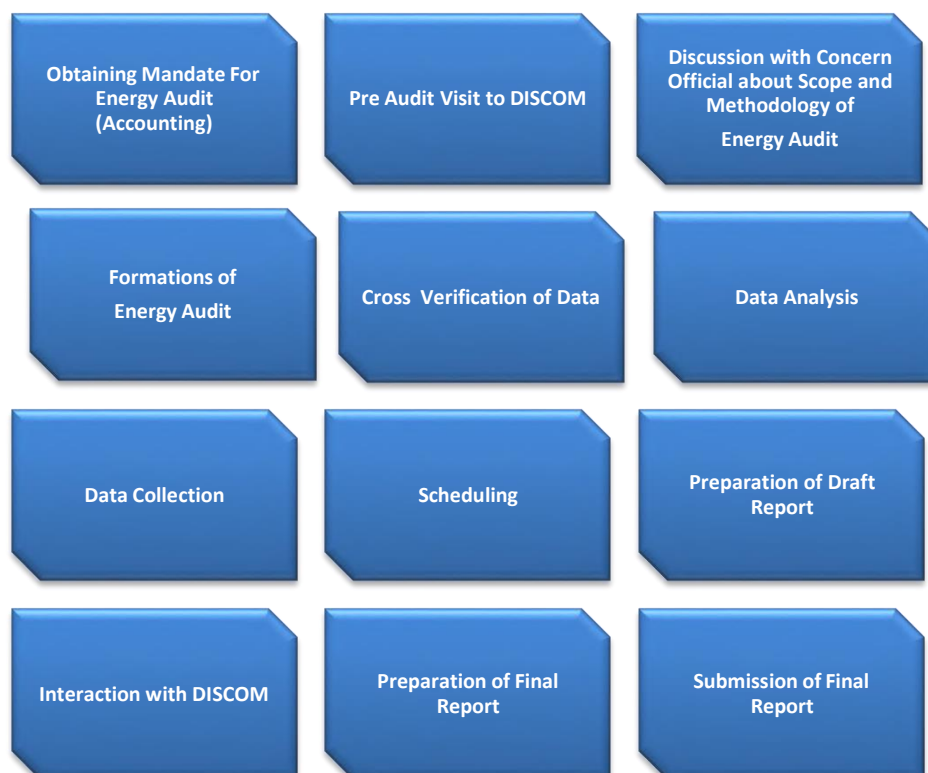
► Checking & verification of over loading of feeders at Substation level either by the study of SCADA system or by the log book

- Month wise input and billed energy.
- T&D losses computation approach.
- Un-metered energy consumption approach.
- Internal field audit report of input and billed energy.
- Performance of discom on distribution losses.
- Outcome of internal filed audit.
- Measures taken to reduce losses and improve losses.
- Zone/circle/Division/Sub-division wise loss computation.
- Reduction achieved, measures adopted for energy conservation and quantity of energy saved.
- Report on distribution losses.
- Write up on energy scenario.
- Net Input Energy Computation Details.
- Category wise consumer's details.
- Category wise consumers connected load and % load
- Bifurcation of Billed Energy (metered billed energy and unmetered billed energy).

Write up on procedure followed technical loss analysis.

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 32: Infrastructure details

Parameters	Total	Covered during in audit	Verified by Auditor in Sample Check	Remarks (Source of data)
Number of circles	3	3	Sample checked	
Number of divisions	10	10	Sample checked	
Number of sub-divisions	60	60	Sample checked	
Number of feeders	127	127	Sample checked	
Number of DTs	3176	3176	Sample checked	
Number of consumers	504522	504522	Sample checked	

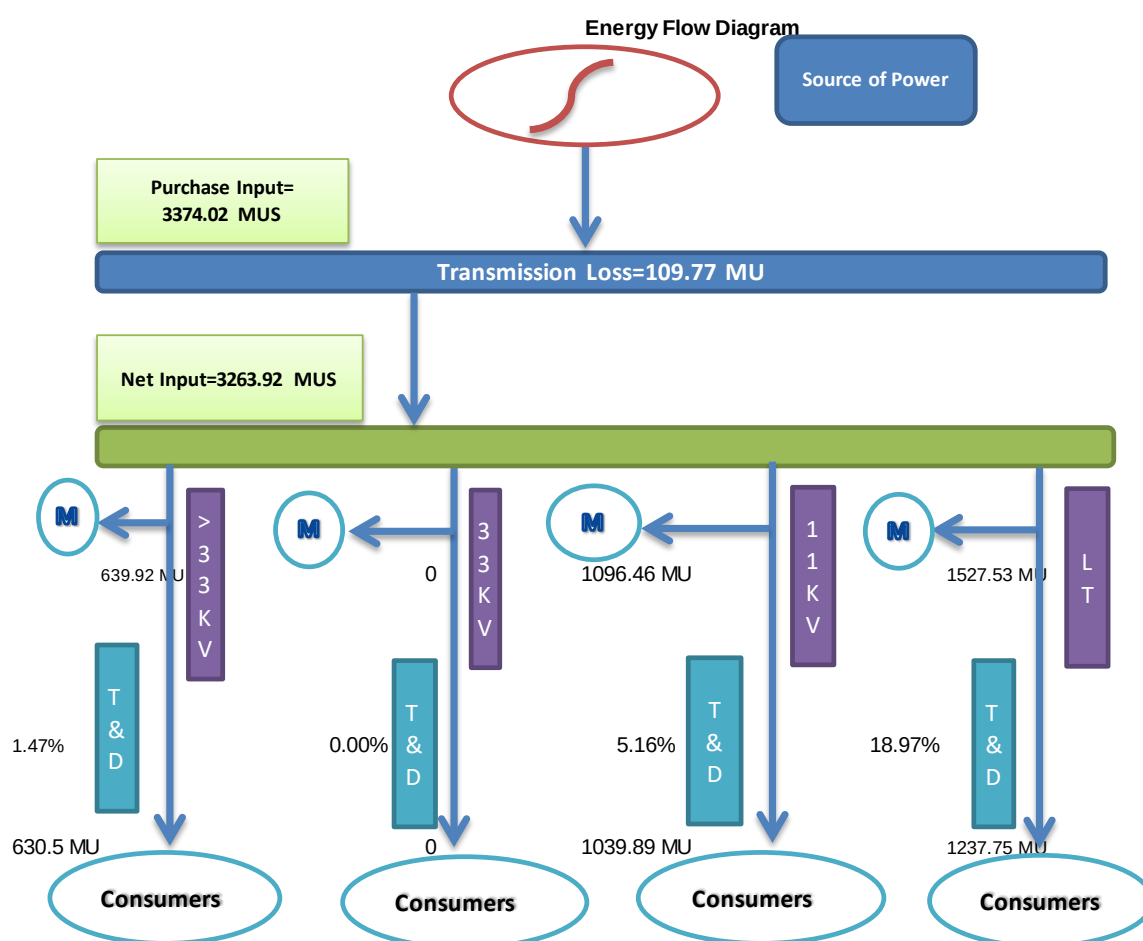
Table 33: Metering details

Parameters	>66kV	33kV	11/22kV	LT
Number of conventional metered consumers	0			460893
Number of consumers with 'smart' meters	0			36000
Number of consumers with 'smart prepaid' meters	0			0
Number of consumers with 'AMR' meters	11	0	0	0
Number of consumers with 'non-smart prepaid Meters	0	0	512	0
Number of unmetered consumers				7106
Number of total consumers	11		512	503999
Number of conventionally metered Distribution Transformers	0			
Number of DTs with communicable meters				2477
Number of unmetered DTs				699
Number of total Transformers				3176
Number of metered feeders	0	2	125	6352
Number of feeders with communicable meters	0	2	125	
Number of unmetered feeders	0	0	0	
Number of total feeders	0	2	125	6352
Line length (ct km)	6028.37			
Length of Aerial Bunched Cables	0			
Length of Underground Cables	997.349			

Annexure VI - Electrical Distribution System

- Energy flow between transmission and 220kV/132kV/33kV/20 kV/11kV/6.0 kV/3.3 kV incoming distribution feeders
- Energy flow between 132kV/33kV outgoing and 20 kV/11kV/6.6 kV/6.0 kV incoming feeders
- Energy flow between 11kV/6.0 kV/3.3 kV feeders and distribution transformers, or high voltage distribution system

Energy flow between distribution transformer, or high voltage distribution system to end-consumer, including ring main system. Energy flow between Feeder to end-consumer & Energy flow between 132kV/33kV/20 kV/11kV/6.0 kV/3.3 kV directly to consumer



Annexure VII - Power Purchase Details**a) Purchase Power for FY 2022-23**

The details specified below, source wise/generating station wise power purchase, contracted capacity, RPO obligation met by the DISCOM, etc.

Table 34: Month wise power purchase

Sr. No.	Months	Energy (in Mus)
1	Apr-22	307.35
2	May-22	316.54
3	Jun-22	305.97
4	Jul-22	306.92
5	Aug-2	295.51
6	Sep-22	286.09
7	Oct-22	287.61
8	Nov-22	265.85
9	Dec-22	268.06
10	Jan-23	273.37
11	Feb-23	263.55
12	Mar-23	311.58
	Total	3,488.40

b) Monthly Input Energy for FY 2022-23

The Month wise break up of input energy (MUs) parameter for all the circle is given below:

Table 35: Monthly Input energy (MU)

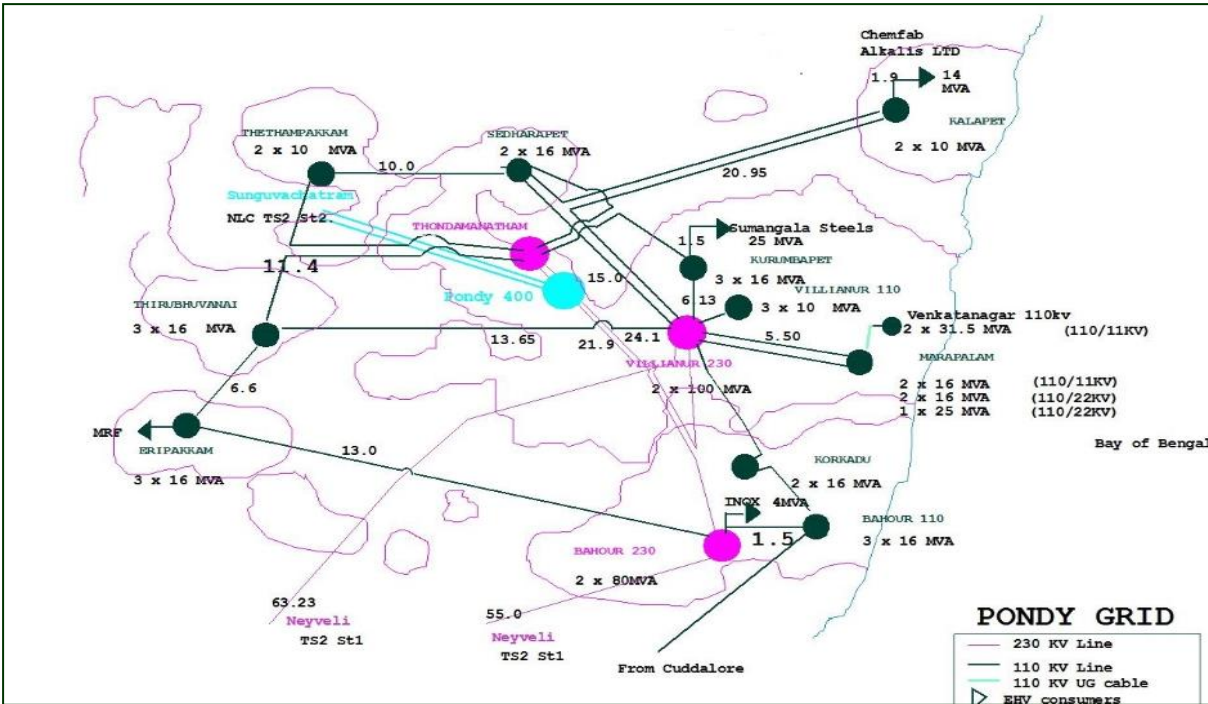
Sr. No.	Months	Energy Input (in Mus)
1	Apr-22	292.48
2	May-22	299.51
3	Jun-22	292.36
4	Jul-22	290.97
5	Aug-2	273.86
6	Sep-22	272.00
7	Oct-22	263.81
8	Nov-22	251.17
9	Dec-22	252.19
10	Jan-23	250.74
11	Feb-23	240.49
12	Mar-23	284.33
	Total	3263.92

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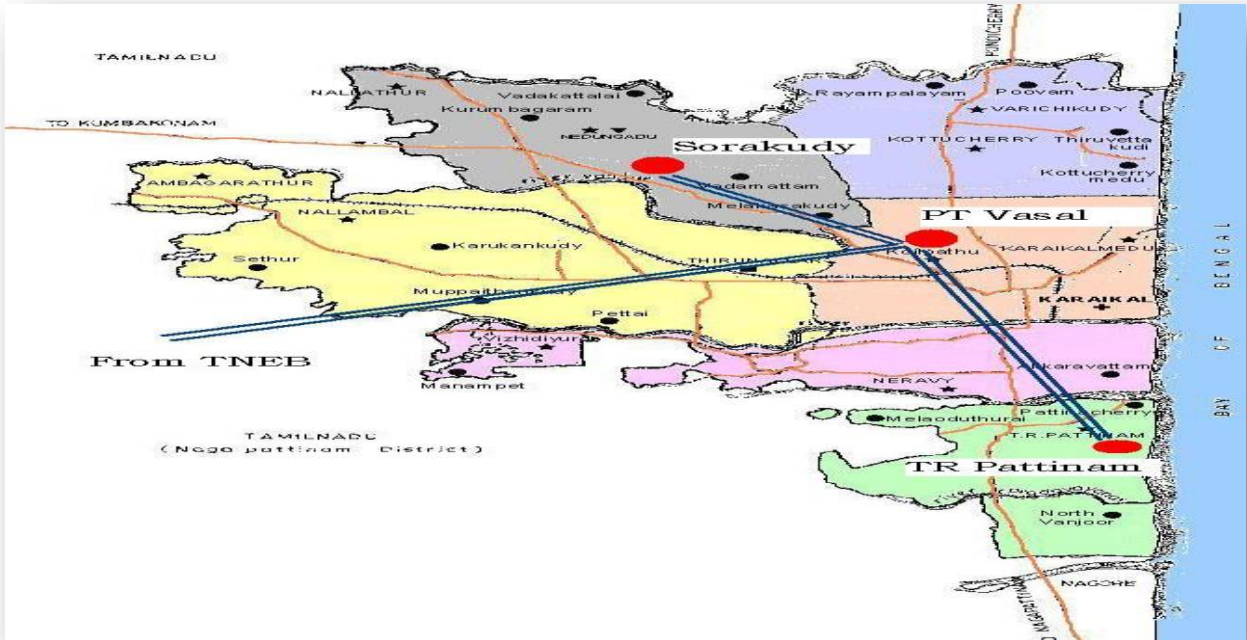
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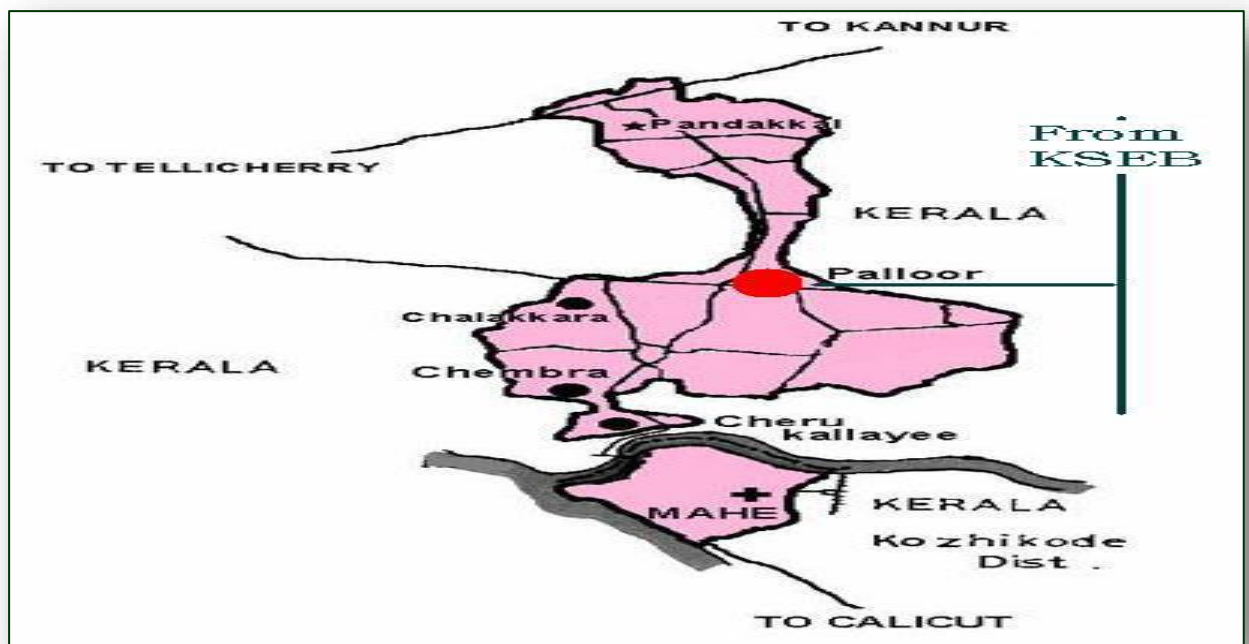
GRID MAP OF PUDUCHERRY REGION



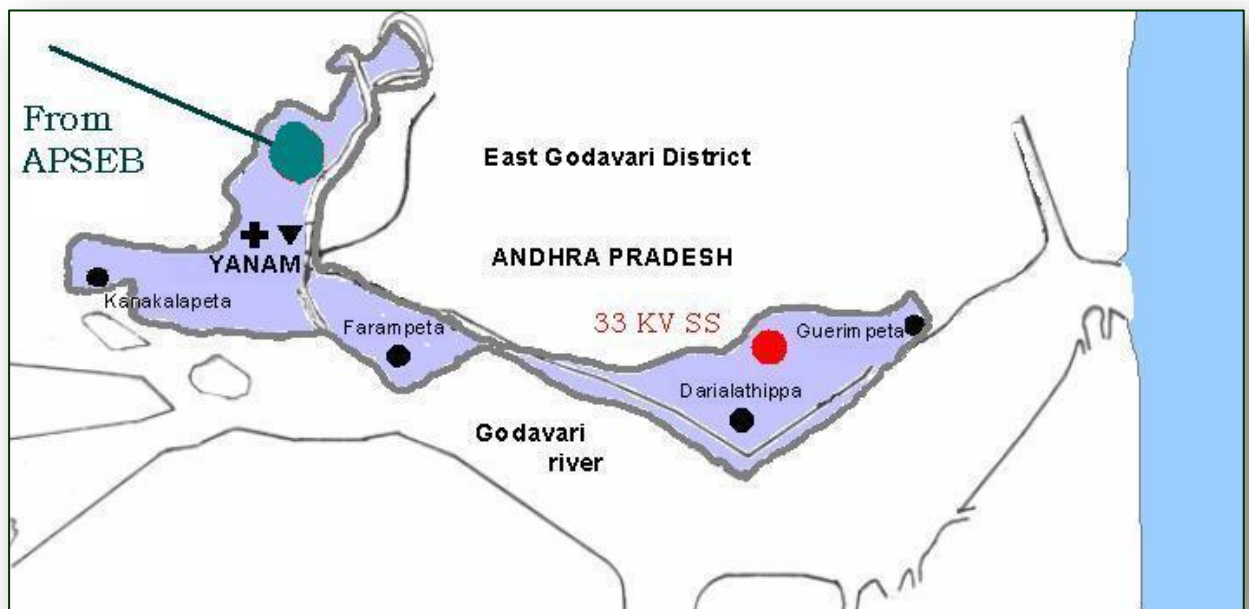
GRID MAP OF KARAİKAL REGION



GRID MAP OF MAHE REGION



GRID MAP OF YANAM REGION



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

Type of consumers with different type of voltage & number of consumers are shown in below table:

Table 36: Category of service details

S. No	Type of Consumers	Category of Consumers (EHT/HT/LT/Others)	Voltage Level (In Voltage)	No of Consumers	Total Consumption (In MU)
1	Residential	LT		379088	781.99
2	Agriculture	LT		7109	59.34
3	Commercial/Industrial-LT	LT		63430	371.56
4	Commercial-Industrial-HT	LT		523	1043.66
5	Others	LT		54372	651.59
	Total			504522	2908.14

Annexure X - Field Verification data and reports

The Sample field inspection details are shown in the below table:

Table 37: Field inspection details







Annexure XI - List of documents verified with each parameter

The documents verified are listed in the below table:

Table 38: 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 2022-2023 (Annually)	Provided	Data Attached
2	Supporting Data with Month wise breakup	Provided Month wise breakup	Data Attached
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	Calculated	Provided
3	Feeder wise input, Billed Energy, T&D & AT&C losses	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	Verified T&D and AT&C losses (Approved with Petition)	Petition provided	Data Attached
7	Energy Flow Diagram	Data Attached	Data Attached
8	Subsidy category Wise (BEE Guideline proforma)	Format Provided	Provided
9	High Loss area T&D & AT&C action plan to reduce losses	Provided	Data Attached

Annexure XII - Quarter Wise Subsidy Details

The Quarter wise subsidy is listed in the below table:

Table 39: Quarter wise subsidy details

S.N.	Division Name	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 MU)			(In MU)			(In Rs/Kwh)		(In Rs. Cr.)					
1	UT of Puducherry	1	2	3	4=2+3	5	6	7=5+6	8	9	10=5x8	11=6x9	12=10+11	13	14	15=13-14
		Residential (upto 100 Units/month)	781.91	0.00	781.91	41.78	0.00	41.78	Rs.1.90/Kwh	0.00	3.97	0.00	3.97	3.97	3.97	0.00
		Agriculture	0.00	59.34	59.34	0.00	59.34	59.34			0.00	5.29	5.29	5.29	5.29	0.00
		Commercial/Industrial-LT	372	0	371.56											
		Commercial/Industrial-HT	1044	0	1043.66											
		Other (Specify) WW	652	0	651.59											
		Total	2848.72	59.34	2908.06	41.78	59.34	101.12	0.00	0.00	3.97	5.29	9.26	9.26	9.26	0.00
2																
3																
Total for DISCOM																
Note: The Government of Puducherry has granted subsidy of 50% to Doemstic Consumers in the UT of Puducherry for those consuming below 100 units per month for the financial years FY 2022-23.																

Annexure XIII - Brief Description of Unit

The Union Territory of Puducherry is spread over an area of 492 Sq.Km., which constitutes of the four erstwhile French establishments of Puducherry, Karaikal, Mahe and Yanam. The total population of the UT of Puducherry is 16,08,849 as per the 2021 census. The city of Puducherry located in the Puducherry region serves as the capital of the Union Territory. The Union Territory has semi-arid type of climate, with a mean annual temperature of around 30° C and 70-85% relative humidity, is prevalent in the Union Territory. While Puducherry, Karaikal and Yanam region receive rain mostly through North - East monsoon, Mahe region benefits from the South-West monsoon.

While the energy Purchase at generation End, Net Input & billed Unit PED for the customer is 3374.02 MU, 3263.92 MU & 2908.14 MU. The monthly consumption per customer stands at 480.34 KWH/Month. PED caters to area spread in 3 circles, 10 Division & 60 Subdivision.

Annexure XIV - 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 Discoms 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.

It was decided that out of the two parameters, T&D loss parameter seems to be appropriate parameter which reflects energy savings to a greater extent as compared to AT&C losses

Table 40: Formulas used to derive the parameters

Parameter	Formula	Data Source
AT&C Losses	$\{1 - (\text{Billing Efficiency} \times \text{Collection Efficiency})\} \times 100$	Billing Software
T& D Losses	$\{1 - (\text{Total energy Billed} / \text{Total energy Input in the system})\} \times 100$	
Billing efficiency	Total unit Billed/ Total unit Inputs	Collection efficiency
Collection efficiency	Revenue collected / Amount Billed	

Annexure XV - Detailed Formats

General Information				
1	Name of the DISCOM	Electricity Department, Puducherry		
2	i) Year of Establishment	1962		
	ii) Government/Public/Private	Government		
3	DISCOM's Contact details & Address			
i	City/Town/Village	UT of Puducherry		
ii	District	UT of Puducherry		
iii	State	Puducherry	Pin	605001
iv	Telephone		Fax	
4	Registered Office			
i	Company's Chief Executive Name	T.Chanemougam		
ii	Designation	Superintending Engineer Cum HoD		
iii	Address	Electricity Department, Main Office, No.137, NSJ Bose Salai, Puducherry		
iv	City/Town/Village	Puducherry	P.O.	605001
v	District	Puducherry		
vi	State	Puducherry	Pin	605001
vii	Telephone	0413-2334277	Fax	--
5	Nodal Officer Details*			
i	Nodal Officer Name (Designated at DISCOM's)	Thiru.M.Ramesh		
ii	Designation	Executive Engineer		
iii	Address	Electricity Department, Main Office, No.137, NSJ Bose Salai, Puducherry		
iv	City/Town/Village	Puducherry	P.O.	605001
v	District	Puducherry		
vi	State	Puducherry	Pin	605001
vii	Telephone	0413-2341238	Fax	
6	Energy Manager Details*			
i	Name			
ii	Designation	Executive Engineer	Whether EA or EM	EM
iii	EA/EM Registration No.	-		
iv	Telephone	0413-2341238		
v	Mobile	9489080400	E-mail ID	ee10ped@py.gov.in
7	Period of Information			
	Year of (FY) information including Date and Month (Start & End)	FY-2022-23		

Authorized Signatory and Seal

Signature of Authorised Signatory
 Name of Authorised Signatory
 Name Electricity Department, Puducherry
 Electricity Department, Main Office,
 No.137, NSJ Bose Salai, Puducherry
T. CHANEMOUGAM, B.E., M.I.E., PGDCA.,
SUPERINTENDING ENGINEER
- cum - HOD
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Signature:-

Name of Energy Manager:

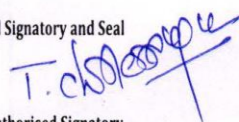
Registration Number:

M. RAMESH
EXECUTIVE ENGINEER - GENERAL
GENERAL DIVISION
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Performance Summary of Electricity Distribution Companies			
1	Period of Information		April-22 to Mar-23
	Year of (FY) information including Date and Month (Start & End)		2022-23
2	Technical Details		
(a)	Energy Input Details		
(i)	Input Energy Purchase (From Generation Source)		3374.02
(ii)	Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)		3263.92
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded) in MU		2,908.14
(b)	Transmission and Distribution (T&D) loss Details	MU	355.00
		%	10.88%
	Collection Efficiency	%	95.88
(c)	Aggregate Technical & Commercial Loss	%	14.57

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 th Electricity Department, Puducherry

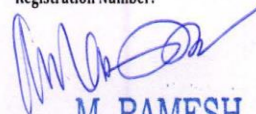
Full Addre Electricity Department, Main Office, No.137, NSJ Bose Salai, Puducherry

T. CHANEMOUGAM, B.E., M.E., PGDCA,
SUPERINTENDING ENGINEER
 - cum - HOD
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Signature:-

Name of Energy Manager:

Registration Number:



M. RAMESH
EXECUTIVE ENGINEER - GENERAL
GENERAL DIVISION
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Form-Details of Input Infrastructure (April -2022 to March-2023)					
1	Parameters	Total	Covered during in audit	Verified by Auditor in Sample Check	Remarks (Source of data)
i	Number of circles	3			
ii	Number of divisions	10			
iii	Number of sub-divisions	60			
iv	Number of feeders	127			
v	Number of DTs	3176			
vi	Number of consumers	504522			
2	Parameters	66kV and above	33kV	11/22kV	LT
a.i.	Number of conventional metered consumers	0			460893
ii	Number of consumers with 'smart' meters	0			36000
iii	Number of consumers with 'smart prepaid' meters	0			0
iv	Number of consumers with 'AMR' meters	11	0	0	0
v	Number of consumers with 'non-smart prepaid' meters	0	0	512	0
vi	Number of unmetered consumers				7106
vii	Number of total consumers	11		512	503999

b.i.	Number of conventionally metered Distribution Transformers	0			
ii	Number of DTs with communicable meters				2477
iii	Number of unmetered DTs				699
iv	Number of total Transformers				3176
c.i.	Number of metered feeders	0	2	125	6352
ii	Number of feeders with communicable meters	0	2	125	
iii	Number of unmetered feeders	0	0	0	
iv	Number of total feeders	0	2	124	6352
d.	Line length (ct km)	6028.37			
e.	Length of Aerial Bunched Cables	0			
f.	Length of Underground Cables	997.349			

3	Voltage level	Particulars	MU	Reference	Remarks (Source of data)
i	66kV and above	Long-Term Conventional	3374.02	Includes input energy for franchisees	Includes long term conventional power and Puducherry owned Power generation (PPCL)
		Medium Conventional	NA		
		Short Term Conventional	NA		
		Banking	NA		
		Long-Term Renewable energy	NA		
		Medium and Short-Term RE	NA	Includes power from bilateral/ PX/ DEEP	
		Captive, open access input	NA	Any power wheeled for any purchase other than sale to DISCOM. Does not include input for franchisee.	
		Sale of surplus power			
		Quantum of inter-state transmission loss	110	As confirmed by SLDC, RLDC etc	
		Power procured from inter-state sources	3,374	Based on data from Form 5	
ii	33kV	Power at state transmission boundary	3,264		
		Long-Term Conventional			
		Medium Conventional	0		
		Short Term Conventional			
		Banking	0		
		Long-Term Renewable energy	0		
		Medium and Short-Term RE	0		
		Captive, open access input			
		Sale of surplus power			
		Quantum of intra-state transmission loss	0		
iii		Power procured from intra-state sources	0		
iv	33 kV	Input in DISCOM wires network	3,264		
		Renewable Energy Procurement	0		
		Small capacity conventional/ biomass/ hydro plants Procurement			
		Captive, open access input	0		
v	11 kV	Renewable Energy Procurement			
		Small capacity conventional/ biomass/ hydro plants Procurement			
		Sales Migration Input			
vi	LT	Renewable Energy Procurement			
		Sales Migration Input			
vii		Energy Embedded within DISCOM wires network	0		
viii		Total Energy Available/ Input	3,264		

4	Voltage level	Energy Sales Particulars	MU	Reference	
i	LT Level	DISCOM' consumers	1,237.75	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive		Non DISCOM's sales	
		Embedded generation used at LT level		Demand from embedded generation at LT level	
		Sale at LT level	1237.75		
		Quantum of LT level losses	289.36		
		Energy Input at LT level	1527.53		
ii	22/11 kV Level	DISCOM' consumers	1,039.89	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive	0	Non DISCOM's sales	
		Embedded generation at 11 kV level used	0	Demand from embedded generation at 11kV level	
		Sales at 22/11 kV level	1,039.89		
		Quantum of Losses at 11 kV	56.57		
		Energy input at 11 kV level	1,096.46		

iii	33 kV Level	DISCOM' consumers	0	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive		Non DISCOM's sales	
		Embedded generation at 33 kV or below level		This is DISCOM and OA demand met via energy generated at same voltage level	
		Sales at 33 kV level	0		
		Quantum of Losses at 33 kV	0		
		Energy input at 33kV Level	0		
iv	> 33 kV	DISCOM' consumers	630.50	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive		Non DISCOM's sales	
		Cross border sale of energy			
		Sale to other DISCOMs			
		Banking			
		Energy input at > 33kV Level	639.92		
		Sales at 66kV and above (EHV)	630.50		
		Total Energy Requirement		3,263.92	
Total Energy Sales		2,908.14			

Energy Accounting Summary					
5	DISCOM	Input (In MU)	Sale (In MU)	Loss (In MU)	Loss %
i	LT	1527.53	1237.75	289.78	18.97
ii	11 Kv	1096.46	1039.89	56.57	5.16
iii	33 kv	0.00	0.00	0.00	0.00
iv	> 33 kv	639.92	630.50	9.42	1.47
6	Open Access, Captive	Input (In MU)	Sale (In MU)	Loss (In MU)	
i	LT				
ii	11 Kv				
iii	33 kv				
iv	> 33 kv				

Loss Estimation for DISCOM	
T&D loss	355
D loss	313
T&D loss (%)	10.87649207
D loss (%)	9.576492071

Authorised Signatory and Seal

Name of Authorised Signatory

Name of the Electricity Department, Puducherry

Full Address: Electricity Department, Main Office, No. 137, NSJ Bose Salai, Puducherry

T. CHANEMOUCAM, B.E., M.E., PGDCA.,
SUPERINTENDING ENGINEER
- cum - HOD
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Signature:-

Name of Energy Manager:

Registration Number:

M. RAMESH
EXECUTIVE ENGINEER - GENERAL
GENERAL DIVISION
ELECTRICITY DEPARTMENT
PUDUCHERRY.

S.No	Parameters	FY-2022-23 Q1 to Q4
A.1	Input Energy purchased (MU)	3374.02
A.2	Transmission loss (%)	3%
A.3	Transmission loss (MU)	109.77
A.4	Energy sold outside the periphery(MU)	0.00
A.5	Open access sale (MU)	0.00
A.6	EHT sale	628.24
A.7	Net input energy (received at DISCOM periphery or at distribution point,after adjustment)-(MU)	3263.92
A.8	Is 100% metering available at 33/22 kV (Select yes or no from list)	yes
A.9	Is 100% metering available at 11 kV (Select yes or no from list)	yes
A.10	% of metering available at DT	86%
A.11	% of metering available at consumer end	96%
A.12	No of feeders at 33kV voltage level	2
A.13	No of feeders at 22kV voltage level	72
A.14	No of feeders at 11kV voltage level	53
A.15	No of LT feeders level	6352
A.16	Line length (ckt. km) at 33kV voltage level	19
A.17	Line length (ckt. km) at 22kV voltage level	1800.52
A.18	Line length (ckt. km) at 11kV voltage level	568.268
A.19	Line length (km) at LT level	3659.58
A.20	0.566	0.566

Zone/Circle	B. Meter reading of Input energy injection points							
	S.No	Voltage level	Feeder ID	Feeder Name	Meter S.No	CT/PT ratio	Import (MU)	Export (MU)
	B.1	22KV		Nellithope feeder 22 KV	x236639	400/1,22000/110 V	51.87	0.00
	B.2	22KV		Ariyankuppam feeder22 KV	x236574	400/1,22000/110 V	59.60	0.00
	B.3	22KV		Mill Feeder 22 KV	x236520	300/1,22000/110 V	28.11	0.00
	B.4	22KV		Raj Nivas feeder22 KV	x236524	400/1,22000/110 V	7.29	0.00
	B.5	22KV		Town feeder22 KV	x236521	300/1,22000/110 V	18.40	0.00
	B.6	22KV		Amaravathy feeder22 KV	x236573	400/1,22000/110 V	40.73	0.00
	B.7	22KV		New Feeder 22 KV	x236522	400/1,22000/110 V	5.13	0.00
	B.8	22KV		Pillaithottam feeder22 KV	x236523	300/1,22000/110 V	45.36	0.00
	B.9	11KV		Laporte feeder11 KV	x236668	600/1,11000/110 V	0.00	0.00
	B.10	11KV		GH Feeder11 KV	x236664	600/1,11000/110 V	12.74	0.00
	B.11	11KV		Kandan Feeder 11 KV	x236669	600/1,11000/110 V	0.00	0.00
	B.12	11KV		Golconda feeder11 KV	x236667	600/1,11000/110 V	12.22	0.00
	B.13	11KV		Market Feeder11 KV	x236666	400/1,11000/110 V	18.61	0.00
	B.14	22KV		Marapalam Feeder 22 KV	x236623	300/1,22000/110 V	40.26	0.00
	B.15	22KV		Kanuvapet Feeder 22 KV	x236622	300/1,22000/110 V	25.44	0.00
	B.16	22KV		Agaram Feeder 22 KV	KA100158	300/1,22000/110 V	17.67	0.00
	B.17	22KV		Sedarapet interlinking feeder 22 KV	x236620	300/1,22000/110 V	51.81	0.00
	B.18	22KV		Industrial feeder22 KV	x236621	300/1,22000/110 V	26.15	0.00
	B.19	22KV		Pandasozhanallur Feeder 22 KV	x236615	400/1,22000/110 V	17.23	0.00
	B.20	22KV		Mittal Feeder 22 KV	x236614	400/1,22000/110 V	40.70	0.00
	B.21	22KV		Industrial Feeder 22 KV	x236612	400/1,22000/110 V	5.72	0.00
	B.22	22KV		Steel Mill 22 KV	x236611	400/1,22000/110 V	19.16	0.00
	B.23	22KV		Bahour Feeder 22 KV	x236515	400/1,22000/110 V	33.51	0.00
	B.24	22KV		Thavalakuppam Feeder 22 KV	x236610	400/1,22000/110 V	0.00	0.00
	B.25	22KV		Paper Mill Feeder 22 KV	x236613	400/1,22000/110 V	38.99	0.00
	B.26	22KV		Pillaichavady Feeder22 KV	x236544	300/1,22000/110 V	20.31	0.00
	B.27	22KV		Kazhuperumpakkam feeder22 KV	x236519	300/1,22000/110 V	0.00	0.00
	B.28	22KV		Alankuppam Feeder 22 KV	x236517	300/1,22000/110 V	6.15	0.00
	B.29	22KV		Kanaga chettiukulam 22 KV	x236608	300/1,22000/110 V	62.91	0.00
	B.30	22 KV		University 22 KV	x236673	300/1,22000/110 V	6.78	0.00

B.31	22KV	Kurumbapet Interlinking 22 KV	x236635	300/1,22000/110 V	0.00	0.00
B.32	22KV	Kurumbapet feeder22 KV	x236526	400/1,22000/110 V	54.85	0.00
B.33	22 KV	Karuvadikuppam 22 Kv		400/1,22000/110 V	35.94	0.00
B.34	22KV	JIPMER feeder22 KV (old)	x236618	400/1,22000/110 V	37.26	0.00
B.35	22KV	Lawspet feeder22 KV	x236527	300/1,22000/110 V	33.05	0.00
B.36	22KV	ECR feeder22 KV	x236617	400/1,22000/110 V	41.60	0.00
B.37	22KV	New Jipmer feeder22 KV	x236567	400/1,22000/110 V	18.07	0.00
B.38	22KV	Moolakulam 22 KV	x236525	400/1,22000/110 V	51.35	0.00
B.39	22KV	PIPDIC -I Feeder 22 KV	x236616	400/1,22000/110 V	32.51	0.00
B.40	22KV	PIPDIC -II Feeder 22 KV	x236565	400/1,22000/110 V	20.63	0.00
B.41	22KV	Sedarapet Feeder 22 KV	x236619	400/1,22000/110 V	21.37	0.00
B.42	22KV	Station			0.07	0.00
B.43	22KV	Industrial Feeder 22 KV	x236572	400/1,22000/110 V	30.91	0.00
B.44	22KV	Villianur Interlinking Feeder 22 KV	x236631	400/1,22000/110 V	29.12	0.00
B.45	22KV	Abishegapakkam 22 KV	x236636	400/1,22000/110 V	17.89	0.00
B.46	22KV	Mangalam Feeder 22 KV	x236571	400/1,22000/110 V	49.12	0.00
B.47	22KV	Embalam 22 KV	x236570	400/1,22000/110 V	48.65	0.00
B.48	22KV	Manalmedu feeder 22 KV	x236605	300/1,22000/110 V	24.32	0.00
B.49	22KV	Motchakulam 22 KV	x236568	300/1,22000/110 V	0.00	0.00
B.50	22KV	Madukarai Feeder 22 KV	x236609	300/1,22000/110 V	13.27	0.00
B.51	22KV	Industrial 1 Feeder 22 KV	x236542	300/1,22000/110 V	31.51	0.00
B.52	22KV	Industrial 2 Feeder 22 KV	x236606	300/1,22000/110 V	13.93	0.00
B.53	22KV	Snam Alloys Feeder 22 KV	x236543	300/1,22000/110 V	37.24	0.00
B.54	22KV	Pushpit Feeder 22 KV	x236607	400/1,22000/110 V	22.76	0.00
B.55	22KV	Thirubhuvanai Interlink Feeder 22	x236569	400/1,22000/110 V	31.52	0.00
B.56	22KV	Rampakam feeder 22 KV			0.00	0.00
B.57	22KV	Industrial 1 Feeder 22 KV	x236557	400/1,22000/110 V	25.06	0.00
B.58	22KV	Kalitheerthakuppam 22 KV	x236534	300/1,22000/110 V	16.65	0.00
B.59	22KV	Industrial 2 Feeder 22 KV	x236530	300/1,22000/110 V	55.01	0.00
B.60	22KV	Industrial 3 Feeder 22 KV			15.54	0.00
B.61	22KV	Eripakkam interlinking feeder 22 K	x236532	400/1,22000/110 V	52.34	0.00
B.62	22KV	P.S.Pallayam 22 KV	x236531	300/1,22000/110 V	34.35	0.00
B.63	22KV	Sellipet 22 KV	x236555	300/1,22000/110 V	49.82	0.00
B.64	22KV	Station Aux			0.07	0.00
B.65	22KV	Spare			0.00	0.00

B.66	22KV	L.R.Palayam 22 KV	x236671	300/1,22000/110 V	25.25	0.00
B.67	22KV	Manalipet 22 KV	x236672	300/1,22000/110 V	17.89	0.00
B.68	22KV	Vadanur 22 KV	x236558	300/1,22000/110 V	0.93	0.00
B.69	22KV	Industrial Feeder 22 KV	x236556	300/1,22000/110 V	10.98	0.00
B.70	22KV	Interlinking Feeder 22 KV	x236559	300/1,22000/110 V	5.49	0.00
B.71	22KV	BALLARPUR 22 KV	x236670	400/1,22000/110 V	4.17	0.00
B.72	22KV	KATTERIKUPPAM 22 KV	x236541		0.00	0.00
B.73	22KV	KURUMBAPET 22 KV	x236633	300/1,22000/110 V	31.03	0.00
B.74	22KV	PIPDIC - II 22 KV	x236632	300/1,22000/110 V	38.85	0.00
B.75	22KV	PIPDIC - I 22 KV	x236630	300/1,22000/110 V	21.10	0.00
B.76	22KV	V S K 22 KV	x236540	300/1,22000/110 V	0.00	0.00
B.77	22KV	Pathukannu 22 KV	x236634	400/1,22000/110 V	5.91	0.00
B.78	11KV	Mettakur Feeder 11 KV	x236562	150/1A,11000/110 V	4.59	0.00
B.79	11 KV	Savithri Nagar feeder 11KV	x236596	300/1A,11000/110 V	11.49	0.00
B.80	11KV	Industrial Feeder 11 KV	x236561	300/1A,11000/110 V	2.35	0.00
B.81	11KV	Kurasampeta feeder 11 KV	x236598	300/1A,11000/110 V	8.57	0.00
B.82	11KV	Town Feeder 11 KV	x236597	300/1A,11000/110 V	11.14	0.00
B.83	11KV	Kanakadurga 11 KV			0.00	0.00
B.84	11KV	Kanakalpet 11 KV	x236595	600/1A,11000/110 V	15.66	0.00
B.85	11KV	11KV VKR Feeder	x236560	200/1A,11000/110 V	2.35	0.00
B.86	33KV	Adivipulam-33KV Line-1	x621354	500/1A,11000/110 V	0.00	0.00
B.87	33KV	Adivipulam-33KV Line-2			0.00	0.00
B.88	11KV	Clock Tower Feeder 11 KV	x236538	300/1,11000/110 V	10.73	0.00
B.89	11KV	DAT feeder 11 KV	x236604	300/1,11000/110 V	15.05	0.00
B.90	11KV	Mandi Feeder 11 KV	x236600	300/1,11000/110 V	19.88	0.00
B.91	11KV	Chief Secretariat Feeder 11 KV	x236603	300/1,11000/110 V	15.39	0.00
B.92	11KV	Paper Mill Feeder 11 KV	x236602	300/1,11000/110 V	19.33	0.00
B.93	11KV	Vengatanagar Feeder 11 KV	x236537	300/1,11000/110 V	15.29	0.00
B.94	11KV	Brindavanam feeder 11 KV	x236554	300/1,11000/110 V	16.83	0.00
B.95	11KV	GRT Feeder 11 KV			19.08	0.00
B.96	11KV	Gingee Salai 11 KV	x236535	300/1,11000/110 V	13.96	0.00
B.97	11KV	Krishna Nagar 11 KV	x236550	300/1,11000/110 V	9.83	0.00
B.98	11KV	Muthialpet 11 KV	x236601	300/1,11000/110 V	14.71	0.00
B.99	22KV	Muthialpet 22 KV	x8464429	200/1,22000/110 V	20.14	0.00

B.100	22KV	Uppar 22 KV	x8464431	200/1,22000/110 V	26.50	0.00
B.101	11KV	Nedungadu feeder 11 KV	x236654	300/1A,11000/110 V	21.55	0.00
B.102	11KV	Ambagarathur feeder 11 KV	x236652	600/1A,11000/110 V	23.07	0.00
B.103	11KV	Ceramic feeder 11 KV	x236653	300/1A,11000/110 V	2.82	0.00
B.104	11KV	Industrial feeder 11 KV	x236651	600/1A,11000/110 V	23.82	0.00
B.105	11KV	Alloy feeder 11 KV	x236648	600/1A,11000/110 V	16.75	0.00
B.106	11KV	Agalankannu feeder 11 KV	x236650	600/1A,11000/110 V	2.40	0.00
B.107	11KV	Thirunallar feeder 11 KV	x236647	300/1A,11000/110 V	0.65	0.00
B.108	11KV	Link feeder 11 KV	x236649	600/1A,11000/110 V	14.69	0.00
B.109	11KV	Karaikal Chlorate feeder 11 KV	x236646	300/1A,11000/110 V	6.29	0.00
B.110	11KV	Melakasakudy feeder 11 KV	x236645	400/1A,11000/110 V	9.75	0.00
B.111	11KV	Station 11KV			0.06	
B.112	11KV	PPCL 11 KV	x236551	400/1A,11000/110 V	0.00	0.00
B.113	11KV	INDUSTRIAL 11 KV	x236552	400/1A,11000/110 V	7.32	0.00
B.114	11KV	VANJUR 11 KV	x236545	400/1A,11000/110 V	7.89	0.00
B.115	11KV	Karaikal Town feeder 11 KV	x236549	400/1A,11000/110 V	37.70	0.00
B.116	11KV	INTERLINK 11 KV	x236547	400/1A,11000/110 V	19.37	0.00
B.117	11KV	POLAGAM 11 KV	x236548	400/1A,11000/110 V	4.48	0.00
B.118	11KV	ALLOY 11 KV	x236553	400/1A,11000/110 V	11.13	0.00
B.119	11KV	STEEL 11 KV	x236546	400/1A,11000/110 V	23.14	0.00
B.120	11KV	LINK 11 KV	x236656	300/1A,11000/110 V	26.56	0.00
B.121	11KV	TOWN 2 - 11 KV	x236662	300/1A,11000/110 V	23.92	0.00
B.122	11KV	TOWN 1 - 11 KV	x236660	300/1A,11000/110 V	12.75	0.00

B.123	11KV	POOVAM 11 KV	x236658	300/1A,11000/110 V	15.76	0.00
B.124	11KV	KEEZHKASAKUDY 11 KV	x236661	300/1A,11000/110 V	17.79	0.00
B.125	11KV	TOWN 3 - 11 KV	x236663	300/1A,11000/110 V	15.04	0.00
B.126	11KV	Town North			12.51	0.00
B.127	11 KV	TOWN 4 - 11 KV			18.85	
B.128	11 KV	Station 11KV			0.11	
B.129	11KV	SPINNING MILL - 11 KV	x0452858	200/5,11000/110 V	0.60	0.00
B.130	11KV	MAHE - 11 KV	x236686	200/5,11000/110 V	14.09	0.00
B.131	11KV	PANDAKKAL - 11 KV	x236683	200/5,11000/110 V	12.02	0.00
B.132	11KV	CHALAKKARA - 11KV	x236681	200/5,11000/110 V	4.96	0.00
B.133		East Palloor	x236688	200/5,11000/110 V	3.96	0.00
B.134	11KV	AUX - 11 KV	x236687	200/5,11000/110 V	0.06	0.00
B.135	22KV	Villianur Interlinking Feeder 22 KV	x381284	400/1,22000/110 V	18.37	0.00
B.136	22KV	Sedarapet Interlinking feeder 22 KV	x381296	400/1,22000/110 V	23.47	0.00
B.137	22KV	Industrial 22 KV	x381285	400/1,22000/110 V	39.20	0.00
B.138	22KV	Pillayarkuppam 22KV			15.15	
B.139	22 KV	Thethampakkam			34.56	
B.140	110 KV	All EHT feeders			628.24	0.00
					3263.92	0.00
Net input energy at DISCOM periphery (MU)					3263.92	

Authorised Signatory and Seal

Name of Authorised Signatory

Name of the DE: Electricity Department, Puducherry

Full Address:- Electricity Department, Main Office, No.137,NSJ Bose Salai, Puducherry

T. CHANEMONGAM, B.E., M.I.E., PGDCA,
SUPERINTENDING ENGINEER
 - cum - HOD
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Signature:-

Name of Energy Manager:

Registration Number:

M. RAMESH
EXECUTIVE ENGINEER - GENERAL
GENERAL DIVISION
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Details of Division Wise Losses (See note below**)																							
Division Wise Losses																							
Period From January-23 To March-2023 04-22-23																							
S.No	Name of circle	Circle code	Name of Division	Consumer profile							Energy parameters				Losses		Commercial Parameter			AT & C loss (%)			
				Consumer category	No of connection metered (Nos)	No of connectio n Un-metered	Total Number of connections (Nos)	% of number of connections	Connecte d Load (MW)	Connecte d Load Un-metered (MW)	Total Connecte d Load (MW)	% of connected load	Input energy (MU)	Metered energy	Unmetered/assess ment energy	Total energy	% of energy consumption	T&D loss (MU)	T&D loss (%)		Billing efficiency	Billed Amount in Rs. Crore	Collected Amount in Rs. Crore
1	Circle-1		Puducherry	Residential	283278	0	283278	77%				0%	606.78	0	606.78	25%				0	0	0.00%	
				Agricultural	3	6208	6211	0%				0%	0	50.019	50.019	2%				0	0	0.00%	
				Commercial/Industrial-LT	43593	0	43593	13%				0%	314.982	0	314.982	13%	307.647	11%		0	0	0.00%	
				Commercial/Industrial-HT	420	0	420	0%				0%	859.14	0	859.14	36%				0	0	0.00%	
				Others	32945	0	32945	9%				0%	581.542	0	581.542	24%				0	0	0.00%	
Sub-total				360239	6208	366447	100%				100%	2720.11	2362.444	50.019	2412.463	100%	307.647	11%	88.69	1508.301	1495.498	96.76	14.18
2	Circle-2		Karaikal	Residential	70778	0	70778	71%	0	0	0	0%	127.7909	0	127.7909	31%				0	0	0.00%	
				Agricultural	0	838	838	1%	0	0	0	0%	0	8.960229	8.960229	2%				0	0	0.00%	
				Commercial/Industrial-LT	12922	0	12922	13%	0	0	0	0%	38.37381	0	38.37381	9%	38.38308	8%		0	0	0.00%	
				Commercial/Industrial-HT	69	0	69	0%	0	0	0	0%	168.61	0	168.61	41%				0	0	0.00%	
				Others	15634	0	15634	16%	0	0	0	0%	69.84197	0	69.84197	17%				0	0	0.00%	
Sub-total				99403	838	100241	100%	0	0	0	100%	451.96	406.8187	8.960229	413.5769	100%	38.38308	8%	91.51	266.85	242.03	90.70	17.00
3	Circle-2		Mahe	Residential	10924	0	10924	57%	0	0	0	0%	23.06734	0	23.06734	75%				0	0	0.00%	
				Agricultural	0	3	3	0%	0	0	0	0%	0	0	0	0%				0	0	0.00%	
				Commercial/Industrial-LT	5045	0	5045	26%	0	0	0	0%	5.533956	0	5.533956	18%	4.785851	13%		0	0	0.00%	
				Commercial/Industrial-HT	4	0	4	0%	0	0	0	0%	1.75916	0	1.75916	6%				0	0	0.00%	
				Others	3101	0	3101	16%	0	0	0	0%	0.463696	0	0.463696	2%				0	0	0.00%	
Sub-total				19074	3	19077	100%	0	0	0	100%	35.61	30.82415	0	30.82415	100%	4.785851	13%	86.56	17.28	16.406	94.94	17.82
4	Circle-2		Yanam	Residential	14108	0	14108	75%	0	0	0	0%	22.76848	0	22.76848	44%				0	0	0.00%	
				Agricultural	0	57	57	0%	0	0	0	0%	0	0.352093	0.352093	1%				0	0	0.00%	
				Commercial/Industrial-LT	1870	0	1870	10%	0	0	0	0%	12.66681	0	12.66681	25%	4.899851	9%		0	0	0.00%	
				Commercial/Industrial-HT	19	0	19	0%	0	0	0	0%	14.14163	0	14.14163	28%				0	0	0.00%	
				Others	2703	0	2703	14%	0	0	0	0%	1.341143	0	1.341143	3%				0	0	0.00%	
Sub-total				18790	57	18757	100%	0	0	0	100%	56.17	50.81806	0.352093	51.27015	100%	4.899851	9%	91.28	29.999	29.3402	97.80	10.73
5			U.T of Puducherry	Residential	379088	0	379088	75%	663.841	0	663.841	0%	780.4067	0	780.4067	27%				0	0	0.00%	
				Agricultural	3	7106	7109	1%	60.602	60.602	0%	1263.85	0	59.33132	59.33132	2%				0	0	0.00%	
				Commercial/Industrial-LT	63430	0	63430	13%	291.565	291.565	0%	371.5566	0	371.5566	13%	355	11%		0	0	0.00%		
				Commercial/Industrial-HT	512	0	512	0%	262.07	262.07	0%	1043.651	0	1043.651	36%				0	0	0.00%		
				Others	54383	0	54383	11%	53.6614	53.6614	0%	653.1888	0	653.1888	22%				0	0	0.00%		
Sub-total				497416	7106	504522	100%	1271.137	60.602	1331.739	100%	3263.85	2848.803	59.33132	2908.134	100%	355	10.88%	89.10	1822.43	1747.274	95.88	14.57

Note 1: Four regions namely Puducherry, Karaikal, Mahe & Yanam called in two circle Circle 1 Puducherry Region and Circle -2 contains Karaikal, Mahe and Yanam region. All four regions combined Puducherry

Note 2: Region wise connected load is not available Hence UT connected load is being furnished.

Circle code	Parameter
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: ELECTRICITY DEPARTMENT, GOVERNMENT OF PUDUCHERRY
Full Address: No.137, N.S.J Bose Salai,
Electricity Department,
Main Campus,
Puducherry - 605 001

T. CHANEMONGAM, B.E., M.E., PGDCA,
SUPERINTENDING ENGINEER
- cum - HOD
ELECTRICITY DEPARTMENT
PUDUCHERRY.

Signature:

Name of Energy Manager:

Registration Number:

M. RAMESH
EXECUTIVE ENGINEER - GENERAL
GENERAL DIVISION
ELECTRICITY DEPARTMENT
PUDUCHERRY.

(Details of Consumers)						
Summary of Energy						
Period From April 22 To March 2023						
S.No	Type of Consumers	Category of Consumers (EHT/HT/LT/Others)	Voltage Level (In Voltage)	No of Consumers	Total Consumption (In MU)	Remarks (Source of data)
1	Residential	LT		379088	781.99	From Billing Software
2	Agriculture	LT		7109	59.34	
3	Commercial/Industrial-LT	LT		63430	371.56	
4	Commercial-Industrial-HT	LT		512	1043.66	
5	Others	LT		54383	651.59	
Total				504522	2908.14	

Details of Input Energy Sources								
Period From...April 2022 to March-23								
A. Generation at Transmission Periphery (Details)								
S.No.	Name of Generation Station	Generation Capacity (In MW)	Type of Station Generation (Based- Solid (Coal ,Lignite)/Liquid/Gas/Renewable (biomass-bagasse)/Others)	Type of Contract (in years/months /days)	Type of Grid (Intra-state/Inter-state)	Point of Connection (POC) Loss MU	Voltage Level (At input)	Remarks (Source of data)
	There is no major Generating Station in the UT of Puducherry except a 32.5 MW Gas Power plant namely Puducherry Power Corporation Limited at Karaikal .The Power requirement is being met through power allocation made by Ministry of Power,Government of India from various Central Generating Stations . The allocation made by MOP,GOI is 597.25 MW with effect from 28.6.23.The agencies wise allocation is detailed below. The Power is being received at 230 KV level from Grid.							
1	Neyveli Lignite Corporation of India Limited						209.36 MW	Allocation made by MOP//GOI
2	National Thermal Power Corporation						227.48 MW	
3	Madras Atomic Power Station						7.43 MW	
4	KAIGA Atomic Power Station						31.82 MW	
5	Kudankulam Atomic Power Station						73.75 MW	
6	NTPC Tamilnadu Energy company Limited (NTECL)						21.9 MW	
7	NLC Tamilnad Power Limited (NTPL)						25.51 mW	
	Total Conventional Power						597.25 MW	
8	STOA- NTPC-ABC-Solar						100MW	
9	LTOA-SECI-SITAC_KABINI -WIND						112.61 MW	In order to fulfil RPO PSA signed
10	State Owned Generating Station: Puducherry Power Corporation Limited						32 MW	
10	Grand Total						847.06MW	