Annual Energy Audit Report

of

Manipur State Power Distribution Company Ltd.

(MSPDCL)

(For **FY 2022-23)**

Regd. Office: Secure Office Complex, 3rd Floor,North AOC, A.T. Line
Imphal West, Manipur- 795001

October 2023

Submitted By

SIRI EXERGY & CARBON ADVISORY SERVICES (P) LTD
93A, Janaki Enclave, Saroornagar, Hyderabad – 500035
Phone: 8125128222, Fax: 040-24075323, Mobile: +91-9866324164
Email: siriexergy@gmail.com, www.siriexergy.in

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We sincerely acknowledge the contribution of the following MSPDCL officials and the support staff during this audit.

- Shri H ShantiKumar Singh, MD
- Shri Rabi Singh, Executive Director (Technical)
- Shri Lourembam Momocha, DGM (PP & EA)
- Mr Uskam Rocky- DGM
- Mr Bikram Sharma, DM- IT
- Mr Satuakeet DM- Commercial
- Shri Ravinder Vannam, Energy Manager

We are also thankful to the other staff members who were actively involved while collecting the data and conducting the field studies and validation of data.

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1. Executive Summary

Bureau of Energy Efficiency (BEE), the apex regulatory body under ministry of power, Government of India notified the 'Manner and Intervals for conducting Energy Audit / Accounting of Electricity Distribution Companies Regulations' through notification no. 18/1/BEE/DISCOM/2021 dated 6th October 2021. As per the regulation, all Electricity Distribution Companies are mandated to do the periodic energy accounting on a quarterly basis and detail energy audit on yearly basis to comply with the provisions of this act. Collection, compilation and maintaining data sub-station wise, division-wise, circle-wise and finally state- wise is pre-requisite to comply with the provisions and requirements of this act.

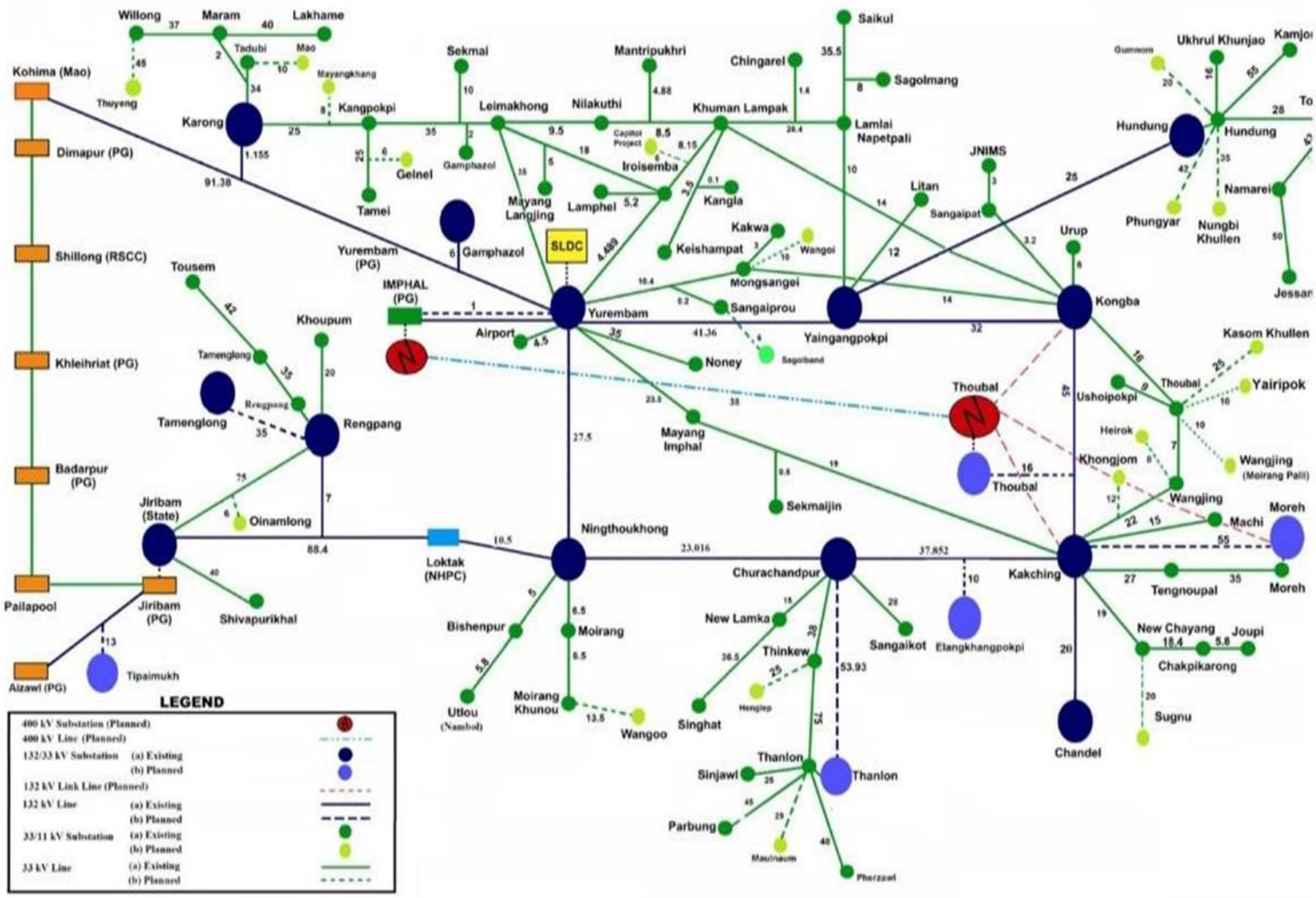
Manipur State Power Distribution Company Limited is a Public Company incorporated on 15th July 2013. It is classified as a State Government company. Its registered office is in Imphal West, Manipur, India.

MSPDCL has been advised to form an official energy cell with the designated nodal officer and energy manager and communicate the formal structure of this cell to BEE and SDA immediately.After formation of this cell, the cell will convene convey its first meeting and decide the priority list and action plan to fulfill the M&V (Measurement & Verification) need as outlined in this act.

In this audit assignment, the team collected data from the divisions and head office, compiled them, discards eschewed/ incorrect data, filtered the correct and authenticates data, verified them against available documents and then inferred the findings by using these data in the calculation

Let us now take a glance of this DISCOM in terms of size and distribution –

Power Network Map of Manipur:



Infrastructure detail:

Parameters	Nos.
Number of circles	3
Number of divisions	17
Number of sub-divisions	47
Number of feeders (33/11 KV)	84
Number of feeders (LT Level)	216
Number of DTs	9576
Number of consumers	517892

1.1 Energy billing

Energy meters are installed at each voltage level for energy consumption but only few meters are working, and all the T&D losses are adjusted. The readings are taken manually and entered in Omni-net module which calculates the losses. Energy consumption and calculation of losses at each voltage level are not available.
The energy reading of commercial and Industrial consumers, Distribution transformer readings manually entered.
MSPDCL has claims, that there is 84% consumers are metered. However, there is no data of how many of these meters working.

Metering & Energy Accounting system:

Injection point meters -→ JMR manual
DT Meters→ 100% AMR
HT consumer – Partially AMR → Server
remaining downloaded by CMRI
LT consumer → Probe billing (downloaded in mobile app & transferred to server).
The consumption recorded by MSPCL are taken as Input energy.

1.2 Distribution loss

Net Input Energy for MSPDCL is arrived as below:

Net Input Energy at T<>D periphery (For MSPDCL consumers) =Gross Input Energy purchased
– (minus) Transmission Loss
+ (plus) Energy Input for Open Access consumers
- (minus) grossed up Open Access Sale

- The OA sales are grossed up (Wheeling loss as percentage of metered energy is added to metered energy.
- The grossed-up sales are then deducted with energy recorded at T<>D periphery (ABT meters) to arrive at Net input energy at T<>D to MSPDCL consumers.

The various parameters for FY 2022-23 mentioned above is tabulated below.

Particulars	20-21	21-22	22-23
Energy at T-D (MU)	869.33	940.12	931.91
Net T-D energy attributable to MSPDCL-D sale (MU)	748.19	786.10	824.51
Distribution Losses (MU)	223.48	153.215	107.39
Distribution Losses (%)	13.94%	16.3%	11.52%

The below table shows the distribution loss as calculated for MSPDCL consumers from FY 2020-21 to 22-23

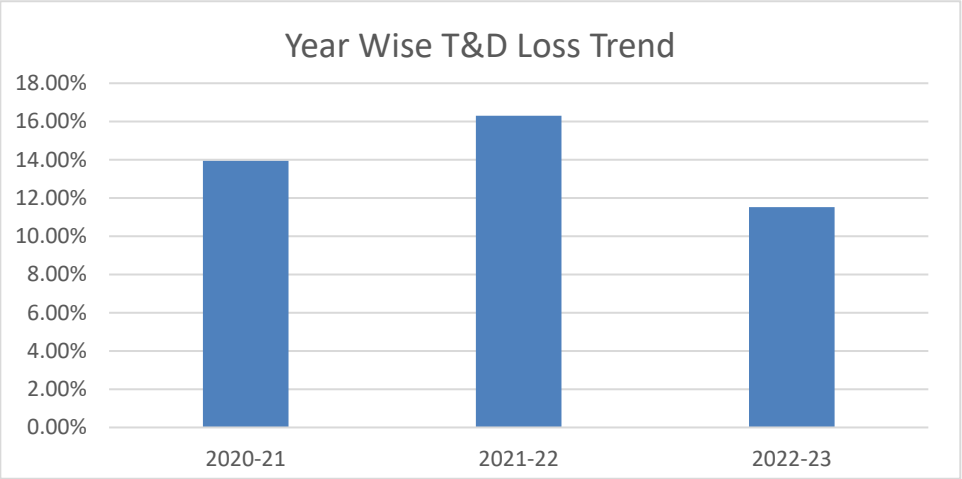


Figure 1: Year wise Distribution loss

The AT&C loss is mentioned below.

Particulars	2022-23
Collection efficiency	92%
AT & C loss	19%

In Proforma:

Net Input Energy at T<>D periphery =
Input Energy purchased (for MSPDCL consumers on their network)
–(minus) Transmission Loss

OR
Net Input Energy at T<>D periphery =
Input Energy received at MSPDCL
periphery
–(minus) Energy received for Open Access Consumers
–(minus) Transmission Losses

Net Sold Energy at T<>D periphery = Energy Sale (for MSPDCL consumers on their network)

Power Purchase:

- The bulk purchase of power is made available by the holding company (Manipur State Power Corporation Limited) and the cost of power purchase is accounted for on accrual basis at the rates approved/bills raised by MSPDCL.
- Transmission charges are accounted for on accrual basis on bills raised by the Manipur State Power Corporation Limited
- Transmission Corporation Limited at the rates approved by MPERC

Critical Comments:

Out of these 216 – 11 KV Feeders, 18 feeders studied which are having T&D losses of more than 15%.

- Most of the places, 11 KV meters are not working, out of 216 feeders, 161 no's of feeders meters are not working. This is first priority for feeders wise loss calculation and energy accounting.
- DTR metering is not available for most of the DTR's. Out of 9553 DTR's, 5843 DTR's are unmetered i.e., 61%
- The consumption is computed based on Min / Max Amps on each feeder
- Initially suggest to rectify the non-working 11 KV feeder meters and install SCADA system.
- Some of the Power transformers in substations are very old. The old transformers have more losses compared to modern transformers.
- TCS has been hired on pilot basis to monitor 5 numbers of 11 KV feeders to monitor feeder wise losses and suggest measures to reduce it. Once this pilot study is successful, it will be implemented in entire state of Manipur.

2. BACKGROUND

2.1 Extant Regulations and role of BEE

In the provision of the Energy Conservation Act, 2001 the Bureau of Energy Efficiency has been set up with effect from day one of March 2002 by joining the earlier energy management center, which was the society under the ministry of powers. The initial aim of the Bureau of Energy Efficiency (BEE) is to decrease the energy intensity in the Indian economy through the taking up of a result-oriented approach. The broad aims of the Bureau of Energy Efficiency (BEE) are:

1. To suppose leadership and give policy system and guide to national energy efficiency and conservation programs and efforts.
2. To direct the stakeholders about the policies and programs on using energy efficiently.
3. To set up a framework and procedures to monitor, verify and measure the efficient use of electricity in individual sectors as well as at the national stage.
4. To use multi-horizontal, bi-sidelong, and private segment support in the execution of theEnergy Conservation Act and projects for effective utilization of energy and its preservation
5. To show the delivery mechanisms of energy efficiency, by a public and private partnership
6. To manage, implement, and plan energy conservation policies as given in the EnergyConservation Act.

In exercise of the powers conferred by clause (g) of sub-section (2) of section 58, read with clause (q) of sub-section (2) of section 13 of the Energy Conservation Act, 2001 (52 of 2001), the Bureau of Energy Efficiency, with the previous approval of the Central Government, has made a regulation regulations, (Manner and Intervals for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies) vide No. 18/1/BEE/DISCOM/2021 dt 6th October 2021 and published it in the Gazette of India Part III section 4 on 7th October 2021. These regulations apply to all electricity distribution companies specified as designated consumer.

2.2 Purpose of audit and accounting Report

A healthy distribution sector is considered as the key to a financially viable power sector. One of the major challenges affecting the health of Indian distribution sector is the high aggregate technical and commercial (AT&C) losses. AT&C loss is the sum of technical loss and commercial loss. The technical loss occurs due to the flow of energy into transmission and distribution network. Technological advancements could help in the reduction of technical loss to an optimum level. As per international norms, the technical loss in a distribution system should be in the range of 4-5%. On the other hand, the commercial loss is mostly man-made and occurs due to inefficient billing and collection of the energy supplied, illegal connections, theft, meter tampering, and pilferage, etc. The commercial loss is occurring mostly due to managerial issues and could be brought down to zero with efficient administrative practices. National aggregate technical and commercial losses stood at 22%. As long as AT&C losses continue to be in sucha high range, it is difficult for the DISCOMs to be commercially viable. In order to improve the energy efficiencies in the power system, the Ministry of Power, Government of India issued notification S.O. 3445 (E) dated 28th September 2020 to cover all the Electricity Distribution Companies (DISCOMs) under the preview of the EC Act. As per the notification, which was formulated in consultation with Bureau of Energy Efficiency (BEE) "**All entities having issued distribution license by State/Joint Electricity Regulatory Commission under the Electricity Act, 2003 (36 of 2003)" are notified**

as Designated Consumers (DCs)."

T&D losses are considered as performance matrix of electricity distribution companies under PAT. Now, each DISCOM will be governed under the various provisions of EC Act, such as Appointment of Energy Manager, Energy Accounting & Auditing, identification of Energy Losses Category wise, Implementation of energy conservation & efficiency measures etc.

2.3 Period of Energy Auditing and Accounting

Periodic Energy Accounting:

After the commencement of BEE regulations dated 6th October 2021, every electricity distribution company should conduct its first periodic energy accounting, for the last quarter of the financial year immediately preceding the date of such commencement (i.e. from 2nd quarter of the FY 21-22);and conduct 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.

An electricity distribution company should submit the periodic energy accounting report to

- Bureau of Energy Efficiency
- State Designated Agency **(MSPDCL)**
- the periodic energy accounting report should be made available on the website of electricity distribution company within forty-five days from the date of the periodic energy accounting.

Annual energy audit.: Every electricity distribution company should conduct an annual energy audit for every financial year and submit the annual energy audit report to the Bureau and respective State Designated Agency and made available on the website of the electricity distribution company withina period of four months from the expiry of the relevant financial year. ***The first annual energy audit of should be conducted within six months from the date of such commencement, by taking into account the energy accounting of electricity distribution company for the financial year immediately preceding the date of the commencement of these regulations (i.e. for FY 22-23).***
A new electricity distribution company is established after the commencement of these regulations, such electricity distribution company shall conduct its first annual energy audit on completion of the first financial year from the date of being notified as designated consumer.

3. Introduction and Overview of MSPDCL

3.1 Introduction:

About MSPDCL

Name of the DISCOM	Manipur State Power Distribution Company Limited (MSPDCL)
Address of the DISCOM	Regd. Office: Secure Office Complex, 3rd Floor, North AOC, A.T. Line Imphal West, Manipur-795001

In pursuance of Electricity Act, 2003, the erstwhile State Electricity Department was unbundled into 2(two) state owned functionally independent successor entities as

i) Manipur State Power Company Limited (MSPDCL)
ii) Manipur State Power Distribution Company Limited (MSPDCL)

MSPCL is a deemed transmission licensee and MSPDCL is a deemed distribution licensee w.e.f.1st Feb. 2014, by a Gazette notification of the Government of Manipur, vide Manipur State Electricity Reforms Transfer Scheme 2013 (or Transfer Scheme 2013) dated December 2013.

MSPDCL is a 100% subsidiary of MSPCL and undertakes power distribution within the state of Manipur.MSPDCL holds the entire network in the state for all voltage levels of 11 kV and below.MSPDCL also carries out the trading activity. At present, out of a total installed capacity of 2909MW in the NE Region, 256.40 MW is currently being allocated to Manipur State (about 8.81%) of which 113.60 MW is from Hydel projects and 142.80 MW is from Thermal projects. The requirement of power in the state for the year 2020-21 (Up to December 2020) was 716.40 MU. But the actual availability of power in the state is 861.59 MU. The gap between Demand and Supply was bridged from Banked Energy and the Trading of energy through Indian Energy Exchange (IEX). The per capita energy consumption of Manipur for FY 2019-20 is 385 kWh, much below the all-India per capita consumption of 1208 kWh in 2019-20 (Source: CEA).

Name and Address of Designated Consumer : Manipur State Power Distribution Company Ltd (**MSPDCL**)

Address: Secure Office Complex, 3rd Floor, North AOC, A.T. Line
Imphal West, Manipur- 795001

3.2 Name and Contact Details of Energy Manager and Authorized Signatory of DC (Nodal Officer)

Energy Manager Details

Name : Ravinder Vannam
Email : rabimang@gmail.com (EA- 13585)

Contact No 7009361238

Authorized Signatory of DC (Nodal Officer)

Name : Shri. Mangsatabam Rabi Singh

Designation : Executive Dir (Tech)

MSPDCLContact No : 7005352476

3.3 Summary profile of DISCOM (Jurisdiction, Electrical circles/ divisions/ sub-divisions etc., Consumer base, Electrical infrastructure, and assets voltage wise, Energy Flow, pattern of energy distribution, other salient features etc.)

3.3.1 ASSETS

Data as in March 2023

Table1: Total Asset

Number of circles	3
Number of divisions	17
Number of sub-divisions	47
Number of feeders	216
Number of DTs	9576
Number of consumers	517892

Consumers:

Parameters	**> 66kV**	**33kV**	**11/22kV**	**LT**
Number of conventional metered consumers			754	431408
Number of consumers with 'smart' postpaid meters				86484
Number of consumers with 'smart prepaid' meters				0
Number of consumers with 'AMR' meters		22		0
Number of consumers with 'non-smart prepaid' meters				0
Number of unmetered consumers			355	
Number of total consumers	**0**	**22**	**1109**	**517892**

Transformers:

Parameters	**> 66kV**	**33kV**	**11/22kV**	**LT**
Number of conventionally metered Distribution Transformers				
Number of DTs with communicable meters		**219**		
Number of unmetered DTs				
Number of total Transformers	**0**	**219**	**9576**	**0**

Feeders:

Parameters	**> 66kV**	**33kV**	**11/22kV**	**LT**
Number of total feeders	**2**	**101**	**216**	**0**

3.3.2 CONSUMER BASE

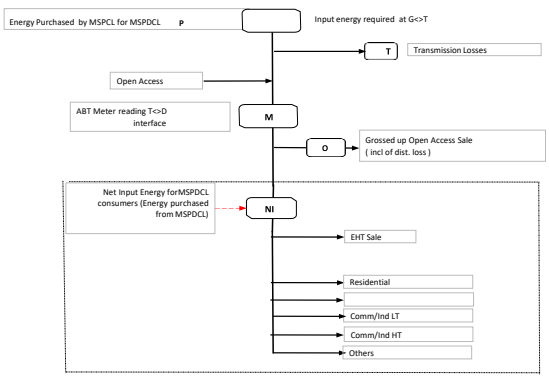
Parameters	> 66kV	33kV	11/22kV	LT
Number of conventional metered consumers	0	0	754	431408
Number of consumers with 'smart' postpaid meters				86484
Number of consumers with 'smart prepaid' meters				0
Number of consumers with 'AMR' meters		22		0
Number of consumers with 'non-smart prepaid' meters				0
Number of unmetered consumers			377	
Number of total consumers	**0**	**22**	**1109**	**517892**

1st Apr 2022 to 31 Mar 2023

Consumer category	Total Number of connections (Nos)	% of number of connections	Input energy (MU)	Metered energy	Unmetered energy	Total energy
Residential	485933	94%	931.9055	600.387	139.634	740.021
Agricultural	0	0%		0.000	0.000	0.000
Commercial/Industrial-LT	29681	6%		69.618	11.828	81.446
Commercial/Industrial-HT	1109	0%		0.992	0.587	1.579
Others	1169	0%		1.097	0.370	1.467
Total	**517892**	**100%**	**931.9055**	**672.0932012**	**152.418798**	**824.512**

3.3.3 ENERGY FLOW

Energy Input & Output Diagram



Meter	Description
	Purchased Energy
P	Input energy required at G<>T
T	Transmission losses
OA	OA Consumer (at MSPDCL Network)
M	ABT Meter reading T<>D interface
O	Grossed up OA and other sales
NI	Net input for MSPDCL consumers on its network

3.4 Energy Conservation measures already taken and proposed for future.

Based on the interaction with MSPDCL, the following options are proposed to be implemented by MSPDCL during the Year 2023-24

Action Plan for Loss Reduction

Sl .No	Targeted interventions for loss reduction	Units	Physical Targets as per DPR				Estimated Outlay as per DPR Rs. Lakh
			FY22	FY23	FY24	FY25	
1	11kV Feeder Bifurcation	ckM		50	150	197.2	61.810
2	Reconductoring of 11kV feeders	ckM		100	200	340.16	69.270
3	Reconductoring of 33kV feederswith new bay	ckM			80	128.5	178.680
4	Laying of AB Cable [(3x50+1x35) Sq.mm. including 5nos. of Steel Tubular pole] by replacing LT bare conductor inLoss prone divisions	kM		150	250	300	81.370
5	Laying of AB Cable [(3x70+1x50) Sq.mm. including 5nos. of Steel Tubular pole] by replacing LT bare conductor inLoss prone divisions	kM		250	350	450	150.260
6	Laying of AB Cable [(3x95+1x70) Sq.mm. including 5nos. of Steel Tubular pole] by replacing LT bare conductor in Loss prone divisions	kM		100	100	300	82.440
7	Unified Billing Solution withMDM	LS			to be implemented		17.136
8	ERP Infra (Four modules)	No of modules		2	1	1	25.000
9	Load forecasting Tool	LS		to be imple mented			16.200
10	Energy Accounting Module	LS		to be imple mented			4.284
11	Consumer indexing	LS			to be implemented		5.100
12	Smart MCCB	Nos.		200	400	1111	13.690
13	Medium Voltage Covered Conductor	ckM		40	80	200	74.580
							779.820

Action Plan for Modernization:

Sl #	Targeted interventions for system strengthening	Units	Physical Targets as per DPR (Numbers)					Estimated Outlay as per DPR Rs. Lakh
			FY 22	FY 23	FY 24	FY 25	FY26	
1	New 33kV/11kV substation	Nos		0	2	6	12	188.622
2	New 33kV line	ckM			100	150	240	94.665
3	Renovation & Modernization of substations	Nos			0	50	100.421	130.233
4	Augmentation of 33kV line	ckM			4	14	19	145.740
5	New 11kV/0.415 kV DTR	Nos			2	5	12	88.755
6	New 11kV line	ckM		0	25	75	125	65.950
7	New LT AB cable	kM			100	175	200	161.907
8	Implementation of SCADA in category A Town (11 Substation) and B Town (8 Substation)	Nos			2	7	10	21.260
9	GIS Tagging of major Electrical Infrastructure	LS				To be implemented		20.000
10	Smart MCCB for newly installed DTRs	Nos			200	400	400	8.000
Grand Total								**925.131**

Action Plan for Implementation of IOT (Internet of Things):

Sl #	Description of Work	Status
1	**SCADA and DMS**	Present SCADA system of SLDC Manipur integrates 12 nos. of 132 kV sub-stations as below which in turn is linked to North Eastern State Load Dispatch Centre at Shillong. Out of the 12 substations, 10 nos of 132 kV sub-stations (Yurembam, Yaingangpokpi, Kongba, Kakching Churachandpur, Ningthoukhong, Chandel, Hundung, Rengpang and Jiribam) are being linked to Main Control Centre at SLDC, Manipur through OPGW network whereas data from remaining two 132 kV sub-station is being acquired through PLCC. Further MSPCL has already implemented pilot projects in four 33/11kV substations (Kakwa, Mongsangei, Thoubal(old) and Wangjing) and taken up work of implementation of RTUs in 20 nos of 33/11kV substations with funding from Techno Economic Sub-Group , PSDF Data from 20+4 (twenty four) nos of 33 kV sub-stations shall be integrated to the existing SCADA system during the implementation of the ongoing project.
2	**Description of Work[Eg. ERP]**	Not yet implemented

3	**Description of Work[Eg. SAP Based Billing System]**	MSPDCL presently have a single billing software which is developed locally and is based on Java platform. The system is backed by MySQL database community edition. Two basic models of billing are available, one based on actual meter readings and another being flat rate billing depending on hours of supply. Tariffs are incorporated on annual basis as is approved by ERC. Consumers can pay their bills online or by visiting MSPDCL collection centres. As most of the consumers are gradually shifted to prepaid meters, the billing software is being used fora very a smaller number of consumers.
4	**Geographic Information System**	Under R-APDRP part A, GIS was implemented only in 13 towns for both and HT and LT network. However, the same was not updated lateras and when new infrastructure is created or existing infrastructure is modified. The GIS work was initially expanded to few more towns. However, the work was not continued from 2017 onwards.
5	**Load Forecasting tool**	Presently done manually through excel based programme sheet

4. Energy flow analysis

4.1Energy flow across 3 Service Levels

Energy losses across at 3 different voltage levels : 220 KV, 132 KV, 33 KV, 11 KV and LT levels are not available, as MSPDCL caters only for power distribution. Even 11 KV feeders also managed by MSPCL (Transmission company)

Particulars	22-23
Energy at T-D (MU)	931.91
Net T-D energy attributable to MSPDCL-D sale (MU)	824.51
Distribution Losses (MU)	107.39
Distribution Losses (%)	11.52%

4.2Validation of metered data

Out of 216, 11 KV feeders, 10% of the feeders i.e 22 feeders data validated with the monthly reports for the input energy and also based on sales.

The following table gives the 11 KV feeders which are verified.

SL.No	Name of Division	Energy Sales (MU)	Input Energy (MU)	Billing Efficiency %	Collection Efficiency %	AT&C Loss (%)
1	IED-I	116.3648	126.6072	91.91%	98.72%	9%
2	IED-II	104.35	115.824	90.09%	96.96%	13.00%
3	IED-III	95.7042	111.6337	85.73%	94.10%	19.00%
4	IED-IV	90.2341	110.0342	82.01%	94.27%	23.00%
5	Bishnupur	89.3668	98.2987	90.91%	84.26%	23.00%
6	Churachandpur	65.8185	74.421	88.44%	86.86%	23.00%
7	Kakching	40.4678	46.0225	87.93%	97.42%	14.00%
8	Thoubal	77.1403	85.31	90.42%	90.89%	18.00%
9	Pherzawl	9.0089	9.8838	91.15%	64.21%	4.00%
10	Kangpokpi	35.8247	40.129	89.27%	86.96%	22.00%
11	Chandel	18.7855	21.5898	87.01%	71.79%	38.00%
12	Noney	3.7554	4.2991	87.35%	81.46%	29.00%
13	Senapati	20.798	23.4485	88.70%	80.58%	29.00%
14	Tamenglong	8.3033	9.598	86.51%	84.65%	27.00%
15	Tengnoupal	13.2049	14.3203	92.21%	89.36%	18.00%
16	Jiribam	14.3812	16.1474	89.06%	80.63%	28.00%
17	Ukhrul	21.0036	24.339	86.30%	72.60%	37.00%

Comments:

- First of all most of the 11 KV feeders meters are not working.
- The high loss feeders are mostly from hilly area.

4.3Validation of energy flow data and losses

The data of high loss feeders > 25% analysed. Since the total 11 KV feeders, having T&D loss more than >25% are ony 9 no's, so losses having more than 20% are segregated and they are 18 feeders.

The following table gives the list of 18 feeders having T&D loss more than 20% and the reasons for high losses.

S.no	Location	T&D Losses (%)	Remarks
1	KAIMAI	21.74%	
2	DAIKHAI	22.73%	
3	SINGHAT	23.30%	
4	BILL	23.47%	
5	KHONGHAMPAT	24.64%	
6	CHAKPIKARONG	24.88%	
7	JNV MAO	25.13%	
8	LANGOL	25.96%	
9	GENEL	26.13%	
10	SAGOLMANG	26.43%	
11	NONEY	26.59%	
12	KHAIDEM	28.43%	
13	MANTRIPUKHRI II	29.04%	
14	HILL FEEDER	29.58%	
15	ICP	29.82%	
16	DC TBL	30.31%	
17	WATER SUPPLY	30.72%	
18	PGCI	30.78%	
19	FEEDER -III	30.85%	
20	AIR	31.06%	
21	JESAMI	31.26%	
22	SEKMAI/KHONGHAMPAT	31.47%	
23	PANGEI	32.73%	
24	SUGNU/SEROU	32.87%	

25	KANGVAI	34.88%	
26	MU	34.95%	
27	Western 2	34.97%	
28	LHANGCHAM	36.03%	
29	TUININGKHAL	36.35%	
30	STPI	36.59%	
31	DMC	36.60%	
32	SORTE	37.25%	
33	WANGJING	39.48%	
34	PHUNGYAR	39.55%	
35	INDUSTRY	41.06%	
36	SINGHAT town	41.56%	
37	CHANDRAKHONG	43.60%	
38	JNIMS	45.08%	
39	SENAPATI	49.09%	
40	CHANDEL	50.49%	
41	BRICKFIELD/WAIFEI	51.40%	
42	ZINGSUI	53.39%	
43	FOOD PARK	57.60%	
44	KANGLA SIPHAI	61.91%	
45	NAMBASHI	62.82%	
46	SAWOMBUNG	64.67%	
47	KHONGMAN	68.95%	
48	TAMEI	69.65%	
49	URUP	70.10%	
50	LANGMEIDONG	94.78%	
51	SITUIKAWN	95.52%	

Comments:

The T&D loss for feeders of SITUIKAWN 95.52% since there is no billing.

5. LOSS AND SUBSIDY COMPUTATION

5.1 Energy accounts analysis for previous years

ENERGY ACCOUNTS OF PREVIOUS YEARS (20-21,21-22 & 22-23)

The Energy Accounts of 20-21, 21-22 & 22-23 were verified based on the data available. The below table shows the distribution loss as calculated for MSPDCL from FY20-21 to 22-23.

Particulars	20-21	21-22	22-23
Energy at T-D (MU)	869.33	940.12	931.91
Net T-D energy attributable to MSPDCL-D sale (MU)	748.19	786.10	824.51
Distribution Losses (MU)	223.48	153.215	107.39
Distribution Losses (%)	13.94%	16.3%	11.52%

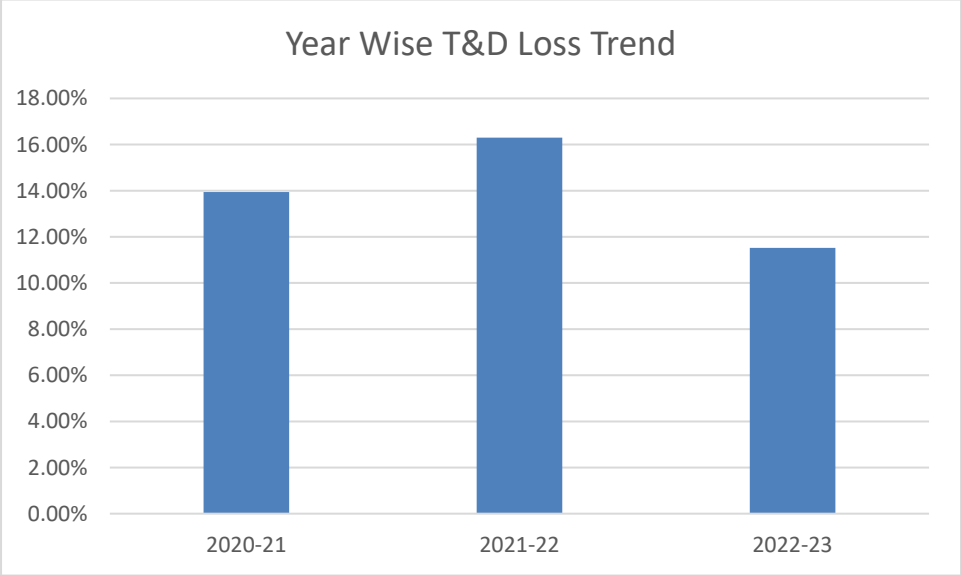


Figure 3: Year wise Distribution loss

The AT&C loss is mentioned below

Particulars	**2022-23**
Collection efficiency	92%
AT & C loss	19%

From the above tables it can be observed that despite almost the same input energy for MSPDCL,the Distribution losses during 20-21 are 13.94%. However, it increased to 16.3% in 21-22 during Covid-19 period and further reduced to 11.52% during the FY 2022-23.

MSPDCL has taken few measures to reduce the distribution losses.

The AT&C losses are 19% due to 92% collection efficiency after COVID.

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

a. Input energy, AT&C losses – aggregate, voltage-wise, Category-wise, division-wise, feeder wise etc.

The following table gives the AT&C losses, Division Wise :

Particulars	**20-21**	**21-22**	**22-23**
Energy at T-D (MU)	869.33	940.12	931.91
Net T-D energy attributable to MSPDCL-D sale (MU)	748.19	786.10	824.51
Distribution Losses (MU)	223.48	153.215	107.39
Distribution Losses (%)	13.94%	16.3%	11.52%

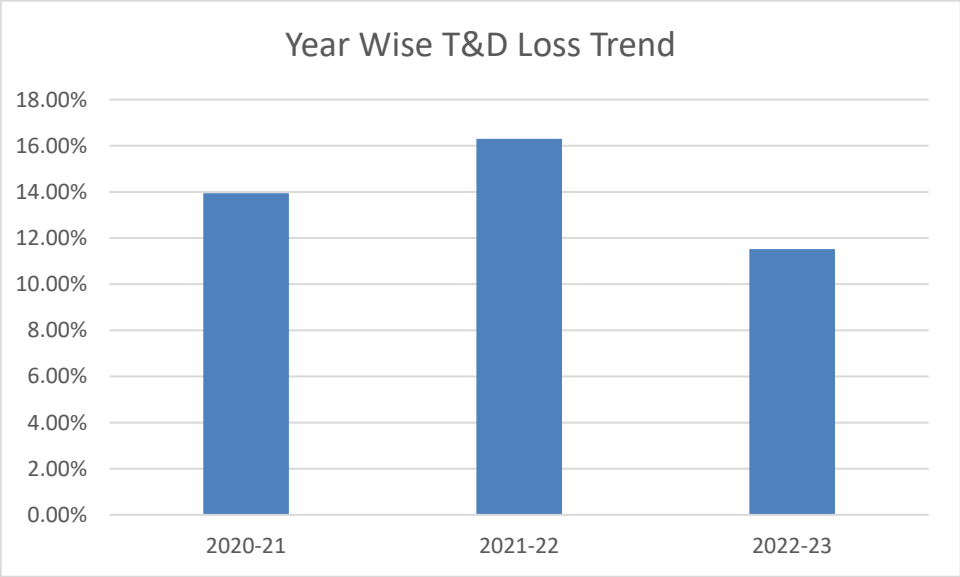


Figure 3: Year wise Distribution loss

b. Identify high loss Divisions.

High loss 11 KV feeders are about 15 numbers, which are having loss more than 20%, and are in Circle -1 only. All these feeders data analysed and physical foot survey carried out in some of the feeders.

c. Identify high loss feeders.

The following list gives the list of high loss-making feeders circle wise / division wise.

S.no	Location	T&D Losses (%)	Remarks
1	KAIMAI	21.74%	25.66%
2	DAIKHAI	22.73%	22.73%
3	SINGHAT	23.30%	23.30%
4	BILL	23.47%	33.42%
5	KHONGHAMPAT	24.64%	28.41%
6	CHAKPIKARONG	24.88%	24.88%
7	JNV MAO	25.13%	4.92%
8	LANGOL	25.96%	33.36%
9	GENEL	26.13%	29.82%
10	SAGOLMANG	26.43%	36.00%
11	NONEY	26.59%	6.77%
12	KHAIDEM	28.43%	37.73%
13	MANTRIPUKHRI II	29.04%	38.26%
14	HILL FEEDER	29.58%	36.62%
15	ICP	29.82%	10.87%
16	DC TBL	30.31%	37.28%
17	WATER SUPPLY	30.72%	39.73%
18	PGCI	30.78%	39.78%
19	FEEDER -III	30.85%	30.85%
20	AIR	31.06%	40.02%
21	JESAMI	31.26%	12.70%
22	SEKMAI/KHONGHAMPAT	31.47%	34.90%
23	PANGEI	32.73%	41.48%
24	SUGNU/SEROU	32.87%	32.87%
25	KANGVAI	34.88%	34.88%
26	MU	34.95%	43.40%
27	Western 2	34.97%	41.47%

28	LHANGCHAM	36.03%	42.43%
29	TUININGKHAL	36.35%	36.35%
30	STPI	36.59%	44.83%
31	DMC	36.60%	44.84%
32	SORTE	37.25%	20.31%
33	WANGJING	39.48%	45.54%
34	PHUNGYAR	39.55%	23.23%
35	INDUSTRY	41.06%	46.95%
36	SINGHAT town	41.56%	41.56%
37	CHANDRAKHONG	43.60%	49.24%
38	JNIMS	45.08%	52.22%
39	SENAPATI	49.09%	35.34%
40	CHANDEL	50.49%	55.44%
41	BRICKFIELD/WAIFEI	51.40%	53.83%
42	ZINGSUI	53.39%	40.80%
43	FOOD PARK	57.60%	63.11%
44	KANGLA SIPHAI	61.91%	66.86%
45	NAMBASHI	62.82%	62.82%
46	SAWOMBUNG	64.67%	69.27%
47	KHONGMAN	68.95%	72.98%
48	TAMEI	69.65%	61.46%
49	URUP	70.10%	73.99%
50	LANGMEIDONG	94.78%	94.78%
51	SITUIKAWN	95.52%	94.31%

d. Identify overloaded segments/ infrastructure

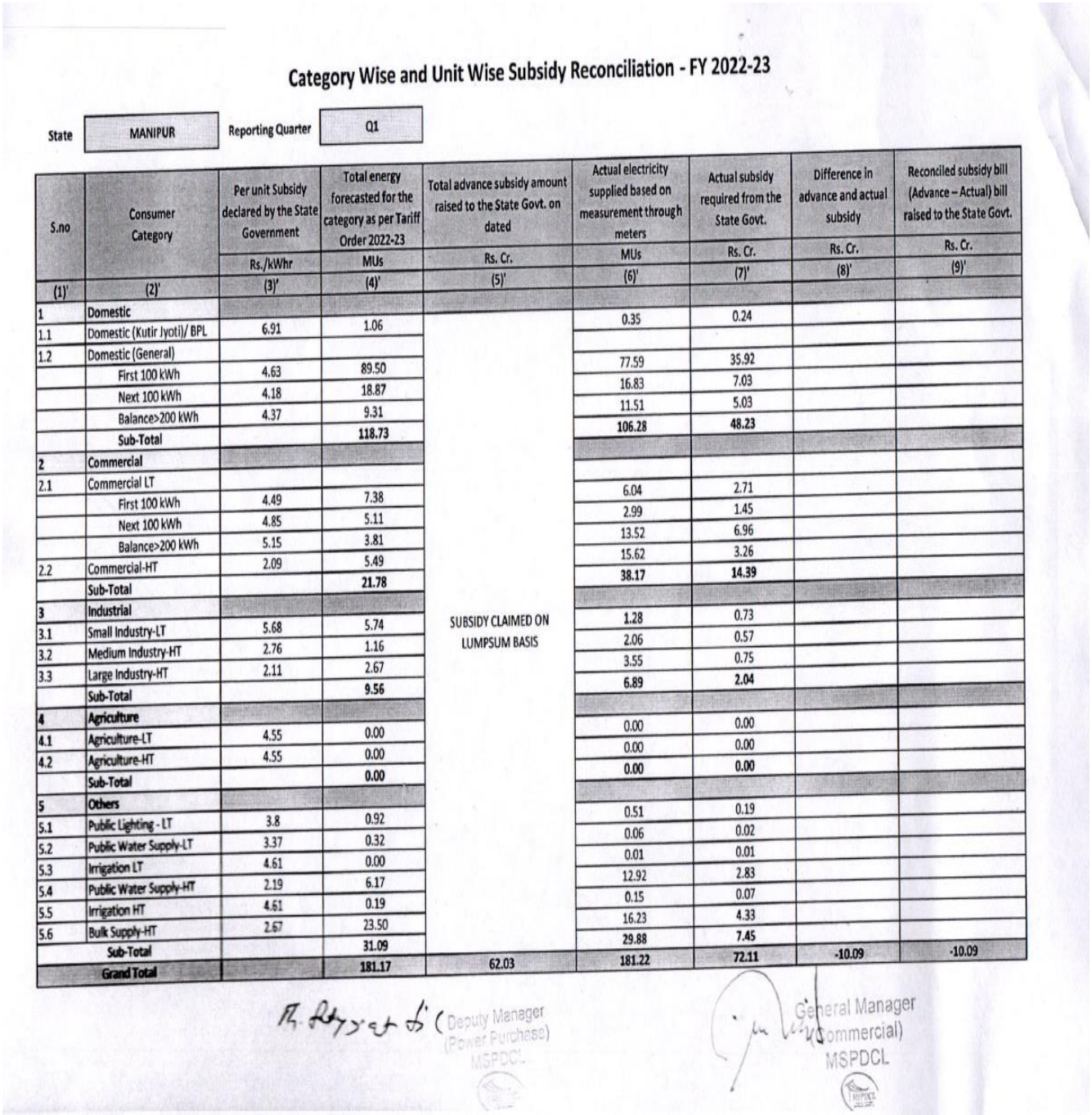
Every day the feeder wise Min and Max ampere data recorded and sent to head office. Where as the DT's data not available.

Out of 9576 DTRs' 5843 DTR's are not having meters.

DTR metering details also not available.

5.3 Subsidy computation and analysis (based on quarterly data)

The following table gives the Quarter wise Subsidy Amount claimed from State Government. The total amount claimed towards subsidy is Rs. 285.41 Crores for the Year 2022-23.



Category Wise and Unit Wise Subsidy Reconciliation - FY 2022-23

State: MANIPUR Reporting Quarter: Q1

S.no	Consumer Category	Per unit Subsidy declared by the State Government	Total energy forecasted for the category as per Tariff Order 2022-23	Total advance subsidy amount raised to the State Govt. on dated	Actual electricity supplied based on measurement through meters	Actual subsidy required from the State Govt.	Difference in advance and actual subsidy	Reconciled subsidy bill (Advance – Actual) bill raised to the State Govt.
		Rs./kWhr	MUs	Rs. Cr.	MUs	Rs. Cr.	Rs. Cr.	Rs. Cr.
(1)'	(2)'	(3)'	(4)'	(5)'	(6)'	(7)'	(8)'	(9)'
1	Domestic							
1.1	Domestic (Kutir Jyoti)/ BPL	6.91	1.06		0.35	0.24		
1.2	Domestic (General)							
	First 100 kWh	4.63	89.50		77.59	35.92		
	Next 100 kWh	4.18	18.87		16.83	7.03		
	Balance>200 kWh	4.37	9.31		11.51	5.03		
	Sub-Total		**118.73**		**106.28**	**48.23**		
2	Commercial							
2.1	Commercial LT							
	First 100 kWh	4.49	7.38		6.04	2.71		
	Next 100 kWh	4.85	5.11		2.99	1.45		
	Balance>200 kWh	5.15	3.81		13.52	6.96		
2.2	Commercial-HT	2.09	5.49		15.62	3.26		
	Sub-Total		**21.78**		**38.17**	**14.39**		
3	Industrial							
3.1	Small Industry-LT	5.68	5.74	SUBSIDY CLAIMED ON LUMPSUM BASIS	1.28	0.73		
3.2	Medium Industry-HT	2.76	1.16		2.06	0.57		
3.3	Large Industry-HT	2.11	2.67		3.55	0.75		
	Sub-Total		**9.56**		**6.89**	**2.04**		
4	Agriculture							
4.1	Agriculture-LT	4.55	0.00		0.00	0.00		
4.2	Agriculture-HT	4.55	0.00		0.00	0.00		
	Sub-Total		**0.00**		**0.00**	**0.00**		
5	Others							
5.1	Public Lighting - LT	3.8	0.92		0.51	0.19		
5.2	Public Water Supply-LT	3.37	0.32		0.06	0.02		
5.3	Irrigation LT	4.61	0.00		0.01	0.01		
5.4	Public Water Supply-HT	2.19	6.17		12.92	2.83		
5.5	Irrigation HT	4.61	0.19		0.15	0.07		
5.6	Bulk Supply-HT	2.67	23.50		16.23	4.33		
	Sub-Total		**31.09**		**29.88**	**7.45**		
	Grand Total		**181.17**	**62.03**	**181.22**	**72.11**	**-10.09**	**-10.09**

(Deputy Manager (Power Purchase) MSPDCL)

(General Manager (Commercial) MSPDCL)

Category Wise and Unit Wise Subsidy Reconciliation - FY 2022-23

State: MANIPUR Reporting Quarter: Q2

S.no	Consumer Category	Per unit Subsidy declared by the State Government	Total energy forecasted for the category as per Tariff Order 2022-23	Total advance subsidy amount raised to the State Govt. on dated	Actual electricity supplied based on measurement through meters	Actual subsidy required from the State Govt.	Difference in advance and actual subsidy	Reconciled subsidy bill (Advance – Actual) bill raised to the State Govt.
		Rs./kWhr	MUs	Rs. Cr.	MUs	Rs. Cr.	Rs. Cr.	Rs. Cr.
(1)'	(2)'	(3)'	(4)'	(5)'	(6)'	(7)'	(8)'	(9)'
1	Domestic							
1.1	Domestic (Kutir Jyoti)/ BPL	6.91	1.06		0.24	0.17		
1.2	Domestic (General)							
	First 100 kWh	4.63	89.50		77.84	36.04		
	Next 100 kWh	4.18	18.87		20.76	8.68		
	Balance>200 kWh	4.37	9.31		11.36	4.96		
	Sub-Total		118.73		110.20	49.85		
2	Commercial							
2.1	Commercial LT							
	First 100 kWh	4.49	7.38		6.03	2.71		
	Next 100 kWh	4.85	5.11		2.99	1.45		
	Balance>200 kWh	5.15	3.81		13.15	6.77		
2.2	Commercial-HT	2.09	5.49		16.76	3.50		
	Sub-Total		21.78		38.93	14.43		
3	Industrial							
3.1	Small Industry-LT	5.68	5.74	SUBSIDY CLAIMED ON LUMPSUM BASIS	1.30	0.74		
3.2	Medium Industry-HT	2.76	1.16		2.23	0.62		
3.3	Large Industry-HT	2.11	2.67		3.56	0.75		
	Sub-Total		9.56		7.09	2.11		
4	Agriculture							
4.1	Agriculture-LT	4.55	0.00		0.00	0.00		
4.2	Agriculture-HT	4.55	0.00		0.00	0.00		
	Sub-Total		0.00		0.00	0.00		
5	Others							
5.1	Public Lighting - LT	3.8	0.92		0.54	0.21		
5.2	Public Water Supply-LT	3.37	0.32		0.06	0.02		
5.3	Irrigation LT	4.61	0.00		0.02	0.01		
5.4	Public Water Supply-HT	2.19	6.17		14.77	3.23		
5.5	Irrigation HT	4.61	0.19		0.15	0.07		
5.6	Bulk Supply-HT	2.67	23.50		17.50	4.67		
	Sub-Total		31.09		33.03	8.21		
	Grand Total		181.17	72.72	189.25	74.59	-1.87	-1.87

Deputy Manager (Power Purchase) MSPDCL

General Manager (Commercial) MSPDCL

Category Wise and Unit Wise Subsidy Reconciliation - FY 2022-23

State: MANIPUR | Reporting Quarter: Q3 | Date of Sub. of Subsidy Bill to State Govt. | Copy of Subsidy Bill (Attached)

S.no	Consumer Category	Per unit Subsidised tariff declared by JERC	Total energy forecasted for the category as per Tariff Order 2022-23	Total advance subsidy amount raised to the State Govt. on dated	Actual electricity supplied based on measurement through meters	Actual subsidy required from the State Govt.	Difference in advance and actual subsidy	Reconciled subsidy bill (Advance – Actual) bill raised to the State Govt.
		Fixed Charge (Rs./kW)	MUs	Rs. Cr.	MUs	Rs. Cr.	Rs. Cr.	Rs. Cr.
(1)'	(2)'	(3)'	(4)'	(6)'	(7)'	(8)'	(9)'	(9)'
1	**Domestic**							
1.1	Domestic (Kutir Jyoti)/ BPL	6.91	1.06	0.73	1.27	0.88	-0.15	-0.15
1.2	Domestic (General)							
	First 100 kWh	4.63	89.50	41.44	108.26	50.12	-8.69	-8.69
	Next 100 kWh	4.18	18.87	7.89	22.81	9.53	-1.65	-1.65
	Balance>200 kWh	4.37	9.31	4.07	11.24	4.91	-0.84	-0.84
	Sub-Total		**118.73**	**54.12**	**143.58**	**65.45**	**-11.33**	**-11.33**
2	**Commercial**							
2.1	Commercial LT							
	First 100 kWh	4.49	7.38	3.31	8.90	4.00	-0.68	-0.68
	Next 100 kWh	4.85	5.11	2.48	6.19	3.00	-0.52	-0.52
	Balance>200 kWh	5.15	3.81	1.96	4.59	2.36	-0.40	-0.40
2.2	Commercial-HT	2.09	5.49	1.15	6.65	1.39	-0.24	-0.24
	Sub-Total		**21.78**	**8.90**	**26.32**	**10.75**	**-1.85**	**-1.85**
3	**Industrial**							
3.1	Small Industry-LT	5.68	5.74	3.26	6.94	3.94	-0.68	-0.68
3.2	Medium Industry-HT	2.76	1.16	0.32	1.40	0.39	-0.07	-0.07
3.3	Large Industry-HT	2.11	2.67	0.56	3.23	0.68	-0.12	-0.12
	Sub-Total		**9.56**	**4.14**	**11.58**	**5.01**	**-0.87**	**-0.87**
4	**Agriculture**							
4.1	Agriculture-LT	4.55	0.00	0.00	0.00	0.00	0.00	0.00
4.2	Agriculture-HT	4.55	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
5	**Others**							
5.1	Public Lighting - LT	3.8	0.92	0.35	1.12	0.43	-0.08	-0.08
5.2	Public Water Supply-LT	3.37	0.32	0.11	0.40	0.14	-0.03	-0.03
5.3	Irrigation LT	4.61	0.00	0.00	0.00	0.00	0.00	0.00
5.4	Public Water Supply-HT	2.19	6.17	1.35	7.46	1.63	-0.28	-0.28
5.5	Irrigation HT	4.61	0.19	0.09	0.24	0.11	-0.02	-0.02
5.6	Bulk Supply-HT	2.67	23.50	6.27	28.43	7.59	-1.32	-1.32
	Sub-Total		**31.09**	**8.17**	**37.65**	**9.89**	**-1.72**	**-1.72**
	Grand Total		**181.17**	**75.33**	**219.13**	**91.11**	**-15.78**	**-15.78**

Deputy Manager (Power Purchase) MSPDCL

General Manager (Commercial) MSPDCL

Category Wise and Unit Wise Subsidy Reconciliation - FY 2022-23

State	MANIPUR	Reporting Quarter	Q4	Date of Sub. of Subsidy Bill to State Govt.	20-Jan-23	Copy of Subsidy Bill (Attached)	

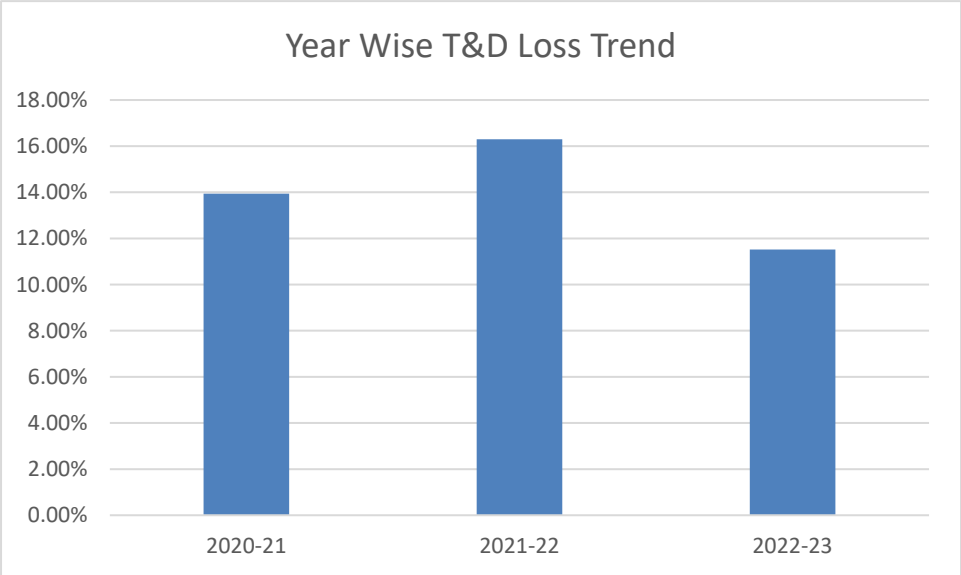
S.no	Consumer Category	Per unit Subsidised tariff declared by JERC	Total energy forecasted for the category as per Tariff Order 2022-23	Total advance subsidy amount raised to the State Govt. on dated	Actual electricity supplied based on measurement through meters	Actual subsidy required from the State Govt.	Difference in advance and actual subsidy	Reconciled subsidy bill (Advance – Actual) bill raised to the State Govt.
		Fixed Charge (Rs./kW)	MUs	Rs. Cr.	MUs	Rs. Cr.	Rs. Cr.	Rs. Cr.
(1)'	(2)'	(3)'	(4)'	(6)'	(7)'	(8)'	(9)'	(9)'
1	Domestic							
1.1	Domestic (Kutir Jyoti)/ BPL	6.91	1.06	0.73	1.42	0.98	-0.25	-0.15
1.2	Domestic (General)							
	First 100 kWh	4.63	89.50	41.44	120.16	55.63	-14.20	-8.69
	Next 100 kWh	4.18	18.87	7.89	25.31	10.58	-2.69	-1.65
	Balance>200 kWh	4.37	9.31	4.07	12.47	5.45	-1.38	-0.84
	Sub-Total		118.73	54.12	159.36	72.64	-18.52	-11.33
2	Commercial							
2.1	Commercial LT							
	First 100 kWh	4.49	7.38	3.31	9.88	4.44	-1.12	-0.68
	Next 100 kWh	4.85	5.11	2.48	6.87	3.33	-0.85	-0.52
	Balance>200 kWh	5.15	3.81	1.96	5.10	2.62	-0.66	-0.40
2.2	Commercial-HT	2.09	5.49	1.15	7.38	1.54	-0.39	-0.24
	Sub-Total		21.78	8.90	29.22	11.93	-3.03	-1.85
3	Industrial							
3.1	Small Industry-LT	5.68	5.74	3.26	7.70	4.38	-1.12	-0.68
3.2	Medium Industry-HT	2.76	1.16	0.32	1.56	0.43	-0.11	-0.07
3.3	Large Industry-HT	2.11	2.67	0.56	3.59	0.76	-0.20	-0.12
	Sub-Total		9.56	4.14	12.85	5.56	-1.42	-0.87
4	Agriculture							
4.1	Agriculture-LT	4.55	0.00	0.00	0.00	0.00	0.00	0.00
4.2	Agriculture-HT	4.55	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total		0.00	0.00	0.00	0.00	0.00	0.00
5	Others							
5.1	Public Lighting - LT	3.8	0.92	0.35	1.24	0.47	-0.12	-0.08
5.2	Public Water Supply-LT	3.37	0.32	0.11	0.45	0.15	-0.04	-0.03
5.3	Irrigation LT	4.61	0.00	0.00	0.00	0.00	0.00	0.00
5.4	Public Water Supply-HT	2.19	6.17	1.35	8.28	1.81	-0.46	-0.28
5.5	Irrigation HT	4.61	0.19	0.09	0.26	0.12	-0.03	-0.02
5.6	Bulk Supply-HT	2.67	23.50	6.27	31.55	8.42	-2.15	-1.32
	Sub-Total		31.09	8.17	41.78	10.98	-2.81	-1.72
	Grand Total		181.17	75.33	243.21	101.12	-25.79	-25.79

Deputy Manager (Power Purchase) MSPDCL

General Manager (Commercial) MSPDCL

5.4 Trend analysis and identification of key exceptions

The T&D losses over a period getting reduced due to various initiatives taken by MSPDCL. Periodic , vigilance survey of high loss segments/ areas carried out to avoid theft and avoid any pilferage and reduce losses.



6. Energy Audit findings

6.1 Review of capacity of DISCOM's energy accounting and audit cell

MSPDCL has dedicated Energy Audit cell headed by ED(Tech) and supporting by DGM (PP & EA) and other staff.

Right now full time energy manager is not there and outsourced from outside.

Internal people are encouraged to become BEE Certified energy Manager/ Auditor

6.2 Critical analysis - status and progress in compliance to prerequisites to energy accounting, data gaps, and summary of key responses of DISCOM management on Comments by Energy Auditor

i. Summary of Critical Analysis

1. Critical Analysis by Energy Auditor

Division wise analysis:

It is imperative to do division wise analysis to get the real picture of the energy performance. There are well performing divisions in the state. But at the same time there are worse performing divisions which are dragging down the overall performance of the DISCOM. In the audit these divisions should be pointed out and corrective measures should be devised in the action plan. The overall division wise analysis is given below-

Table 16: Division wise analysis

Item Description	Audited Data
Average T&D Loss (%)	11.52
T&D Loss Range in % (minimum & maximum values)	8 to 18%
Division with highest T&D Loss	IDE-4
Division with lowest T&D Loss	IDE-1,Tengnoupal
Average Collection Efficiency (%)	85.63%
Collection Efficiency Range in % (minimum & maximum values)	64.21 to 98.72%
Average AT&C Loss (%)	22%
AT&C Loss Range in % (minimum to maximum)	4 to 38%
Division with highest AT&C Loss	Pherzawl
Division with lowest AT&C Loss	IED I & IED II& IED III& Tengnoupal

Table 17: High T&D Loss Feeders:

Sl. No	Average T&D Loss	Name of the Divisions reported with more than the average T&D Losses	T&D Loss %
1	➢ **20%**	KAIMAI	21.74%
		DAIKHAI	22.73%
		SINGHAT	23.30%
		BILL	23.47%
		KHONGHAMPAT	24.64%
		CHAKPIKARONG	24.88%
		JNV MAO	25.13%
		LANGOL	25.96%
		GENEL	26.13%
		SAGOLMANG	26.43%
		NONEY	26.59%
		KHAIDEM	28.43%
		MANTRIPUKHRI II	29.04%
		HILL FEEDER	29.58%
		ICP	29.82%
		DC TBL	30.31%
		WATER SUPPLY	30.72%
		PGCI	30.78%
		FEEDER -III	30.85%
		AIR	31.06%
		JESAMI	31.26%
		SEKMAI/KHONGHAMPAT	31.47%
		PANGEI	32.73%
		SUGNU/SEROU	32.87%
		KANGVAI	34.88%
		MU	34.95%
		Western 2	34.97%
		LHANGCHAM	36.03%
		TUININGKHAL	36.35%
		STPI	36.59%
		DMC	36.60%
		SORTE	37.25%
		WANGJING	39.48%
		PHUNGYAR	39.55%

		INDUSTRY	41.06%		
		SINGHAT town	41.56%		
		CHANDRAKHONG	43.60%		
		JNIMS	45.08%		
		SENAPATI	49.09%		
		CHANDEL	50.49%		
		BRICKFIELD/WAIFEI	51.40%		
		ZINGSUI	53.39%		
		FOOD PARK	57.60%		
		KANGLA SIPHAI	61.91%		
		NAMBASHI	62.82%		
		SAWOMBUNG	64.67%		
		KHONGMAN	68.95%		
		TAMEI	69.65%		
		URUP	70.10%		
		LANGMEIDONG	94.78%		
		SITUIKAWN	95.52%		

Some of the feeders the T&D loss is negative, as the billing is done from these consumers in these feeders, but power supply is given from another feeders/ diverted, due to operation problems and breakdowns.

Highlights of Collection Efficiency:

SL.No	Name of Division	Energy Sales (MU)	Input Energy (MU)	Billing Efficiency %	Collection Efficiency %
1	IED-I	116.3648	126.6072	91.91%	98.72%
2	IED-II	104.35	115.824	90.09%	96.96%
3	IED-III	95.7042	111.6337	85.73%	94.10%
4	IED-IV	90.2341	110.0342	82.01%	94.27%
5	Bishnupur	89.3668	98.2987	90.91%	84.26%
6	Churachandpur	65.8185	74.421	88.44%	86.86%
7	Kakching	40.4678	46.0225	87.93%	97.42%
8	Thoubal	77.1403	85.31	90.42%	90.89%
9	Pherzawl	9.0089	9.8838	91.15%	64.21%
10	Kangpokpi	35.8247	40.129	89.27%	86.96%
11	Chandel	18.7855	21.5898	87.01%	71.79%
12	Noney	3.7554	4.2991	87.35%	81.46%
13	Senapati	20.798	23.4485	88.70%	80.58%
14	Tamenglong	8.3033	9.598	86.51%	84.65%
15	Tengnoupal	13.2049	14.3203	92.21%	89.36%
16	Jiribam	14.3812	16.1474	89.06%	80.63%
17	Ukhrul	21.0036	24.339	86.30%	72.60%

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

- Proforma of FY 2020-21, FY 21-22 have been submitted by MSPDCL.
- The Annual Energy Report and Proforma of FY 22-23 is being submitted now by MSPDCL.
- Energy meters are installed at each voltage level for energy consumption, however most of the meters are not working. The daily units consumption is calculated based on Amps and feeder wise losses are computed. The readings are taken manually and submitted to head office for preparation of monthly reports.
- The energy reading of commercial and Industrial consumers, Distribution transformer readings are downloaded by CMRI into the appropriate software for billing and analysis.

6.3 Revised findings based on data validation and field verification

Based on the Verification report, the following values towards T&D and AT&C losses finalized.

The below table shows the main parameters arrived for MSPDCL

Particulars	**22-23**
Energy at T-D (MU)	931.91
Net T-D energy attributable to MSPDCL-D sale (MU)	824.51
Distribution Losses (MU)	107.39
Distribution Losses (%)	11.52%

Figure 5: FY 22-23 Distribution loss

The AT&C loss is mentioned below

Particulars	**2022-23**
Collection efficiency	92%
AT & C loss	19%

6.4 Inclusions and Exclusions

The inclusion and exclusion are as below:

- Open Access Energy is excluded
- Transmission losses are excluded as energy purchased from MSPCL is energy received at MSPDCLperiphery

7. Conclusion and Action Plan

i. Summary of critical analysis by Energy Auditor

Distribution losses have reduced from 13.84 % in 2020-21 to 11.52% in 2022-23.

- The residential consumers form a bulk of the consumers where losses are high.
- The HT/LT ratio is approximately 0.75. The growth of LT is higher than HT network.
- The numbers of 11/0.415 KV transformers are very high as compared to 33/22/11 KV transformers due to high LT load and LT consumers. This is one of the reasons for high T&D loss.

Around 70% of MSPDCL load is LT with LT Residential consumers nearly 85%. To cater to the high LT load and consumer demand the number of LT and LT cables is high.

- Most of the places, 11 KV meters are not working, i.e 61% not working
- The consumption is computed based on Min / Max Amps on each feeder
- Some of the Power transformers in substations are very old. The old transformers have more losses compared to modern transformers.
- Out of 9553 DTR's 5843 DTR's are not metered, and the existing DTR's meters also mostly not working.
- The length of LT cables is 1.33 times that of HT cables. The HT load is around 30% withapprox. 0.4% of HT consumers. These necessitates long lengths of LT cables to cater to demand which increase distribution loss.

7.2. Summary of key findings – energy balance and losses

- 11 KV feeders metering is the major issue.
- From the below table out of 216 feeders 161 feeders are not metered, it can be seen that only 43% feeder are metered.
- Hence firm action plan isneeded to complete the metering of the remaining feeders.

Name of the Division	33/11 KV AT A GLANCE				
	No. of Feeders	No. Feeders Metered	No. of Feeders Unmetered	No. of Feeders currently covered by energy audit	No. of Feeders connected with Feeder Monitoring System (FMS)
IED-I	17	14	3	0	0
IED-II	23	22	1	0	0
IED-III	35	19	16	0	0
IED-IV	33	0	33	0	0
Bishnupur	23	15	8	0	0
Thoubal	30	15	15	0	0
Kakching	13	0	13	0	0
Churachandpur	19	10	9	0	0
Pherzawl	6	0	6	0	0
Chandel	12	7	5	0	0
Jiribam	4	4	0	0	0
Kangpokpi	14	2	12	0	0
Noney	5	0	5	0	0
Tengnoupal	9	2	7	0	0
Ukhrul	8	0	8	0	0
Kamjong	8	0	8	0	0
Senapati	12	9	3	0	0
Tamenglong	9	0	9	0	0

ENERGY ACCOUNT OF FY 2022-23

Details of computation of Input energy

- Energy is purchased from MSPCL.
- Transmission loss is not accounted for as energy purchased from MSPCL is the energy available at DISCOM periphery.
- Energy received at the periphery includes energy for Open Access consumers at MSPDCL network.Energy for Open Access consumers is deducted to arrive Input energy required at T<>D.
- Input energy at T<>D interface (including OA consumers) is computed by compilation of ABT meter readings. The energy drawn by MSPDCL at T<>D interface is based on ABT meters installedat their RSS and check meters.

Net Input Energy for MSPDCL is arrived as below:

Net Input Energy at T<>D periphery (For MSPDCL consumers) =Gross Input Energy purchased
–(minus) Transmission Loss
+ (plus) Energy Input for Open Access consumers
- (minus) grossed up Open Access Sale

- The OA sales are grossed up (Wheeling loss as percentage of metered energy is added tometered energy.
- The grossed-up sales are then deducted with energy recorded at T<>D periphery (ABT meters)to arrive at Net input energy at T<>D to MSPDCL consumers.

The various parameters for FY 2022-23 are tabulated below

Particulars	Values
Energy at T-D (MU) – including Open Access	824.51

Distribution Losses (MU)	107.39
Distribution Losses (%)	11.52

AGGREGATE TECHNICAL LOSSES

The aggregate technical loss is shown below

Sr no	Particulars	Unit	2022-23
1	Net T<>D energy attributable to MSPDCL-D sale	MU	931.91
2	Distribution Losses	MU	107.39
3	Distribution Losses	%	11.52

Note:

- The energy attributed to OA consumers is not included in MSPDCL network T&D loss calculations.
- The transmission losses are not made available. As Energy purchased through the MSPCL is billed for energy received at DISCOM periphery, technical losses as exclusiveof transmission losses.

AT&C LOSSES

Collection efficiency

	Commercial Parameter		
	Billed Amount in Rs. Crore	**Collected Amount in Rs. Crore**	**Collection Efficiency**
Residential	369.839	336.658	91.03%
Agricultural	0.000	0.000	0.00%
Commercial/Industrial-LT	117.146	110.930	94.69%
Commercial/Industrial-HT	95.337	87.544	91.83%
Others	221.192	203.479	91.99%
Total	**803.5144978**	**738.61051**	**91.92%**

The AT&C losses is shown below

Particulars	2022-23
Collection efficiency	92%
AT & C loss	19%

VOLTAGE-WISE LOSSES

Voltage-wise consumption data and losses are not computed.

DIVISION-WISE LOSSES

Division wise data was not made available. The circle wise energy input and sales data was collected.Circle wise and total distribution losses are given below:

ENERGY DETAILS	CIRCLE1	CIRCLE2	CIRCLE3	MSPDCL
Energy Inputs (MU)	509.644	274.56	129.97	931.91
Energy Sales (MU)	480.07	261.92	97.55	824.51
Distribution losses (MU)	29.57	12.54	34.75	107.39
Distribution losses (%)	6%	9%	24%	11.52%

FEEDER-WISE LOSSES

In total 216 – 11 KV Feeders data available and provided in the annexure.

Out of these 216 – 11 KV Feeders are having T&D losses of more than 15%, which are given separately in the annexure. MSPDCL is having an action plant to reduce the losses particularly for these feeders.

Initially suggest to rectify the non working 11 KV feeder meters and install SCADA system.

TCS has been hired on pilot basis to monitor 5 numbers of 11 KV feeders to monitor feeder wise losses and suggest measures to reduce it. Once this pilot study is successful, it will be implemented in entire state of Manipur.

DTR Losses.

Name of Division	Total No. of DTs	Non-Agriculture (Capacity-wise data and if HVDS or not)			
		Total No. of DTs Metered (Functioning)	Total No. of DTs with AMR/ Communicating meters	Total No. of DTs with non-functioning meters/ CT-PTs	Total No. of DTs unmetered
IED I	346	4	0	278	64
IED-II	660	145	0	102	413
IED III	843	47	47	129	620
IED-IV	729	68	0	0	661
Bishnupur	695	157	0	33	505
Thoubal	1023	47	6	484	486
Kakching	372	35	35	0	302
Churachandpur	748	136	136	125	351
Pherzawl	118	0	0	0	118
Chandel	381	80	0	70	231
Jiribam	170	25	25	0	120
Kangpokpi	565	93	0	0	472
Noney	462	173	0	10	279
Tengnoupal	236	23	0	0	213
Ukhrul	434	104	0	0	330
Kamjong	570	410	0	0	160
Senapati	471	135	0	33	303
Tamenglong	730	38	0	497	195

DTR metering is not available for most of the DTR's. Out of 9553 DTR's 5843 DTR's are unmetered i.e. 61%

UNITWISE PERFORMANCE (Circle wise)

The area of distribution is divided in 3 Circles & 18 Divisions. Division wise data was not made available. The circle wise energy input and sales data was collected. Circle wise and total distribution losses are given below:

ENERGY DETAILS	CIRCLE1	CIRCLE2	CIRCLE3	MSPDCL
Energy Inputs (MU)	509.644	274.56	129.97	931.91
Energy Sales (MU)	480.07	261.92	97.55	824.51
Distribution losses (MU)	29.57	12.54	34.75	107.39
Distribution losses (%)	6%	9%	24%	11.52%

Consumer Consumption Details

1st Apr 2022 to 31 Mar 2023 (Energy in MU)

Consumer category	Total Number of connections (Nos)	% of number of connections	Input energy (MU)	Metered energy	Unmetered energy	Total energy
Residential	485933	94%	931.9055	600.3871387	139.633751	740.0208897
Agricultural	0	0		0	0	0
Commercial/Industrial-LT	29681	6%		69.61768172	11.82787609	81.44555782
Commercial/Industrial-HT	1109	0		0.991854001	0.5867772	1.578631201
Others	1169	0		1.096526836	0.370394436	1.466921272
Total	**517892**	**100%**	**931.9055**	**672.0932012**	**152.4187988**	**824.512**

This detail excludes Open Access consumers at MSPDCL network.

7.3. Recommendations and best practices – energy accounting, loss reduction, and energy conservation

ENERGY CONSERVATION ADOPTED AND PROPOSED FOR FUTURE

MSPDCL also planned varied field actions and track the performance of the said actions to ensure sustainable loss reduction initiatives. Following key loss reductions initiatives undertaken in corresponding financial years.

- Pilot studies going for monitoring of 11 KV feeders & energy audit
- Smart meters are being installed.
- LT ABC cables have laid in theft prone areas.
- HT ABC cables have been laid.
- Power transformer capacity enhancement work has been done.
- Distribution transformer capacity enhancement work is undertaken.
- Agency has been appointed for monitoring of feeder wise loss on monthly basis.

MSPDCL has also planned major advanced initiatives for enhancing productivity and efficiency by implementation of SCADA system.

The following table gives the action plan for loss reduction and automated data accounting and Reporting to improve both T&D and AT&C losses

Based on the interaction with MSPDCL, the following Action plan proposed to be implemented by MSPDCL during the coming years.

Sl.No	Targeted interventions for loss reduction	Units	Physical Targets as per DPR				Estimated Outlay as per DPR Rs. Lakh
			FY22	FY23	FY24	FY25	
1	11kV Feeder Bifurcation	ckM		50	150	197.2	61.810
2	Reconductoring of 11kV feeders	ckM		100	200	340.16	69.270
3	Reconductoring of 33kV feeders with new bay	ckM			80	128.5	178.680
4	Laying of AB Cable [(3x50+1x35) Sq.mm. including 5nos. of Steel Tubular pole] by replacing LT bare conductor inLoss prone divisions	kM		150	250	300	81.370
5	Laying of AB Cable [(3x70+1x50) Sq.mm. including 5nos. of Steel Tubular pole] by replacing LT bare conductor inLoss prone divisions	kM		250	350	450	150.260
6	Laying of AB Cable [(3x95+1x70) Sq.mm. including 5nos. of Steel Tubular pole] by replacing LT bare conductor in Loss prone divisions	kM		100	100	300	82.440
7	Unified Billing Solution withMDM	LS			to be implemented		17.136
8	ERP Infra (Four modules)	No of modules		2	1	1	25.000
9	Load forecasting Tool	LS		to be imple-mented			16.200
10	Energy Accounting Module	LS		to be imple-mented			4.284
11	Consumer indexing	LS			to be implemented		5.100
12	Smart MCCB	Nos.		200	400	1111	13.690
13	Medium Voltage Covered Conductor	ckM		40	80	200	74.580
							779.820

7.4 Action plan for monitoring and reporting

- First suggested to rectify the 11 KV feeder meters.
- Next suggested MSPDCL to implement SCADA.
- Have a dedicated team for Monitoring and reporting of feeder wise data, and also implement smart meter for the major consumers.

7.5 Action plan for automated energy accounting

- Suggested to implement smart meters at the earliest
- Suggested to implement SCADA / ADMS for the Substations

8. ANNEXURES

Annexures: To be accompanied with the Report

8.1. Introduction of Verification Firm

Siri Exergy is Established in 2008, and is a leading sustainability solutions provider specialized in Energy Efficiency, ISO-50001 (EnMS) Implementation, Water Audit, Carbon Foot Print, NetZero, Clean Development Mechanism (CDM), Solar Energy, Sustainability Reporting/BRSR/ ESG studies as per SEBI guidelines. Siri Exergy is empanelled with the Bureau of Energy Efficiency (BEE), Govt of India as an Energy Auditing consultancy and an ESCO (Energy Services Company)- Grade-3 company. Over 600 energy audits, Monitoring & Verification audits, DPR's under its belt, Siri Exergy is the chosen partner for several businesses across India & Abroad for transitioning into a green economy.

Siri Exergy has carried out more than 75 M&V audits and 50 Mandatory Energy Audits of various DC's including DISCOMS and also Annual Energy Audits of few DISCOMs.

For MSPDCL, Annual Energy Audit, the following Team from M/s Siri Exergy & Carbon Advisory Services P Ltd, Hyderabad, constituted.

No	Name	Designation
1.	Dr.G.Subramanyam	Accredited Energy Auditor & Team Leader
2.	Mr. D.Pawan Kumar,	Accredited Energy Auditor
3.	Mr. G Ram Reddy	Discom Sector Expert
4.	Mr. M.Vinod Babu	Team Member

8.2 Minutes of Meeting with the DISCOM team

Annual Energy Audit of FY 2022-23, MINUTES OF MEETING

Name of the DC: Manipur State Power Development Company Ltd, (MSPDCL)

Name of the EmAEA Team: Siri Exergy & Carbon Advisory Services P Ltd, Hyderabad

- Dates: 24th Oct – 1st Nov 2023

Team Members from M/s Siri Exergy & Carbon Advisory Services P Ltd, Hyderabad

No	Name	Designation
1.	Dr.G.Subramanyam	Accredited Energy Auditor & Team Leader
2.	Mr. D.Pawan Kumar,	Accredited Energy Auditor
3.	Mr. G Ram Reddy	Discom Sector Expert
4.	Mr. M.Vinod Babu	Team Member

Members Present from **MSPDCL**

S No	Name	Designation
1	Mr. Mangsatabam Rabi Singh	Exe Director – Tech
2	Mr Lourembam Momocha	DGM (PP & EA)
3	Mr Uskam Rocky	DGM
4	Mr Satyajeet	DM- F&A
5	Mr. Ravinder Vannam	Energy Manager

As part of Annual Energy Audit of FY 2022-23, the site visit was made during the period 24th Oct – 1st Nov 2023, and the minutes of the closing meeting are as follows:

Siri Exergy Team met all the key personnel and thanked **MSPDCL** team for giving the opportunity to carry out Annual Energy Audit of FY 2022-23. The EmAEA team reviewed the initiatives carried out by **MSPDCL- Manipur,** towards T&D loss and also AT& C loss reduction, and below are the following other activities which were carried out:

- Siri Exergy Team has explained the BEE scope of work under Annual Energy Audit during Kick off meeting
- Verification of data for FY 2022- 23 and performance during FY 2022-23

- Siri Exergy Team has explained the BEE scope of work under Annual Energy Audit during Kick off meeting
- Verification of data for FY 2022- 23 and performance during FY 2022-23
- The information regarding energy data sheet provided in Form-1 and sector specific Pro-forma format for the FY 2022-23 were verified for the following points.
  a) Feeder wise Energy Input data and sales
  b) Billed Energy, T&D loss and AT&C loss for the Year 2022-23
  c) Connected Load, Metered / Unmetered consumer's data from MIS data base

- Verification of Month wise energy Input, circle wise energy loss, category wise billing efficiency, Category wise collection Efficiency, and AT&C losses for the FY 2022-23
- Details of Energy conservation options already implemented, various schemes under implementation, and the Budget allocation for each scheme.
- Carried out Field survey of some of the substations, high loss feeders.

Siri Exergy Team thanked **MSPDCL** for excellent support & Cooperation extended.

Signature	Signature
Name : Dr G Subramanyam	Name : **Mr.Mangsatabam Rabi Singh**
Designation : Accredited Energy Auditor & Team Leader G. SUBRAMANYAM Director Siri Exergy & Carbon Advisory Services (P) Ltd. 93A, Janaki Enclave, Saroornagar, Hyderabad-500035, Telangana State	Designation : Exe Director (Tech) Executive Director (Tech.), MSPDCL
Company/Firm : **Siri Exergy & Carbon Advisory Services Pvt Ltd**	Company/Firm : **MSPDCL**

SiriExergy Team	MSPDCL Team
Mr. D. Pawan Kumar Accredited Energy Auditor	**Mr Momocha - DGM (PP& EA)**
Mr. G Ram Reddy Discom Sector Expert	**Mr Satyajeet – DM**
Mr. M.Vinod Babu Team Member	**Mr Ravinder Vannam – Energy Manager**

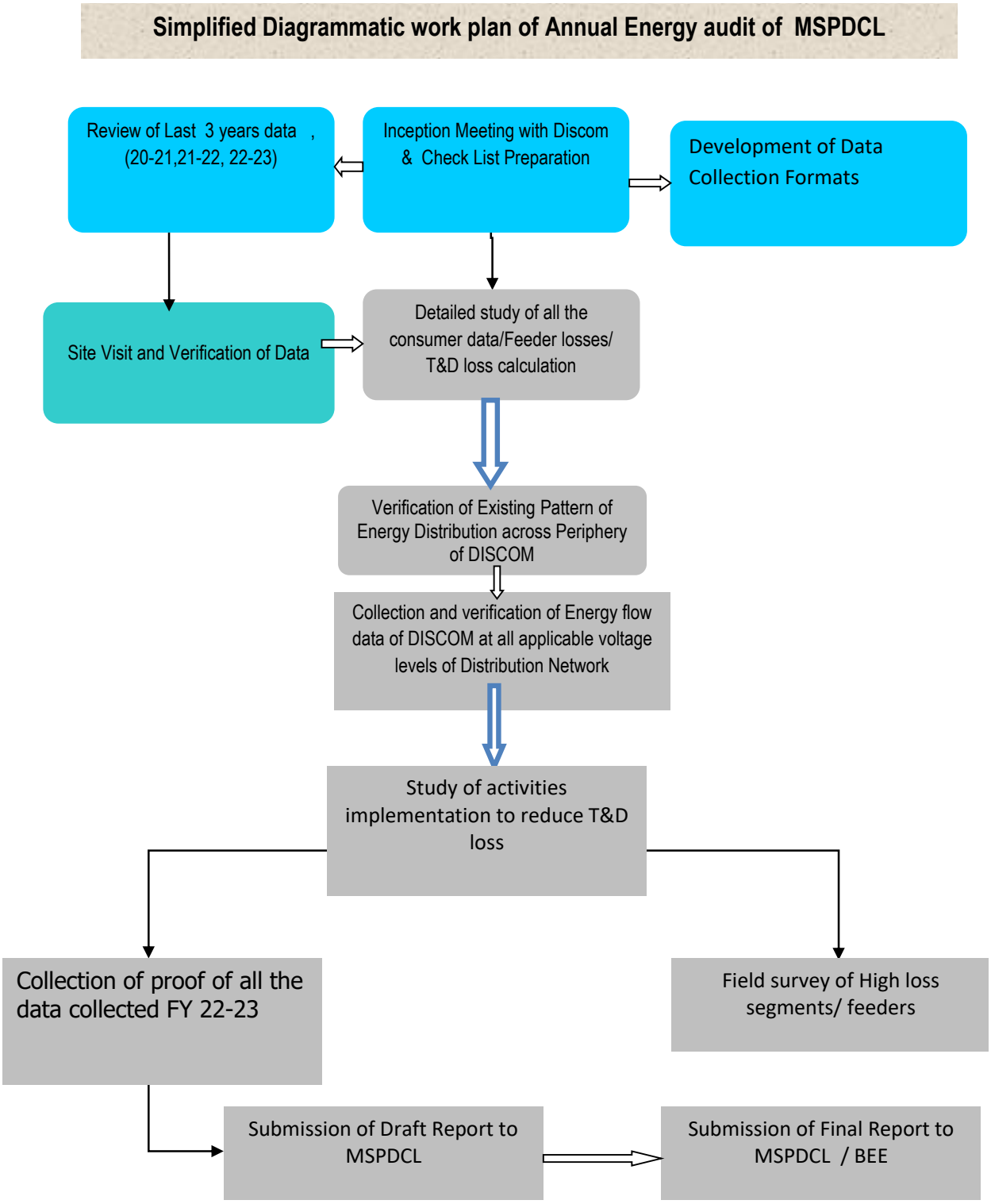
8.3 Check List prepared by auditing Firm. (check list items may be detailed out in annexure)

The following checklist prepared and accordingly the data collected and verified

- Verification of data for FY 2022- 23 and performance during FY 2022-23
- The information regarding energy data sheet provided in Form-1 and sector specific Pro-forma format for the FY 2022-23 were verified for the following points.
  a) Electrical Energy Input data verified log book and online generated data
  b) Billed Energy, T&D loss and AT&C loss for the Year 2022-23
  c) Connected Load, Metered / Unmetered consumer's data from MIS data base

- Verification of Month wise energy Input, circle wise energy loss, category wise billing efficiency, Category wise collection Efficiency, and AT&C losses for the FY 2022-23
- Details of Energy conservation options already implemented, various schemes under implementation, and the Budget being spent on each scheme verified.
- Details of High T&D loss Feeders and Divisions
- Foot over survey of Feeders and high T&D loss areas
- Verification of Input Energy Metering points at 220/33 KV substation.
- Details of Overloaded / Unbalanced load DTR's
- Power Point presentation on key observations to top Management.

8.4 Brief Approach, Scope & Methodology for audit

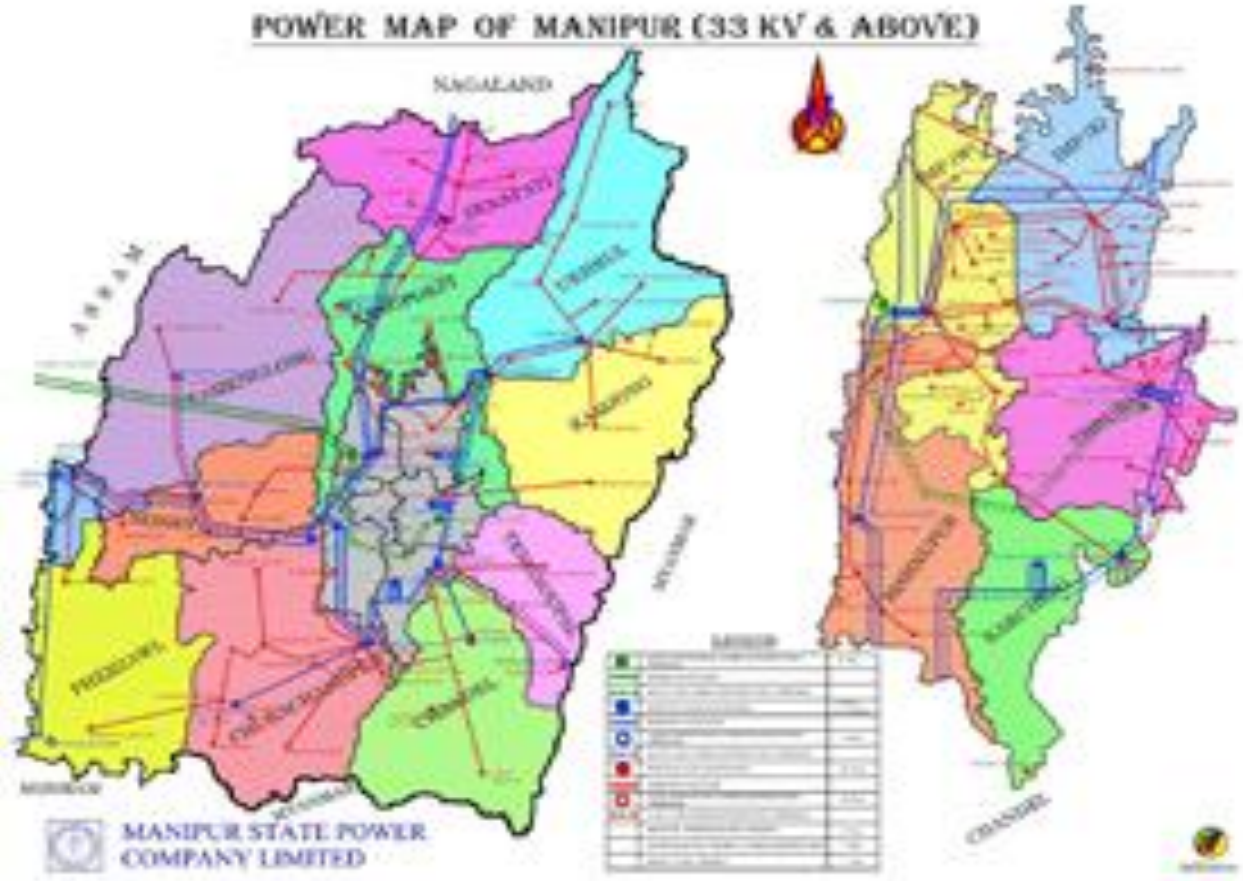


8.5 Infrastructure Details

Form-Details of Input Infrastructure					
1	**Parameters**	**Total**	**Covered during in audit**	**Verified by Auditor in Sample Check**	**Remarks (Source of data)**
i	Number of circls	3			
ii	Number of divisions	17			
iii	Number of sub-divisions	47			
iv	Number of feeders	216			
v	Number of DTs	9576			
vi	Number of consumers	517892			
2	**Parameters**	**66kV and above**	**33kV**	**11/22kV**	**LT**
a. i.	Number of conventional metered consumers	0	0	754	431408
ii	Number of consumers with 'smart' postpaid meters				86484
iii	Number of consumers with 'smart prepaid' meters				0
iv	Number of consumers with 'AMR' meters		22	0	0
v	Number of consumers with 'non-smart prepaid' meters				0
vi	Number of unmetered consumers			355	
vii	**Number of total consumers**	**0**	**22**	**1109**	**517892**
b.i.	Number of conventionally metered Distribution Transformers		0	0	
ii	Number of DTs with communicable meters		219	0	
iii	Number of unmetered DTs				
iv	**Number of total Transformers**	**0**	**219**	**9576**	
c.i.	Number of metered feeders	0	101	0	
ii	Number of feeders with communicable meters	0	0	0	
iii	Number of unmetered feeders	0	0		
iv	**Number of total feeders**	**2**	**101**	**216**	**0**
d.	Line length (ct km)		789	7860	2891
e.	Length of Aerial Bunched Cables		0	0	16872
f.	Length of Underground Cables		270.5	253	600

8.6 Electrical Distribution System

The following diagram gives the Electrical Distribution system of MSPDCL

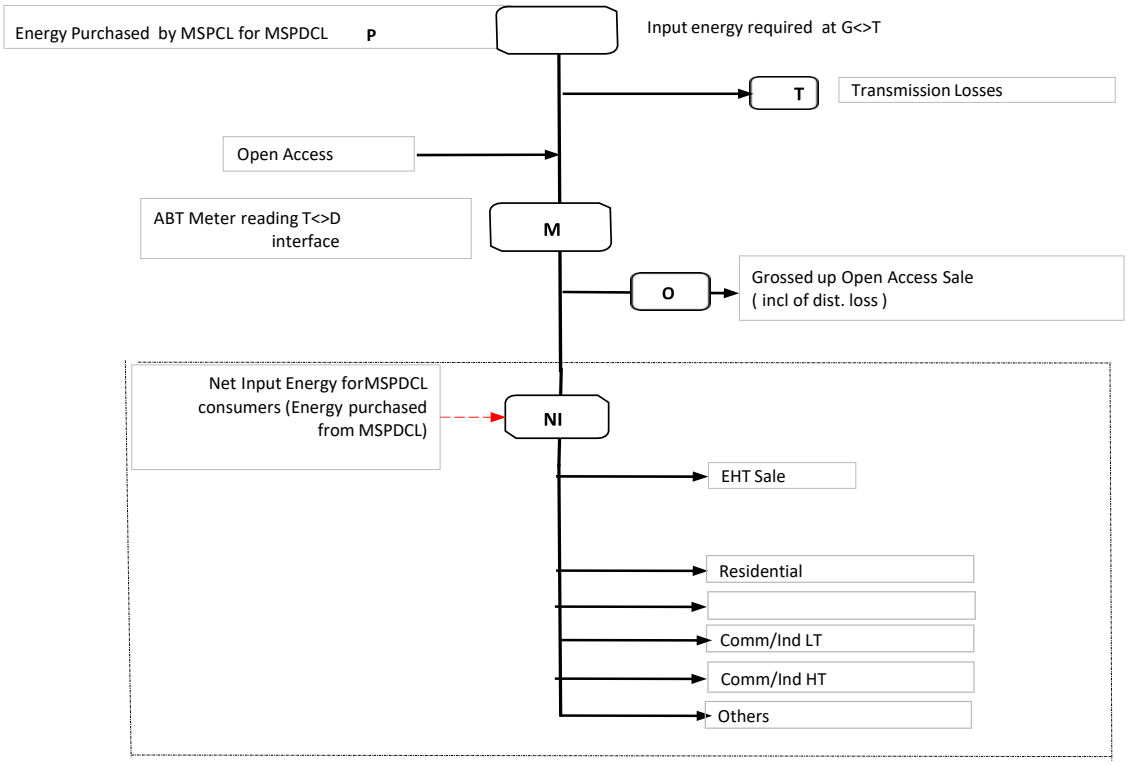


8.7 Power Purchase Details

Power Purchase Details

- The bulk purchase of power is made available by the MSPCL on accrual basis at the rates approved/ bills raised by MSPDCL.
- Transmission charges are accounted for on accrual basis on bills raised by the MSPDCL

8.8 Line Diagram (SLD)



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

220/132 KV or 132/33 KV, 33/11 KV Voltage wise losses are not available.

8.10 Field verification data and reports

Foot Survey Report

Based on the discussion with MSPDCL, Foot Survey was carried out in Kangla Substation by taking permission from Manipur State Power Company Ltd (MSPCL), which manages all the 33/11 KV substations in Manipur

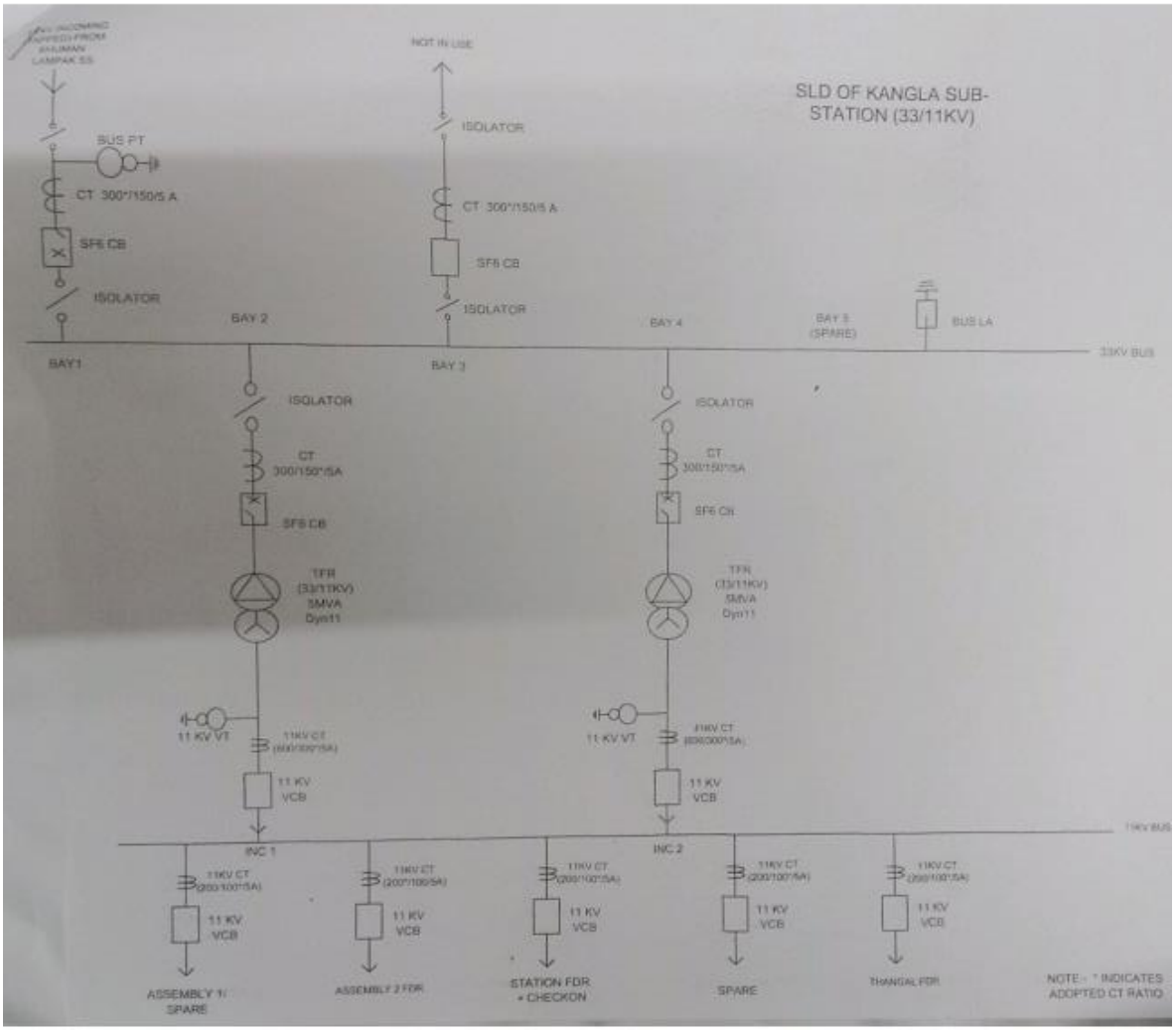
As part of the foot Survey, Thangal Feeder in Kangla 33/11 KV substation is selected, which is having 19.34% T&D loss during the year 2022-23.

The Kangla 33/11 substation has 1 x 5 MVA power transformer, with 3 no's of 11 KV Feeders namely:

1. Assembly -2
2. Thangal
3. Station

Site Observations

This substation receives power through 2 number of 33 KV incomers from Khuman 33 KV feeder. The following figure gives the SLD of Kangla Substation.



33/11 KV Sub-Station ENERGY EXCHANGE DATA

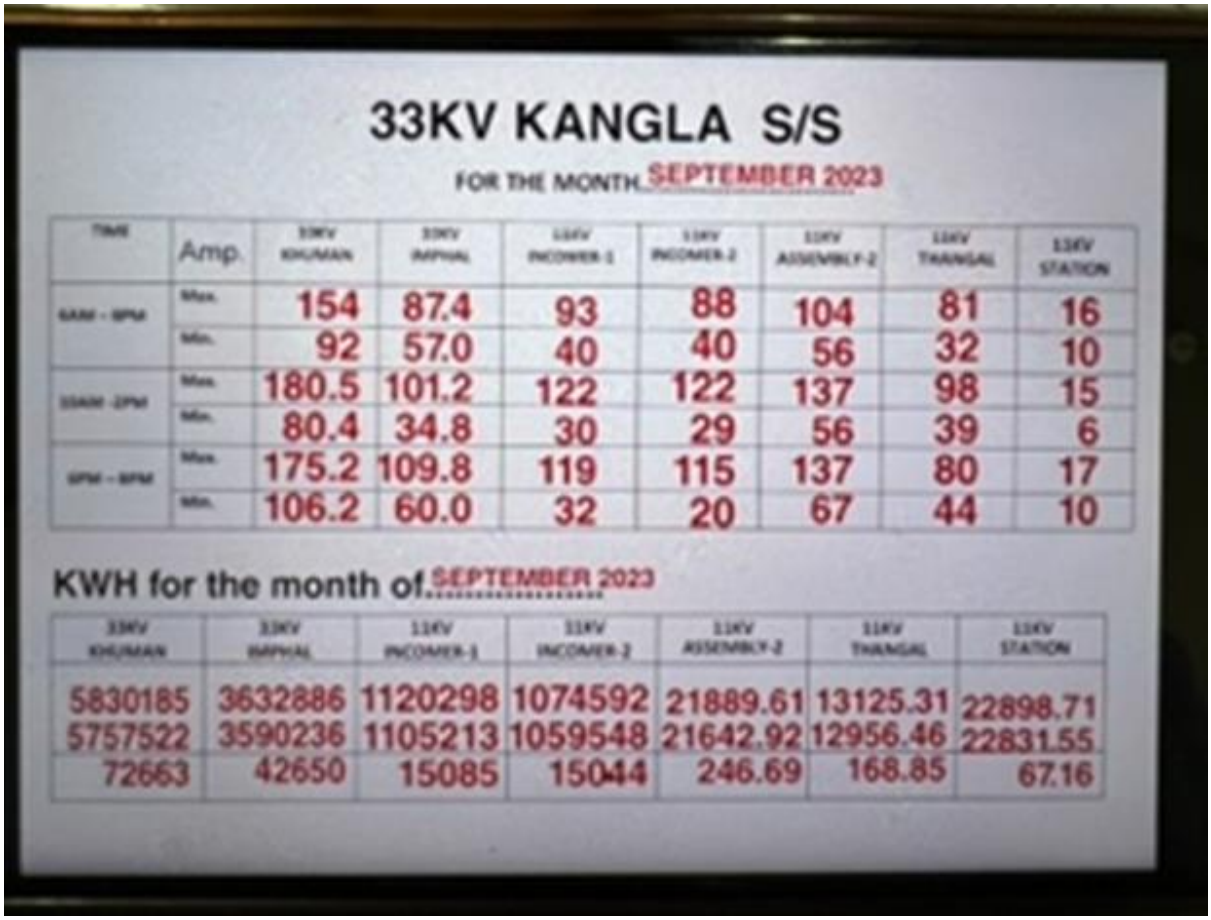
Division : SSD-I

Month : MARCH 2023

Sl. No.	Sub-Station	Name of Feeder	Initial Reading KWH	Final Reading KWH	Difference KWH	CT RATIO	MF	Energy Consumed in MU	Demand (MW) Max.		Remarks
									Max.	Min	
	33/11 kV Kangla	33 kV Khuman	5332446	5404817	72371	300/5	60	4.34226	9.69	3.48	
		33 kV Imphal Power House	3314229	3372290	58061	300/5	60	3.48366	7.93	3.15	
		11 kV Incomer 1	1030386	1037751	7365	300/5	60	0.4419	1.7818	0.0364	
		11 kV Incomer 2	985198	992271	7073	300/5	60	0.42438	1.2182	0.0364	
		11 kV Assembly 2	20645.67	20646.23	0.56	200/5	4000	0.00224			
		11 kV Station Feeder	22363.03	22469.67	106.64	100/5	200	0.021328	0.4364	0.1818	
		11 kV Thangal	11961.99	12125.92	163.93	200/5	400	0.065572	2.1455	0.6364	
								4.43908			

Feeders Load

Sl.No	Feeder Name	Max	Min	Number of trips during October	T&D Loss	Remarks
1	Assembly-2 Feeder	137	56	1		
2	Thangal	98	32	1		
3	Station	17	6	NIL		



33KV KANGLA S/S

FOR THE MONTH SEPTEMBER 2023

TIME	Amp.	33KV KHUMAN	33KV IMPHAL	11KV INCOMER-1	11KV INCOMER-2	11KV ASSEMBLY-2	11KV THANGAL	11KV STATION
6AM - 8PM	Max.	154	87.4	93	88	104	81	16
	Min.	92	57.0	40	40	56	32	10
10AM -2PM	Max.	180.5	101.2	122	122	137	98	15
	Min.	80.4	34.8	30	29	56	39	6
6PM - 8PM	Max.	175.2	109.8	119	115	137	80	17
	Min.	106.2	60.0	32	20	67	44	10

KWH for the month of SEPTEMBER 2023

33KV KHUMAN	33KV IMPHAL	11KV INCOMER-1	11KV INCOMER-2	11KV ASSEMBLY-2	11KV THANGAL	11KV STATION
5830185	3632886	1120298	1074592	21889.61	13125.31	22898.71
5757522	3590236	1105213	1059548	21642.92	12956.46	22831.55
72663	42650	15085	15044	246.69	168.85	67.16

Site Observations

- All the feeders energy meters are working and the data recorded day wise in the log book and sent to SSD every month
- Peak load is during 10am to 2 PM and again 6 pm to 8 pm
- The consumers are mostly Offices / households
- The main reason reasons trips due to replacement of power cables / insulators / isolators / terminal bus failure / burnt etc

Suggestions:

- ✓ It is suggested to replace power cables/insulators
- ✓ Suggested to go for SCADA implementation
- ✓ Suggested to replace all the faulty meters.
- ✓ Suggested to install smart meters with pre-paid metering.
- ✓ Educate the consumers on smart meters.

KEISHAMPAT Substation 33/11 KV

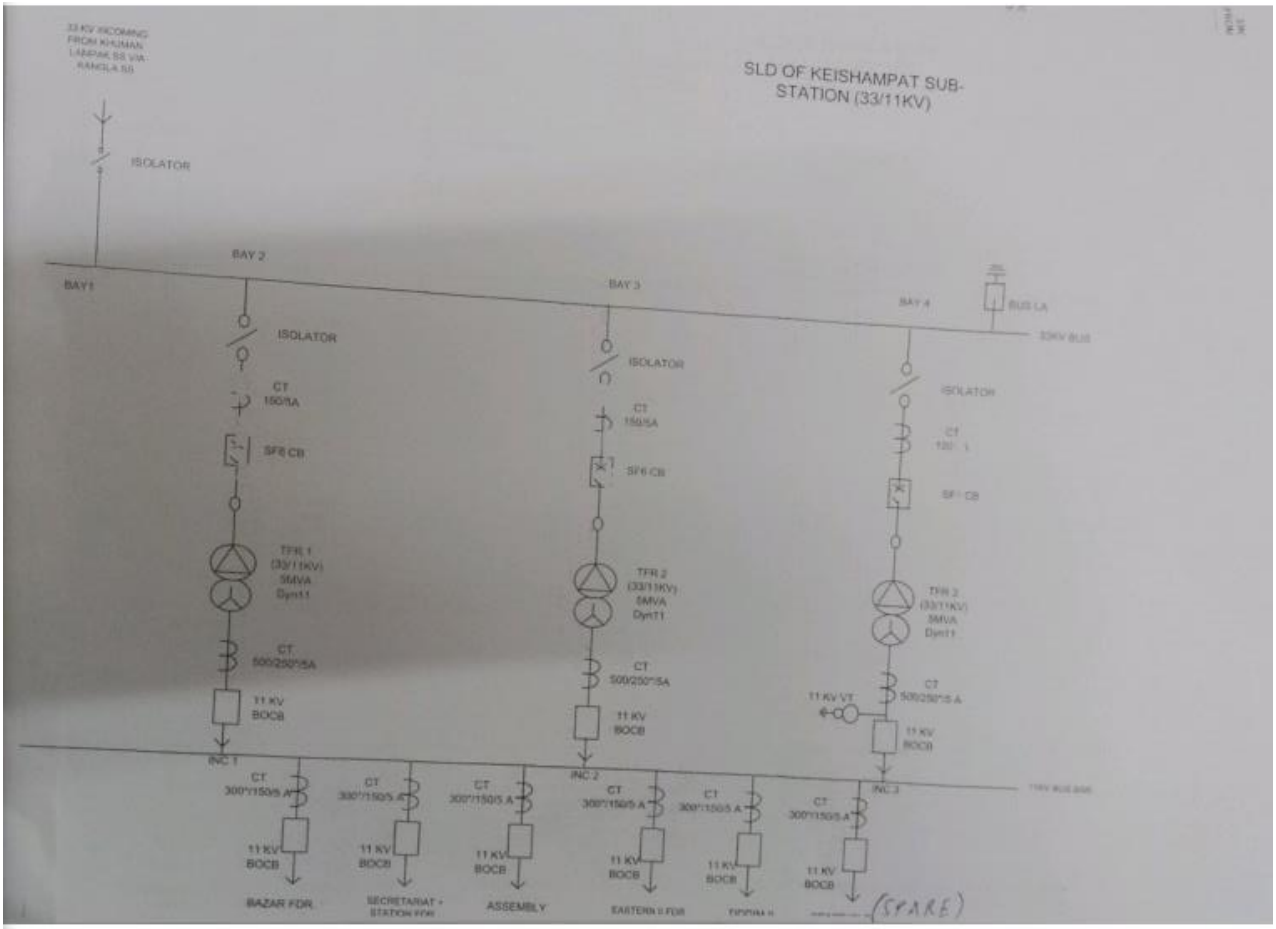
Based on the discussion with MSPDCL, one more 33/11 KV substation – Keishampat was selected. Below are the observations noted during visit, and few photographs are enclosed.

The Keishampat 33/11 substation has 3 x 5 MVA power transformers, with 5 no's of 11 KV Feeders namely: (during the audit period one of 1 x5 MVA power transformer was out of service since March 2023.

1. Bazar
2. Secreteriate
3. Assembly-1
4. Eastern-II
5. Tiddin- II

Site Observations

This substation receives power through 1 number of 33 KV incomers from Kuzman 33 KV substation.



Feeders Load

Sl.No	Feeder Name	Max	Min	Number of trips during August	T&D Loss	Remarks
1	Bazar	80	10			
2	Secretariat	60	30			
3	Assembly-1	40	25			
4	Eastern-II	100	30			
5	Tiddin- II	45	40			

C

33/11 KV Sub-Station ENERGY EXCHANGE DATA

Division : SSD-I

Month : MARCH 2023

Sl. No.	Sub-Station	Name of Feeder	Initial Reading KWH	Final Reading KWH	Difference KWH	CT RATIO	MF	Energy Consumed in MU	Demand (MW)		Remarks
									Max.		
									Max.	Min	
	33/11 kV IPH	11 kV INCOMER 1	1489999	1518297	28298	250/5	50	1.4149	2.5455	0.9091	
		11 kV INCOMER 2	1534204		0	250/5	50	0	2.4545	1.0909	Incommer II Transformer (5MVA) was under maintenance
		11 kV INCOMER 3	1592554	1628051	35497	250/5	50	1.77485	2.3636	1.2727	
		11 kV Tiddim No. II	7725.44	7813.62	88.18	300/5	60	0.005291	1.6364	0.4545	
		11 kV Eastern No.II	11251.25	11390.11	138.86	300/5	60	0.008332	2.2727	0.5455	
		11 kV Assembly	11195.06	11296.28	101.22	300/5	60	0.006073	1.6364	0.6364	
		11 kV Secretariat	15358.85	15502.69	143.84	300/5	60	0.00863	1.8182	0.7273	
		11 kV Bazar	7885.64	7991.13	105.49	300/5	60	0.006329	1.5455	0.4545	

Site Observations:

- The substation more than 30 years old
- All the Power Transformers & switchgears are very old
- All the feeders energy meters are working and the data recorded day wise in the log book and sent to SSD every month
- Peak load is during 10am to 2 PM and again 6 pm to 8 pm
- The consumers are mostly Offices / VIP's like – Raj Bhavan/Secretariat
- The main reason reasons trips due to replacement of power cables / insulators / isolators / terminal bus failure / burnt etc

Suggestions:

- ✓ It is suggested to modernize entire Keishampat Substation
- ✓ Suggested to go for SCADA implementation
- ✓ Suggested to install smart meters with pre-paid metering.
- ✓ Educate the consumers on smart meters.

8.11. List of documents verified with each parameter

Sl.No	As per BEE guidelines for Validation	To be Verified as per BEE	Nos as per MSPDCL	Verified No's	Document Verified
1	11 KV Feeders - Data	10%	216	22	Energy Input/sales Monthly data
2	Input Energy Metering points between transmission and 66KV/33KV/11KV feeders	Min 10 or 1%		10	Field visit to 220 KV/33 KV S/s
3	Metering stations (functional and feeders Communication Stations)-(which ever higher) where T&D losses > 25%	10		10	Field Survey
4	Urban High losses division – (which are higher) at DTs which are installed under R-APDRP and IDPS	5 or 1% of metering points		5	Foot Survey
5	Foot survey 11 KV/66 KV feeders and DTs up to consumer meter	Min of 10 or 1 %		10	Field Visit
6	Verify metering and Connections of Agri/Govt/(ULB/RLB etc), LT industries	Min 10 or 2%		10	220/33 KV Substation Field visit
7	High loss segments/ Feeders			18	Field Visit
8	Overloaded segments/ DTR's			5	Daily reports

8.12. Brief Description of Unit

In pursuance of Electricity Act, 2003, the erstwhile State Electricity Department was unbundled into 2(two) state owned functionally independent successor entities as

i) Manipur State Power Company Limited (MSPDCL)

ii) Manipur State Power Distribution Company Limited (MSPDCL)

MSPCL is a deemed transmission licensee and MSPDCL is a deemed distribution licensee w.e.f. 1st Feb. 2014, by a Gazette notification of the Government of Manipur, vide Manipur State Electricity Reforms Transfer Scheme 2013 (or Transfer Scheme 2013) dated December 2013.

MSPDCL is a 100% subsidiary of MSPCL and undertakes power distribution within the state of Manipur.MSPDCL holds the entire network in the state for all voltage levels of 11 kV and below. MSPDCL also carries out the trading activity. At present, out of a total installed capacity of 2909 MW in the NE Region, 256.40 MW is currently being allocated to Manipur State (about 8.81%) of which 113.60 MW is from Hydel projects and 142.80 MW is from Thermal projects. The requirement of power in the state for the year 2020-21 (Up to December 2020) was 716.40 MU. But the actual availability of power in the state is 861.59 MU. The gap between Demand and Supply was bridged from Banked Energy and the Trading of energy through Indian Energy Exchange (IEX). The per capita energy consumption of Manipur for FY 2019-20 is 385 kWh, much below the all-India per capita consumption of 1208 kWh in 2019-20.

The total area supplied electricity by MSPDCL is divided in 3 Circles & 17 divisions.

1) MSPDCL is serving 517892 consumers of domestic and commercial power categories connected to grid through 216 no. 11 KV feeders
2) MSPDCL has installed 9576 distribution transformers in its distribution network.

8.13 List of Parameters arrived through calculation or formulae with list of documents as source of data

The following T&D losses and AT&C losses for the Year 2022-23, arrived based on final verification of Data.

MSPDCL distribution is divided in 3 Circles & 17Divisions. Division wise data was not made available. The circle wise energy input and sales data was collected. Circle wise and total distribution losses are given below:

ENERGY DETAILS	CIRCLE1	CIRCLE2	CIRCLE3	MSPDCL
Energy Inputs (MU)	509.644	274.56	129.97	931.91
Energy Sales (MU)	480.07	261.92	97.55	824.51
Distribution losses (MU)	29.57	12.54	34.75	107.39
Distribution losses (%)	6%	9%	24%	11.52%

Sr no	Particulars	Unit	2022-23
1	Net T<>D energy attributable to MSPDCL-D sale	MU	824.51
2	Distribution Losses	MU	107.39
3	Distribution Losses	%	11.52

General Information					
1	**Name of the DISCOM**	Manipur State Power Distribution Company Ltd (MSPDCL)			
2	**i) Year of Establishment**	14/01/2000			
	ii) Government/Public/Private				
3	**DISCOM's Contact details & Address**				
i	City/Town/Village	Secure Office Complex, A.T.Line, Imphal West			
ii	District	Imphal East			
iii	State	Manipur		Pin	795001
iv	Telephone			Fax	
4	**Registered Office**				
i	Company's Chief Executive Name	Shri H. Shantikumar Singh			
ii	Designation	Managing Director, MSPDCL			
iii	Address	3rd Floor, Secure Office Building, Near 2nd MR Gate, Imphal-Dimapur Road, Imphal			
iv	City/Town/Village	Imphal		P.O.	Imphal
v	District	Imphal East			
vi	State	Manipur		Pin	795001
vii	Telephone	8837009146		Fax	mdmandiscom@gmail.com
5	**Nodal Officer Details***				
i	Nodal Officer Name (Designated at DISCOM's)	Ng. Kirankumar Singh			
ii	Designation	GM (Commercial)			
iii	Address	3rd Floor, Secure Office Building, Near 2nd MR Gate, Imphal-Dimapur Road, Imphal			
iv	City/Town/Village	Imphal		P.O.	Imphal
v	District	Imphal East			
vi	State	Manipur		Pin	795001
vii	Telephone	7085262175		Fax	knsinghkiran6@gmail.com
6	**Energy Manager Details***				
i	Name	Shri Lourembam Momocha Singh			
ii	Designation	DGM (PP&EA)		Whether EA or EM	EA
iii	EA/EM Registration No.				
iv	Telephone			Fax	
v	Mobile	8731017650	E-mail ID	mmchasin@gmail.com	
7	**Period of Information**				
	Year of (FY) information including Date and Month (Start & End)	April 2022 - March 2023			

NG. KIRANKUMAR SINGH
MSPDCL
Secured Office Building Imphal

8.14 Detailed Formats to be annexed

1.signed copy of Form-1 and Summary sheets

Performance Summary of Electricity Distribution Companies			
1	Period of Information Year of (FY) information including Date and Month (Start & End)	April 2022- March 23	
2	**Technical Details**		
(a)	**Energy Input Details**		
(i)	Input Energy Purchase (From Generation Source)	Million kwh	931.91
(ii)	Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kwh	931.91
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kwh	824.51
(b)	Transmission and Distribution (T&D) loss Details	Million kwh	107.39
		%	11.52
	Collection Efficiency	%	92%
(c)	Aggregate Technical & Commercial Loss	%	19%

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 N.G.K.RAJKUMAR SINGH
Name of the DISCOM: MSPDCL
Full Address:- Second Office Building Imphal

Signature:-
Name of Energy Manager*:
Registration Number:

S.No	Name of circle	Circle code	Name of Division	Consumer category	No of connection	No of connection	Total Number of	% of number of	Connected Load metered	Connected Load Un-metered	Total Connected Load	% of connected load	Input energy (MU)	Metered energy	Unmetered/ assessment energy	Total energy	% of energy consumpt	T&D loss (MU)	T&D loss (%)	Billed Amount in Rs.	Collected Amount in Rs.	Collection Efficiency	AT & C loss (%)
1	Circle -I		IED-1	Residential	25146.00	1292.00	26438	46%	40.308	5.963313817	46.271	30%	126.6072	85.082	2.353570052	87.435	75%	10.242	8%	45.20	44.87	Author: Completed	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0	0.000	0%			0.00	0.00		
				Commercial/Industrial-LT	7373.00	463.00	7836	14%	19.031	3.045140314	22.076	14%		27.269	1.246901974	28.516	25%			24.45	24.36		
				Commercial/Industrial-HT	25.00	4.00	29	0%	2.845	0.46	3.305	2%		0.087	0.012670021	0.099	0%			5.78	5.28	91.48%	
				Others	58.00	35.00	93	0%	0.000	2.57	2.570	2%		0.197	0.117438355	0.315	0%			23.41	23.05	98.50%	
	Sub-total				32602	1794	34396	100%	62.184	12.03865413	74.22265	100%	126.6072	112.6342196	3.730580402	116.3648	100%	10.2424	8%	98.83902	97.57273	98.72%	9%
2	Circle -I		IED-2	Residential	49130.00	3287.00	52417	135%	103.6174105	5.609942056	109.2274	108%	115.824	75.123	6.391	81.514	78%	11.474	10%	55.959	54.345	97.12%	
				Agricultural	0.00	0.00	0	0%	0	0	0	0%		0	0.000	0.000	0%			0	0	0.00%	
				Commercial/Industrial-LT	3321.00	243.00	3564	9%	16.0664255	1.8	17.86643	18%		20.762	1.519	22.281	21%			18.040	17.183	95.25%	
				Commercial/Industrial-HT	99.00	5.00	104	0%	13.87	0.09	13.96	14%		0.237	0.098	0.334	0%			24.188	23.482	97.08%	
				Others	57.00	11.00	68	0%	8.776551724	1.08	9.856552	10%		0.192442561	0.028	0.221	0%			28.99326	28.29754	97.60%	
	Sub-total				52607	3546	56153	100%	142.3303877	8.579942056	150.9103	100%	115.824	96.33415124	8.035848763	104.35	100%	11.474	10%	127.1802	123.3077	96.96%	13%
3	Circle -I		IED-3	Residential	61423.00	6418.00	67841	182%	31.213	12.54830955	43.761	48%	111.634	87.479	1.565	89.044	93%	15.930	14%	70.04	66.59	95.08%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	3260.00	516.00	3776	10%	33.415	2.141161972	35.556	39%		6.288	0.113	6.400	16%			13.42	11.88	88.57%	
				Commercial/Industrial-HT	32.00	21.00	53	0%	16.293	0.58	16.873	18%		0.062	0.001	0.064	0%			3.18	2.86	89.96%	
				Others	100.00	63.00	163	0%	0.000	1.65	1.650	2%		0.193	0.003	0.197	0%			30.25	28.65	94.72%	
	Sub-total				64815	7018	71833	100%	80.921	16.91947153	97.84047	100%	111.6337	94.0217304	1.682469598	95.7042	100%	15.9295	14%	116.8922	109.9929	94.10%	19%
4	Circle -I		IED-4	Residential	46693.00	4890.00	51583	108%	13.781	17.75410491	31.535	22%	110.0342	84.377	1.852	86.229	96%	19.800	18%	46.96	42.51	90.51%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	1760.00	426.00	2186	5%	80.114	2.95130064	83.065	57%		3.065	0.572	3.637	4%			13.43	12.97	96.52%	
				Commercial/Industrial-HT	77.00	10.00	87	0%	144.370	0.2	144.370	99%		0.120	0.041	0.161	0%			14.50	14.22	98.08%	
				Others	100.00	60.00	160	0%	0.000	4.633114754	4.613	3%		0.206	0.001	0.207	0%			47.42	45.62	96.19%	
	Sub-total				48630	5386	54016	100%	238.065	25.51852031	263.5835	100%	110.0342	87.7683	2.4658	90.2341	100%	19.8001	18%	122.3226	115.3163	94.27%	23%
5	Circle-II		Bishnupur	Residential	53692.00	1466.00	55158	160.36%	93.949	1.289322582	95.238	178%	98.299	78.859	7.160	86.019	96%	8.932	9%	33.78	30.77	96.78%	
				Agricultural	0.00	0.00	0	0.00%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	1721.00	351.00	2072	6.02%	20.159	2.294214876	22.453	30%		2.679	0.522	3.201	4%			11.77	11.08	94.15%	
				Commercial/Industrial-HT	33.00	35.00	68	0.20%	30.351	1.1	31.451	42%		0.024	0.041	0.064	0%			3.53	3.30	93.87%	
				Others	45.00	49.00	94	0.27%	0.000	3.6	3.600	5%		0.015	0.068	0.083	0%			12.65	5.18	40.94%	
	Sub-total				55491	1901	57392	100%	144.459	8.283537258	152.7425	100%	98.2987	81.5766	7.7902	89.3668	100%	8.9319	9%	59.72108	50.32156	84.26%	23%
6	Circle-II		Churachandpur	Residential	29895.00	6949.00	36844	51%	60.448	6.26683768	66.715	68%	74.4207	39.472	21.785	61.257	93%	8.602	12%	29.38	24.74	84.22%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	1610.00	187.00	1797	3%	26.556	0.908482143	27.464	28%		2.787	1.538	4.325	7%			7.46	7.30	97.80%	
				Commercial/Industrial-HT	95.00	47.00	142	0%	5.361	1.2	6.561	7%		0.126	0.069	0.195	0%			6.59	6.12	92.74%	
				Others	20.00	17.00	37	0%	0.000	0.3	0.300	0%		0.077	0.015	0.041	0%			6.45	5.18	80.23%	
	Sub-total				31620	7200	38820	100%	92.365	8.675319823	101.0403	100%	74.4207	42.411	23.4075	65.8185	100%	8.6022	12%	49.88831	43.33331	86.86%	23%

NG. KIRANKUMAR SINGH
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Secured Office Executive Engineer

				Residential	33123.00	2439.00	35562	186%	73.747	1.493646209	75.241	67%		26.422	12.435	38.857	96%			20.99	20.74	98.80%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
7	Circle-II		Kakching	Commercial/Industrial-LT	1230.00	155.00	1385	7%	9.942	0.837209302	10.779	10%	46.023	0.984	0.352	1.336	3%	5.555	12%	4.65	4.61	99.00%	
				Commercial/Industrial-HT	30.00	18.00	48	0%	2.956	0.4	3.356	3%		0.024	0.009	0.033	0%			3.11	2.79	89.62%	
				Others	223.00	38.00	261	1%	0.000	2.18	2.180	2%		0.178	0.064	0.242	1%			17.22	16.66	96.71%	
Sub-total					34606	2650	37256	100%	86.645	4.910855512	91.55586	100%	46.0225	27.609	12.8588	40.4678	100%	5.5547	12%	45.9768	44.78867	97.42%	14%
				Residential	38052.00	7336.00	45388	214%	104.245	14.1072155	118.352	121%		53.410	19.992	73.402	95%			29.89	25.78	86.25%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
8	Circle-II		Thoubal	Commercial/Industrial-LT	1821.00	404.00	2225	10%	16.578	1.983462415	18.561	19%	85.31	2.564	0.960	3.524	5%	8.170	10%	8.63	8.19	94.87%	
				Commercial/Industrial-HT	78.00	53.00	131	1%	4.300	1.23	5.530	6%		0.111	0.041	0.152	0%			6.79	6.04	88.94%	
				Others	32.00	73.00	105	0%	0.000	3.66	3.660	4%		0.045	0.017	0.062	0%			17.69	17.25	97.52%	
Sub-total					39983	7866	47849	100%	125.123	20.98067792	146.1037	100%	85.31	56.1301	21.0102	77.1403	100%	8.1697	10%	62.99901	57.25781	90.89%	18%
				Residential	850.00	622.00	1472	8%	2	0.73	2	1%		5.829	2.985	8.814	98%			0.660	0.311	47.09%	
				Agricultural	0.00	0.00	0	0%	0	0	0	0%		0.000	0.000	0.000	0%			0.000	0.000	0.00%	
9	Circle-II		Pherzawl	Commercial/Industrial-LT	22.00	29.00	51	0%	0	0.077333333	0	0%	9.8838	0.034	0.153	0.186	2%	0.875	9%	0.254	0.213	83.77%	
				Commercial/Industrial-HT	1.00	15.00	16	0%	0	0.28	0	0%		0.002	0.007	0.008	0%			1.472	1.009	68.50%	
				Others	0.00	3.00	3	0%	0	0.08	0	0%		0.000	0.000	0.000	0%			0.000	0.000	0.00%	
Sub-total					873	669	1542	100%	1.72	1.167333333	2.887333	100%	9.8838	5.8642	3.1447	9.0089	100%	0.8749	9%	2.386396	1.532343	64.21%	41%
				Residential	14368.00	3895.00	18263	485%	75.080	8.25147537	83.331	71%		17.487	16.893	34.380	96%			13.49	11.03	81.76%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
10	Circle-III		Kangpokpi	Commercial/Industrial-LT	594.00	132.00	726	19%	20.624	0.697152318	21.321	18%	40.129	0.714	0.577	1.291	4%	4.304	11%	2.84	2.52	88.77%	
				Commercial/Industrial-HT	59.00	16.00	75	2%	6.772	0.99	7.762	7%		0.071	0.056	0.127	0%			5.61	5.48	97.77%	
				Others	12.00	15.00	27	1%	0.000	0.24375	0.244	0%		0.015	0.012	0.026	0%			3.92	3.45	88.05%	
Sub-total					15033	4058	19091	100%	102.476	10.18237769	112.6584	100%	40.1286	18.2864	17.5383	35.8247	100%	4.3039	11%	25.8561	22.48361	86.96%	22%
				Residential	5262.00	6507.00	11769	21%	70.543	5.997203066	76.540	51%		6.228	12.057	18.285	97%			2.05	1.39	35.04%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
11	Circle-III		Chandel	Commercial/Industrial-LT	137.00	49.00	186	0%	40.611	0.282692308	40.894	27%	21.5898	0.110	0.313	0.423	2%	2.804	13%	0.72	0.68	94.05%	
				Commercial/Industrial-HT	16.00	17.00	33	0%	17.970	0.3	18.270	12%		0.013	0.037	0.050	0%			1.87	1.54	82.11%	
				Others	9.00	19.00	28	0%	0.000	0.7	0.700	0%		0.007	0.021	0.028	0%			5.41	5.00	92.03%	
Sub-total					5424	6592	12016	100%	129.124	7.279895974	136.4039	100%	21.5898	6.3581	12.4274	18.7855	100%	2.8043	13%	11.99001	8.607276	71.79%	38%
				Residential	1325.00	2283.00	3608	7%	77.678	2.08	79.758	30%		1.002	1.049	2.052	55%			1.06	0.54	51.46%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
12	Circle-III		Noney	Commercial/Industrial-LT	50.00	37.00	87	0%	29.593	0.256153846	29.849	11%	4.2991	0.078	1.626	1.704	45%	0.544	13%	0.69	0.34	49.42%	
				Commercial/Industrial-HT	35.00	13.00	48	0%	7.123	0.75	7.873	3%		0.000	0.000	0.000	0%			2.42	2.20	90.85%	
				Others	0.00	19.00	19	0%	0.000	0.66	0.660	0%		0.000	0.000	0.000	0%			2.09	2.01	96.32%	
Sub-total					1410	2352	3762	100%	114.394	3.746153846	118.1402	100%	4.2991	1.0798	2.6756	3.7554	100%	0.5437	13%	6.254924	5.095389	81.46%	29%
				Residential	8422.00	9091.00	17513	135%	73.171	10.81759315	83.989	55%		8.977	9.742	18.720	90%			3.14	0.83	26.43%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
13	Circle -III		Senapati	Commercial/Industrial-LT	987.00	141.00	1128	9%	38.541	0.913972603	39.455	26%	23.449	0.818	1.142	1.960	2%	2.651	11%	2.38	1.99	83.56%	
				Commercial/Industrial-HT	58.00	30.00	88	1%	33.246	0.59	33.836	22%		0.048	0.067	0.115	0%			7.88	6.75	85.65%	
				Others	2.00	13.00	15	0%	0.028	1.13	1.158	1%		0.002	0.002	0.004	0%			9.44	8.84	93.63%	
Sub-total					9469	9275	18744	100%	144.986	13.45156575	158.4376	100%	23.4485	9.8447	10.9533	20.798	100%	2.6505	11%	22.84407	18.40734	80.58%	29%
				Residential	3117.00	9700.00	12826	56%	92.868	5.338313103	98.206	95%		3.070	5.096	8.165	98%			2.91	1.99	68.31%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
14	Circle-III		Tamenglong	Commercial/Industrial-LT	48.00	57.00	105	0%	26.201	0.24137931	26.442	26%	9.598	0.016	0.078	0.094	1%	1.295	13%	0.96	0.84	87.07%	
				Commercial/Industrial-HT	21.00	7.00	28	0%	26.127	0.13	26.257	25%		0.007	0.035	0.042	1%			1.37	1.33	97.14%	
				Others	1.00	19.00	20	0%	0.000	1.09	1.090	1%		0.000	0.002	0.002	0%			2.67	2.54	95.17%	
Sub-total					3187	9792	12979	100%	145.196	6.799692413	151.9957	100%	9.598	3.0936	5.2097	8.3033	100%	1.2947	13%	7.912204	6.697678	84.65%	27%

NG. KIRANKUMAR SINGH
MSPDCL
Second Office Building Imphal

15	Circle-III		Tengnoupal	Residential	13917.00	7692.00	21609	272%	83.088	0.5805742	83.669	86%	14.3203	8.749	3.740	12.489	95%	1.315	8%	4.59	4.31	93.82%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	1203.00	52.00	1255	16%	15.881	0.012439024	15.893	16%		0.489	0.216	0.704	5%			2.82	2.77	98.21%	
				Commercial/Industrial-HT	5.00	8.00	13	0%	3.426	0.24	3.666	4%		0.003	0.000	0.003	0%			0.86	0.57	65.55%	
				Others	15.00	5.00	20	0%	0.000	0.083333333	0.083	0%		0.005	0.004	0.009	0%			3.83	3.18	82.86%	
	Sub-total				15140	7757	22897	100%	102.395	0.916346558	103.3113	100%	14.3203	9.2458	3.9591	13.2049	100%	1.1154	8%	12.11767	10.82841	89.36%	18%
16	Circle-III		Jiribam	Residential	6365.00	954.00	7319	475%	81.328	1.53	82.858	2870%	16.1474	7.935	5.332	13.264	92%	1.766	11%	3.93	3.14	80.00%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	520.00	82.00	602	39%	10.041	0.272328767	10.313	357%		0.648	0.486	1.083	8%			2.96	2.41	81.66%	
				Commercial/Industrial-HT	14.00	9.00	23	1%	2.718	0.16	2.878	100%		0.018	0.012	0.030	0%			1.80	0.68	48.58%	
				Others	2.00	9.00	11	1%	0.000	1.04	1.040	36%		0.003	0.002	0.004	0%			4.73	4.26	89.98%	
	Sub-total				6901	1054	7955	100%	94.087	3.002328767	97.08933	100%	16.1474	8.6005	5.7807	14.3812	100%	1.7662	11%	13.01382	10.4925	80.63%	28%
17	Circle-III		Ukhrul	Residential	32929.00	7394.00	20323	0%	71.082	8.55513047	79.617	0%	24.339	10.888	9.205	20.093	96%	3.335	14%	5.88	2.77	47.06%	
				Agricultural	0.00	0.00	0	0%	0.000	0	0.000	0%		0.000	0.000	0.000	0%			0.00	0.00	0.00%	
				Commercial/Industrial-LT	593.00	107.00	700	0%	10.877	0.33	11.207	0%		0.315	0.467	0.782	4%			1.66	1.60	96.06%	
				Commercial/Industrial-HT	76.00	47.00	123	0%	5.335	0.86	6.195	0%		0.041	0.061	0.103	0%			4.78	3.89	81.25%	
				Others	19.00	26.00	45	0%	0.000	0.62	0.620	0%		0.011	0.016	0.026	0%			4.99	4.32	86.61%	
	Sub-total				13617	7574	21191	100%	87.294	10.34513047	97.63913	100%	24.339	11.255	9.7486	21.0036	100%	3.3354	14%	17.32011	12.57493	72.60%	37%
18	Grand Total		Total	Residential	403709	82224	485933	94%	1147.656	108.8929821	1256.549	61%	931.9055	600.387	139.634	740.021	90%	107.394	12%	369.839	336.658	91.03%	
				Agricultural	0	0	0	0%	0.000	0	0	0%		0.000	0.000	0.000	0%			0.000	0.000	0.00%	
				Commercial/Industrial-LT	26750	3431	29681	6%	414.430	19.04862317	433.475	21%		69.618	11.828	81.446	10%			117.346	110.930	94.69%	
				Commercial/Industrial-HT	754	355	1109	0%	322.873	9.56	332.433	16%		0.992	0.587	1.579	0%			95.337	87.544	91.83%	
				Others	695	474	1169	0%	8.805	25.30019809	34.10475	2%		1.097	0.370	1.467	0%			221.192	203.479	91.99%	
77	At company level				431408	86484	517892	100%	1893.764388	162.7978033	2056.562	100%	931.9055	672.0932032	152.4187988	824.512	100%	107.3935	11.52%	803.5145	738.6105	91.92%	18.67%

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

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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: NG. KRANTHUMAR SINGH

Name of the DISCOM: MSPDCL

Full Address:- Secured office Building Imphal

Seal

Signature:-

Name of Energy Manager:

Registration Number: