

# ANNUAL ENERGY AUDIT FY 2022-23

## CHHATTISGARH STATE POWER DISTRIBUTION COMPANY LIMITED



**CHHATTISGARH STATE POWER DISTRIBUTION COMPANY LTD**  
CSPDCL, DANGANIA, RAIPUR  
[Website: www.cspdcl.co.in](http://www.cspdcl.co.in)

Prepared By -



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**FY 2022-2023**

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## ACKNOWLEDGEMENT

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M/s. **AUDITTECH INDUSTRIAL SERVICES PVT LTD** would like to thanks to **Chhattisgarh State Power Distribution Company Limited , Danganiya Raipur , Sunder Nagar-492013** providing us an opportunity to conduct Annual Energy Audit of CSPDCL. We are thankful to all the officials and staff of CSPDCL for showing keen interest in the study and for the help and cooperation extended to the team during the audit resulting in the successful completion of this project.

We would like to express our deep sense of gratitude to the other departments also who helped us with infrastructure / arrangements and encouragement in our endeavour. We do hope that you will find the recommendations given in this report useful in helping you save energy. While we have made every attempt to adhere to high quality standards, in both data collection and analysis, as well as in presentation through the report, we would welcome any suggestions from your side as to how we can improve further.

**For, Audittech Industrial Services Pvt. Ltd.**

A handwritten signature in blue ink is written over a circular blue stamp. The stamp contains the text "Audittech Industrial Services Pvt. Ltd." around the perimeter and a small star symbol at the bottom.

**Authorized Signatory**

## CERTIFICATION

I/We Audittech Industrial Services Pvt. Ltd. the Accredited Energy Auditor, have undertaken a thorough independent evolution of the activities and measures taken by **Chhattisgarh State Power Distribution Company Limited (CSPDCL), Chhattisgarh** a designated consumer in compliance with the energy consumption norms and standards specified under the Energy conservation Act-2001, notified by the Government of India Ministry of Power. It is certify that-

**(a)** The verification of the data collection in relation to energy import/export and power injection including distribution loss data has been carried out diligently and truthfully.

**(b)** The verification of the identified energy efficiency measures/schemes and the progress of their implementation is enclosed in the report and has been carried out diligently and truthfully.

**(c)** The verification of the compliance with energy consumption norms and standard has been carried out diligently and truthfully.

**(d)** All reasonable professional skill, care and diligence have been taken during verifying the various verification activities, finding and conclusions, documents, reports, preparing the documents the content's thereof are a true representation of the facts.

Signature,



**Mr. Rakesh Khichariya**  
**Accredited Energy Auditor (AEA-0295)**





## BUREAU OF ENERGY EFFICIENCY



Examination Registration No.: ..... **EA-5514** .....

Accreditation Registration No.: ..... **AEA-0295** .....

### Certificate of Accreditation

This is to certify that Mr./Ms..... **Rakesh Khichariya** .....having its trade/registered office at ..... **Bhilai** ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from ..... **11<sup>th</sup>** day of ..... **February, 2019** .....


The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No..... **0295** ..... in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **19<sup>th</sup>** day of **March, 2019**

  
Secretary,  
Bureau of Energy Efficiency  
New Delhi

## 1. EXECUTIVE SUMMARY

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The Govt. of India vide gazette notification dated 06 October 2021 has published bureau of energy efficiency (manner and interval for conduct of energy audit in electricity distribution companies) regulation 2021. Under this regulation every designated consumer shall conducted Annual Energy Audit and Energy Accounting in distribution companies.

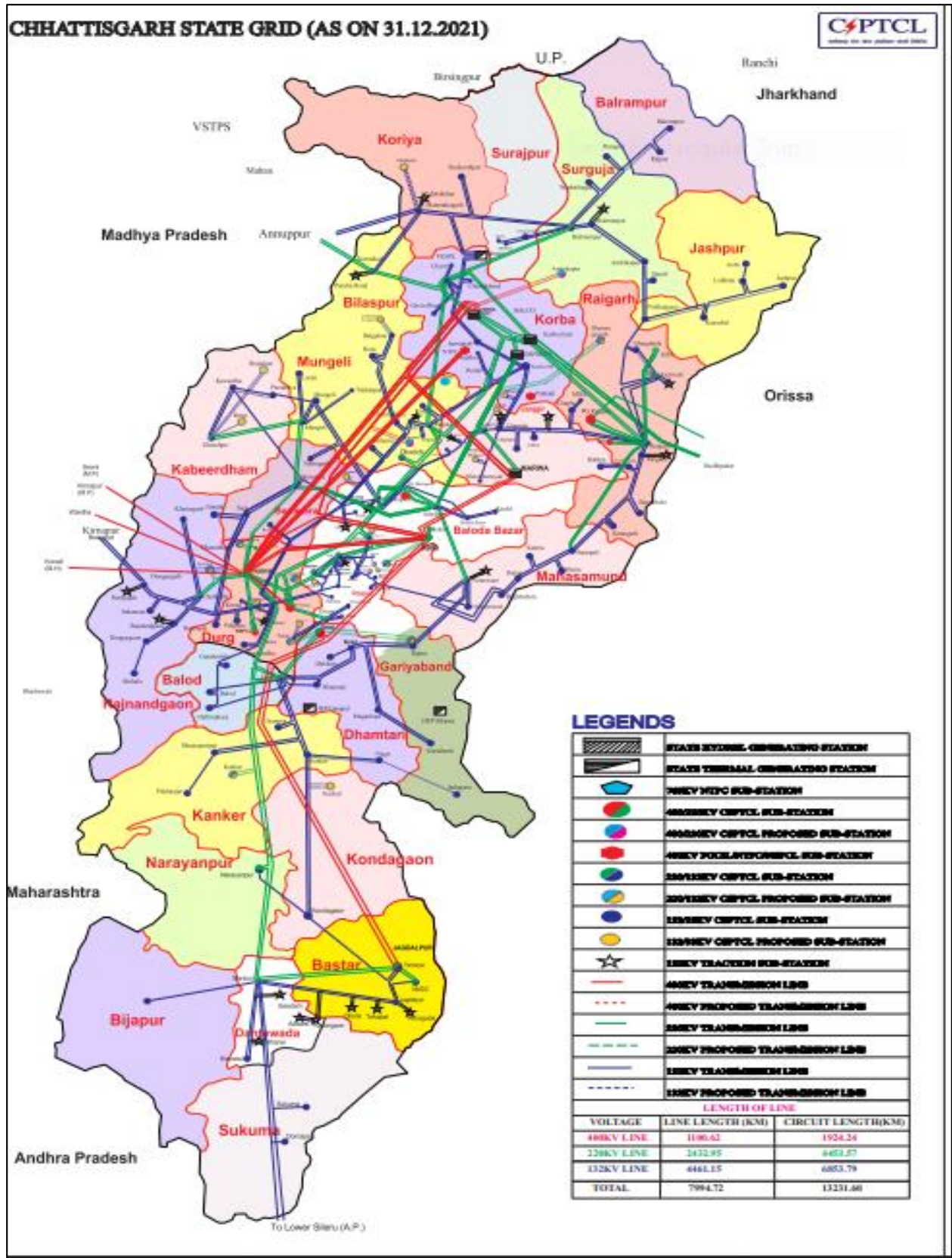
CSPDCL is a designated consumer submitting all mandatory compliances under notification of BEE regulation 2021. For year 2022-23 Annual Audit Report has been prepared with following objectives

- Verification of existing pattern of energy distribution across the periphery of CSPDCL
- Verification of energy flow and its accounting submitted by Distribution Company at all applicable voltage levels of distribution network.
- Identification of high loss areas and corrective actions.
- Identification of high loss feeders and corrective actions.
- Verification of accuracy of data collected, analysis and processing the data with respect to consistency, improvement in energy accounting and loss reduction in DISCOM.
- Verification and comparison of energy balancing data of CSPDCL for previous two years.
- Quantification of energy losses and potential of energy saving.

The accredited energy auditor in consultation with the nodal officer of CSPDCL has developed a scope of work for the conduct of energy audit and also agreed on the best practice procedures on accounting of energy distributed across the network.

In order to facilitate effective energy audit of CSPDCL, all guidelines are followed as approved by the ministry for Energy Manager & Energy Auditor for conducting annual energy audit.

It covers aspects relating to data collection, verification and validation by energy auditor through field visits for metering (at feeder, DT and consumer level) and metered data, determination of energy flows including input energy, consumption, identification of areas related to energy leakage, high loss-making areas, overloaded segments of network, computation of loss, subsidy for preparation & submission of annual energy audit report.





## 2. BACKGROUND

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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 284 Oct. 2022. The extant regulations specify the following key aspects related to energy accounting and audit for electricity distribution companies.

- i. Intervals of time for conduct of periodic energy accounting and annual energy audit and report submission thereof.
- ii. Pre requisites for annual energy audit and periodic energy accounting.
- iii. Reporting requirements for annual energy audit and periodic energy accounting.
- iv. Manner of annual energy audit and periodic energy accounting.
- v. Prioritization and preparation of action plan and
- vi. 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.

Energy accounting for all such energy inflows in the distribution system, including renewable energy generation, open access consumers, and energy consumption by the end consumers, shall be conducted on a periodic basis. This necessitates that energy, accounting data is made available at a consumer, transformer, feeder and system level. Energy accounting will help to identify areas of high loss and pilferage, and thereafter, focused efforts can be made by DISCOMs to take corrective action.

The regulation stipulates quarterly energy accounting by DISCOMs, through a certified Energy Manager and annual energy audit by an Independent Accredited Energy Auditor. The periodic energy accounting (quarterly) report needs to be submitted within 60 days of completion of the respective Quarter while the annual energy audit report should be submitted within four months of the completion of the financial year.

The regulations also specify the Manner of periodic energy accounting and annual energy audit (Regulation 7), Prioritization and preparation of action plan (Regulation 8) and Structure of the annual audit report (Regulation 9). Relevant extracts of the regulations are annexed herewith as Annexure-I for reference. Further, indicative

structure and contents of the annual energy audit report along with details to be captured in the report template and form for energy accounting to be completed by the accredited Energy Auditor and Energy Manager.

## **2.1 Extent of Regulation & Role of BEE**

### **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.

## 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 & labelling 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 be the equip BEE to manage ever evolving sphere of energy efficiency in the country.

### **The main amendments made to the original Act are given below:**

- 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 Annual Energy Audit
- The Central Government may, in consultation with the Bureau, prescribe the value of per metric ton of oil equivalent of energy consumed
- Commercial buildings which are having a connected load of 100 kW or contract demand of 120 kVA and above brought under the purview under the EC Act.

## Promotional Role

### **The major Promotional Role of BEE includes:**

- 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.

## **2.2 Purpose of Audit & Accounting Report**

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.

Bureau of Energy Efficiency (BEE) through Ministry of Power, Government of India issued regulations namely Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies) Regulations BEE notification No 18/1/BEE/Discom/2021 dated 6th October, 2021 (hereinafter referred as 'BEE Regulation 2021'), for Conduct of Mandatory Annual Energy Audit and Periodic Energy Accounting in DISCOMs. As per the said regulation, all Electricity Distribution Companies are mandated to conduct annual energy audit and periodic energy accounting (quarterly basis). These Regulations for Energy audit in Electricity Distribution Companies provides broad framework for conduct of Annual Energy Audit and quarterly Periodic Energy Accounting with necessary Pre-requisites and reporting compliance to be met

## **2.3 Period of Energy Accounting Report**

Period of energy audit report is from 1<sup>st</sup> April 2022 to 31<sup>st</sup> March 2023 and it is third annual audit report of CSPDCL against compliance. Energy Audit activity was started with a meeting between CSPDCL and M/s Audittech Industrial Service Pvt. Ltd. in July 2023. Based on requirement visit to substation division, grid for data collection and technical discussion the report covers maximum point requires.



### 3. DISCOM INTRODUCTION AND OVERVIEW

#### 3.1 General Details of CSPDCL

Name of DISCOM	Chhattisgarh State Power Distribution Company Limited
Address of Designated Consumer	Vidyut Seva Bhavan, Danganiya, Raipur (CG) 492013
Certified Energy Manager	Shri Aashish Bafna (EA-28916)
Authorized Signatory	Smt. Saroj Tiwari (Executive Director - Revenue)CSPDCL RAIPUR

#### 3.2 Summary profile of DC

Erstwhile Chhattisgarh State Electricity Board (CSEB) was responsible for Generation, Transmission and Distribution of electricity in Chhattisgarh State. In accordance with the provisions contained in the Section 131-134 of Electricity Act 2003, Govt. of Chhattisgarh has reorganized erstwhile CSEB into following five companies vide Notification No. F1-8/ 2008/ 13/ 1 dated 19.12.2008

- Chhattisgarh State Power Holding Company Limited,
- Chhattisgarh State Power Generation Company Limited,
- Chhattisgarh State Power Transmission Company Limited,
- Chhattisgarh State Power Distribution Company Limited and
- Chhattisgarh State Power Trading Company Limited

The assets and liabilities of the erstwhile CSEB have been allocated to the successor Companies w.e.f. January 1, 2009 according to the provisions of the CSEB Transfer Scheme Rules, 2010.

Accordingly, Chhattisgarh State Power Distribution Company Limited (CSPDCL) came into existence w.e.f. 01.01.2009

Chhattisgarh State Power Distribution Company Limited has been registered by the 'Registrar of Companies MP & CG' with Registration No. U40108CT2003PLC15822.

CSPDCL is a Public limited Company in the category of 'State Government Company' registered under the Companies Act 1956, with the main objectives of developing, operating and maintenance of distribution system for supplying electricity to the consumers of entire state. As a deemed distribution licensee under section 14 of the Electricity Act 2003, CSPDCL is carrying out the supply of power to the end users as well as maintaining the wire business for supply of such power.

Currently, CSPDCL provides electricity throughout the State of Chhattisgarh. CSPDCL supplies electricity to more than 61 Lakh consumers. In terms of infrastructure, the Company operates a vast network comprising of 1352 33/11 kV substations and switching stations, approximately 875 no. 33KV Feeders, around 5392 no. 11KV feeders approximately 2.14 Lakh Distribution transformers, 1.30 Lakh KMs of 11 kV lines and approximately 24409 KMs of 33 kV lines spread over 135194 sq.km geographical area of Chhattisgarh covering 8 Region officers 18 Circle Offices, 66 Divisional Offices and 444 zone/DC offices.

The overall AT&C (Aggregate Technical and Commercial) losses of the Company have reduced from 19.84 % in FY 2018-19 to 14.72% FY 2022-23, which is below the national average of 23%. As a part of demand side management, agricultural feeders 717 feeders have been separated assuring minimum 18 hours of quality power supply to uplift the rural agriculture economy.

The Company is providing various consumer services such as new connection, load change, name change, complaint redressal, notification for supply interruption etc. on digital platform through the dedicated consumer portal and also through the 'Mobile app'. The Company is also deploying latest IT implementations to pace up

with the technological advances happening in the power sector. AMR has been provided to all HT consumers and most of the LT consumers having load more than 15 HP. The Company stresses on value creation and cost optimization. In order to achieve the same, in the next five years, the Company is committed in improving IT interventions and system strengthening measures with an ultimate aim to reduce the AT&C losses to 13.10 % in line with RDSS scheme.

The Company has already in process of installation of prepaid smart meters in compliance of RDSS to the directives of Ministry of Power, Government of India. CSPDCL is committed to do our best to achieve the national goal of uninterrupted and quality power to all at a cheaper cost.

### **VISION:**

To be the best power distribution utility of India by delivering reliable and quality service at competitive price to the consumers and contribute to the sustainable development of our State and Nation.

### **Company Mission**

To establish Chhattisgarh State Power Distribution Company Limited as one of the best power distribution company in India by

- CSPDCL is dedicate to accept all challenges to serve consumers by supplying reliable and quality power at reasonable and competitive tariffs so as to boost agricultural, industrial sector and overall economic development of Chhattisgarh.
- CSPDCL is committed to being a consumer centric organization and a trustee for consumers.
- CSPDCL is committed as learning organization focusing on continuous improvement.
- CSPDCL is committed for reduction in loss of human life due to electrical accidents.

### 3.3 Infrastructure details of CSPDCL

Details of Number of Circle, Division, feeder, DTS as on Mar-2023 are as under:-

Particulars	Total
Number of circles	18
Number of Divisions	66
Number of zone	57
Number of DC	532
Number of Subdivision	156
Number of 33 kv Feeder	875
Number of 11 kv Feeder	5392
Number of DTs	214762
Number of Consumers	6153423

Details of Voltage wise consumer and type of meters:-

Parameters	66kV and above	33kV	11/22kV	LT
Number of conventional metered consumers	0	0	0	6130014
Number of consumers with 'smart' meters	0	0	0	0
Number of consumers with 'smart prepaid' meters	0	0	0	0
Number of consumers with 'AMR' meters	113	2491	995	22276
Number of consumers with 'non-smart prepaid' meters	0	0	0	0
Number of unmetered consumers	0	0	0	0

## Annual Energy Audit of CSPDCL Raipur FY 2022-23

Status of Distribution Transformers and meter:-

Parameters	66kV and above	33kV	11/22kV	LT
Number of conventionally metered Distribution Transformers	0	0	69270	0
Number of DTs with communicable meters	0	0	7690	0
Number of unmetered DTs	0	0	137802	0
<b>Number of total Transformers</b>	<b>0</b>	<b>0</b>	<b>214762</b>	<b>0</b>

Status of Feeder Metering:-

Parameters	66kV and above	33kV	11/22kV	LT
Number of metered feeders	0	875	5392	0
Number of feeders with communicable meters	0	0	4700	0
Number of unmetered feeders	0	0	0	0
<b>Number of total feeders</b>	<b>0</b>	<b>875</b>	<b>5392</b>	<b>0</b>

Established Cable Circuit:-

Parameters	Total
Line length (ckt km)	33 KV 24409 CKT.KM 11 KV 130039 CKT.KM LT 224723 KM
Length of Aerial Bunched Cables	39659 KM
Length of Underground Cables	757 KM
<b>HT/LT Ratio</b>	<b>0.455</b>



### 3.4 Energy Conservation measures already taken

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

1. Maintained the accuracy on the billing data through Photo spot billing in around 50 Lacs LT Consumers (except agriculture and temporary connection)
2. System improvement & automation.
3. 100% AMR in 11 KV Feeder
4. Targeted Work for Distribution loss reduction under RDSS Scheme
5. Increases HT Lines Feeders.
6. Shifting of consumer meters outside the premise for improved meter reading and protection from malfunction.
7. Agricultural Feeder segregation and solarisation.
8. SCADA Implementation for monitoring.
9. Installation and replacing of conventional/non star rated transformer into level 1 energy efficient transformers.
10. Replacement of all conventional mechanical energy meters with static digital energy meters having less power consumption and more accuracy.
11. Laying of AB cable in theft prone area where loss is in higher side.
12. Increase in HT/LT Ratio.
13. Strengthening of energy accounting infrastructure-100% consumer metering

### 3.5 Energy Conservation measures proposed for future.

1. Installation of energy level -1 distribution transformers for reduction transformer losses.
2. To rectify the issue of modems in 11 Kv feeders and calculate the consumption 100% through AMR in automation mode without any manual intervention.
3. Phase wise and category wise conversion of conventional metering of consumers into prepaid smart metering with the help of ESCOs , so that the energy accounting will get shifted in automation mode rather that manual method.
4. To ensure non manual intervention to maintain the accuracy of 33 KV level input energy received from CSPTCL. It is under process of installation of modem on 33KV feeder meters.
5. The AMR meter installed in LT consumers i.e 50 HP & above and 15-50 HP the readability is very poor and around 40% meters billed on the basis of MRI data. It is required to maintained and improve readability in existing AMR as well as complete AMR metering in 15-50 HP category.

## 4. Energy Flow Analysis

### 4.1 Energy flow across 5 service level

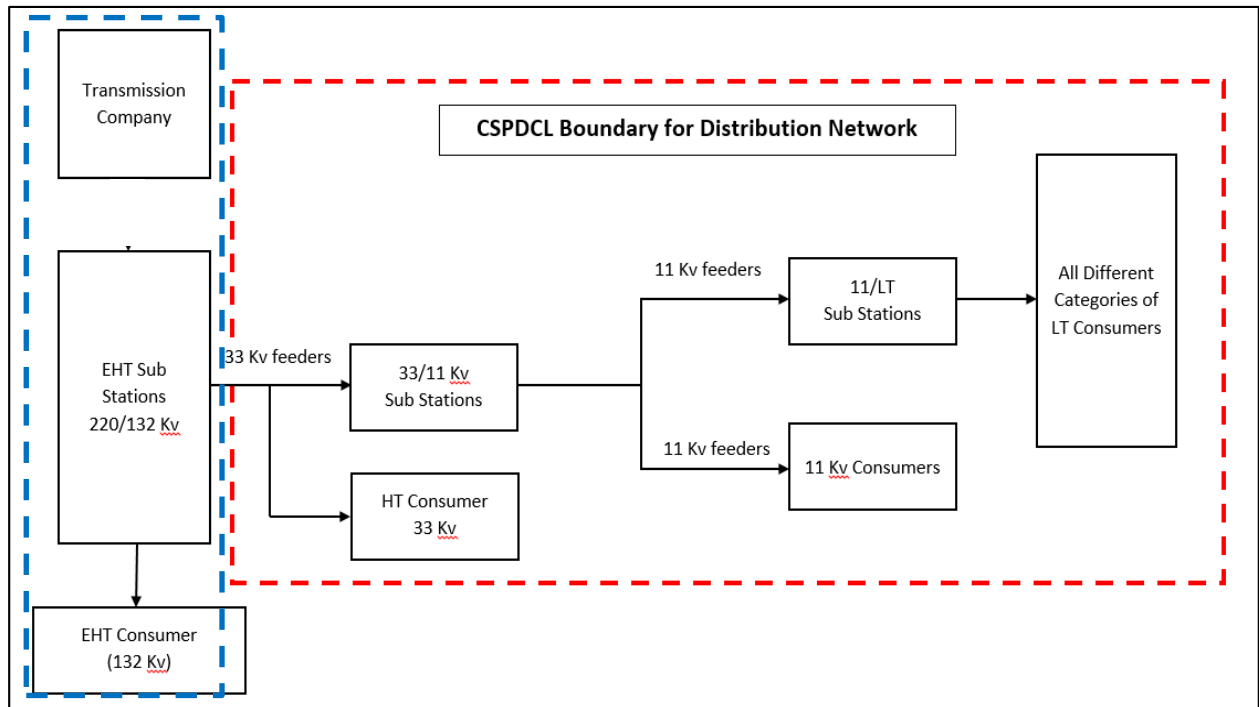
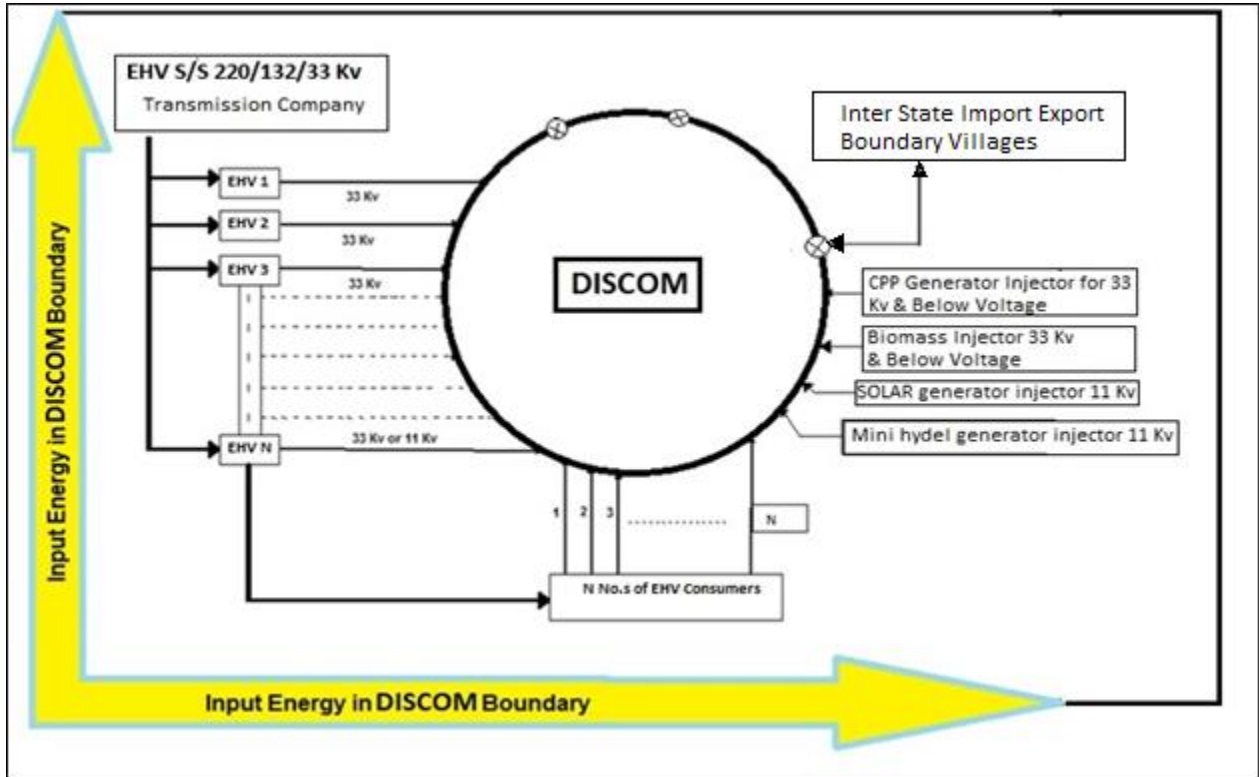
Metering is an inevitable part of the Power Distribution network for evaluating the energy injected and transferred to end consumers. Meter readings are the only way to evaluate the accurate energy balance of the system. Faulty meters, Nonworking meters mislead the losses statement. To evaluate the metering system of the CSPDCL, auditors have physically visited the some sample grid and inspected the meter working conditions.

CSPDCL is a distribution entity bifurcated from CSEB and do not have any generating unit. Earlier CSEB had its own generation unit, transmission unit and distribution unit. At present CSPDCL purchases energy from generating company (CSPGCL), central sector (as per allocation), generators (CPP-IPP, Biomass & solar) to fulfil the energy requirement of state. Being a surplus power state, CSPDCL trade/sale energy outside the state. CSPDCL is meeting its energy requirement without any load shedding in State. The peak demand during 2022-23 was 5444 .MW during march 2023.

CSPDCL, receives energy at 33 KV Level from all 33 KV Feeders emanating from EHV substations of transmission company (CSPTCL). All 33 KV feeders are metered with 0.2 class ABT meters. At present no AMR installed by Transmission Company. Hence energy consumption recorded is based on MRI performed on regular mandated intervals. The net input of CSPDCL presently maintained in Excel. CSPDCL is in process of system generated energy accounting and expected to be complete by Dec-2023. The input computation for year 2022-23 is detailed below: -

Power Purchase (in MU)	Outside sale / energy trading (in MU)	Transmission Loss (in MU)	Net Input at DISCOM periphery (in MU)
39326	3379	1240	34706

### 4.1.1 Energy Flow of CSPDCL



## 4.2 Validation of Metered Data

The voltage wise metering is tabulated below. The sample meters at each voltage level has been verified by auditor team.

Parameters	33kV	11kV
Number of metered feeders	875	5392
Number of feeders with communicable meters	0	4700
Number of unmetered feeders	0	0
<b>Number of total feeders</b>	875	5392

It has been observed by accredited auditor that CSPDCL has incomplete metering in 33KV incoming points of distribution substations (at 33 /11 KV substations). Due to incomplete metering at receiving point of 33 Kv incoming feeders, the input at 33 Kv voltage level could not be estimated / measured accurately. In infrastructure sheet the 33 kv voltage level input has been calculated on prorata basis of dedicated 33 Kv feeder loss. 33 KV feeder wise losses only maintained at dedicated 33 KV feeders.

Around 92% communicating 11KV feeders are there in CSPDCL. Loss calculation of around 60% feeders are being maintained by CSPDCL through AMR i.e. automated mode without any manual intervention on SAP portal. During the visit by auditor team the meter installed at 11 Kv feeders found properly monitored on regular basis by dedicated AMR cell of CSPDCL. However, readability on 11 Kv feeders are around 60 to 70 %. Rest 30 % meters are read through MRI data

CSPDCL has integrated 100% feeders (urban + rural) in NPP Portal. CSPDCL is achieving its target of SAIFI and SAIDI wrt RDSS target of 2022-23.

Particular	Target	Achievement
Hour of supply URBAN	23.50	23.82
Hour of supply RURAL	23.15	23.25
SAIFI URBAN	70	127
SAIFI RURAL	300	227



## **Annual Energy Audit of CSPDCL Raipur FY 2022-23**

The loss at 11kV feeder is calculated by subtracting billed energy from the energy consumption of 11kV feeders. Sometimes boundary meters are not functioning properly and hence the assessment is carried out at division level.

### 4.3 VALIDATION OF ENERGY FLOW DATA AND LOSSES

The input of CSPDCL has been accounted through metered data of all 875 number 33 Kv feeders radiating from EHV substations of CSPTCL these feeders are non-communicable hence periodic reading is being done through MRI.

Sample meters of EHV substations has been verified and attached in Annexures.

For cross verification input verified from power purchase data as mentioned in table, some minor data gap has been observed by the team which can be due to manual record keeping of data .It has been suggested to CSPDCL to maintain energy accounting in system generated mode.

For division wise distribution loss calculation follows the difference between Total Input energy arrived by summing all the 33 KV feeder's consumption energy for a particular division and the total billed energy of consumers of that division is the loss for that Division.

Net Input Energy for the Particular Division = Sum of all the energy received from 33 KV feeders and generators + energy imported from other division – exported energy to other division

Distribution Loss of Division = Net Input Energy of the Particular Division – Billed Energy for that respective division.

## 5. LOSS AND SUBSIDY COMPUTATION

## 5.1 Energy accounts for previous years (Discussion and data in tabular format).

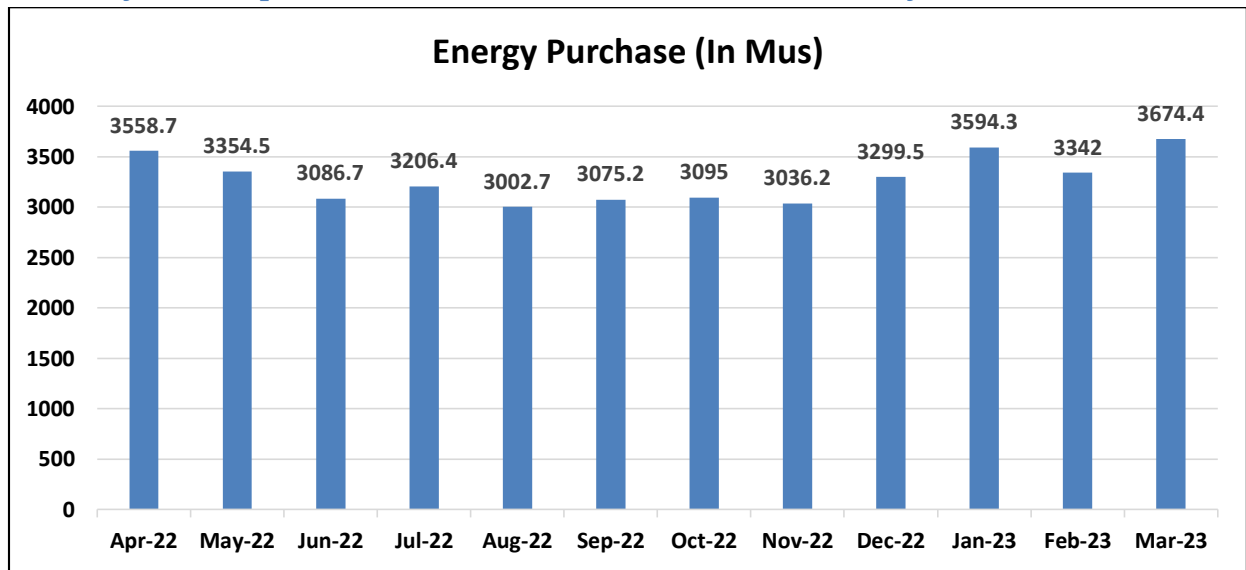
Form-Input energy (Details of Input Energy & Infrastructure) FY 21-22		
Sr. No	Parameters	Value
1	Input Energy purchased (Million Unit (MU))	37950.8
2	Transmission loss (%)	3.30
3	Transmission loss (MU)	1255.08
4	Energy sold outside the periphery (MU)	5962.80
5	Open access sale (MU)	0
6	EHT sale	3791.72
7	Net input energy (received at DISCOM periphery) (MU)	30732.64
8	Billed Energy	25258.1
9	% of T&D Loss	18

Financial Year (2021-22)						
Consumer profile	Energy parameters				Losses	
Consumer category	Input energy (MU)	Billed energy (MU)			T&D loss (MU)	T&D loss (%)
		Metered energy	Unmetered/assessment energy	Total energy		
Residential	30732.64	535.48	5733.42	6268.91	5474.52	18%
Agricultural		3503.59	2460.87	5964.47		
Commercial/Industrial-LT		31.064	1707.87	1738.94		
Commercial/Industrial-HT		10812.04	0	10812.04		
Others		44.00	429.73	473.73		
<b>Total</b>	<b>30732.6</b>	<b>14926.2</b>	<b>10331.91</b>	<b>25258.1</b>	<b>5474.52</b>	<b>18%</b>

**5.2 (A) Energy accounts and performance in the current year (% losses –aggregate, voltage-wise and category-wise, division-wise, feeder and DT wise)**

At present CSPDCL purchases energy from generating company (CSPGCL), central sector (as per allocation), generators (CPP-IPP, Biomass & solar) to fulfil the energy requirement of entire state. Being a surplus power state form last 08 years, CSPDCL trade/sale energy outside the state. CSPDCL is meeting its energy requirement without any load shedding in State.

**Monthly Power purchase details of CSPDCL for Financial year 2022-23.**



**Entity Wise power Purchase Details for FY 2022-23 verified from Feeder Input Data.**

S.No.	Particulars	Total FY 2022-23	
		Unit (MU)	Amount (Cr.)
1	State Generating Station (CSPGCL)	16483.62	5823.31
i	CSPGCL- Thermal	16209.72	5739.38
ii	CSPGCL- Renewables & Hydro	273.90	83.93
2	Obligatory Power (Concessional power)	2351.96	435.92
3	Central Generating Station(i+ii+iii+iv+v+vi+vii)	15928.93	6994.07
i	NTPC (National Thermal Power Corporation Limited)	14558.66	6438.26

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ii	NPCIL (Nuclear Power Corporation of India Limited)	362.68	123.34
iii	NSPCL (NTPC-SAIL Power Company Limited)	318.80	144.12
iv	OHPCL (Odisha Hydro Power Corporation Ltd.)	16.44	3.00
v	NHPCL (National Hydroelectric Power Corporation of India Limited)	432.94	181.70
vi	NEEPCO (North Eastern Electric Power Corporation Limited)	62.34	24.94
vii	NVVNL Bundled Thermal Power (25 MW)	177.06	78.71
4	Short Term (i+ii)	479.25	424.10
i	Short Term (DEEP Portal)	0.00	0.00
ii	IEX (Purchase)	479.25	424.10
5	Renewable Sources (i+ii+iii+iv+v+vi)	2805.10	1471.86
i	Biomass Power	815.35	578.80
ii	Solar Power (Private Generators)	329.43	174.55
iii	Small Hydel Power (Private Generators)	117.44	62.49
iv	M/s Madhya Bharat Power Corporation Ltd., Sikkim (Hydel Power) (Rongnichu) (113 MW HPO)	393.20	290.99
v	Solar Energy Corporation of India (70MW)	125.83	69.21
vi	NVVNL Bundel Solar Power (25 MW)	30.89	33.11
vii	Solar Energy Corporation of India (250 MW) (M/s MRPL)	617.53	159.85
viii	Solar Energy Corporation of India (Hybride power 400 MW) Solar Power	293.64	80.46
xi	Solar Energy Corporation of India (Hybrid power 400 MW) Wind Power	81.81	22.41
6	Unscheduled Power	31.29	4.19
7	Border Village	1.74	1.52
8	UI Inter-state(over Drawl)	250.02	202.72
9	UI intra-state(over Drawl)	52.06	35.53
10	UI (CSPGCL)(over Drawl)	256.61	130.58
11	UI (Open Access)(over Drawl)	11.29	3.80
12	Banking import	673.62	0.00
A	Total Power Purchase (1+2+3+4+5+6+7+8+9+10+11+12)	39325.49	15527.60



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<b>Calculation of Net Input Energy for FY 2022-23</b>		
Sr. No	Parameters	Value
<b>1</b>	Input Energy purchased (Million Unit (MU))	39325.49
<b>2</b>	Transmission loss (%)	3.15%
<b>3</b>	Transmission loss (STU+CTU) (MU)	1240
<b>4</b>	Energy sold outside the periphery (MU)	3379.06
<b>5</b>	Open access sale (MU)	0
<b>7</b>	<b>Net input energy (received at DISCOM periphery) (MU)</b>	<b>34706.44</b>

Name	Financial Year (2022-23)						
	Energy parameters					Losses	
	Consumer category	Input energy (MU)	Billed energy (MU)			T&D loss (MU)	T&D loss (%)
			Metered energy	Unmetered/assessment energy	Total energy		
CSPDCL	Residential	34706.44	5550.74	766.40	6317.14	5601.592	16.14%
	Agricultural		3947.63	2880.21	6827.84		
	Commercial/Industrial-LT		1953.74	41.10	1994.84		
	Others		632.27	64.33	696.60		
	Commercial/Industrial-HT		13268.37	0.00	13268.37		
	Total	34706.44	<b>25352.75</b>	<b>3752.04</b>	<b>29104.79</b>	5601.592	16.14%

The Input extracted from power purchase i.e. excluding of energy traded and transmission losses (CTU +STU ) has been verified from entity wise power purchase and feeder wise metered input data based on quarterly reporting's.

## % AT&amp;C losses –aggregate, voltage-wise and category-wise, division-wise, feeder

S.No	Name of circle	Period From Apr_22 To Mar_23									
		Consumer profile			Energy parameters		T&D loss (%)	Commercial Parameter			AT & C loss (%)
		Consumer category	Total Number of connections (Nos)	Total Connected Load (MW)	Input energy (MU)	Total energy		Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	
1	Raipur City 1	Residential	241453	600.7032	1359.781	742.38	8%	466.85	467.27	100.09%	
		Agricultural	766	2.287		4.95		3.22	3.21	99.82%	
		Commercial/Industrial-LT	52249	255.2501		251.30		274.58	275.02	100.16%	
		Commercial/Industrial-HT	324	81		232.55		254.02	220.18	0.00%	
		Others	2148	15.204		20.48		16.29	18.47	113.36%	
<b>Sub-total</b>			<b>296940</b>	<b>954.4443</b>	<b>1359.78</b>	<b>1251.6</b>	<b>8%</b>	<b>1014.96</b>	<b>984.15</b>	<b>96.96%</b>	<b>11%</b>
2	Raipur City 2	Residential	106067	176.73433	6379.968	252.86	3%	146.44	146.09	99.76%	
		Agricultural	930	2.746		4.04		3.85	3.86	100.43%	
		Commercial/Industrial-LT	20010	167.47463		174.16		160.42	160.68	100.16%	
		Commercial/Industrial-HT	621	966		5745.13		3648.07	3669.33	0.00%	
		Others	1329	6.292		8.74		7.88	7.42	94.19%	
<b>Sub-total</b>			<b>128957</b>	<b>1319.24</b>	<b>6379.96</b>	<b>6184.9</b>	<b>3%</b>	<b>3966.65</b>	<b>3987.38</b>	<b>100.52%</b>	<b>3%</b>
3	Raipur O&M	Residential	398586	290.68782	2673.585	530.65	11%	288.58	287.29	99.55%	
		Agricultural	75166	183.553		679.40		348.07	348.08	100.00%	
		Commercial/Industrial-LT	43925	176.3213		181.55		175.81	175.93	100.07%	
		Commercial/Industrial-HT	615	260		940.30		739.00	735.72	99.56%	
		Others	4105	23		46.90		48.53	108.78	224.17%	
<b>Sub-total</b>			<b>522397</b>	<b>933.56212</b>	<b>2673.58</b>	<b>2378.7</b>	<b>11%</b>	<b>1599.991</b>	<b>1655.81</b>	<b>103.49%</b>	<b>8%</b>
4		Residential	220690	110.2857	1522.606	257.96	26%	145.50	147.55	101.41%	

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	Baloda Bazzar	Agricultural	35074	86.017		314.67		143.82	143.36	99.68%	
		Commercial/Industrial-LT	17179	89.48664		106.70		94.90	97.34	102.57%	
		Commercial/Industrial-HT	87	124		425.27		361.56	359.61	99.46%	
		Others	2280	7		27.51		29.96	40.92	136.57%	
<b>Sub-total</b>			<b>275310</b>	<b>416.78934</b>	<b>1522.60</b>	<b>1132.1</b>	<b>26%</b>	<b>775.744</b>	788.78	<b>101.68%</b>	<b>24%</b>
5	Mahasmand	Residential	286295	108.54226	2083.281	260.87	27%	154.87	123.94	80.03%	
		Agricultural	75946	167.897		1051.89		429.68	425.93	99.13%	
		Commercial/Industrial-LT	18292	73.61368		75.33		74.04	75.42	101.87%	
		Commercial/Industrial-HT	107	38		109.02		90.63	88.71	97.88%	
		Others	4125	9		30.16		47.04	81.85	174.01%	
<b>Sub-total</b>			<b>384765</b>	<b>397.05294</b>	<b>2083.28</b>	<b>1527.2</b>	<b>27%</b>	<b>796.26</b>	795.85	<b>99.95%</b>	<b>27%</b>
6	Durg City	Residential	220399	443.04397	1918.474	510.77	11%	300.44	300.27	99.95%	
		Agricultural	1807	4.341		8.95		5.88	5.90	100.37%	
		Commercial/Industrial-LT	34675	153.98179		137.93		141.10	141.20	100.07%	
		Commercial/Industrial-HT	262	290		1023.83		924.97	891.89	96.42%	
		Others	1600	12		18.80		18.77	17.62	93.88%	
<b>Sub-total</b>			<b>258743</b>	<b>903.36676</b>	<b>1918.47</b>	<b>1700.2</b>	<b>11%</b>	<b>1391.16</b>	1356.89	<b>97.54%</b>	<b>14%</b>
7	Durg O&M	Residential	487907	264.11873	2811.936	507.82	17%	273.62	269.35	98.44%	
		Agricultural	123396	355.938		1036.88		576.66	580.56	100.68%	
		Commercial/Industrial-LT	43060	156.79397		150.63		149.03	151.27	101.50%	
		Commercial/Industrial-HT	304	146		599.67		491.06	487.32	99.24%	
		Others	6956	20		50.44		49.22	102.36	207.98%	
<b>Sub-total</b>			<b>661623</b>	<b>942.8507</b>	<b>2811.93</b>	<b>2345.4</b>	<b>17%</b>	<b>1539.58</b>	1590.87	<b>103.33%</b>	<b>14%</b>
8	Rajnandgaon	Residential	331091	184.807	1605.855	358.19	13%	195.58	194.09	99.24%	
		Agricultural	68367	155.006		475.32		265.17	265.52	100.13%	
		Commercial/Industrial-LT	30990	110.369		100.47		100.08	99.50	99.42%	
		Commercial/Industrial-HT	219	117		432.00		333.22	328.76	98.66%	
		Others	3131	12		29.88		30.59	69.61	227.54%	
<b>Sub-total</b>			<b>433798</b>	<b>579.182</b>	<b>1605.85</b>	<b>1395.8</b>	<b>13%</b>	<b>924.64</b>	957.48	<b>103.55%</b>	<b>10%</b>

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9	Kawardha	Residential	139992	47.176	748.9908	130.39	21%	72.08	67.65	93.86%	
		Agricultural	36323	91.783		398.74		176.93	178.69	100.99%	
		Commercial/Industrial-LT	9971	53.04		44.80		44.37	44.39	100.06%	
		Commercial/Industrial-HT	22	6		7.26		8.36	8.17	97.70%	
		Others	1144	4		9.20		6.74	16.30	241.84%	
<b>Sub-total</b>			<b>187452</b>	<b>201.999</b>	<b>748.99</b>	<b>590.39</b>	<b>21%</b>	<b>308.48</b>	315.20	<b>102.18%</b>	<b>19%</b>
10	Jagdalpur	Residential	357875	133.65934	1086.489	249.88	12%	137.76	133.97	97.25%	
		Agricultural	11555	29.835		94.28		53.85	53.36	99.08%	
		Commercial/Industrial-LT	19882	81.51347		85.59		89.08	89.10	100.01%	
		Commercial/Industrial-HT	116	179		511.94		556.79	448.51	80.55%	
		Others	1631	8		19.50		18.86	20.67	109.58%	
<b>Sub-total</b>			<b>391059</b>	<b>432.00781</b>	<b>1086.48</b>	<b>961.19</b>	<b>12%</b>	<b>856.34</b>	745.61	<b>87.07%</b>	<b>23%</b>
11	Kanker	Residential	306265	128.96813	979.9946	224.44	16%	121.93	119.15	97.72%	
		Agricultural	51140	119.846		517.22		277.04	276.36	99.75%	
		Commercial/Industrial-LT	19221	66.09812		61.64		61.97	60.06	96.92%	
		Commercial/Industrial-HT	32	7		11.38		12.32	10.56	85.69%	
		Others	1332	6		12.45		13.36	18.61	139.28%	
<b>Sub-total</b>			<b>377990</b>	<b>327.91225</b>	<b>979.99</b>	<b>827.13</b>	<b>16%</b>	<b>486.62</b>	484.74	<b>99.61%</b>	<b>16%</b>
12	Bilaspur city	Residential	115462	215.61473	720.3545	300.94	12%	183.38	182.55	99.54%	
		Agricultural	1120	3.05		10.25		5.04	4.99	99.00%	
		Commercial/Industrial-LT	22487	94.05778		98.03		102.03	101.15	99.13%	
		Commercial/Industrial-HT	129	48		171.40		149.42	146.19	97.84%	
		Others	1081	8.17		49.99		42.04	12.19	28.99%	
<b>Sub-total</b>			<b>140279</b>	<b>368.89251</b>	<b>720.35</b>	<b>630.61</b>	<b>12%</b>	<b>481.92</b>	348.96	<b>72.41%</b>	<b>37%</b>
13	Bilaspur	Residential	370605	188.6824	2399.744	439.55	21%	257.81	228.59	88.67%	
		Agricultural	51627	140.89		718.19		294.31	286.56	97.37%	
		Commercial/Industrial-LT	25760	106.20105		113.24		111.11	110.00	99.01%	
		Commercial/Industrial-HT	185	124		462.69		339.78	337.49	99.33%	
		Others	3158	10		165.09		109.18	151.83	139.07%	

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<b>Sub-total</b>			<b>451335</b>	<b>569.77345</b>	<b>2399.74</b>	<b>1898.7</b>	<b>21%</b>	<b>1112.18</b>	1114.48	<b>100.21%</b>	<b>21%</b>
14	Korba	Residential	192406	134.18991	1264.048	268.96	24%	161.22	145.27	90.10%	
		Agricultural	8056	16.754		55.28		32.77	32.70	99.80%	
		Commercial/Industrial-LT	14804	69.67287		67.14		68.79	73.79	107.27%	
		Commercial/Industrial-HT	77	121		539.77		593.03	589.31	99.37%	
		Others	3141	6		30.06		25.77	39.25	152.32%	
<b>Sub-total</b>			<b>218484</b>	<b>347.61</b>	<b>1264.04</b>	<b>961.21</b>	<b>24%</b>	<b>881.58</b>	880.32	<b>99.86%</b>	<b>24%</b>
15	Raigarh	Residential	240457	188.7652	2852.467	301.53	18%	183.37	179.50	97.89%	
		Agricultural	49258	165.301		639.90		283.21	283.78	100.20%	
		Commercial/Industrial-LT	20017	101.18227		94.74		96.76	97.64	100.91%	
		Commercial/Industrial-HT	198	283		1232.77		841.14	784.31	93.24%	
		Others	6806	17		64.41		67.11	129.42	192.85%	
<b>Sub-total</b>			<b>316736</b>	<b>755.24</b>	<b>2852.46</b>	<b>2333.3</b>	<b>18%</b>	<b>1471.59</b>	1474.65	<b>100.21%</b>	<b>18%</b>
16	Janjgir	Residential	282238	184.482	1693.694	345.09	24%	208.23	205.16	98.52%	
		Agricultural	35976	94.641		364.24		180.20	179.89	99.82%	
		Commercial/Industrial-LT	22392	99.377		105.60		100.72	102.46	101.73%	
		Commercial/Industrial-HT	98	100		372.30		273.50	338.53	123.78%	
		Others	3530	8		94.06		79.00	74.06	93.75%	
<b>Sub-total</b>			<b>344234</b>	<b>486.5</b>	<b>1693.69</b>	<b>1281.2</b>	<b>24%</b>	<b>841.66</b>	900.09	<b>106.94%</b>	<b>19%</b>
17	Ambikapur	Residential	452140	161.30582	1420.748	439.45	37%	263.54	220.83	83.79%	
		Agricultural	36594	73.822		284.85		148.81	147.77	99.30%	
		Commercial/Industrial-LT	23239	114.07112		100.73		102.40	104.80	102.35%	
		Commercial/Industrial-HT	94	27		58.07		70.28	63.69	90.63%	
		Others	942	5.039		10.38		12.75	15.39	120.69%	
<b>Sub-total</b>			<b>513009</b>	<b>381.23</b>	<b>1420.74</b>	<b>893.48</b>	<b>37%</b>	<b>597.78</b>	552.49	<b>92.42%</b>	<b>42%</b>
18	Baikunthpur	Residential	212582	75.10658	1184.363	195.41	32%	112.88	89.42	79.22%	
		Agricultural	23407	49.491		168.78		91.28	89.72	98.30%	
		Commercial/Industrial-LT	13647	50.22053		45.27		47.41	46.82	98.75%	
		Commercial/Industrial-HT	109	118		393.03		436.44	413.96	94.85%	
		Others	567	3		8.54		6.11	5.31	86.92%	
<b>Sub-total</b>			<b>250312</b>	<b>295.81</b>	<b>1184.36</b>	<b>811.03</b>	<b>32%</b>	<b>694.13</b>	645.24	<b>92.96%</b>	<b>36%</b>

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19	sub sidy	Residential	0	0	0	0	0%		108.74	0.00%	
		Agricultural	0	0		0			-8.83	0.00%	
		Commercial/Industrial-LT	0	0		0			0.00	0.00%	
		Commercial/Industrial-HT	0	0		0			17.33	0.00%	
		Others	0	0		0			0.00	0.00%	
<b>Sub-total</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0%</b>	<b>0</b>	117.24	<b>0.00%</b>	<b>100%</b>
76	Total	Residential	4962510	3636.87312	34706.38	6317.14	16.14 %	3674.08	3616.68	98.44%	
		Agricultural	686508	1743.198		6827.84		3319.78	3301.42	99.45%	
		Commercial/Industrial-LT	451800	2018.72532		1994.84		1994.59	2006.55	100.60%	
		Commercial/Industrial-HT	3599	3035		13268.3 7		10123.60	9939.60	98.18%	
		Others	49006	179.705		696.60		629.20	930.07	147.82%	
77	<b>At company level</b>		<b>6153423</b>	<b>10613.50</b>	<b>34706.38</b>	<b>29104. 7</b>	<b>16%</b>	<b>19741.25</b>	<b>19794.3</b>	<b>100.27%</b>	<b>15.91</b>

## 5.2 (B) Identified High Loss Circle

Sl. No.	NAME OF CIRCLE	Distribution Loss During FY 2022-23 in
1	RAIPUR CITY CIRCLE - II	3%
2	RAIPUR CITY CIRCLE - I	8%
3	RAIPUR CIRCLE	11%
4	DURG CITY CIRCLE	11%
5	JAGDALPUR CIRCLE	12%
6	BILASPUR CITY CIRCLE	12%
7	RAJNANDGAON CIRCLE	13%
8	KANKER CIRCLE	16%
9	DURG CIRCLE	17%
10	RAIGARH CIRCLE	18%
11	KAWARDHA CIRCLE	21%
12	BILASPUR CIRCLE	21%
13	KORBA CIRCLE	24%
14	JANJGIR CIRCLE	24%
15	B-BAZAR CIRCLE	26%
16	MAHASAMUND CIRCLE	27%
17	BAIKUNTHPUR CIRCLE	32%
18	AMBIKAPUR CIRCLE	37%

Observation: -

CSPDCL has been given target of 15.72 % for PAT-VII for year 2022-23 to 2024-25. Circles who are above the target has been identified as high loss circles in CSPDCL. The action plan / recommendation for reducing the distribution loss so as to achieve at PAT-VII target has given separately.

It is observed that eight circles have maintained their losses below 16% during the FY 2022-23 where as six circles are in the range of 16% to 25% loss and remaining four circles are having highest losses above 25% to 37 %. CSPDCL has to provide special action plan / target to respective circles for losses reductions.



## 5.2 (C) Identified High Loss Feeders

Scheme	Total No. of 11 kV Feeder	Metering Status (METERED)	Metering Status (UNMETERED)	DLMS METER	Non DLMS METER	Modem Installed	Modem Not Installed	Modem Communication as per MAR 2023
RAPDRP	926	926	0	924	2	925	1	850
IPDS	441	441	0	441	0	433	8	354
Other	4025	4025	0	4024	1	3342	683	2380
<b>Total</b>	<b>5392</b>	<b>5392</b>	<b>0</b>	<b>5389</b>	<b>3</b>	<b>4700</b>	<b>692</b>	<b>3584</b>

CSPDCL informed that they have completed 100% metering of the 11KV feeder and accordingly submitted the received energy at the 11kV feeders where they have installed the meter. Further, CSPDCL has also informed that the consumers are not properly mapped or indexed to each 11KV/33KV feeder. Hence T&D loss and AT&C losses (feeder wise) could not be computed properly. Target for completing consumer indexing has been given to the field offices.

## 5.2 (D) Overload segment / infrastructure.

During preparation of annual report, it was informed by CSPDCL that over load 33 Kv feeders / 11 kv feeders are monitored by circle / division offices however no records are available or maintained for over load feeders in field offices. Manual log books are maintained in substations.

It has been recommended to CSPDCL to make system for overloaded feeders recording and proper planning to manage with system improvement & capacity addition in infrastructure.

### **5.3 SUBSIDY COMPUTATION**

#### **SUBSIDY ON FREE SUPPLY TO AGRICULTURE CONSUMERS**

State Govt. has launched Krishak Jeevan Jyoti Yojana in the state from 02.10.2009 to provide financial relief to the consumers / agriculture consumers of the state. As per the provisions of this scheme, the agriculture consumers up to 3 HP are entitled for exemption of 6000 units per annum per pump whereas the agriculture consumers above 3 HP and up to 5 HP are entitled for exemption of 7500 units per annum per pump. This facility has been extended to the farmers having temporary pump connection also. Pump consumers can also choose flat rate in place of above where they will be required to pay @ Rs 100 per HP per month.

#### **SUBSIDY ON FREE SUPPLY TO BPL CONNECTION**

Govt. of Chhattisgarh is making reimbursement for electricity consumed up to 30 units per month to all single light point (BPL) connections in the state.

#### **50% REBATE TO DOMESTIC CONNECTION**

Govt. of Chhattisgarh has launched a new scheme named “Half bijali bill scheme” with effect from 01 march 2019 to all domestic connections in the state. In this scheme 50% rebate on all domestic connections upto 400 units consumption in each month.

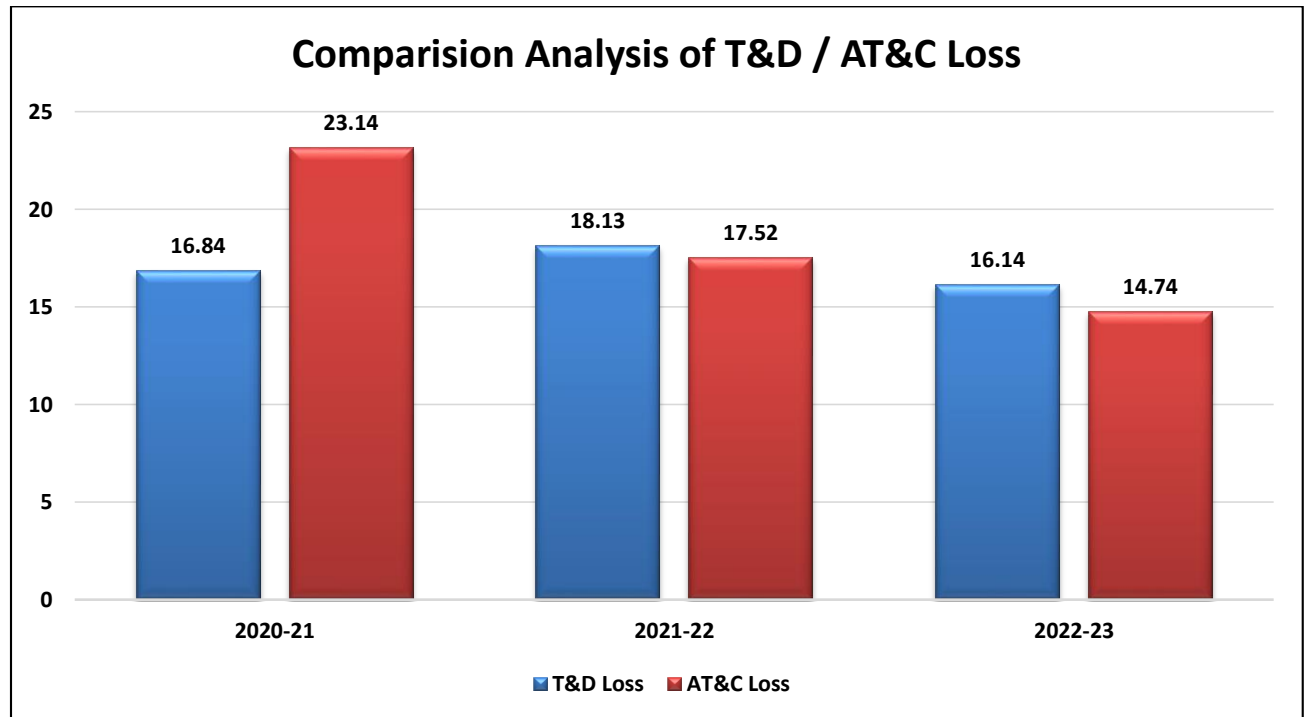
During year 2022-23 the details of subsidy claim and received from State Govt. against free supply to free supply to agriculture consumers, BPL consumers and 50% rebate of domestic consumers and steel industries are here under: -

<b>Particulars</b>	<b>Subsidy Claim in Rs. Crore</b>	<b>Subsidy received in rs. Crore</b>
Agriculture	3262.25	3253.42
BPL	536.79	534.63
50% Rebate of domestic consumers	1004.58	1115.4
Steel Industries	191.33	208.66
<b>Total</b>	<b>4994.95</b>	<b>5112.19</b>

<b>Subsidy accounting for the year 2022-23</b>								
<b>S.no</b>	<b>Consumer Category</b>	<b>Per unit Subsidy declared by the State Government</b>	<b>Total energy forecasted for the category</b>	<b>Total advance subsidy amount raised to the State Govt.</b>	<b>Actual electricity supplied based on measurement through meters</b>	<b>Actual subsidy required from the State Govt.</b>	<b>Difference in advance and actual subsidy</b>	<b>Reconciled subsidy bill (Advance - Actual) bill raised to the State Govt.</b>
		<b>Rs./Kwh</b>	<b>Mus</b>	<b>Rs. Cr.</b>	<b>MUs</b>	<b>Rs. Cr.</b>	<b>Rs. Cr.</b>	<b>Rs. Cr.</b>
<b>(1)'</b>	<b>(2)'</b>	<b>(3)'</b>	<b>(4)'</b>	<b>(5)'</b>	<b>(6)'</b>	<b>(7)'</b>	<b>(8)'</b>	<b>(9)'</b>
1	<b>Agriculture</b>	6.13	4659.62	3253.20	5317.90	3261.10	-7.91	57.91
2	<b>Fisheries</b>	6.38	1.00	0.22	1.81	1.15	-0.93	0.93
3	<b>BPL</b>	6.66	1010.72	534.63	805.88	536.79	-2.16	2.16
4	<b>DLF</b>	5.15	2737.63	1115.46	1948.75	1004.45	111.01	-111.01
5	<b>Gauthan-IT Park</b>	7.36	0.77	0.02	0.18	0.13	-0.11	0.11
6	<b>Rolling Mill</b>	28.24	64.44	195.69	67.76	190.33	4.36	-4.36
	<b>Total</b>		<b>8474.19</b>	<b>5099.22</b>	<b>8142.27</b>	<b>4994.95</b>	<b>104.27</b>	<b>-104.27</b>

## 5.4 TREND ANALYSIS AND IDENTIFICATION OF KEY EXCEPTIONS

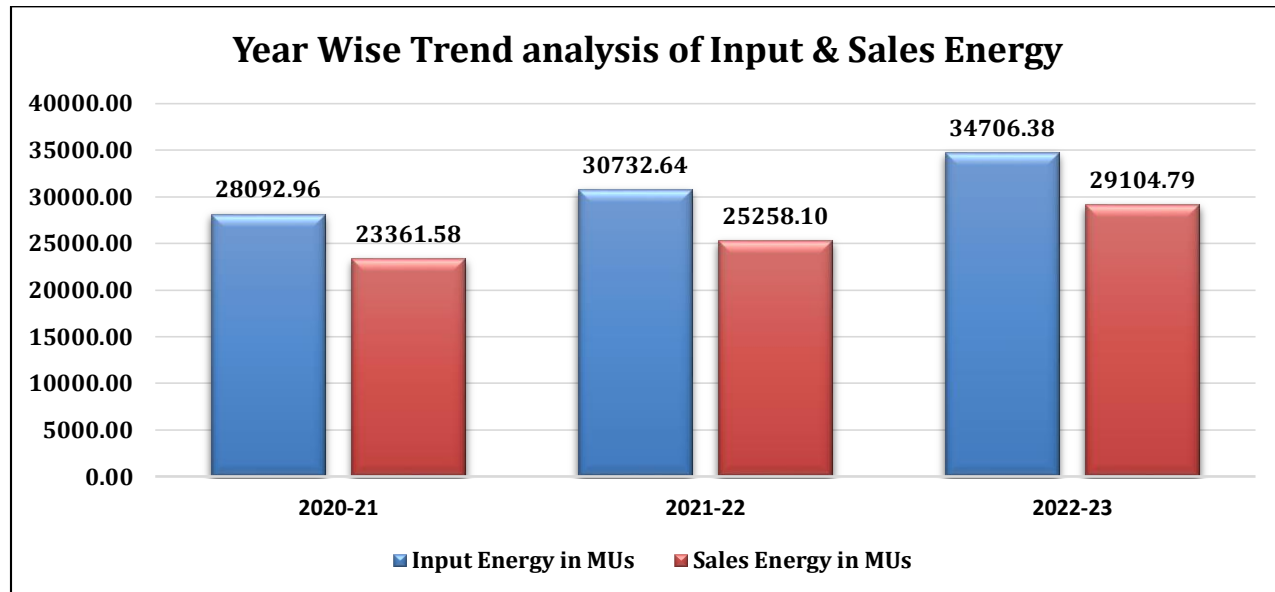
CSPDCL has been notified as designated consumer under PAT Cycle-II by Bureau of Energy Efficiency. CSPDCL has achieved distribution loss 16.60% during conclusion of PAT Cycle-II i.e year 2018-19. Distribution loss achieved was 1.88% higher than the target. On non-achievement of target, CSPDCL has to be purchase 35,511 no ESCerts in the ESCerts trading. Continuous efforts has been made by CSPDCL to reduce the distribution losses which is shown in the graph below:



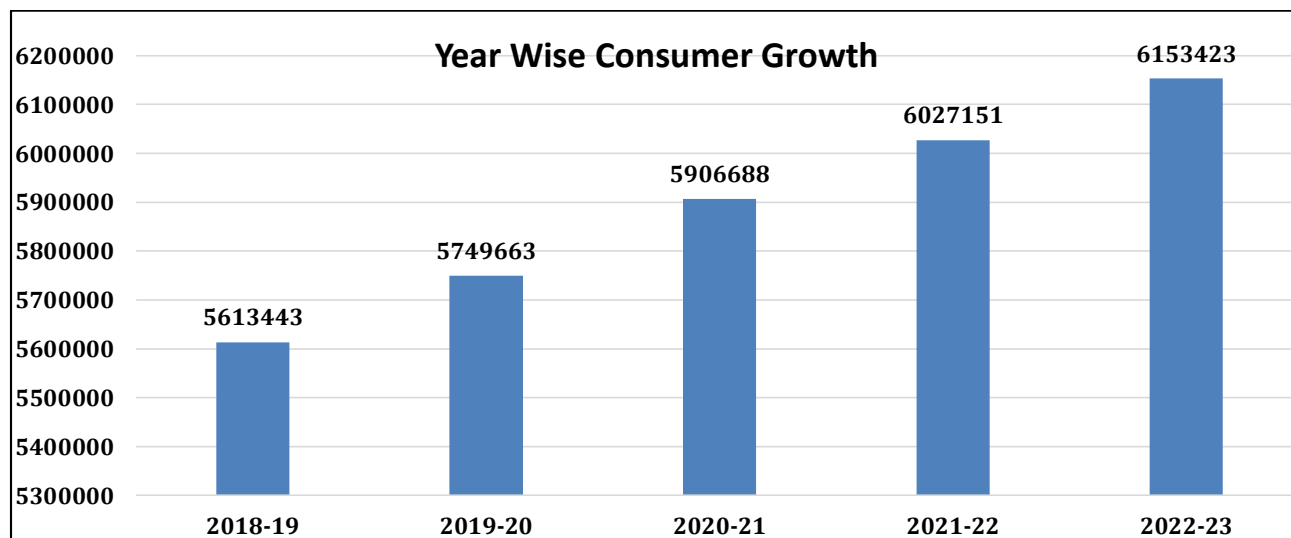
Comparison analysis of Loses		2020-21	2021-22	2022-23
2	T&D Loss	16.84	18.13	16.14
1	AT&C Loss	23.14	17.52	14.74

CSPDCL has reduced AT&C Losses from 23.14% to 14.74% from 2020-21 to 2022-23. CSPDCL has made remarkable efforts for improving collection efficiency and reducing Distribution loss.

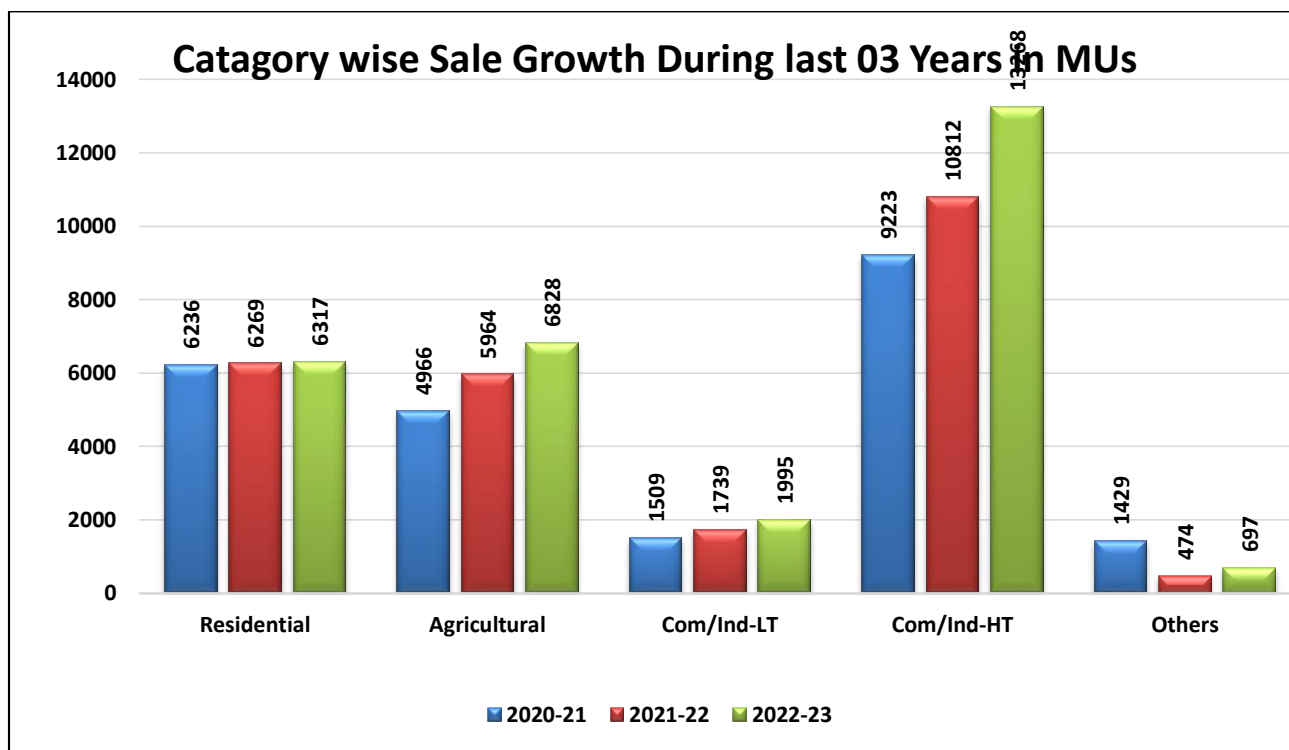
### Trend Analysis of Energy



Comparison analysis of Loses		2020-21	2021-22	Growth	2022-23	Growth
1	Input Energy in MUs	28092.96	30733	9.40%	34706	12.93%
2	Sales Energy in MUs	23361.58	25258	8.12%	29105	15.23%



Sr. No	Parameters	Consumer Profile		
		2020-21	2021-22	2022-23
1	Residential	4838288	4933638	4962510
2	Agricultural	462874	618498	686508
3	Commercial/Industrial-LT	394504	428982	451800
4	Commercial/Industrial-HT	3181	3356	3599
5	Others	207840	42677	49006
6	<b>Total</b>	<b>5906687</b>	<b>6027151</b>	<b>6153423</b>



Category Wise Sale (In Mus)		2020-21	2021-22	2022-23
1	Residential	6236	6269	6317
2	Agricultural	4966	5964	6828
3	Com/Ind-LT	1509	1739	1995
4	Com/Ind-HT	9223	10812	13268
5	Others	1429	474	697
6	<b>Total</b>	<b>23361.58</b>	<b>25258.1</b>	<b>29104.79</b>

## 6 ENERGY AUDIT FINIDINGS

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### 6.1 Capacity of DISCOM'S Energy Accounting and Audit Cell.

CSPDCL has formed energy accounting cell under compliance of BEE regulation of 2021 & modified order of Energy Accounting and Audit Cell is attached below.

The centralized accounting cell has adequate capacity of officers but they are not dedicatedly engaged in accounting & audit cell work. It is being suggested to CSPDCL that the designated officer shall engage dedicatedly in core activity of Energy Accounting so that effective result may appear.

The centralized accounting cell has initiated IT enable system for energy accounting in which infrastructure (all 33 kv feeders) has been mapped and its monthly consumption recording is being carried out. It is expected that at the end of December 2023 CSPDCL would finalize system based Energy Accounting without Manual Intervention under compliance of regulation 2021.

CSPDCL has suggested to request BEE that there is a requirement of central level energy accounting portal of each state, where entries of all states may be furnished by DCs. It will be a common authenticated platform for all DCs.



**CHHATTISGARH STATE POWER DISTRIBUTION COMPANY LTD**  
(A Government of Chhattisgarh Undertaking) (A Successor Company of CSEB)  
(CIN : U40106CT2003SGC015622)  
**O/o GENERAL MANAGER (H.R.),**  
Phone: 0771-2574925 Fax 0771-2574990 : email : [hr.cspdcl@cseb.gov.in](mailto:hr.cspdcl@cseb.gov.in) website: [www.cspdcl.co.in](http://www.cspdcl.co.in)

No. 02-11/BEE/ 24 Raipur; Dtd. = 4 JAN 2023

**ORDER**

In compliance to the provisions of Energy Conservation Act-2001 and BEE Regulation 2021, a Centralized Energy Accounting Cell under CE (Rev) CSPDCL Raipur is formed to establish IT enabled system to conduct Annual Energy Audit and Periodic Energy Accounting, without manual interference, of Chhattisgarh State Power Distribution Company Limited Raipur. This cell shall be responsible for monitoring losses, implementation of all scheme and all actions for reduction of Distribution Losses.

The cell is constituted as under :-

S. No.	Name of Officer	Designation	Role
1	Shri Avedan Kujur	ACE O/o CE (Rev)	Nodal Officer
2	Shri Rajkumar Rathore	DGM (F&A) O/o GM (Fin)	Financial Manager
3	Shri D.K. Marawi	EE (AMR Cell-2)	IT Manager
4	Smt. Archana Nagrale	EE O/o CE (Rev)	EE (Tech)
5	Shri Aashish Bafna	Outsourced	Energy Manager
6	Shri Hitesh Mahanand	AE ( AMR Cell-2)	Asst. Engineer (IT)
7	Smt. Nidhi Suryawanshi	AE O/o CE (Rev)	Asst. Engineer

(Approved by competent authority)

*(Signature)*  
4.1.23  
(N.L. Sahu)  
GENERAL MANAGER (H.R.)  
CSPDCL, Raipur  
Raipur; Dtd. = 4 JAN 2023

*(Signature)*  
(Mallika Beck)  
Dy. GENERAL MANAGER (HR)  
CSPDCL, Raipur

No. 02-11/BEE/ 25  
Copy To:  
1. The ED/CE/GM/(..... RA .....), CSPDCL RAIPUR  
2. The S.E(.....) Circle, CSPDCL,.....  
3. The DGM (CAU) /Sr. A.O.-I/II CSPDCL, Raipur.  
4. The Staff officer to Chairman/MD, CSPC/CSPDCL, Raipur.  
5. Shri/Smt. ....  
*max Reports*

## 6.2 Status and progress in compliance to prerequisite to energy accounting

S.N.	Compliance / Prerequisite	Status
1.	Submission of Energy Accounting report of Quarter -1 From April-2023 to June -2023	Complied
2.	Submission of Energy Accounting report of Quarter -2 From July-2023 to Sep -2023	Complied
3.	Submission of Energy Accounting report of Quarter -3 From Oct-2023 to Dec -2023	Complied
4.	Submission of Energy Accounting report of Quarter -4 From Jan-2023 to Mar -2023	Complied
5.	Feeder wise, circle wise periodic energy accounting shall be conducted by the energy manager of the electricity distribution company for each quarter of the financial Year	Complied
6	Identification and mapping of all of the electrical network assets	Complied
7	Identification and mapping of high tension and low-tension consumers	Complied
8	The development and implementation of information technology enabled energy accounting and audit system, including associated software	In process
9	The CSPDCL shall ensure the installation of functional meters for all consumers, transformers and feeders	In process
10	All distribution transformers (other than high voltage distribution system upto 25kVA and other Distribution system below 25 kVA) shall be metered with communicable meters. And existing non communicable distribution transformer meters shall be replaced with communicable meters and integrated with advanced metering infrastructure	Planned under RDSS
11	The electricity distribution company shall create a centralized energy accounting and audit cell	Complied

### Data Gaps: -

It is observed that the Transmission loss (STU+CTU) is around 1240 MUs and CSPDCL has produced data sheet STU losses.

### 6.3 Critical analysis by Energy Auditor.

The observations and critical comments with regards of the energy data is furnished as under.

Input verification: The input from transmission company energy should be considered as reference data. Every Division shall verify the reading of the meters installed on the input feeder. The Division wise / Circle wise input shall be matched with state input.

In Energy Accounting Summary of “Infrastructure Details” sheet of the Pro-forma HT input by reverse calculating the difference of total sale and HT sale and assuming 5-6% loss in the HT system, which is not the accurate approach. Since majority of the 33kV feeders are metered and all the 33kV consumers are supplied with meters and 100% outgoing 11KV feeders are being metered, therefore CSPDCL is in a position to capture the total input energy and energy sale at 33KV system. In view of the same it is recommended CSPDCL should take a corrective approach to capture 33kV and 11kV input energy and energy sale as per the metered data and should not consider the normative approach of 8% distribution loss in HT systems.

1. There are conventionally metered Distribution Transformers are reported in “Infrastructure Details” sheet of the Pro-forma, however during field audit and study it was found that the meter readings are not being taken and meters are not communicating as far as DTR metering is concerned. It is recommended that DTR metering should be made functional and meter reading should be taken on Regular basis.
2. During the field study it was observed that 33KV meters are installed at Grid Substation interface points and at each consumer point. However 33kV meters are not installed at the input point to the 33/11 kV substation. This metering should be covered.

3. During the field study it was also observed that installed 33KV meters are not AMR hence the reading is still MRI Based. However CSPDCL has planned feeder meters with AMR meters.
4. The energy generated from solar rooftops are metered and the meter readings are properly captured by CSPDCL
5. CSPDCL submitted that metering in DTR is 39% during 2022-23 with non-communicable meters. However, the installed meter in DT level, the data were not captured in regular interval due to lack of metering, billing personnel and majority of meters are also not working at DTR level. CSPDCL has also informed that the consumers are not properly mapped or indexed to each 11KV/33KV feeder. In view of the same CSPDCL couldn't submit proper "Details of Feeder Levels" sheet due to which feeder wise T&D loss and AT&C loss could not be computed precisely.

**The various loss reduction recommendations are furnished below.**

1. CSPDCL may be required to incentivise the Industrial Consumption by taking up better tariff rationalisation measures in future tariff hearing process, as increase in HT / EHT consumption will help in reducing the T&D loss and AT & C loss.
2. It is found that the 10% meters are defective which is very high in consumer categories like BPL, domestic, Agricultural, it is recommended to emphasize specially on for replacement of defective meters with correct one.
3. In the next tariff hearing process CSPDCL may propose to the Hon'ble Commission DBT based subsidy for these consumers in which the subsidy linked with the above category consumer can be transferred through Direct Benefit Transfer (DBT) Scheme based on the correct meter reading.
4. It is proposed that CSPDCL should promote Energy Efficient Lighting System (LED Bulbs, Tube lights and Energy Efficient Fans) in association with BEE / EESL / Private ESCO in its utility area. The availability of LED Bulbs, Tube Lights, BLDC Fans, IE3 Meters which are supposed to be distributed to consumers through BEE / EESL / Private ESCO as part of the Utility based Demand Side Management Program are not

available in plenty. CSPDCL may discuss with BEE / EESL / Private ESCO to open more outlets and increase the LED Lights, Super-Efficient AC and Fans Distribution.

5. Promoting the use of renewable energy (Solar) through facilitation: Hon'ble Commission has notified Net Metering Scheme for Solar Roof Top Project in the consumer premises. CSPDCL should popularize the scheme for LT consumers and provide prompt support and cooperation to the consumer for net metering agreement and solar project interconnection with DISCOM systems. Once Solar Interconnection happens at the LT systems, this will improve the voltage profile and reduce LT loss. Also the RPO of GRIDCO / DISCOM can be compiled which may reduce the BSP in future and will lead to financial savings for DISCOM.

6. At present Hon'ble CSERC has implemented kVAh billing for the HT/ EHT consumers. In view of the kVAh billing, the consumer which are having low power factor are paying higher energy bills, still the awareness about kVAh billing is not there and consumers are operating with low Power Factors. CSPDCL may carry out special drives for awareness and sensitisation about kVAh billing. This may lead to more numbers of APFC installation and improvement in Power Factor and will lower the burden on the existing infrastructure. CSPDCL may sign MoU with ESCO / AFPC installer under the Utility based Demand Side Management program so that APFC installer will assess the data base of Consumers with low power factor, take necessary action for installation of APFC Panels in consultation with Consumers directly.

7. Exploring opportunities in industrial segments (using efficient motors, pumps, compressors, capacitor bank, etc). CSPDCL can coordinate and inform BEE / EESL / Private ESCO to provide the Industrial LED lighting Solution, IE3 Motors in RESCO / PMC level as per the provision of DSM Regulations. This will facilitate Demand Side Management in a long way.

8. CSPDCL should conduct more nos. of Consumer awareness programs on saving electricity, electricity wastage, power theft, using electricity during off peak hour, using star rated equipment.



## 6.4 Recommendations

- In order to maintain the supply and requirement of practical difficulties changes in system network shall be updated in the consumer indexing 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. It provides healthiness of substation working.
- Communicable meters shall be installed in Distribution Transformer with proper record keeping of DT wise transformer losses so as to locate LT Loss prone areas.
- Transformer Optimization During Off Peak Season- During off-peak periods, CSPDCL 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

## 6.4 Revised Findings based on data validation & field verification

Details of Feeders and Substations visited and verified:-

S.N O.	CIRCLE	Name of 33 KV /11 KV Feeder	Meter Make	Meter S.No.	Meter MF ratio	Meter reading as on 01.04.2022 in Kwh	Meter reading as on 31.03.2023 in Kwh	CT Ratio & PT Ratio	VISIT DATE	READING AS ON DATE OF VISIT in Kwh
1	Durg City	33 KV TALPURI	SECURE	CSP09710	12000	16593.48	18033.9	200/5A	31-Oct-23	19068.36
2	Durg City	33 KV PULGAON OUTGOING	SECURE	418SEM083499	12000	1859.1	3541.8	200/5A	31-Oct-23	4419.6
3	Durg City	33 KV PD PARISAR	SECURE	418SEM083498	18000	2983	3006.1	300/5A	31-Oct-23	3016.5
4	Durg City	11 KV PETROL PUMP	SECURE	S1421291	4000	12660.52	4652.3	200/5A	31-Oct-23	1440
5	Durg City	11 KV MILAN CHOWK	SECURE	418SEM082371	2000	3365.7	4102.7	200/5A	31-Oct-23	4576.1
6	Durg O&M	11 KV BSNL	SECURE	S1420837	3000	727.52	662.9	300/150/5A	30-Oct-23	1356.9
7	Durg O&M	11 KV RASMADA INDUSTRY	SECURE	418SEM081363	4000	2940.7	3064	200/5A	30-Oct-23	3168.1
8	Durg O&M	11 KV POPUSA	SECURE	418SEM081365	2000	1218.1	1427.4	100/5A	30-Oct-23	1573.7
9	Durg O&M	11 KV GRAHMIN	SECURE	418SEM081361	2000	2328.2	2848.4	100/5A	30-Oct-23	3221.3
10	Durg O&M	11 KV ATAL JYOTI PUMP	SECURE	418SEM081364	2000	2702.5	2842.7	300/150/5A	30-Oct-23	2973.1
11	Durg O&M	11 Kv NAGPURA BASTI	SECURE	418SEM082326	4000	5916	6864.7	200/5A & 11000/110V	30-Oct-23	7457.2
12	Durg O&M	11 Kv BORAI BASTI	SECURE	418SEM080832	4000	8096.2	9029	200/5A & 11000/110V	30-Oct-23	9712
13	Durg O&M	11 Kv JAIN MANDIR BASTI	GENUS	G1075978	2000	631.74	933.69	200/5A & 11000/110V	30-Oct-23	1108.95
14	Durg O&M	11 Kv ANJORA BASTI	SECURE	418SEM081477	4000	2359.9	3156.7	200/5A & 11000/110V	30-Oct-23	3668.4



## Annual Energy Audit of CSPDCL Raipur FY 2022-23

15	Durg O&M	11 Kv DHABA PUMP	SECURE	418SEM081280	4000	5492	6513.1	200/5A & 11000/110V	30-Oct-23	6860.5
16	Durg City	11 Kv TAKIYAPARA	GENUS	G1087478	4000	1721.17	3121.53	200/5A & 11KV/110	30-Oct-23	4105.1
17	Durg City	11 Kv MILLPAPA	SECURE	418SEM083889	4000	12874.3	13695.4	200/5A & 11KV/110	30-Oct-23	14366.1
18	Durg City	11 Kv COLLECTORATE	SECURE	418SEM082993	4000	3529.3	5163.2	200/5A & 11KV/110	30-Oct-23	625.5
19	Durg City	11 Kv FARISTA COMPLEX	SECURE	418SEM082118	4000	5385.2	6123.5	200/5A & 11KV/110	30-Oct-23	6607.6
20	Durg City	11 Kv TEHSIL	GENUS	G1087482	4000	1397.49	2408.33	200/5A & 11KV/110	30-Oct-23	3260.21
21	Durg O&M	33 Kv Jungera	SECURE	418SEM082125	6000	16130.8	17709.5	CTR-300-150/5	30-Oct-23	18892.2
22	Durg O&M	11 Kv Parras	SECURE	418SEM082137	4000	9660.9	11471.5	CTR-200-100/5	30-Oct-23	13001.3
23	Durg O&M	11 Kv Jungera	SECURE	418SEM082138	4000	7149.1	8812.2	CTR-200-100/5	30-Oct-23	10239.7
24	Durg O&M	11 Kv Balod Town	SECURE	418SEM082136	4000	6663.5	8083.4	CTR-200-100/5	30-Oct-23	9185.1
25	Durg O&M	11 Kv Jhalmala	SECURE	418SEM081796	4000	3067.3	3606.5	CTR-200-100/5	30-Oct-23	4161.2
26	Durg O&M	33Kv Balod-1	SECURE	KAV09535	2000	156097.6	174197	CT-400	30-Oct-23	182676
27	Durg O&M	33 Kv Sankara	SECURE	KAV09531	2000	65987.2	79295	CT-400	30-Oct-23	85223
28	Durg O&M	33 Kv Balod-2	SECURE	KAV09533	2000	120213.9	135625	CT-400	30-Oct-23	144825
29	Durg O&M	33 Kv Latabod	SECURE	KAV09534	2000	42922.7	57860	CT-400	30-Oct-23	67125
30	Durg O&M	33 Kv Parsuli	SECURE	KAV09532	2000	0	9112	CT-400	30-Oct-23	20888
31	Raipur City -II	33 Kv Alankar	SECURE	X1210711	2000	1899.61	7513.8	400/1	31-Oct-23	11724.2
32	Raipur City -II	33 Kv Omkiran	SECURE	X1441055	120000	172.49	580.1	400/1	31-Oct-23	843.57
33	Raipur City -II	33Kv Tatibandh	SECURE	X1441068	120000	119.19	437.71	400/1	31-Oct-23	665.8
34	Raipur City -II	33 Kv Kabir nagar	SECURE	X1441058	120000	71.21	337.16	400/1	31-Oct-23	515.01

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35	Raipur City -II	33 Kv Atari	SECURE	X1441067	120000	40.58	176.7	400/1	31-Oct-23	270.96
36	Raipur City -II	11 Kv BSUP	SECURE	51006032	4000	692.4	862.3	200/5A, 11Kv/110 v	31-Oct-23	1094.4
37	Raipur City -II	11 Kv Maruti Feeder	SECURE	51006031	4000	3468.1	5959.7	200/5A, 11Kv/110 v	31-Oct-23	6574.5
38	Raipur City -II	11 Kv Samta Feeder	SECURE	51006030	3000	430.2	735.6	150/5A, 11Kv/110 v	31-Oct-23	1844.5
39	Raipur City -II	11 Kv CII Feeder	SECURE	51006029	2000	1018.5	1737.9	100/5A, 11Kv/110 v	31-Oct-23	2196.3

Observation: - Total number of nine 132/33 Kv & 33/11 Kv substations visited and details of 39 feeders verified in which it is found that

1. There is no any unmetered feeder found.
2. There is no faulty meter found in the verified feeders.
3. All 11 Kv feeders were installed with modem for online AMR metering and it was found that modem of 5 feeders were not working out of 40 feeders verified.
4. In all feeders manual log book is also maintained in the substation with online AMR.
5. No any discrepancy found in meter reading verified from AMR & manual log book for FY 2022-23.
6. All feeders were marked properly with serial number & Ct/PT ratio which was also verified and found ok.

## 6.5 Inclusion & Exclusion

It is to be noted that no inclusion and exclusion are made in the report data provided by CSPDCL during the FY 22-23.

## 7. Conclusion & Action Plan.

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### 7.1 Summary of Key Findings – Energy balance & Losses

CSPDCL has T&D losses 16.14% which is on higher side. AT&C losses are 14.76% . Various schemes have been implemented by CSPDCL to reduce losses. CSPDCL is having the following documents for purchase power, Input/Billed energy i.e. Internal Departmental Report, SAP & IT Department Data Base. Also supporting documents for the same has been provided which is attached in annexure of report Detailed Formats to be annexed

- 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.
- List of measuring equipment's and calibration certificates and frequency of calibration. • Write up on energy scenario.

## Annual Energy Audit of CSPDCL Raipur FY 2022-23

- Generation via solar, DG and any other source and share of energy consumption. •  
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).
- Disconnected consumers details
- Loss Analysis report
- Write up on procedure followed technical loss analysis.

## 8. Annexures

### A. Introduction of Verification Firm.

M/s. Audittech Industrial Services Pvt. Ltd. is an Empanelled Accredited Energy Audit firm from Bureau of Energy Efficiency, Ministry of Power, Government of India and one of the fast-growing Energy Audit & services providing company. Company executed several projects covering 23 nos. states of India so far. The directors and associate team members are very well experienced in the field of Energy Audit and executed more than 150 nos. Detailed Energy Audit covering all type of Energy Intensive Industries and Commercial buildings

The associate team and expert are highly qualified and experienced in the field of Energy Audit and Services. Individual credential of each member in the field of Energy Audit is very rich due to their past association with very reputed organization of Energy Audit Services.

Name of Firm:	Audittech Industrial Services Private Limited
Address:	Opposite Mahavir Bhawan , Ward No.-4 Tikara Para Balod, PIN-491226 [C.G.]
Contact details:	9827143100 / 9109875738, Email id: <b>info@audittech.co.in</b>

Company has its Head office at Durg (C.G.) & Branch offices at Balod, Delhi & Hyderabad.

**Directors Details**

Sr. No.	Name	Designation / Technical Experience	Technical Experience /Qualification
1	Mr. Aashish Bafna	Managing Director - 11yrs	B.E (E&I). , MBA(Energy Management), Certified Energy Auditor, Surveyor & Loss Assessor
2	Mr. Rakesh Khichariya	Director- 26 Yrs	B.E (Elect.), Accredited Energy Auditor
3	Mr. Ramesh Patel	Director- 26 Yrs	B.E.(Mech), Govt Approved Valuer, Competent Person for Factory Act
4	Mr. Isshant Chainani	Director- 12 Yrs	B.E. (Elect & telecom)
5	Mrs. Shikha Golchha	Director- 11 yrs	B.E., MBA (Finance)

Auditors have critically examined the various systems, schemes, devices employed as well as the associated documents at CSPDCL for all voltage Level so as to ascertain its adequacy and efficacy as per the directives of the BEE and guidelines as per regulation.

**The Study Team for Energy audit team**

As per regulation Following are the team involved in the Detail Energy Audit of CSPDCL from DISCOM & Audittech to conduct the energy accounting for 2022-23.



**Auditor Team**

<b>SN.</b>	<b>Name</b>	<b>Designation/ Qualification</b>	<b>Contact Details</b>
1	Mr. Rakesh khichariya	Accredited Energy Auditor (AEA-0295)	9827411444
2	Mr. Aashish Bafna	Certified Energy Auditor (EA-28916)	9827143100
3	Mr. Isshant Chainani	Certified Energy Manager (EA-29062)	9407702444
4	Mr. Mahaveer Bafna	Energy Manager (EM-300497/23)	7999575489

**B. Minutes of Meeting with the DISCOM team.**

**Minutes of Meeting**

**Dt. 20.07.2023**

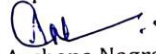
**Name of work:** Annual Energy Audit of CSPDCL for FY 2022-23 under BEE Regulation 2021

**Audit Venue:** CSPDCL Dangania Raipur.

Annual Energy Audit of CSPDCL Raipur (DSIC0028CG) was conducted by Audittech Industrial Services Private Limited.

1. Team of Audittech Industrial Services Private limited visited the DC 3 times during the period of annual audit.
2. Audittech Industrial Services Private Limited briefed about various activities carried out during the audit and prepared checklist with the energy manager & nodal officer of CSPDCL.
3. All the data of the quarterly submitted proforma and report was checked from the primary & secondary source of documents for FY 2021-2022 & 2022-2023 and same has been collected.
4. Field visit was also done by the audittech team for the verification and analysis purpose and same is enclosed in the report.
5. All the points discussed regarding critical comments / recommendations are mentioned in the report.
6. M/s. Audittech Industrial Services Private Limited) will submit the report after receiving all the documents.

Representative of CSPDCL

  
Archana Nagrale  
(E.E Rev)

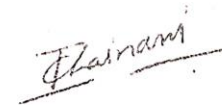
  
B.K Borikar  
(S.E. Rev)

Representative of AISPL

Rakesh Khichariya  
(AEA -0295)



Isshant Chainani  
(EA-29062)



**C. Check List prepared by auditing Firm.**

1. Review of quarterly submitted Energy Accounting Report.
2. Review of CSPDCL Boundary & Distribution system in whole state.
3. Review of internal Energy Audit & Financial report, if already conducted.
4. Review of data and its source, and information to verify the correctness, credibility, and interpretation of information.
5. Cross-check information provided in the audit report with information from other sources (if comparable information is available from sources other than those used in the audit report) and carry out independent background investigation.
6. Feeder wise details of the input energy intake.
7. R15 report on monthly basis which collects category wise month wise consumption sales & collection details.
8. Information on new equipment installation and its impact on energy consumption.
9. Any other document deemed necessary for verifying accuracy of data submitted and reported to BEE.

## D. Brief Approach, Scope & Methodology for audit.

### Approach

- Kick off meeting with CSPDCL team to finalise the sample size
- Survey of the Distribution network
- Collection of the Primary Data and finalization of the sample size check
- Site visit and Energy Meter data collection
- Collection of the Metered Energy Data for the respective voltage level as per the sample size
- Scrutiny of collected data and Data gaps of the submitted data
- Loss calculation for the network segment then if required normalization
- Compilation of the Draft report
- Presentation on Draft report
- Final report with incorporation of comments.

### Methodology

- (1) Every annual energy audit and periodic energy accounting under these regulations shall be conducted in the following manner, namely: —
  - (a) Verification of existing pattern of energy distribution across periphery of electricity distribution company; and
  - (b) Verification of accounted energy flow submitted by electricity distribution company at all applicable voltage levels of the distribution network, —
    - (i) Energy flow between transmission and 66kV/33kV/11kV incoming distribution feeders;
    - (ii) Energy flow between 66kV/33kV outgoing and 11kV/6.6kV incoming feeders;

- (iii) Energy flow between 11 kV/6.6kV feeders and distribution transformers, or high voltage distribution system;
  - (iv) Energy flow between distribution transformer, or high voltage distribution system to end consumer, including ring main system;
  - (v) Energy flow between Feeder to end-consumer; and
  - (vi) Energy flow between 66/33/11 kV directly to consumer.
- (2) The accredited energy auditor, in consultation with the nodal officer of the electricity distribution company shall, —
- (a) Develop a scope of work for the conduct of energy audit required under these regulations;
  - (b) Agree on best practice procedures on accounting of energy distributed across the network; and
  - (c) Collect data on energy received, and distributed, covered within the scope of energy audit.
- (3) The accredited energy auditor shall—
- (a) Verify the accuracy of the data collected in consultation with the nodal officer of the electricity distribution companies as per standard practice to assess the validity of the data collected; and
  - (b) Analyse and process the data with respect to—
    - (i) Consistency of data monitoring compared to the collected data;
    - (ii) Recommendations to facilitate energy accounting and improve energy efficiency; and
    - (iii) With respect to the purpose of energy accounting in reducing losses for the electricity distribution company.

E. Field Verification Data & Reports

**Field Verification form**  
M/s. AISPL , Accredited Energy Auditor appointed by CSPDCL Annual Energy Audit FY 2022-23

Name Of Circle	City Circle Durg	Name Of SE	Mr. Tarun Thakur
Name of Division	City Division Durg	Contact Details	+919171879336
Name of 132/33 KV Substations	33/11 KV Durg town	Date of Verification	30/10/2023
Capacity Of Power Transformer	5 MVA X 3 nos.		

Metering System Details								
S.NO.	Name of 33 KV /11 KV Feeder	Meter Make	Meter S.No.	Meter MF ratio	Meter reading as on 01.04.2022	Meter reading as on 31.03.2023	CT Ratio & PT Ratio	Reading On visit date
1.	Takiyapara <sup>11KV</sup>	Genus	61087478	4000	1721.17kwh	3121.53kwh	200/5A/11KV/110	4105.1kwh
2.	Mi4 para <sup>11KV</sup>	Secure	4185EM 083889	4000	12874.3kwh	13695A kwh	200/5A/11KV/110	14366.1kwh
3.	Collect <sup>11KV</sup>	Secure	4185EM 082993	4000	3529.3kwh	5163.2kwh	200/5A/11000/110	6025.5kwh
4.	Fazishita <sup>11KV</sup> Complex	Secure	4185EM 082118	4000	5385.2kwh	6123.5kwh	200/5A/11000/110	6607.6kwh
5.	Tahsil <sup>11KV</sup>	Genus	61087482	4000	1397.49kwh	2408.33kwh	200/5A/11000/110	3260.32kwh

Comments if any (a.) variation in Provided data and Verified data (b.) Faulty / Unmetering (C.) Any other observations

Capacitor Bank installed Capacity :- No capacitor bank installed.

Mode of Metere reading Manual & online both.

Modem installed or Not - Yes, Total 8 outgoing feeders. All have modems installed.

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Representative of AISPL Date 30/10/2023 Place Durg	<u>Kanwar</u> 30/10/23	Representative of CSPDCL <b>Assistant Engineer (HT),</b> <b>C.S.P.D.C.L. DURG</b>
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Field Verification form

M/s. AISPL , Accredited Energy Auditor appointed by CSPDCL Annual Energy Audit FY 2022-23

Name Of Circle	Durg	Name Of SE/DE	Mr. A.K. Bizarq
Name of Division	O&M Division Durg	Contact Details	9827103423
Name of 132/33 KV Substations	Rasmada Substation	Date of Verification	30/10/23
Capacity Of Power Transformer	3.15MVA X 2 nos		

Metering System Details								
S.NO.	Name of 33 KV /11 KV Feeder	Meter Make	Meter S.No.	Meter MF ratio	Meter reading as on 01.04.2022	Meter reading as on 31.03.2023	CT Ratio & PT Ratio	Reading On visit date
1.	11KVBSNL	Secure	SI420837	3000	727.52kWh	662.9kWh	300/150/5A	13569 kWh
2.	11 KV Rasmada Industry	Secure	418SEM 081363	4000	2940.7kWh	3064.0kWh	200/5A	3168.1 kWh
3.	11 KV Papusa	Secure	418SEM 081365	2000	1218.1kWh	1427.4kWh	100/5A	1573.7 kWh
4.	11 KV Gramin	Secure	418SEM 081361	2000	2328.2kWh	2848.4kWh	100/5A	3221.3 kWh
5.	11 KV Atal Jyoti Pump	Secure	418SEM 081364	3000	2702.5kWh	2842.7kWh	300/150/5A	2973.1 kWh

Comments if any ( a.) variation in Provided data and Verified data (b.) Faulty / Unmetering (C.)Any other observations

Capacitor Bank installed Capacity :- No capacitor bank installed  
 Mode of Meter reading Manual & Rasmada Ind. and Papusa having online meter readings.  
 Modem installed or Not Modem installed

Representative of AISPL  
 Date 30/10/23  
 Place Rasmada, Durg.

*Carver*  
 30/10/23

Representative of CSPDCL

*Von*  
**Junior Engineer**  
**C.S.P.D.C.L. Baghera**

## Field Verification form

M/s. AISPL, Accredited Energy Auditor appointed by CSPDCL Annual Energy Audit FY 2022-23

Name Of Circle	Durg -	Name Of SE /EE	Mr. A.K. Bizora
Name of Division	ORM Division Durg	Contact Details	9827103423
Name of 132/33 KV Substations	Nagpura 33/11KV Substat	Date of Verification	30/10/23.
Capacity Of Power Transformer	5MVA X 2 & 3.15MVA X 1		

## Metering System Details

S.NO.	Name of 33 KV /11 KV Feeder	Meter Make	Meter S.No.	Meter MF ratio	Meter reading as on 01.04.2022	Meter reading as on 31.03.2023	CT Ratio & PT Ratio	Reading On visit date
1.	Nagpura Basti 11KV	Secure	418SEM 082326	4000	5916.0kWh	6864.7kWh	200/5A & 11000/110V	7457.2 kWh
2.	Bargi Basti 11KV	Secure	418SEM 080832	4000	8096.2kWh	9029.0kWh	200/5A & 11KV	9712.0 kWh
3.	Jain Mandi Basti 11KV	Genus	61075978	2000	631.74kWh	933.69kWh	200/5A & 11KV	1108.95 kWh
4.	Anjora Basti 11KV	Secure	418SEM 081477	4000	2359.9kWh	3156.7kWh	200/5A &	3668.4 kWh
5.	Dhaba pump 11KV	Secure	418SEM 081280	4000	5492.0kWh	6513.1kWh	200/5A &	6860.5 kWh

Comments if any (a.) variation in Provided data and Verified data (b.) Faulty / Unmetering (c.) Any other observations

Total 3 outgoing 33 KV feeders & 7 11KV outgoing feeder & 2 incoming 33 KV feeders  
 Capacitor Bank installed Capacity :- Capacitor bank only in pipedwell pump feeders.

Mode of Meter reading Manual in all & online in all except Dhaba pump & Damoda pump.

Modem installed or Not Modern installed in all, not working in 2 of them

Representative of AISPL  
 Date 30/10/23  
 Place Durg

*Signature*  
 30/10/23

Representative of CSPDCL

*Signature*  
 कनिष्ठ यंत्री  
 सी.एस.पी.डी.सी.एल, नगपुरा

Comments & Observations.

1. Dhaba pump & Damoda pump manual meter reading.
2. Rest all have online meter reading



Field Verification form  
M/s. AISPL , Accredited Energy Auditor appointed by CSPDCL Annual Energy Audit FY 2022-23

Name Of Circle	City circle Durg	Name Of SE	Mr. Tarun Thakur
Name of Division	West Division Bhilai	Contact Details	9171879336
Name of 132/33 KV Substations	33/11KV Hudco Substation	Date of Verification	31/10/23
Capacity Of Power Transformer	SMVA X 1 nos & 3.15 X 1 nos		

Metering System Details								
S.NO.	Name of 33 KV /11 KV Feeder	Meter Make	Meter S.No.	Meter MF ratio	Meter reading as on 01.04.2022	Meter reading as on 31.03.2023	CT Ratio & PT Ratio	Reading On visit date
1.	33 KV Talpur	Secure	CP09710	12000	16593.48kwh	18033.9kwh	200/5A 33KV/110	19068.36kwh
2.	33KV Pulgon	Secure	418SEM 083499	12000	1859.1kwh	3541.8kwh	200/5A 33KV/110	4419.6kwh
3.	outgoing 33KV PD Polisar	Secure	418SEM 083498	18000	2983.0kwh	3006.1kwh	300/5A 33KV/110	3016.5kwh
4.	11KV Petrol Pump	Secure	51421291	4000	1266.052kwh	1652.3kwh	200/5A 11KV/110	1440.0kwh
5.	11KV Milan Chowk	Secure	418SEM 082371	2000	3365.7kwh	4102.7kwh	200/5A 11KV/110	4576.1kwh

Comments if any (a.) variation in Provided data and Verified data (b.) Faulty / Unmetering (c.) Any other observations

Capacitor Bank installed Capacity :- No capacitor bank installed  
Mode of Meter reading AMR  
Modem installed or Not Modem installed in all feeders.

Representative of AISPL  
Date 31/10/23  
Place Hudco, Bhilai

Representative of CSPDCL

*Caran*  
31/10/23



Junior Engineer  
C.S.P.C.L Raipur Zone

Comments & Observations.

1. There are 3 33KV incoming feeders.
2. There is 1 33KV outgoing feeders.
3. There are 3 11KV outgoing feeder.
4. Petrol Pump 11KV outgoing feeder meter changed on 20.07.2022.

**Field Verification form**  
**M/s. AISPL , Accreditated Energy Auditor appointed by CSPDCL Annual Energy Audit FY 2022-23**

Name Of Circle	city circle II Raipur	Name Of SE	Shri Amit Kumar (E.E.)
Name of Division	City Divi. North Raipur	Contact Details	7999 9893066005
Name of 132/33 KV Substations	33/11KV SIS Kotra	Date of Verification	31/10/2023 time 18.10PM
Capacity Of Power Transformer	5 MVA		

**Metering System Details**

S.NO.	Name of 33 KV /11 KV Feeder	Meter Make	Meter S.No.	Meter MF ratio	Meter reading as on 01.04.2022	Meter reading as on 31.03.2023	CT Ratio & PT Ratio	Reading On visit date
01	11KV BSUP Fed.	Secure	S1006032	4000	692.4	862.3	200/5A, 11KV/110V	1094.4
02	11KV Marubi Fed.	Secure	S1006631	4000	3468.1	5959.7	200/5A 11KV/110V	6574.5
03	11KV Samta Fed	Secure	S1006030	3000	430.2	735.6	150/5A 11KV/110V	1844.5
04	11KV C.I Fed	Secure	S1006029	2000	1018.5	1737.9	100/5A 11KV/110V	2196.3

Comments if any ( a.) variation in Provided data and Verified data (b.) Faulty / Unmetering (C.)Any other observations

Capacitor Bank installed Capacity :- No Capacitor Bank.

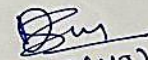
Mode of Metere reading

Modem installed or Not Modern installed.

- No meter faulty nor any changes in meter.  
 -> No unmetered.  
 ->

Representative of AISPL

Date 31/10/23  
 Place Audihau

  
 AE (HT) North  
 31/10/23  
 Representative of CSPDCL (93518585)  
 Assistant Engineer (H.T.)  
 City Dn North, CSPDCL, RAIPUR

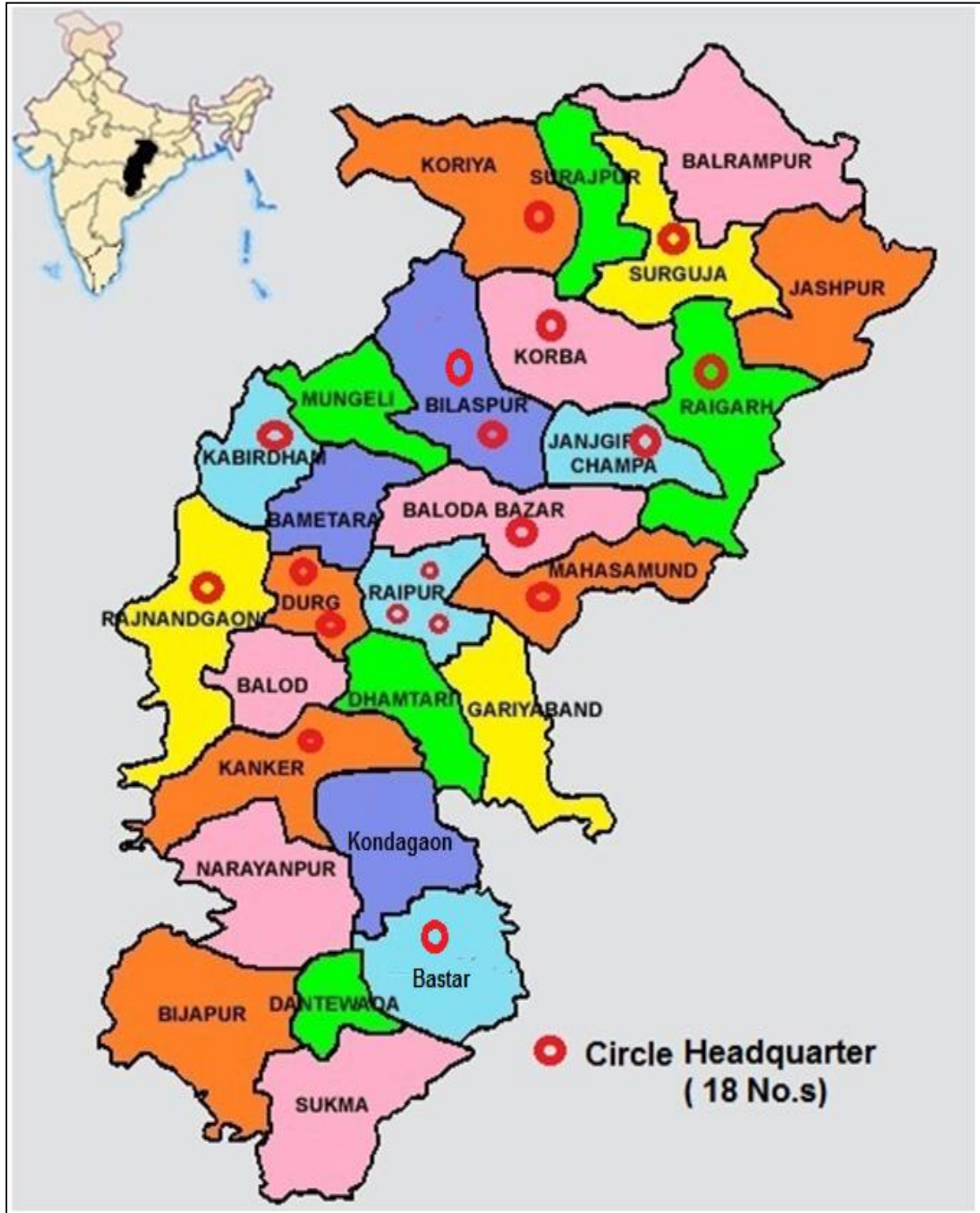


**F. List of documents verified with each parameter.**

<b>S.No</b>	<b>Data</b>	<b>Source of Data</b>
1	Input Energy Purchased	O/o ED (RA&PM)
2	Transmission Loss %	O/o ED (SLDC)
3	Energy sold outside the periphery MUs	O/o ED (RA&PM)
4	Open access sale MUs	-
5	EHT sale MUs	SAP System generated report
6	% of metering available at DT %	O/o ED (Revenue)
7	% of metering available at consumer end %	O/o ED (Revenue)
8	No of feeders at 66kV voltage level Nos.	O/o ED (Revenue)
9	No of feeders at 33kV voltage level Nos.	O/o ED (Revenue)
10	No of feeders at 11kV voltage level Nos.	O/o ED (Revenue)
11	No of LT feeders level Nos.	O/o ED (O&M)
12	Line length (ckt. km) at 66kV voltage level Km	O/o ED (O&M)
13	Line length (ckt. km) at 33kV voltage level Km	O/o ED (O&M)
14	Line length (ckt. km) at 11kV voltage level Km	O/o ED (O&M)
15	Line length (km) at LT level Km	O/o ED (O&M)
16	HT/LT ratio	O/o ED (O&M)
17	Feeder wise Import & Export Energy Mus	O/o ED (Revenue)
18	Nos. of Consumers Nos.	O/o ED (Revenue)
19	Connected Load of Consumers MW	O/o ED (Revenue)
20	Input Energy MUs	O/o ED (Revenue)
21	Consumer wise Billed Energy	O/o ED (Revenue)
22	T&D Loss MUs	O/o ED (Revenue)
23	T&D Loss %	O/o ED (Revenue)
24	Feeder meters accuracy and error	Field visit

### G. Brief Description of Unit.

Chhattisgarh State Power Distribution Company Limited



## Annual Energy Audit of CSPDCL Raipur FY 2022-23

### General Information

General Information				
<b>1</b>	<b>Name of the DISCOM</b>	CHHATTISGARH STATE POWER DISTRIBUTION COMPANY LTD.		
<b>2</b>	<b>i) Year of Establishment</b>	2009		
	<b>ii) Government/Public/Private</b>	Government		
<b>3</b>	<b>DISCOM's Contact details &amp; Address</b>			
<b>i</b>	City/Town/Village	Raipur		
<b>ii</b>	District	Raipur		
<b>iii</b>	State	Chhattisgarh	Pin	492013
<b>iv</b>	Telephone		Fax	0771-2576754
<b>4</b>	<b>Registered Office</b>			
<b>i</b>	Company's Chief Executive Name	MR. MANOJ KHARE		
<b>ii</b>	Designation	Managing Director (CSPDCL)		
<b>iii</b>	Address	Sewa Bhawan Danganiya Head office CSEB Raipur Chhattisgarh		
<b>iv</b>	City/Town/Village	Raipur	P.O.	Raipur
<b>v</b>	District	Raipur		
<b>vi</b>	State		Pin	
<b>vii</b>	Telephone		Fax	0771-2574200
<b>5</b>	<b>Nodal Officer Details*</b>			
<b>i</b>	Nodal Officer Name (Designated at DISCOM's)	Smt Saroj Tiwari		
<b>ii</b>	Designation	Executive Director		
<b>iii</b>	Address	CSPDCL Office of ED(REV) ,Danganiya,Raipur		
<b>iv</b>	City/Town/Village	Raipur	P.O.	Raipur
<b>v</b>	District	Raipur		
<b>vi</b>	State	Chhattisgarh	Pin	492013
<b>vii</b>	Telephone		Fax	0771-2576754
<b>6</b>	<b>Energy Manager Details*</b>			
<b>i</b>	Name	Aashish Bafna		
<b>ii</b>	Designation	ENERGY MANAGER	Whether EA or EM	EM
<b>iii</b>	EA/EM Registration No.			
<b>iv</b>	Telephone		Fax	
<b>v</b>	Mobile	9827143100	E-mail	<a href="mailto:aashishbbl@gmail.com">aashishbbl@gmail.com</a>
<b>7</b>	<b>Period of Information</b>			
	Year of (FY) information including Date and Month (Start & End)	1st Oct 2022 to 31st Dec 2022		