Mandatory Energy Audit Report

FY 2020-21

Thrissur Corporation Electricity Department (TCED)

Reg No. DIS0070KL

Thrissur, Kerala.

Conducted by

SANTHOSH A – ACCREDITED ENERGY AUDITOR SR.NO 0275

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ACKNOWLEDGEMENTS

Bureau of Energy Efficiency (BEE) through its extraordinary gazette notification on 06th October 2021 made the regulation: Manner and Intervals for Conduct of Energy Audit in electricity distribution companies) Regulations, 2021. Through this every electricity distribution company shall conduct an annual energy audit for every financial year and submit the annual energy audit report to the Bureau and respective State Designated Agency (Energy Management Centre, Govt of Kerala) within a period of four months from the expiry of the relevant financial year.

Athul Energy Consultants Pvt Ltd (AEC) places on record its sincere thanks to Energy Management Centre (EMC) for supporting the task of conducting Energy audit of TCED DISCOM for the year 2020-21. The energy audit started in the month of November 2022 and field study completed in December 2022.

We would also like to thank the following officials of M/s Thrissur Corporation Electricity Department (TCED), Thrissur District-Kerala - 680001. for their proactive support and courtesy extended to the AEC team during the study and all other staff, especially the Assistant Engineers and sub staffs of each section, for their cooperation and support given during the whole process.

Mr. Jose T Simon	Electrical Engineer
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Mr. Nikhil B	Assistant engineer/Energy Auditor
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31/01/2023

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ENERGY AUDIT TEAM

Table 1: Energy audit team

Sr No	Name	Qualification	EM/EA/AEA/ Registration No	Experience (In Years)
Team Leader				
1	Mr. Santhosh	• Accredited Energy Auditor	AEA-0275	25
Team Members				
2	Ms. Gayathri Nair	• Certified Energy Auditor • DISCOM Expert	EA - 5918	35
3	Mr. Babu K K	• Certified Energy Auditor • DISCOM Expert	EA - 2422	30
4	Mr. Ashok K M P	• Certified Energy Auditor • M. E. (Energy Engineering)	EA-34760/22	8
5	Ms. Della David	• Certified Energy Auditor • M. Tech (Power electronics)	EA-34867/22	14
6	Ms. Keerthana K	• B Tech Electrical & Electronics	NIL	03
7	Ms. Neema Joy	• B Tech Electrical & Electronics	NIL	03

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1. BASELINE DATA

Table 2: Baseline data - TCED

Base Line Data – FY 2020-21			
1	Electricity provider	KSEBL	
2	Supply Voltage	110 kV	66 kV
3	Tariff	Licensee: Thrissur Corporation– EHT TARIFF	
4	Consumer number	LCN: 21/Thr.Corp	LCN: 21/1029
5	Section office	110 KV Sub Station, Viyyur	
6	Contract demand (kVA)	Can access unlimited demand as per the agreement signed between KSEBL and Thrissur municipality on 1949.	
7	Maximum demand registered (kVA)	24782	10694
8	Average monthly electricity consumption (MU)	7.29	3.49
9	Annual unit consumption (MU)	87.47	41.86
10	Average power factor	0.95	0.95
11	Tariff Rate of energy charges (Rs / kWh)	6.05	
12	Demand charge (Rs / kVA)	340	
	Other details		
13	Number of incoming feeders – From KSEBL - 110 kV and 66 kV (Nos)	02	
14	Number of substations and voltage level	110 kV – Aswini – 01 no 66 kV Aswini – 01 no 33 kV Ikkanda warrier – 01 no	
15	Number of TCED Distribution Feeders – 11 kV (Nos)	16	
16	Feedback points – To KSEBL (Nos)	Nil	
17	Number of DT under TCED	441	
18	Number of DT at 415V level	441	
19	Number of s/s transformers at 33 kV level	01	
20	Number of s/s transformers at 11 kV level	07	
21	Line length at 33 kV voltage level (km)	4.2	
22	Line length at 11 kV voltage level (km)	178.316	
23	Line length at LT voltage level (km)	285.675	
24	HT/LT ratio	01:1.6	
25	Number of consumers - as of March 2021	40436	
26	Connected load (MW) - as of March 2021	214.09	
27	Number of HT consumers	126	
28	Number of LT consumers	40310	
29	Total area of supply (sq km)	12.65	
30	Total population (as per 2011 census)	1,60,000	
31	Number of divisions	01	
32	Number of circles	01	

2. FORM-1 – ENERGY ACCOUNTING

The performance summary of TCED as DISCOM as per the FY 2020-21 is given in the following table.

Table 3: Summary of DISCOM – Form-1

Performance Summary of Electricity Distribution Companies			
1	Period of Information Year of (FY) information including Date and Month (Start & End)	1st Apr, 2020 - 31st March, 2021	
2	**Technical Details**		
(a)	**Energy Input Details**		
(i)	Input Energy Purchase (From Generation Source)	Million kWh	129.33
(ii)	Net input energy (at DISCOM Periphery including sale outside periphery)	Million kWh	129.33
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded)	Million kWh	121.08
(b)	Transmission and Distribution (T&D) loss	Million kWh	8.25
		%	6.38
	Collection Efficiency	%	96.43%
	Billing Efficiency	%	93.62%
(c)	Aggregate Technical & Commercial Loss	%	9.72%

The feeder wise T&D loss of the TCED distribution system is calculated based on the annual unit consumption for 4 feeders and summarized in the following table:

Table 4: T & D loss – Summarised – feeder wise

Sl. No	**Feeder**	**Net energy sales - annual**	**LT Overhead line loss**	**LT Cable loss**	**Transformer Loss**	**HT overhead & cable line loss**	**Estimated Consumption at feeder level**	**T&D Loss**	
		MU	**MU**	**MU**	**MU**	**MU**	**MU**	**MU**	**%**
1	Chembukavu	7.40	0.52	0.01	0.11	0.00	8.05	0.65	8.11
2	Bini	3.85	0.06	0.00	0.09	0.00	4.00	0.15	3.78
3	Ramanilayam	4.57	0.08	0.00	0.09	0.00	4.74	0.17	3.55
4	Shornur Road	8.51	0.63	0.02	0.20	0.00	9.36	0.86	9.15
	Total	**24.32**	**1.29**	**0.04**	**0.49**	**0.01**	**26.15**	**1.83**	**6.99**

Note:

- ***Sampled 4 feeders for the T&D loss analysis out of 16 feeders as the feeder wise LT line length, consumer numbers and transformer details were not present for the remaining feeders during the audit period.***
- *The DISCOM is mapping the consumers and its assets in the due process under the RDSS.*
- *The performance summary sheet or loss analysis does not contain the solar generated units as all were consumed in the generated voltage level itself.*

3. ENERGY FLOW DIAGRAM

Energy flow diagram is given below in figure:

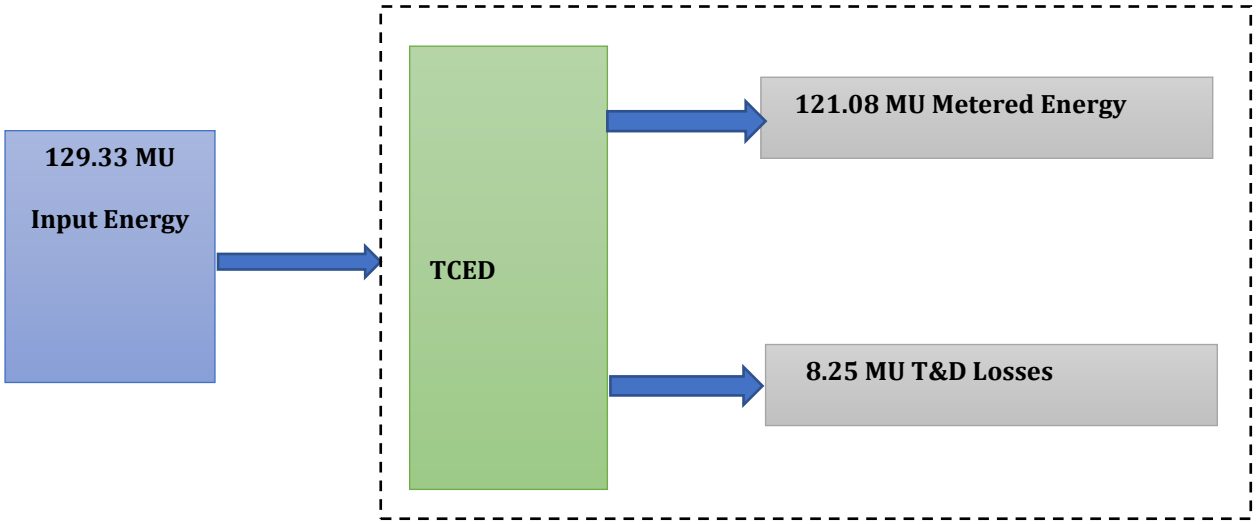

Figure 1: Energy flow diagram - TCED

- *Input energy = the energy received at the TCED for distribution.*
- *Metered energy = energy metered at the consumer end*
- *T&D losses = Net losses*

4. FORM INPUT ENERGY

The table below shows the **major energy parameters for the FY 2020-21**

Table 5: Major energy parameters – DISCOM

Form-Input energy (Details of Input energy & Infrastructure)			
A. Summary of energy input & Infrastructure			
Sl. No	**Pa rameters**	**Period from April 2020 to March 2021**	**Remarks (Source of data)**
A.1	Input Energy purchased (MU)	129.33	Electricity bill
A.2	Transmission loss (%)	0%	
A.3	Transmission loss (MU)	0	
A.4	Energy sold outside the periphery (MU)	0.00	
A.5	Open access sale (MU)	0	
A.6	EHT sale	0	
A.7	Net input energy (received at DISCOM periphery or at distribution point)-(MU)	129.33	Total input energy
A.8	Is 100% metering available at 66/33 kV (Select yes or no from list)	Yes	
A.9	Is 100% metering available at 11 kV (Select yes or no from list)	Yes	
A.10	% of metering available at DT	62%	274 out of 441 transformers
	Total number of DT (Nos)	441	
A.11	Total number of consumers (Nos)	40436	
	Number of HT consumers (Nos)	126	
	Number of LT consumers (Nos)	40310	
A.12	% of metering available at consumer end	100%	
A.13	No of feeders at 66kV voltage level	0	
A.14	No of feeders at 33kV voltage level	0	
A.15	No of feeders at 11kV voltage level	16	
A.16	No of LT feeders' level	0	Not available
A.17	Line length (ckt. km) at 66kV voltage level	0	
A.18	Line length (ckt. km) at 33kV voltage level	4.20	
A.19	Line length (ckt. km) at 11kV voltage level	117.976	Measured through HT line mapping
A.20	Line length (km) at LT level	285.675	Measured through LT line mapping
A.21	Length of Aerial Bunched Cables (km)	1.85	
A.22	Length of Underground Cables (km)	54.29	From SLD
A.23	HT/LT ratio	1/1.6	

5. INPUT ENERGY SUMMARY

Table 6: Metered reading of input energy

B. Meter reading of Input energy at injection points																		
Zone	**Circle**	**Voltage Level (KV)**	**Division (KVA)**	**Sub-Division (KVA)**	**Feeder ID**	**Feeder Name**	**Feeder Metering Status (Metered/ unmetered / AMI/ AMR)**	**Status of Meter (Functional/Non-functional)**	**Metering Date**	**Feeder Type (Agri/ Industrial/Mixed)**	**Status of Communication**			**Period from April 2020 to March 2021**				**Sales**	**Remarks (Source of data)**
									Date of last actual meter reading / communication		**% data received through automatically if feeder AMR**	**Number of hours when meter was unable to communicate in period**	**Total Number of hours in the period**	**Meter S.No**	**CT/PT ratio**	**Import (MU)**	**Export (MU)**		
		110			21/ Thrissur corp	VIPL	Metered	Functioning	01-04-2021	Mixed	0	0	NA	X2005320	200/1	87.47	-		110 kV s/s
		66			21/1029	OLVI	Metered	Functioning	01-04-2021	Mixed	0	0	NA	17052040	200/1	41.86	-		66 kV s/s
Total (MU)																**129.33**	**-**		
Net input energy at DISCOM periphery (MU)																**129.33**			

6. DETAILS OF CONSUMERS AND CONSUMPTION

The details of consumers and consumption is given in the table below:

Table 7: Details of consumers and consumption

Summary of Energy						
Period from April 2020 to March 2021						
S. No	**Type of Consumers**	**Category of Consumers (EHT/HT/LT/ Others)**	**Voltage Level (kV)**	**No of Consumers**	**Total Consumption (In MU)**	**Remarks (Tariff)**
1	Domestic	LT	0.415	21812	43.14	
2	Commercial	LT	0.415	17220	37.63	
3	Public Lighting	LT	0.415	272	1.34	VIII B
4	HT Industrial	HT	11	4	0.47	HT IA
5	Industrial (Small)	LT	0.415	505	2.57	LT IV
6	HT Commercial	HT	11	89	15.15	HT 4A,4B, SPS
7	Government offices and department	LT	0.415	313	4.03	
8	HT general	HT	11	19	12.79	HT 2A,2B
9	Agriculture	LT	0.415	188	0.07	LT V
10	Government offices and department	HT	11	14	3.89	
			Total	**40436**	**121.08**	

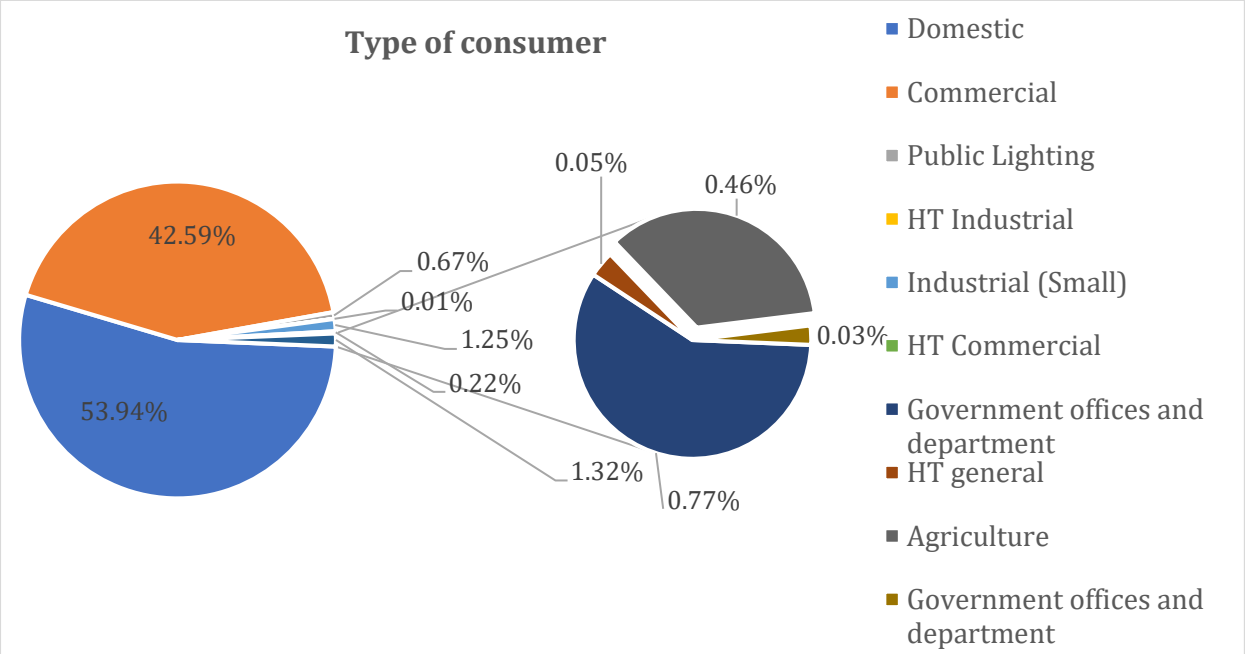

Figure 2:Type of consumer

7. LIST OF MEASURES ADOPTED/PROPOSED FOR ENERGY CONSERVATION AND QUANTITY OF ENERGY SAVED

1) Replacing HT & LT overhead lines with UG cables

Even though TCED has initiated the replacement of overhead lines with underground cables, there are still areas in the distribution network with overhead lines. Sample analysis has been done for 04 number of feeders which were audited for the viability of replacing overhead lines with UG cables. Resistance per kilometre of the UG cables is less than the overhead lines which is Racoon type for HT and Rabbit type for LT in TCED. The replacement of HT & LT overhead lines with UG cables will result in reduction in energy losses in the distribution network and hence will lead to financial savings. The summary of the proposal in given in the table below.

Particulars	Units	Values
Annual Energy savings	MU	0.987
Annual financial savings	Rs in lakhs	59.75
Estimated investment	Rs in lakhs	175.46
Simple payback period	Months	35

- ***Detailed analysis given in the Annexure-1***

2) Replacing Old Transformers with Energy Efficient transformers

Among the 04 number of feeders audited, there were two number of old transformers in the Shornur Road feeder which were aged more than 30 years and therefore these transformers are proposed to replace with energy efficient transformers as sample basis. This will result in the reduction in energy losses for the specified loading level of the transformer.
The details are summarized in the table below.

Particulars	Units	Values
Annual Energy savings	MU	0.01205
Annual financial savings	Rs in lakhs	0.729
Estimated investment	Rs in lakhs	14.0
Simple payback period	Years	19
	Months	230

- ***Detailed analysis given in the Annexure-1***

3) Power Factor Improvement in Feeders

The average power factor during the measurement period (24-hour logging) at 110kV incomer was 0.94 lagging. During the feeder level measurement, the PF was found to be less than 0.98 for 6 numbers of feeders for which power factor improvement can be done by installing capacitors of 60kVAr capacity each (in the secondary side of 5 distribution transformers in the feeders mentioned under 66kV incomer) and 120kVAr in total (in the secondary side of 15 distribution transformers in the feeders mentioned for feeders under 110kV incomer).

The annual financial savings occur via demand reduction, PF incentives and avoiding penalty. The summary of the savings is given in the table below.

Particulars	**Units**	**Values**
Average reduction in monthly demand based on FY 20-21 data	kVA/month	971.9
Annual financial savings	Rs in lakhs	202.23
Estimated investment	Rs in lakhs	37.5
Simple payback period	Months	2

- ***Detailed analysis given in the Annexure-1***

4) Summary of energy conservation measures

Table 8: Energy conservation measures - summary

ECM No	Energy Efficiency Measures	Annual Electricity Savings	Annual Financial Savings	Investment	Fixed interest rate	Cash inflow	Net present value	Internal rate of return
		MU	(Rs)	(Rs)	%	Years	Rs	%
1	Replacing HT & LT overhead lines with UG cables***	0.987	59,75,116	1,75,45,800	8	5	63,11,106	20.84%
2	Replacing Two nos of Old Transformers with Energy Efficient transformers	0.01205	72,913	14,00,000	8	20	-6,84,129	0.39%
3	Power Factor Improvement in Feeders – installation of 420 kVAr total	-	2,02,22,532	37,50,000	8	1	1,49,74,567	439.27%

***At 11 kV = 8.273 km & at 415 V = 20.97 km

5) General observations and suggestions

Observation	Suggestions
Collection efficiency of the DISCOM is low (96.43%) which resulted in high AT & C loss. As per the TCED availed data, the major dues are from the Government departments, urban local bodies, street light and corporation owned buildings.	Collection drives should be placed in the DISCOM area. Awareness shall be provided for the proper billing in due time. Energy cell can give awareness in the DSM and various energy efficiency measures to help them in reducing the consumption.
As the back-feed units from one feeder to another were not available in the DISCOM, exact loss analysis was unable to calculate from the existing data.	Feeder boundary energy meter is suitable option to have the back-feed data and records shall be maintained properly.

8. CRITICAL COMMENTS AND ANALYSIS BY ENERGY AUDITOR

8.1. COMPLIANCE TO BEE REGULATIONS

The compliance status of DISCOM to various provisions of BEE Regulations 2021 is analysed and presented below.

Table 9: Compliance to BEE regulations

Clause No	Clause Details	Subclause Details	Present Status	Action plan/ comments by DISCOM
3	Intervals of time for conduct of annual energy audit	a. Conducted an annual energy audit for every financial year and submitted the annual energy audit report to the Bureau and respective State Designated Agency and also made available on the website of the electricity distribution company within a period of four months from the expiry of the relevant financial year	a. Annual energy audit for FY 2020-2021 being conducted. Report will be submitted to BEE and SDA. Report will also be uploaded onto TCED website.	
4	Intervals of time for conduct of periodic energy accounting	a. All feeder wise, circle wise and division wise periodic energy accounting is conducted by the energy manager of the electricity distribution company for each quarter of the financial year.	a. Periodic energy accounting for Q1 & Q2 FY 20-21 have been prepared by the DC.	
		b. Submitted the periodic energy accounting report to the Bureau and respective State Designated Agency and also made available on the website of electricity distribution company within forty-five days from	b. Periodic energy accounting for Q1 & Q2 FY 20-21 have been prepared by the DC. DC has uploaded the energy	

		the date of the periodic energy accounting.	accounting reports onto the website of DC	
Clause No	**Clause Details**	**Subclause Details**	**Present Status**	**Action plan/ comments by DISCOM**
		c. Electricity distribution company conducted its first periodic energy accounting, for the last quarter of the financial year immediately preceding the date of such commencement (i.e. 6th October 2021).	c. DC has submitted its first periodic energy accounting for all quarters FY20-21.	
		d. Electricity distribution company conducted its subsequent periodic energy accounting for each quarter of the financial year for a period of two financial years from the date of such commencement, and submit the periodic energy accounting report within sixty days from the date of periodic energy accounting	d. The DC used to submit the periodic energy auditing reports as per the Energy Audit regulations.	
5	Pre-requisites for annual energy audit and periodic energy accounting	a. Identification and mapping of all of the electrical network assets	a. Mapping of HT line and transformers conducted by the AEA and LT lines are getting mapped by the DISCOM.	The mapping of all the assets such as transformer, pole and consumer meters will be completed by June 2024.
		b. Identification and mapping of high tension and low-tension consumers	b. All the HT consumers have been mapped by AEA and the LT consumers will be mapped by DISCOM	The mapping of LT consumers will be completed by June 2024.

		c. Development and implementation of information technology enabled energy accounting and audit system, including associated software.	c. DC has LECTOREN software which does only the billing one as per the consumption input.	DC is planning to implement the software as along with the RDSS implementation of the smart meter.
Clause No	**Clause Details**	**Subclause Details**	**Present Status**	**Action plan/ comments by DISCOM**
		d. Electricity distribution company ensures the installation of functional meters for all consumers, transformers and feeders. Meter installation is done in a phased manner within a period of three financial years from the date of the commencement of these regulations in accordance with the trajectory set out in the First Schedule	d. All 11kV feeders have been metered. All consumers have been metered under the DISCOM. As of audit period (03rd December 2022) out of total 455 distribution transformers, 282 have been metered.	Rest of the DT meters will be completed along with the RDSS scheme by March 2024.
		d1. 100% Communicable Feeder Metering integrated with AMI, by 31st December 2022 along with replacement of existing non-communicable feeder meters.	d.1. 100% of the feeders are having DLMS (Device Language Message Specification Communicable Meters).	
		d2. All Distribution Transformers (other than HVDS DT up to 25kVA and other DTs below 25 kVA) shall be metered with communicable meters. Communicable DT Metering for the following areas/ consumers to be completed by December 2023 and in balance areas by December	d.2. 95% of the DT are installed as on 03rd December 2022.	Balance will be completed by the end of financial year 2022-23.

		2025: 100% Communicable Feeder Metering integrated with AMI, by 31st December 2022 along with replacement of existing non-communicable feeder meters.		
Clause No	**Clause Details**	**Subclause Details**	**Present Status**	**Action plan/ comments by DISCOM**
		d.2.1. All Electricity Divisions of 500 AMRUT cities, with AT&C Losses > 15%	d.2.1. Not Relevant for DC.	
		d.2.2. All Union Territories (for areas with technical difficulty, non-communicable meters may be installed)	d.2.2. Not Relevant for DC	
		d.2.3. All Industrial and Commercial consumers	d.2.3. 100% of the DTR meters is installed in the DISCOM	
		d.2.4. All Government offices at Block level and above	D2.4. DC installed 90% of the government offices at block level with communicable meter.	Plans to do the remaining installations in phased manner along with RDSS scheme.
		d.2.5. Other high loss areas i.e. rural areas with losses more than 25% and urban areas with losses more than 15%	d.2.5. The whole DISCOM comes under the Urban area and thus not relevant for DC.	
		d.3. Prepaid Smart Consumer Metering to be completed for all directly connected meters and AMR in case of other meters, by December 2023 in the following areas:		

<table>
<tr><td></td><td></td><td>d.3.1. All Electricity Divisions of 500 AMRUT cities, with AT&C Losses > 15%;</td><td>d.3.1. Not applicable as AT&C loss is less than 15%.</td><td></td></tr>
<tr><th>Clause No</th><th>Clause Details</th><th>Subclause Details</th><th>Present Status</th><th>Action plan/ comments by DISCOM</th></tr>
<tr><td></td><td></td><td>d.3.2. All Union Territories (for areas with technical difficulty, prepaid meters to be installed);</td><td>d.3.2. Not Relevant for DC.</td><td></td></tr>
<tr><td></td><td></td><td>d.3.3. All Industrial and Commercial consumers;</td><td>d.3.3. DC has installed 127 communicable metering-AMI for HT consumers and 18155 meters in LT, industrial and commercial.</td><td>Plans to do the work in phased manner along with RDSS by March 2024.</td></tr>
<tr><td></td><td></td><td>d.3.4. All Government offices at Block level and above;</td><td>d.3.4. DC installed 90% of the government offices at block level with communicable meter.</td><td>Plans to do the work in phased manner by March 2024.</td></tr>
<tr><td></td><td></td><td>d.3.5. Other high loss areas i.e. rural areas with losses more than 25% and urban areas with losses more than 15%.</td><td>d.3.5. Not applicable as T&D loss is less than 15%</td><td></td></tr>
<tr><td></td><td></td><td>d4. Consumer Metering: 98% by FY 2022-23 99% by FY 2023-24</td><td>d4. 100% of the consumers are metered.</td><td></td></tr>
<tr><td></td><td></td><td>d.5. Targets for functional meters.
<table><tr><td>Meter</td><td>FY 22-23</td><td>FY 23-24</td><td>FY24-25</td></tr><tr><td>Feeder metering</td><td>98.5%</td><td>99.5%</td><td>99.5%</td></tr><tr><td>DT metering</td><td>90%</td><td>95%</td><td>98%</td></tr></table></td><td>d5. 100% of the feeders are metered. 95% of the DT are metered. 100% of the consumers are metered.</td><td>DT metering will complete by FY 2023-24 along with RDSS scheme.</td></tr>
<tr><td></td><td></td><td>e. e1. All distribution transformers (other than high voltage distribution system up to 25kVA and other distribution system below 25 kVA) is metered with communicable meters.</td><td>e.1. DC yet to start the work</td><td>DT metering will start in phased manner.</td></tr>
</table>

		e.2.And existing non-communicable distribution transformer meters is replaced with communicable meters and integrated with advanced metering infrastructure.	e.2. Yet to start the work	DT metering will start in phased manner along with RDSS smart meter installation scheme will complete by March 2024.
Clause No	**Clause Details**	**Subclause Details**	**Present Status**	**Action plan/ comments by DISCOM**
		e. Electricity distribution company has established an information technology enabled system to create energy accounting reports without any manual interference and such systems may be within a period of three years from the date of the commencement of these regulations in case of urban and priority area consumers; and within five years from the date of the commencement of these regulations in case of rural consumers	f. Yet to start the work	After the implementation of RDSS scheme, the information technology enabled system will be integrated to it by March 2024.
		g. Electricity distribution company has a centralized energy accounting and audit cell comprising of— (i) a nodal officer, an energy manager and an information technology manager, having professional experience of not less than five years; and (ii) a financial manager having professional experience of not less than five years	g. DISCOM has energy audit cell. List is mentioned in the audit report. Certified energy auditor is present for the DISCOM.	

Clause No	Clause Details	Subclause Details	Present Status	Action plan/comments by DISCOM
6	Reporting requirements for annual energy audit and periodic energy accounting	a. Electricity distribution company has a nodal officer, who is a full-time employee of the electricity distribution company in the rank of the Chief Engineer or above, for the purpose of reporting of the annual energy audit and periodic energy accounting and communicate the same to the Bureau.	a. The DC is complying with this requirement	
		b. Electricity distribution company ensures that the energy accounting data is generated from a metering system or till such time the metering system is not in place, by an agreed method of assumption as may be prescribed by the State Commission.	b. DC has already have an agreed system of energy accounting as prescribed by the state commission. Yet to implement the system from metering values.	The completion of the energy accounting data will be generated from the metering system by the FY 2023-24.
		c. Metering of distribution transformers at High Voltage Distribution System up to 25KVA is done on cluster meter installed by the electricity distribution company	c. Not applicable	
		d. The energy accounting and audit system and software is developed to create monthly, quarterly and yearly energy accounting reports.	d. The DC is yet implement the same.	Will be completed along with the implementation of RDSS

		e. Electricity distribution company has provided the details of the information technology system in place as specified in clause (f) of regulation 5 that ensures minimal manual intervention in creating the energy accounting reports and any manual intervention of any nature, in respect of the period specified therein, shall be clearly indicated in the periodic energy accounting report	e. The DC is yet to implement the same	Will be completed along with the implementation of RDSS scheme.

8.2. 11KV FEEDER METERING AND ENERGY AUDIT

The DISCOM has 100% metering for all the 11 kV feeders and has provided energy input and consumption/ sale data of all the 11 KV feeders (11 kV feeders – 16 nos).

The process of checking the functioning and calibration of the 11 KV feeder meters is an on-going process and can be tested through M/s KSEBL, TMR unit as per CEA regulation.

8.3. CATEGORY WISE SUBSIDY

The DISCOM does not received subsidy from any government or government institutions on any category during the FY 2020-21.

8.4. ANALYSIS ON T&D LOSSES AND AT&C LOSSES

- **% of losses – Aggregate**: - The overall Technical Loss (T&D Loss) is 6.38% and overall AT&C Loss is 9.72% for FY 2020-2021. This reflects an overall collection efficiency of 96.43%. The detailed HT, LT and Transformer losses with respect to the input energy is shown in table below.

Table 10: Analysis on T&D losses

Particulars	Units	Values**
Total energy purchased	MU	129.3286
Total energy sales	MU	121.0832
Quantum of losses at HT level	**MU**	**0.16471**
	%	**0.127**
Quantum of LT level losses (LT level and Transformer losses)	**MU**	**8.0807**
	%	**6.248**
Total losses	**MU**	**8.2454**
	%	**6.376**
Collection efficiency	**%**	**96.428**
AT &C loss	**%**	**9.720**

Values with full decimal places.

8.5. COMPLIANCE TO RENEWABLE PURCHASE OBLIGATIONS

TCED purchasing the 98.78% of the power consumed through KSEBL. As the KSEBL is on the verge of meeting the RPO obligation, the same can consider for the TCED.

Table 11: Solar generation share

Total Energy Consumption FY 2020-21 (MU)	**129.33**	
Details	**Solar generation**	**Non-solar generation**
Present status - MU	1.573	0
Present status - %	1.22%	0

8.6. NOTES OF THE EA/EM ALONG WITH QUERIES AND REPLIES TO DATA GAPS

The following tables shows the query by AEA, the response from EA of DISCOM and Notes by AEA.

Table 12: Queries and replies to data gaps

Sl no	Query by EA	Response by EA of DISCOM	Notes by AEA
1	Why the contract demand not mentioned in the bill?	Can access unlimited demand as per the agreement signed between KSEBL and Thrissur municipality on 1949.	According to that present registered maximum demand is considered for the audit.
2	Expected completion date for LT line mapping and assets?	As per the action plan to RDSS, expected time of completion is June 2023.	AEA started mapping the HT line and transformer and covered 22% of the Total DT, 31% of the total 11 KV feeders & 16.6% of the total consumers
3	When we analysed the loss of 4 feeder, variation observed in the unit sales found very lower than the feeder meter? Any issue in feeder metering?	There is no issue in feeder metering. The difference is due to the back feeding the supply to certain number of consumers, through interlink poles. For eg: Bini feeder have the option for back feed from Ramanilayam, Vivekodayam and MO road feeders. Back fed unit data not accounted properly in the substation as there is no boundary meter to account the same.	Such that, we have analysed actual loss among the feeder rather than basing on the feeder meter.
4	Mismatch observed among the transformer data in various forms - RDSS, Performa filed in Q4 FY 2020-21 and the transformer data from section. Why?	Transformers of HT consumers were considered during the Quarterly energy accounting.	AEA considered only the transformers that reaches up to the metering point as per the standards following for Energy audit.

8.7. ENERGY ACCOUNTS FOR PREVIOUS YEARS

The historical energy accounts/loss of the TCED DISCOM is tabulated below.

Table 13: Historical energy accounts/loss of the DISCOM

	1. T&D Losses analysis for 2018-19				2. T&D Losses analysis for 2019-20			
Particulars	Input energy (MU)	Total Billed energy (MU)	Total energy Loss (MU)	T&D losses %	Input energy (MU)	Total Billed energy (MU)	Total energy Loss (MU)	T&D losses %
TCED	157.03	144.9	12.13	**7.72%**	162.4	151.05	11.35	**6.99%**

The graphical representation of the losses for the three years (including audit period FY 2020-21) is given in the figure below.

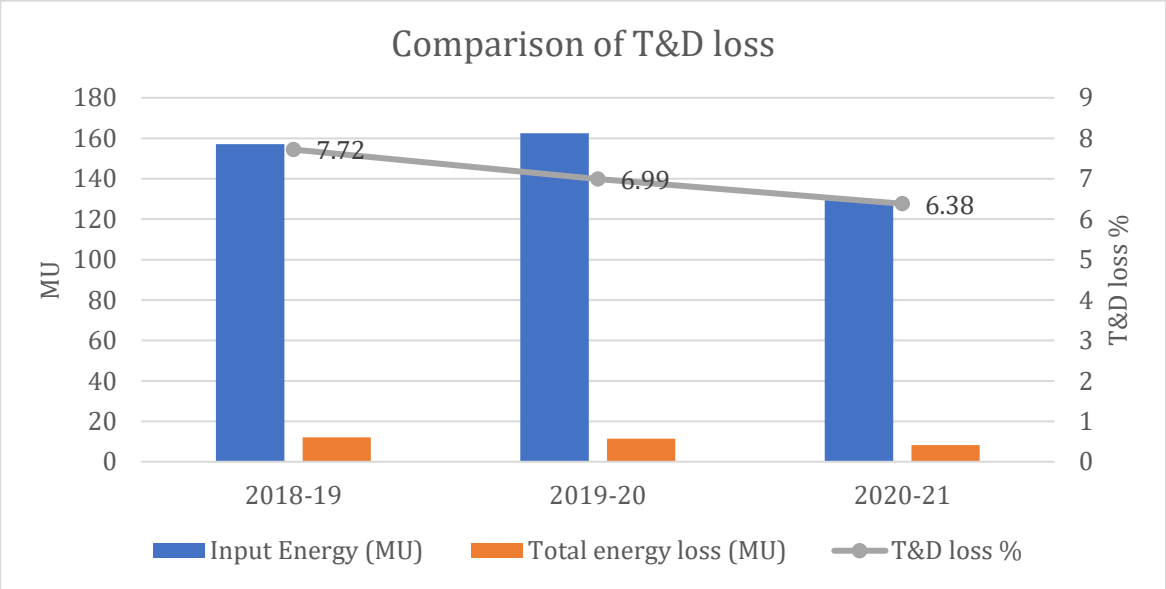

Figure 3: Historical T & D loss with audited data

- The T&D loss % shows decreasing trend which relates to the performance improvement measures implemented in the last 3 years.
- While analyzed decreasing trend pertains to the changes in the HT consumer consumption pattern, that decreased due to the COVID effects.

INTRODUCTION

1. ABOUT THE ACCREDITED ENERGY AUDIT FIRM – ATHUL ENERGY

Athul Energy Consultants Pvt Ltd (AEC) is an Accredited Energy Auditing Firm (AEA) recognised by BEE.

About AEC: Established in 2010 as Athul Engineering Systems and Energy Consultants, (AEC since 2016), is one of the leading consultancy firms concentrating mainly in Energy and safety audits across pan India. The motto of AEC is to deliver services at quality and in time. The basic priority given is for energy conservation and sustainable development.

AEC has wide experience in the energy audit sector and have conducted the same in Chemical, Textile, Steel and DISCOM. The safety audits are another sector in which the AEC has experience and have conducted more than 300 safety audits in the banks, industries and buildings.

Mission: To achieve excellence in energy engineering and to deliver quality services with anchor to customer satisfaction and social commitment.

Vision: To develop new path, concept and services in energetic and associated field with total commitment to quality and reliability.

2. ABOUT THE DISCOM – TCED

Thrissur is known as the cultural capital of Kerala and it is the administrative capital of Thrissur district. Thrissur is known as the cultural capital of Kerala because of its cultural, spiritual and religious leanings throughout history. It is famous for Thrissur Pooram festival, one of the most colourful and spectacular temple festivals of Kerala from ancient times. Thrissur has been politically, economically and culturally significant to the Indian subcontinent. The city is built around a 65-acre (26 ha) hillock called the Thekkinkadu Maidanam. Thrissur was once the capital of the Kingdom of Cochin and was a point of contact for Arabs, Romans, Portuguese, Dutch and English.

The Thrissur Municipal Corporation manages the distribution of electricity to the residents and Commercial establishments through **Thrissur Corporation Electricity Department.** The distribution network covers about 12.65 Sq. km. Thrissur Corporation Electricity Department (TCED is one of the 10 electricity distribution Licensees in the state of Kerala. The present TCED has 40000 plus consumer strength and the annual energy sale is about 162 MU. TCED has its own 110 kV, 66 kV and 33KV substations with 441 distribution transformers. **Thrissur Corporation is unique in that it is the only local body engaged in the distribution of electricity and aims to become a model licensee in India.**

With the support and consent of various govt agencies, TCED has been implementing various programs and projects for efficient use of energy and conservation. TCED has already commissioned 500 kW Solar Power plant, and orientates at more solar plants near future. In addition, TCED will soon be having its own Small Hydel Projects as much as 4 projects are already allotted to TCED by the Kerala Government.

TCED has not availed any funding so far under central support and missed modernisation and strengthening under APDRP, RAPDRP and IPDS.

Presently, as of December 2022, **TCED came under the RDSS and implementing all the required measures as per the Regulations of Energy accounting**. AT& C loss & Revenue gap for TCED are below bench marks but for an area currently handled by TCED this figure is high due to non-segregation of loss data which will be covered in Smart meter program under the RDSS with system metering.

The billing system, ERP covering Material/Procurement, Accounts and HR are missing and more importantly this utility does not have any GIS mapping of consumers and indexing them to Feeder/DTR/Consumer that enable clear energy auditing. This will be covered under IT-enabled system.

As far as KSERC filing is concerned, TCED has equal responsibility as that of other licensees within the state and compliance to variance regulations and statutory filings are mandatory and these reforms now suggested are just for these requirements only and is expected that KSERC will concur for such investment appraisals.

3. NAME AND ADDRESS OF DESIGNATED CONSUMER

Table 14: Name and address of designated consumer

General Details	Description
Registered Office address with telephone, fax nos. & e-mail	**M/s Thrissur Corporation Electricity Department (TCED),** Thrissur Corporation, MO Road, Thrissur District-Kerala -680001. Ph: 0487 2422470
Company Chief executive name & details	**Assistant Secretary** **M/s Thrissur Corporation Electricity Department (TCED),** Thrissur Corporation, MO Road, Thrissur District-Kerala -680001. Ph: 0487 2422470 Email: electricitydepartment@yahoo.co.in

Authorized signatory of DC (Nodal Officer)	**Mr. Jose T S** **Electrical Engineer** **M/s Thrissur Corporation Electricity Department (TCED),** Thrissur Corporation, MO Road, Thrissur District-Kerala -680001**.** Ph: 0487 2423559
Energy Manager's Name, Designation, Registration No., Address, Mobile, Telephone, Fax nos. & e-mail	**Mr. Nikhil B** Assistant Engineer/CEA 24811 **M/s Thrissur Corporation Electricity Department (TCED),** Thrissur Corporation, MO Road, Thrissur District-Kerala -680001**.** Mob: 9037192013

4. ENERGY AUDIT CELL

Table 15: Energy audit cell

Sr	Member of EAC	Name	Designation	Mobile number	Email
1	Nodal officer	Mr. Jose T Simon	Electrical Engineer	9446019795	electricitydepartment@yahoo.co.in
2	Energy Auditor	Mr. Nikhil B	Assistant engineer/Energy Auditor CEA 24811	9037192013	
3	IT manager	Ms. Jaya V R	IT Manager	8089580455	
4	Financial manager	Mr. Shanmughan C	Finance Manager	9495783047	

5. NAME AND DETAILS OF ENERGY MANAGER/AEA

M/s TCED, Thrissur District-Kerala -680001 have a BEE Certified Energy Auditor – Mr. Nikhil B (CEA – 24811), whom will be the signatory for all BEE activities.

On behalf of Athul Energy Consultants (AEC) Pvt Ltd, Mr. Santhosh A (AEA 0275) will be sign the MEA that needs to submit for the financial year 2020-21.

The contact details of Accredited energy auditor and Energy manager from AEC is given in the table below.

TABLE 16: CONTACT DETAILS OF AEA & CEM of AEC

Sr No	Name	Certification	EM/EA/AEA/ Registration No	Phone no	Email
1	Mr. Santhosh	• Accredited Energy Auditor	AEA-0275	7356111990	santhosh@athulenergy.com
2	Mr. Ashok K M P	• Certified Energy Auditor	EA-34760/22	7356111991	ashok@athulenergy.com
3	Ms. Della David	• Certified Energy Auditor	EA-34867/22	9895083581	della@athulenergy.com

BACKGROUND

1. ABOUT BEE

The Government of India has set up Bureau of Energy Efficiency (BEE) on 1st March 2002 under the provision of the Energy Conservation Act, 2001. The mission of Bureau of Energy Efficiency is to assist in developing policies and strategies with a thrust on self-regulation and market principles with the primary objective of reducing energy intensity of the Indian economy within the overall framework of the Energy Conservation Act, 2001. This will be achieved with active participation of all stakeholders, resulting into accelerated and sustained adoption of energy efficiency in all sectors.

2. EXTANT OF REGULATIONS - DISCOM

Under the notification S.O. 3445 (E) dated 28 Sept 2020, all entities having distribution license are notified as Designated Consumers. Notification is read as "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). After this notification, all the DISCOMs will be governed under the various provisions of Energy Conservation Act, such as Appointment of Energy Manager, Energy Accounting & Auditing, identification of Energy Losses Category wise, Implementation of energy conservation & efficiency measures etc.

The amendment is expected to help DISCOMs to monitor their performance parameters and bring in transparency in the Distribution sector through professional inputs. It will also assist in developing projects for reducing the electricity losses by DISCOMs and implementing effective solutions. The amendment is expected to improve the financial state of the DISCOMs.

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, thus made the following regulations:

1. **Named as** Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit in electricity distribution companies) Regulations, 2021.
2. These regulations shall apply to all electricity distribution companies specified as designated consumer.
3. They shall come into force on the date of their publication in the Official Gazette. (No: CG-DL-E-08102021-230245 Dated 06 October 2021).

3. PURPOSE OF AUDIT AND ACCOUNTING REPORT

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. 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.

Owing to the impact of energy auditing on the entire distribution and retail supply business and absence of an existing framework with dedicated focus on the same, it was imperative to develop a set of comprehensive guidelines that all Distribution utilities across India can follow and adhere to.

4. PERIOD OF ENERGY AUDIT AND ACCOUNTING

The table below shows the frequency of energy audit and energy accounting as per the BEE guidelines.

Table 17: Period of Energy Audit & Accounting – as per BEE guidelines

Particulars	Frequency	Submission date	Whom to submit	Who should submit
Energy audit	Every year	Within a period of 4 months from the expiry of the relevant financial year	BEE & SDA	Accredited energy auditor
Energy accounting	Quarterly	45 days from the quarter	BEE & SDA	Certified energy manager

TCED has initiated the energy audit in the month of December 2021 in order to submit the Energy audit report by April 6th 2022 as per the vide notification letter no: 11-10/5/2020-EC dated 27th October 2021 by the Ministry of Power. Later the work was entrusted to Energy Management Centre (EMC), who is also been the SDA of the DISCOM, on 26th August 2022. EMC has conducted an open tender and awarded the work to Athul Energy Consultants (AEC). AEC started the field study by October 2022 - field study for 19 days - and draft report submitted in the month of 04th January 2022.

5. PROGRESS IN COMPLIANCE TO PREREQUISITES TO ENERGY ACCOUNTING

Table 18: Progress in energy accounting

Quarter	Submitted on
1st quarter – 1st July 2021 to 30th Sept'2021	23rd December 2021
2nd Quarter - 1st Oct'2021 to 31st Dec'2021	26th February 2022
3rd Quarter – 1st Jan 2022 to 31st Mar 2022	21st April 2022
1st quarter – 1st Apr 2022 to 30th June'2022	29th July 2022
2nd Quarter - 1st July'2022 to 30th Sep '2022	10th November 2022

- *All the documents are submitted through mail and have been uploaded in the website of the DISCOM.*

APPROACH, SCOPE & METHODOLOGY OF ENERGY AUDIT

1. PERIOD OF AUDIT

The energy audit field study was carried out during the period from 13th October 2022 to 31st December 2022. The draft report submitted on 03rd January 2023.

The activity chart for the field study is given in the table below.

Table 19: Activity chart – Energy audit

ACTIVITIES	Number of manpower days		
	06	50	20
• Kick-off meeting with the concerned DISCOM officials • Data collection • site survey plan			
• Site survey • 11kV HT line mapping • DT mapping • Feeder wise measurement at switching station. • Metering deviations of major HT consumers.			
• Verification of T&D Losses, other Calculation • Finalization of form			

2. SCOPE OF AUDIT

1. Study and validation of the methodology adopted, data source and its accuracy of the energy audit works carried out for internal as well as external reporting in the following areas.
    a) 11 kV level for study of 11 kV distribution loss in 16 feeders.
        - Losses incurred in individual 11 kV feeders
        - Calculation of technical loss of 11 kV line
    b) Sample LT level study of Distribution transformer and LT distribution loss.
        - Losses incurred in LT line of different 11/0.433 kV distribution transformer in 10% of the total feeder and it 10% of the lines.
        - Calculation of technical loss of LT line with actual LT line data.
        - Selection of the distribution transformer shall be based on the differentiated consumer pattern, length of the distribution lines, old lines etc.

2. Collection and Review of the energy related data of last Financial Year (FY) in the Proforma by visiting the DISCOM physically.
3. Verification of existing pattern of energy distribution across periphery of electricity distribution company
4. Collection and verification of energy flow data of electricity distribution company at all applicable voltage level of distribution network.
5. Collection of data on energy received and distributed by DISCOM and verify the accuracy of data
6. Collection & analysis the data and prepare the same with report;
7. Input energy details:
    a) Collection of input energy from recorded system meter reading
    b) All the inputs points of transmission system
    c) Details provided by transmission unit
    d) System loading and Captures infrastructure details (i.e., no of circle, division, sub-division, feeders, DTs, & Consumers).
8. Parameters for computation of distribution losses:
    a) Details of open access, HT sale, LT sale and transmission losses
    b) Number of consumers category wise in each circle
    c) Consumers connected load category wise in each circle
    d) Details of billed and un-billed energy category wise of each circle
    e) Metered and un-metered details.
    f) Boundary meter details
    g) Energy Cost and Tariff data
    h) Source of energy Supply (e.g. electricity from grid or self-generation), including generation from renewables;
    i) Energy supplied to Open Access Consumers which is directly purchased by Open Access Consumers from any supplier other than electricity distribution company
9. Monitoring and verifications of input energy and consumption pattern at various voltage levels
10. Identify the areas of energy leakage, wastage or inefficient use;
11. Identify high loss-making areas/networks, for initiating target based corrective action;
12. Identify overloaded segments of the network for necessary capacity additions.
13. Computation of agriculture consumption (approved by SERC)
14. Methodology for loss computation various losses.
15. Computation of Average Billing Rate (ABR)
    a) Total revenue billed category wise.

b) Category wise ABR with tariff subsidy.
c) Category wise ABR without tariff subsidy.
d) Collection Efficiency (Category wise) and computation of AT&C loss.

16. Observe and compile various Energy Conservation (ENCON) options implemented by the DISCOM and prepared report containing details of expenditure made by DC along with saving and payback period.
17. Recommendations to facilitate energy audit, energy accounting and improve energy efficiency
18. Study the details of loss/gain of DISCOM, analysis of Average Cost of Supply (ACS) and Average Revenue realized (ARR) gap, details of energy charges/Power purchase cost along with the financial analysis.
19. Current System Metering Status at various voltage level of DISCOM
    a) Status of Functional meters for all consumers, transformers and feeders.
    b) Status of default meters (non-functional meters) for all consumers, transformers and feeders
20. Current status of pre-requisites mentioned in regulations.
21. Copies of relevant authentic and certified documents should support the report. Each document should be sealed and signed by DISCOM authorized representative as well as by agency's AEA.
22. Prepare final report of DISCOM as per the scope of work and as per the regulation of Energy Audit, 2021, in a standard format duly indexed, covering profile of the unit and its details of energy related data w.r.t. DISCOMs Sector, analytical & Statistical details and any other relevant information.

3. METHODOLOGY

In order to meet requirements of the scope of Work, Athul Energy Consultants Pvt Ltd, adopted the following phase wise approach for completion of the assignment

Phase 1 – Pre-audit phase

a. Kick off meeting with DISCOM officials.
   The following were the agenda during the kick off meeting.

- Introduction of the team
- Briefing of energy audit – Schedule of plan & execution
- Discussion about data collection format.
- Discussion on the scope of energy audit

After detailed deliberations following points were discussed.

- TCED will provide a single person of contact (Mr. Nikhil B, Energy Auditor) for the energy audit assistance and ensured the assistance from all the Assistant engineers of section.
- Assistant Engineers of each section committed to provide the required persons for 11 kV distance calculation and mapping.
- Also, the IT cell will coordinate the availability of consumer data from the site.

b. Assigning of team members.

c. Collection and Review of the energy related data

Phase 2 – Audit phase

Field survey:

a. The field survey had been conducted for HT lines and transformers of the designated area as representative data for compiling a comprehensive and diligent assessment.

b. A detail route plan of the distribution network had been also ascertained by way of segmenting data through walk down surveys along 11kV incoming feeder and corresponding 11kV feeders were also surveyed.

c. Sample of 4 feeders was considered for loss analysis considering the consumer category and its distribution.

d. Hourly load analysis was done for all the feeders and feeder energy meters were calibrated against the power analyzer.

e. HT lines & Transformers are mapped using the Global positioning system (GPS).

f. HT line length was identified using the GPS.

g. The consumption data, type of cable, transformer details etc were collected from the DISCOM and verified with the field data.

h. Analysis of various types of losses in the system was done. Various losses in the system are as listed below.

Technical Losses:

- HT (11 kV) line losses
- Distribution transformer losses (Iron & Copper losses).
- L.T. Line losses
- HT and LT cable losses

Miscellaneous technical losses

- Losses due to lose jump connections in the line
- Losses due to short circuits & earth faults Losses in service mains of installations.
- Losses incurred in CT'S of energy meters.

- Losses incurred in old static energy meters.

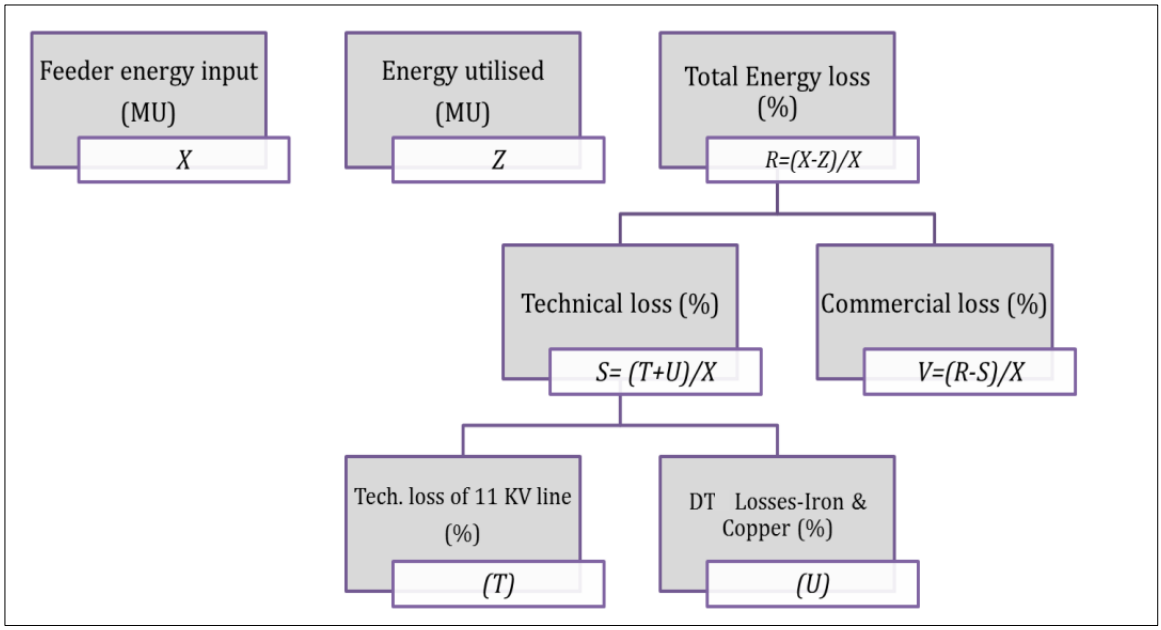

Figure 4: Schematic representation of technical losses

Commercial losses

- Mistakes in the billing.
- Meters not recording (MNR)
- Meters not recording correctly
- Meters bye passed due to defects/ intentionally.
- Meters not read & billed.
- Theft and pilferage.

Phase 3 – Post audit phase

After the identification of various loss reduction initiatives based on the HT & LT distribution detailed analysis was carried out in this phase of the study to prepare a strategy for loss reduction. Under this strategy, detailed steps are defined for loss measurement, energy audit and loss verification as well. A Final Report was prepared after discussion with TCED officials. Submitted the report with complete database and techno economic analysis.

4. CALCULATIONS INVOLVED IN LOSS ANALYSIS

Technical losses occur in the system due to cables, overhead lines, transformers and other equipment in the substation. The losses in cables and overhead lines depends on the length, type of the cable/overhead line as well as the current passing through it.

The length of the overhead lines could be determined after mapping HT/LT lines and transformers using GPS and the type of overhead line was identified. The type of HT, its length, were collected during the field visit. The energy consumption pattern during the previous 12 months for HT consumers and LT consumers (under each distribution transformer) were analyzed under the 10% of the Feeders and average monthly energy consumption was noted.

A. LT Losses

For LT side, the average monthly energy consumption is noted (at the transformer secondary side). The **LT overhead line losses** are calculated as per the formula given below

$$LT\ line\ losses\ per\ month\ \left(\frac{kWh}{month}\right) = 3I_L^2 * R_L * d * 24 * 30 \quad \text{..... (1)}$$

Where: I_L = average value of current passing through the LT overhead line (A)

R_L = Resistance/km of the LT overhead line (Ω/km)

d = mean length of the LT overhead line (km)

The value of I_L can be calculated from the total average monthly kWh consumption of all consumers under a single Distribution Transformer as per the following equation

$$I_L = \frac{Total\ Average\ monthly\ kWh\ consumption\ under\ each\ Distribution\ Transformer\ (\frac{kWh}{month})*1000}{\sqrt{3}*400*24*30} \text{.....(2)}$$

Now, Energy transmitted from the pole of the distribution transformer (DT) is given by

$$Energy\ transmitted\ from\ the\ pole\ of\ DT\ \left(\frac{kWh}{month}\right) =$$

$$Total\ energy\ consumption\ under\ each\ DT\ (\frac{kWh}{month}) + LT\ line\ losses\ (\frac{kWh}{month}) \text{.....(3)}$$

LT cable line losses are calculated as follows:

$$LT\ cable\ losses\ per\ month\ \left(\frac{kWh}{month}\right) = \frac{3I_c^2*R_c*d*24*30}{1000} \quad \text{.....(4)}$$

Where: I_c = average value of current passing through the LT cable (A)

R_c = Resistance/km of the LT cable (Ω/km)

d = length of the LT cable (km)

The value of $I_{c\ can}$ be calculated from the total average monthly energy transmitted from the pole of each Distribution Transformer as per the following equation

$$I_c = \frac{Total\ Average\ monthly\ energy\ transmitted\ from\ pole\ of\ each\ Distribution\ Transformer\ (kWh/month)*1000}{\sqrt{3}*400*24*30} \text{.....(5)}$$

Now, the energy at the secondary side of each distribution transformer is given by

$$Energy\ at\ the\ secondary\ side\ of\ each\ DT\ \left(\frac{kWh}{month}\right) = Total\ energy\ transmitted\ from\ pole\ of\ each\ DT\ \left(\frac{kWh}{month}\right) + LT\ cable\ losses\ \left(\frac{kWh}{month}\right) \text{.....(6)}$$

B. Transformer losses

The major losses in a transformer are accounted as Core losses and Copper losses. Core losses are independent of the transformer loading whereas Copper losses depends on the loading factor. The transformer losses are given by the formula as

$$Transformer\ losses\ \left(\frac{kWh}{month}\right) = \frac{(P_{core}+x^2*P_{Cu})*24*30}{1000} \text{.....(7)}$$

Where: P_{core} = Transformer core losses (W)

P_{Cu} = Transformer Copper losses (W)

x, Transformer loading factor = Total average monthly Energy at the transformer secondary (kWh/month)/ (Average monthly Power Factor* Transformer capacity in kVA)

Thus, the total energy transmitted the HT side of each distribution transformer is given by the equation

$$Total\ average\ monthly\ energy\ transmitted\ from\ the\ transformer\ primary\ \left(\frac{kWh}{month}\right) = Average\ monthly\ energy\ transmitted\ from\ the\ transformer\ secondary\ \left(\frac{kWh}{month}\right) + Transformer\ losses\ \left(\frac{kWh}{month}\right) \text{.....(8)}$$

C. HT losses

For HT consumers the average monthly energy at the transformer HT side is available and the HT overhead line loss was calculated as per follows:

$$\text{HT line loss per month } \left(\frac{\text{kWh}}{\text{month}}\right) = 3I^2 * R * D * 24 * 30 \text{.....(9)}$$

Where: I = average value of current passing through the overhead line (A)

R = Resistance/km of the HT overhead line (Ω/km)

D = length of the overhead line (km)

The value of average current is found from the average monthly energy consumption recorded at the HT side as $I = \frac{average\ monthly\ kWh\ recorded\ at\ HT\ metering\ side}{24*30*11*\sqrt{3}}$ .....(10)

For LT consumers under distribution transformer the energy transmitted from the HT side of each distribution transformer is calculated as per equation (9)

$$Total\ \ monthly\ average\ energy\ transmitted\ from\ the\ pole\ at\ switching\ station\ \left(\frac{kWh}{month}\right) =$$
$$Total\ monthly\ average\ energy\ transmitted\ from\ the\ transformer\ primary\ \left(\frac{kWh}{month}\right) +$$
$$Total\ monthly\ average\ HT\ overhead\ line\ losses\ \left(\frac{kWh}{month}\right) \text{ .....(11)}$$

HT Cable losses is given by equation (12) as follows

$$HT\ cable\ losses\ \left(\frac{kWh}{month}\right) = 3\ I_T^2 * R_{HTcable} * D_c * 24 * 30 \text{ .....(12)}$$

Where: I_T = average current through the HT cable (A)

$R_{HTcable}$ = Resistance/km of HT cable (Ω/km)

D_c = length of HT Cable from incomer to Pole at switching station

The total monthly average energy transmitted from the feeder incomer =

$$The\ total\ monthly\ average\ energy\ transmitted\ from\ the\ feeder\ incomer\ (kWh/month)$$
$$= Total\ monthly\ average\ energy\ transmitted\ from\ the\ pole\ at\ switching\ station$$
$$+ HT\ cable\ losses$$

D. Feeder Meter Calibration

Continuous logging was done at each feeder for a period of 1 to 5 hours during a normal working day. The energy transmitted from each feeder was recorded using power analyzer and it is compared against the power analyzer readings. Percentage of error in the feeder side energy meter was found using the formula shown below.

$$\%\ of\ error = \frac{(Feeder\ energy\ meter\ reading - Power\ analyser\ reading\ ) * 100}{Power\ analyser\ reading}$$

5. LIST OF INSTRUMENTS

The instruments used for the measurements and analysis as a part of electrical distribution audit were as follows:

Table 20: Equipment list

Equipment/software name	**Make**	**Model**	**Purpose**
Portable load manager	Krykard	1. ALM 31 2. ALM 35	Load and distribution loss analysis, Meter deviation
Global positioning system meter	Garmin	Etrex 10	For mapping the HT lines and to have the coordinates of the transformers
Easy GPS software			For mapping the co-ordinates
Google maps			For mapping

ENERGY CONSUMPTION PROFILE

TCED procures electricity from KSEB Ltd for the supply to its consumers and for its own consumption. TCED receives the power as 110 kV and 66kV from the KSEBL (Kerala state electricity board limited) as **Part-C: BULK SUPPLY – EHT TARIFF APPLICABLE TO SMALL LICENSEES** category. The rates specified in this schedule (Part C) are exclusive of Electricity Duty and/or surcharge, other cess, taxes, minimum fees, duties and other impositions. Thus, only the demand and energy charges are applicable for the electricity cost.

1. BASELINE DATA

The basic details of the bill and TCED distribution are as follows:

Base Line Data – FY 2020-21			
1	Electricity provider	KSEBL	
2	Supply Voltage	110 kV	66 kV
3	Tariff	Licensee: Thrissur Corporation– EHT TARIFF	
4	Consumer number	LCN :21/Thr.Corp	LCN :21/1029
5	Section office	110 KV Sub Station, Viyyur	
6	Contract demand (kVA)	Can access unlimited demand as per the agreement signed between KSEBL and Thrissur municipality on 1949.	
7	Maximum demand registered (kVA)	24782	10694
8	Average monthly electricity consumption (MU)	7.29	3.49
9	Annual unit consumption (MU)	87.47	41.86
10	Average power factor	0.95	0.95
11	Tariff Rate of energy charges (Rs / kWh)	6.05	
12	Demand charge (Rs / kVA)	340	
	Other details		
13	Number of incoming feeders – From KSEBL - 110 kV and 66 kV (Nos)	02	
14	Number of substations and voltage level	110 kV – Aswini – 01 no 66 kV Aswini – 01 no 33 kV Ikkanda warrier – 01 no	
15	Number of TCED Distribution Feeders – 11 kV (Nos)	16	
16	Feedback points – To KSEBL (Nos)	NIL	
17	Number of DT under TCED	441	
18	Number of DT at 415V level	441	
19	Number of s/s transformers at 33 kV level	01	
20	Number of s/s transformers at 11 kV level	07	
21	Line length at 33 kV voltage level (km)	4.2	
22	Line length at 11 kV voltage level (km)	178.316	
23	Line length at LT voltage level (km)	285.675	
24	HT/LT ratio	01:1.6	
25	Number of consumers - as of March 2021	40436	
26	Connected load (MW) - as of March 2021	214.09	
27	Number of HT consumers	126	
28	Number of LT consumers	40310	

2. DEMAND ANALYSIS

2.1. DEMAND TARIFF STRUCTURE

As per the Kerala State Electricity regulatory comission (KSERC) tariff order dated 16/03/2020, Billing Demand (BD) shall be the Recorded Maximum Demand (RMD) for the month in kVA or 75% of Contract Demand (CD) whichever is higher in 30 minutes interval period.

However, TCED can access unlimited demand as per the agreement signed between KSEBL and Thrissur municipality on 1949.

The demand calculation for the TCED as per the KSERC order is given below. However this is not followed in the TCED billing as there is no mention of contract demand.

Recorded maximum demand (RMD)	•Maximum Demand registered in Normal, Peak, and Off-peak periods
Billing demand - BD	•BD = RMD or •75% of contract demand
Billing demand charge	•Demand charges = BD x 340 Rs/kVA

2.2. DEMAND CONSUMED – FY 2020-21

The registered or billed demand thus applied to the TCED and the consumption during the FY 2020-21 is given in the figure below.

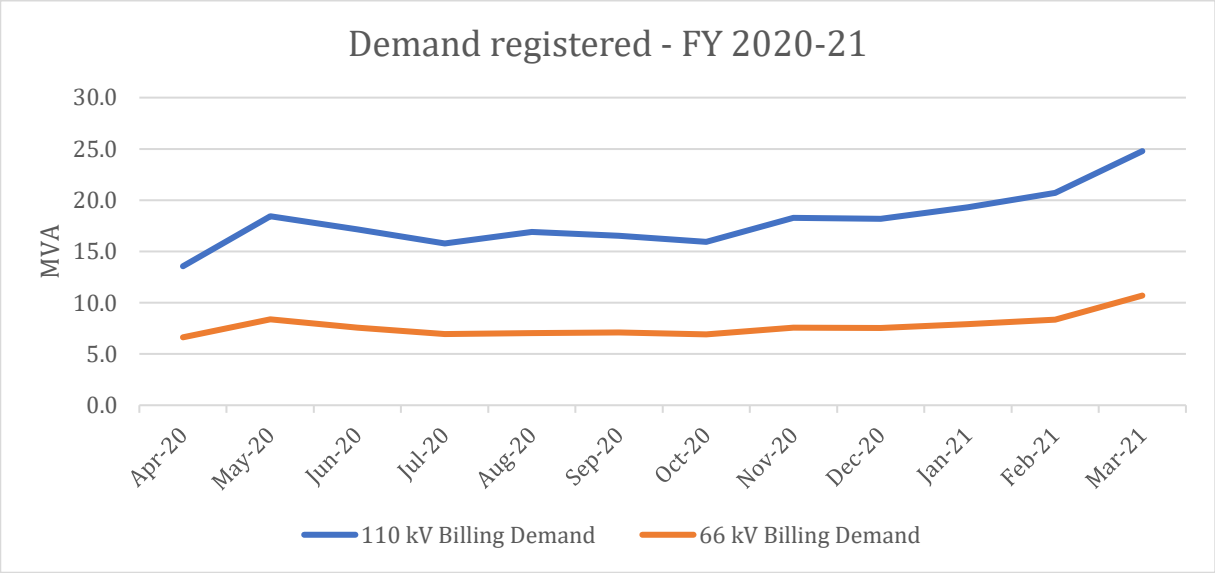

Figure 5: TCED – Demand analysis

3. UNIT CONSUMPTION ANALYSIS

3.1. UNIT TARIFF STRUCTURE

As per the Kerala State Electricity regulatory comission (KSERC) tariff order dated 16/03/2020, TOD tariff is applicable to Bulk consumer - Small licensees. The calculation method for the energy charges is mentioned below.

Energy consumption	•Unit consumption in Normal Period (A) •Unit consumption in Peak Period (B) •Unit consumption in Off-Peak Period (C)
Chargeable energy	•D = A + B +C
Energy charges	•Energy charges = D x 6.05 Rs/kWh

3.2. UNIT CONSUMED – FY 2020-21

This section analyses the trend for the unit consumption by the TCED over the period FY 2020-21. A total of 129.33 MU consumed by TCED during FY 2020-21.

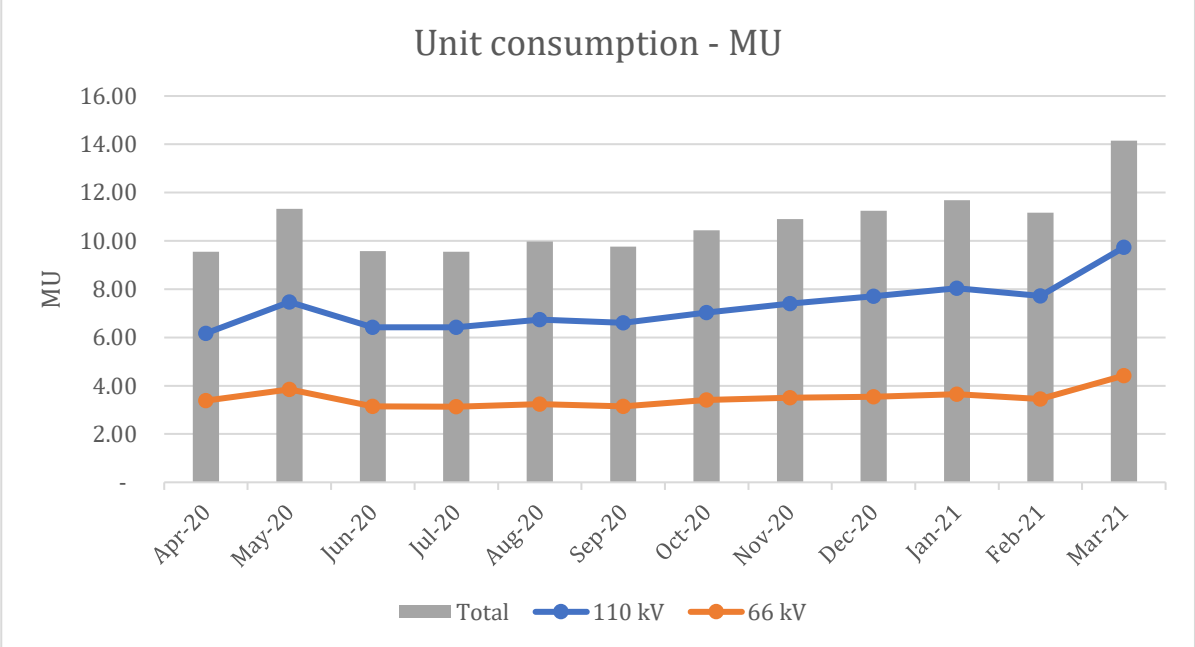

Figure 6: Energy consumption analysis – month wise

4. POWER FACTOR ANALYSIS

4.1. POWER FACTOR CALCULATION METHOD

As per the Kerala State Electricity regulatory comission (KSERC) tariff order dated 16/03/2020, power factor incentive/disincentives were not applicable to Bulk consumer - Small licensees during the FY 2020-21. The calculation method for the Power factor is mentioned below.

Active Energy consumption	•Denoted as (A)
Apparent Energy consumption	•Denoted as (B)
Power factor	•PF = A ÷ B

4.2. POWER FACTOR REGISTERED IN FY 2020-21

This section analyses the trend for the Power factor over the period FY 2020-21

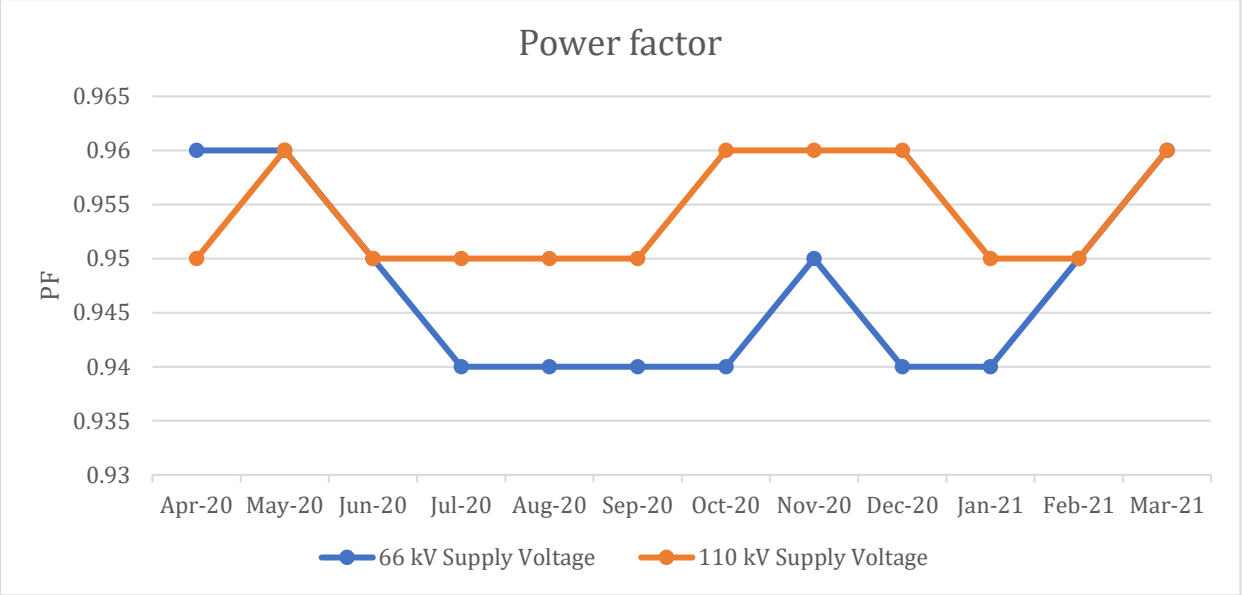

Figure 7: Power factor – FY 2020-21

5. OBSERVATIONS AND RECOMMENDATION – ENERGY CONSUMPTION PROFILE

Table 21: Observations & Recommendation – Energy Consumption Profile as per bill

Observation	Recommendation	Benefit
Contract demand		
As per the 1947 agreement signed between TCED and KSEBL, unlimited supply warranty given for the former, measnwhile the TCED own generation was stopped as per the agreement.	• TCED is entitled to have unlimited Demand as per this agreement.	
Power factor		
Low PF registered in the 66 KV incomer at 0.94 lagging for 06 months in the FY 2020-21. Demand charges will reduce by ensuring the PF at near unity. The detailed calculation for the PF improvement is mentioned below. During the audit period as per the new tariff dated 25-06-2022 the TCED is entitled to get PF incentive if it maintains above 0.95. However, KSEB temporarily disapproved the same and in dispute.	• Awareness shall be given to all the HT consumers for improving the PF near to unity. • Install capacitors for the distribution transformers (DT) in the 11 kV feeders wherever possible. • The selection of DT for reactive power compensation shall be based on their average loading. Choose the DT with an average loading of 40% and above.	• The net annual savings by the PF improvement is • In addition, the distribution line losses and transformer losses will get reduced.
Unit consumption analysis		
The overall unit consumption by the TCED during FY 2020-21 reduced by 20.34% from the FY 2019-20 (FY 2019-20-unit consumption was 162.37 MU) mainly due to the COVID effects.	NIL	• NIL

ELECTRICAL NETWORK CONFIGURATION

The Thrissur Corporation Electricity Department (TCED) receives power at two supply voltage:

1. 110 kV – receives at Aswini substation.
2. 66 kV – receives at Aswini Substation

The However, the Thrissur Corporation Electricity Department (TCED) have three substations in the name of its voltage level.

1. 110 kV substation at Aswini.
2. 66 kV substation at Aswini.
3. 33 kV substation at Ikkandawarrior Road.

The supply receives at 110 kV and stepdown to 11 kV feeders using 2 nos of 12.5 MVA transformers installed in the yard. Another 110-kV bus is passed through the 01 no of 16 MVA transformer to stepdown at 33 kV voltage and transmitted to 33 KV substation. In the 33-kV substation 02 nos of 5 MVA transformer will stepdown the supply to 11 kV and supplies to the feeders.

The supply that receives at 66 kV gets stepdown using 3 nos of 10 MVA transformers installed in the yard.

1. SUBSTATION DETAILS

2. TRANSFORMER AND FEEDER DETAILS – SUBSTATION

Transformer details in each substation is given in the table below:

Table 22: Substation transformer details

S/s	TR. No	Capacity of Transformer	Voltage level	Current	Volt impedance	Serial No.	MFD Name	Date of MFD
		MVA	KV	A	%			
66 kV	TR-1	10	66/11	87.5/525	9.57	120285-1	TELK	1988
	TR-2	10	66/11	87.5/525	9.71	120285-2	TELK	1989
	TR-3	10	66/11	87.6/525	9.97	120495	TELK	2005
110 kV	TR-1	12.5	110/11	65.7/657	10.21	120553-1	TELK	2008
	TR-2	12.5	110/11	65.7/657	10.12	120553-2	TELK	2008
	TR-3	16	110/33	84.1/280	10.31	120554	TELK	2008
33 kV	TR-1	5	33/11	87.6/263	7.14	110125-1	TELK	2009
	TR-2	5	33/11	87.6/263	7.01	110125-2	TELK	2009

There are 07 nos of 11 kV feeders during the FY 2020-21 period under the 110-kV substation, 05 in 66 kV and 4 in 33 kV substation. The feeders are:

Table 23: Distribution Feeder name

Feeder			
33 kV s/s		**110 kV s/s**	
1	Paravattani	1	Ramanilayam
2	Koorkanchery	2	M O Road
3	Veliyanoor	3	Kottappuram
4	Mission Quarters	4	Chembukavu
66 kV s/s		5	Shornur Road
1	Poothole	6	District Hospital
2	Bini	7	East Fort
3	Vivekodayam		
4	Aranattukkara		
5	Jubilee Mission Medical College		

3. DETAILS OF CABLES AND OVERHEAD LINES - SUMMARY

The details of 11 kV cable used at the substation is given below. The data was taken from the Single line diagram of the substation.

Table 24: Switching Station – 11 kV UG Cable Details

From	To	Cable size	Run	Core	Cable length (m)	R/km (ohm)
110/11 kV TRFR	Substation panel	500 sqmm XLPE	3	3	50	0.081
66/11 kV TRFR	Substation panel	500 sqmm XLPE	3	3	50	0.081
33/11 kV TRFR	Substation panel	300 sqmm XLPE	1	3	50	0.081
Substation panel -110/11 kV	Ramanilayam	300 sqmm XLPE	1	3	30	0.13
	M O Road	300 sqmm XLPE	1	3	30	0.13
	Kottappuram	300 sqmm XLPE	1	3	30	0.13
	Chembukavu	300 sqmm XLPE	1	3	30	0.13
	Shornur Road	300 sqmm XLPE	1	3	30	0.13
	District Hospital	300 sqmm XLPE	1	3	30	0.13
	East Fort	300 sqmm XLPE	1	3	25	0.13
Substation panel -66/11 kV	Poothole	300 sqmm XLPE	1	3	50	0.13
	Bini	300 sqmm XLPE	1	3	65	0.13
	Vivekodayam	300 sqmm XLPE	1	3	30	0.13
	Aranattukkara	300 sqmm XLPE	1	3	50	0.13
	Jubilee Mission Medical College	300 sqmm XLPE	1	3	30	0.13
	Paravattani	300 sqmm XLPE	1	3	30	0.13

Substation panel -33/11 kV	Koorkanchery	300 sqmm XLPE	1	3	65	0.13
	Veliyanoor	300 sqmm XLPE	1	3	30	0.13
	Mission Quarters	300 sqmm XLPE	1	3	30	0.13

The details of OH lines used in the TCED distribution system is given in the table below. The HT line length was measured using the GPS mapping and LT line length was taken from the RDSS data.

Note: AEA has mapped HT line and transformer of 9 out of 16 feeders during the audit time period.

Table 25: TCED Distribution –line details

Sl. No	Feeder	HT							LT
		OH Line Length	UG Cable length						OH line Length
			150 sq.mm	185 sq.mm	240 sq.mm	300 sq.mm	400 sq.mm	ABC - 120 sq mm	
		m	m	m	m	m	m	m	m
1	Bini	1710	63	122	354	1097		19	2805
2	Chembukavu	3317	0	170	409	2023		14	6605
3	East Fort	2046		47		4316	56		NA
4	Koorkanchery	2782	130	232	266	2715			NA
5	Ramanilayam	1128	499	95		292			3000
6	Veliyanoor	1359		138	32	3726			NA
7	Vivekodayam	2187	40		86	2559		18	NA
8	Shornur Road	2118	572	301		3950			8960
9	JMC					2821			5705
Total		**16647**	**1305**	**1106**	**1147**	**23499**	**56**	**50**	**26675**

4. TRANSFORMER DETAILS – FEEDER WISE

The details of Transformers in each feeder wise that has been audited under the DISCOM is summarized and listed below in table. **The detailed list is provided in the Annexure-1.**

Table 26: Feeder wise transformer data - Summary

Sl No	Feeder	No: of Trfr	DTR Meter		No of Consumers		
			Yes	No	LT	HT	Total
1	Ramanilayam	18	10	8	613	8	621
2	Bini	17	11	6	935	12	947
3	Chembukavu	23	19	4	2381	4	2385
4	Shornur Road	40	26	14	2841	8	2849
5	East Fort	27	8	19	NA**	NA	NA
6	Koorkanchery	22	15	7	NA	NA	NA
7	Veliyanoor	18	9	9	NA	NA	NA
8	Vivekodayam	21	13	8	NA	NA	NA
9	Aranattukkara	29	15	14	NA	NA	NA
10	DH	33	16	17	NA	NA	NA
11	Kottappuram	53	41	12	NA	NA	NA
12	M O Road	27	11	16	NA	NA	NA
13	Mission Quarters	28	23	5	NA	NA	NA
14	Paravattani	20	19	1	NA	NA	NA
15	Poothole	65	38	27	NA	NA	NA
16	Jubilee mission	Dedicated feeder HT			NA	NA	NA
Total		**441**	**274**	**167**	**6770**	**32**	**6802**

**NA – Feeder or transformer wise consumer data not available in the DISCOM. DISCOM is building the database along with the RDSS scheme which will be completed by December 2023.

5. SINGLE LINE DIAGRAM

5.1. 110 KV & 66 KV SUBSTATION

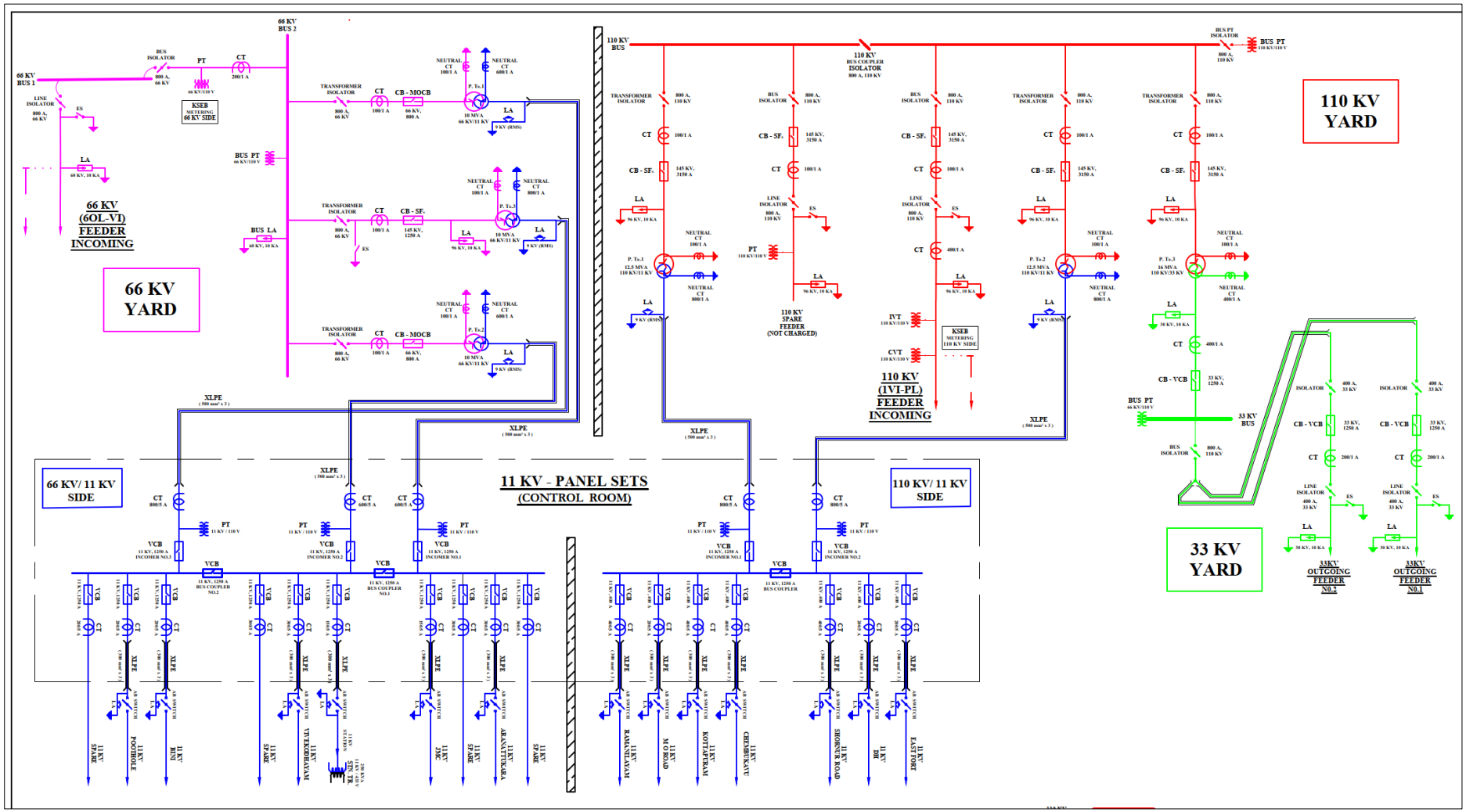

Figure 8: 110 kV & 66 kV substation

5.2. 33 KV SUBSTATION

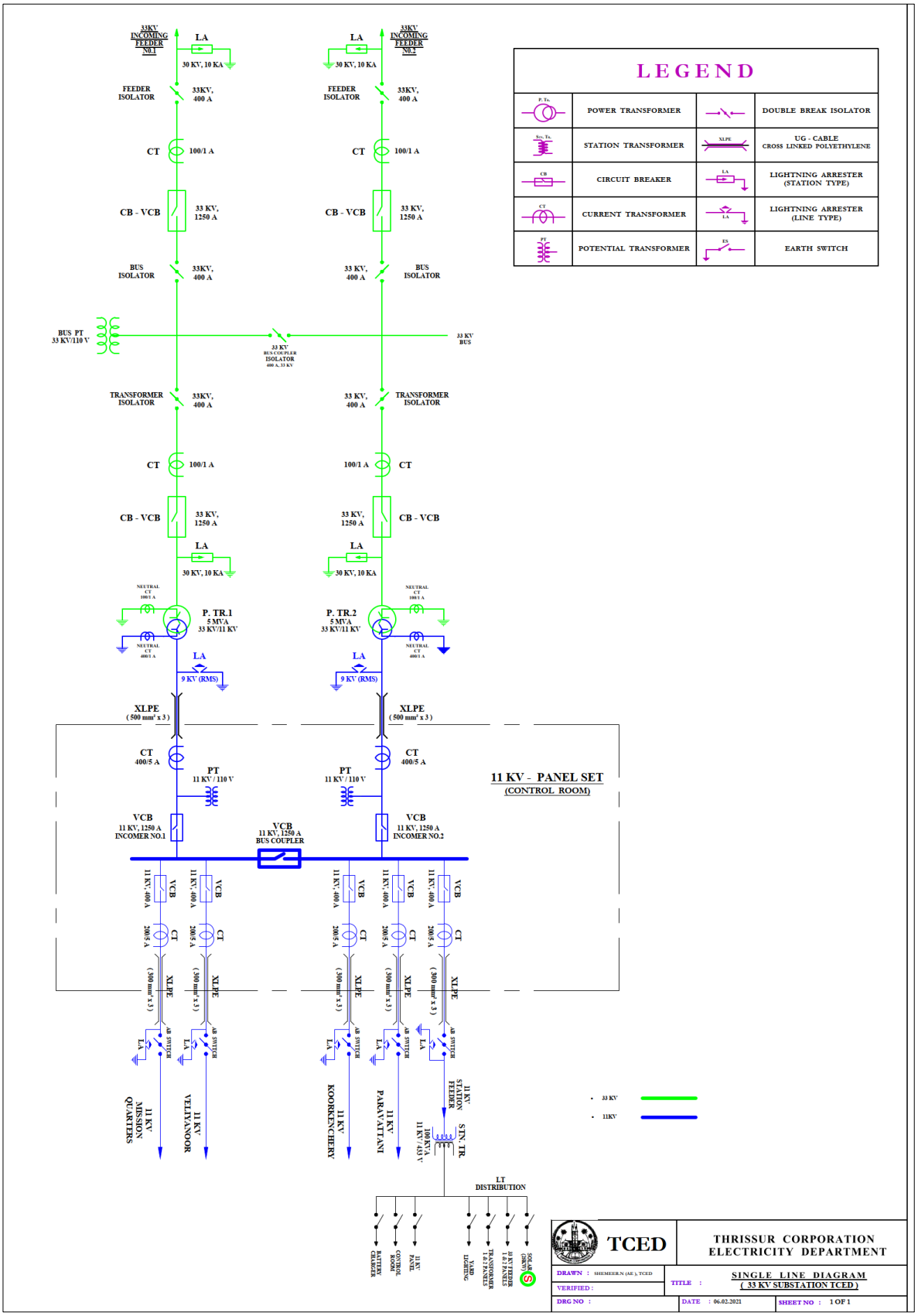

Figure 9: 33 kV substation

6. INFRASTRUCTURE DETAILS

The infrastructure details of the TCED DISCOM are given below as per the Performa filled out and verified by the accredited energy auditor.

Table 27: 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 circles	1	1	1	
ii	Number of divisions	1	1	1	
iii	Number of sub-divisions	1	1	1	
iv	Number of feeders	16	16	4	25% of the Total feeder
v	Number of DTs	441	441	97	21.9% of the total DT. Transformers of HT consumers not included in the list
vi	Number of consumers	40436	40436	6702	16.6% of the total consumers
2	**Parameters**	**66kV and above**	**33kV**	**11/22kV**	**LT**
a. i.	Number of conventional metered consumers	-	-	-	7913
ii	Number of consumers with 'smart' meters	-	-	-	-
iii	Number of consumers with 'smart prepaid' meters	-	-	-	-
iv	Number of consumers with 'AMR' meters	-	-	-	-

v	Number of consumers with 'non-smart prepaid' meters	-	-	126	32397
vi	Number of unmetered consumers	-	-	-	
vii	**Number of total consumers**	-	-	126	40310
b.i.	Number of conventionally metered Distribution Transformers	-	-	-	-
ii	Number of DTs with communicable meters	-	-	-	274
iii	Number of unmetered DTs	-	-	-	167
iv	**Number of total Transformers**			0	441
c.i.	Number of metered feeders			-	
ii	Number of feeders with communicable meters			16	
iii	Number of unmetered feeders			-	
iv	**Number of total feeders**			16	
d.	Line length (ct km)		4.2	117.976	285.675
e.	Length of Aerial Bunched Cables (km)			1.85	-
f.	Length of Underground Cables (km)		2.565	54.29	4.525
3	**Voltage level**	**Particulars**	**MU**	**Reference**	**Remarks (Source of data)**
i	66kV and above	Long-Term Conventional	129.33	Includes input energy for franchisees	

		Medium Conventional	0		
		Short Term Conventional	0		
		Banking	0		
		Long-Term Renewable energy	0.000		
		Medium and Short-Term RE	0		
		Captive, open access input	0		
		Sale of surplus power	0		
		Quantum of inter-state transmission loss	0		
		Power procured from inter-state sources	129.33		
		Power at state transmission boundary	129.33		
iii		**Input in DISCOM wires network**	129.33		
v	11 kV	Renewable Energy Procurement	0.4585	Self-generation = solar power plant in own buildings + 11 kV export received	
		Small capacity conventional/ biomass/ hydro plants Procurement	0.00		
		Sales Migration Input	0.00		
vi	LT	Renewable Energy Procurement	1.114	Total LT export from consumers	
		Sales Migration Input	0		
vii		**Energy Embedded within DISCOM wires network**	0.00		
viii		**Total Energy Available/ Input**	129.33		
4	**Voltage level**	**Energy Sales Particulars**	**MU**	**Reference**	
i	LT Level	DISCOM' consumers	88.78	Include sales to consumers in franchisee areas, unmetered consumers	Total Lt Sales
		Demand from open access, captive	0.00		
		Embedded generation used at LT level	1.114	Demand from embedded generation at LT level	Total LT generation used
		Sale at LT level	88.78		
		Quantum of LT level losses	8.08	Included the LT OH line length, Transformer loss, LT cable, Switch gear & Commercial losses	

		Energy Input at LT level	96.86		
ii	11 kV Level	DISCOM' consumers	32.30	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive	0.00	Non DISCOM's sales	
		Embedded generation at 11 kV level used	0.4585	Demand from embedded generation at 11kV level	
		Sales at 11 kV level	32.30		
		Quantum of Losses at 11 kV	0.164	EHT + HT losses	
		Energy input at 11 kV level	32.47		
		Total Energy Requirement	**129.33**		
		Total Energy Sales	**121.08**		

Energy Accounting Summary

5	**DISCOM**	**Input (in MU)**	**Sale (in MU)**	**Loss (in MU)**	**Loss %**
i	LT				
ii	11 KV	129.33	121.08	8.25	6.38
iii	33 kV				
iv	> 33 kV				
	Loss Estimation for DISCOM				
	T&D loss (MU)	8.25			
	D loss (MU)	8.25			
	T&D loss (%)	6.38			
	D loss (%)	6.38			

7. DIVISION WISE STATUS OF DT LEVEL METERING

The division wise status of DT level metering is given in the table below.

Table 28: Division wise status of DT level metering

a. Division wise status of DT level metering										
Zone name	Circle name	Division name	Feeder name	Total no of DT on feeder	No of unmetered DTs	No of metered DTs			No. of DTs with functional meters	
						AMR metered (communicable)	AMI metered (communicable)	Non-AMR / AMI metered (non-communicable)	Communicating (Total No out of 7 and 8)	Non-communicating (Total No. out of 7,8 and 9)
1	2	3	4	5= (6+7+8+9)	6	7	8	9	10	11
TCED	TCED		Ramanilayam	18	8	-	10	-	10	-
TCED	TCED		Bini	17	6	-	11	-	11	-
TCED	TCED		Chembukavu	23	4	-	19	-	19	-
TCED	TCED		Shornur Road	40	14	-	26	-	26	-
TCED	TCED		East Fort	27	19	-	8	-	8	-
TCED	TCED		Koorkanchery	22	7	-	15	-	15	-
TCED	TCED		Veliyanoor	18	9	-	9	-	9	-
TCED	TCED		Vivekodayam	21	8	-	13	-	13	-
TCED	TCED		Aranattukkara	29	14	-	15	-	15	-
TCED	TCED		DH	33	17	-	16	-	16	-
TCED	TCED		Kottappuram	53	12	-	41	-	41	-
TCED	TCED		M O Road	27	16	-	11	-	11	-

Zone name	Circle name	Division name	Feeder name	Total no of DT on feeder	No of unmetered DTs	No of metered DTs			No. of DTs with functional meters	
						AMR metered (communicable)	AMI metered (communicable)	Non-AMR / AMI metered (non-communicable)	Communicating (Total No out of 7 and 8)	Non-communicating (Total No. out of 7,8 and 9)
TCED	TCED		Mission Quarters	28	5	-	23	-	23	-
TCED	TCED		Paravattani	20	1	-	19	-	19	-
TCED	TCED		Poothole	65	27	-	38	-	38	-
TCED	TCED		Jubilee Mission	Dedicated feeder						
Total				**441**	**167**	**-**	**274**	**-**	**274**	**-**

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8. ENERGY & POWER QUALITY ANALYSIS – AT SWITCHING STATION

The objective of this section is to establish how the facility is performing in terms of energy consumption and the quality of power at the switching station.

8.1. INCOMER 110 KV – MEASUREMENT EVALUATION

The continuous power measurement of incomer feeder (110 kV) conducted using the Krykard ALM 35 power quality analysers. The incomer side was logged for 24 hours and measured data is summarized in the following table. The measurement-averaging period was 02 minutes. The measurement was done on 10th & 11th November 2022.

The summary of measured parameters of the transformer is given in the table below.

Table 29: Incomer Measurement Data

Incomer Name		Incomer 110 kV
Date of measurement		10th & 11th Nov 2022
Basic Parameters		
Parameters	**Units**	**Incomer 110 kV**
Voltage line (kV)	Min	109
	Avg	113
	Max	116
Current (A)	Min	30
	Avg	54
	Max	83
Frequency (Hz)	Min	49.77
	Avg	49.99
	Max	50.13
Energy Parameters		
Parameters	**Units**	**Incomer 110 kV**
Energy consumed (kWh)	Total	236408.1
Energy received (kVAh)	Total	250517.8
Power factor		0.94
Active power (kW)	Min	5786
	Avg	9961
	Max	14793
Apparent power (kVA)	Min	6123
	Avg	10556
	Max	15735
Reactive power (kVAr)	Min	1041
	Avg	2111
	Max	3577
Power quality parameters		
Parameters	**Units**	**Incomer 110 kV**
Voltage imbalance %	Min	0.20
	Avg	0.47
	Max	0.70

Parameters	Units	Incomer 110 kV
Current imbalance %	Min	1.10
	Avg	2.33
	Max	3.50
THDv %	Min	0.90
	Avg	1.34
	Max	2.00
THDa %	Min	0.90
	Avg	3.03
	Max	6.60

8.2. ELECTRICAL PARAMETERS - PROFILE

8.2.1. Power variations – Incomer

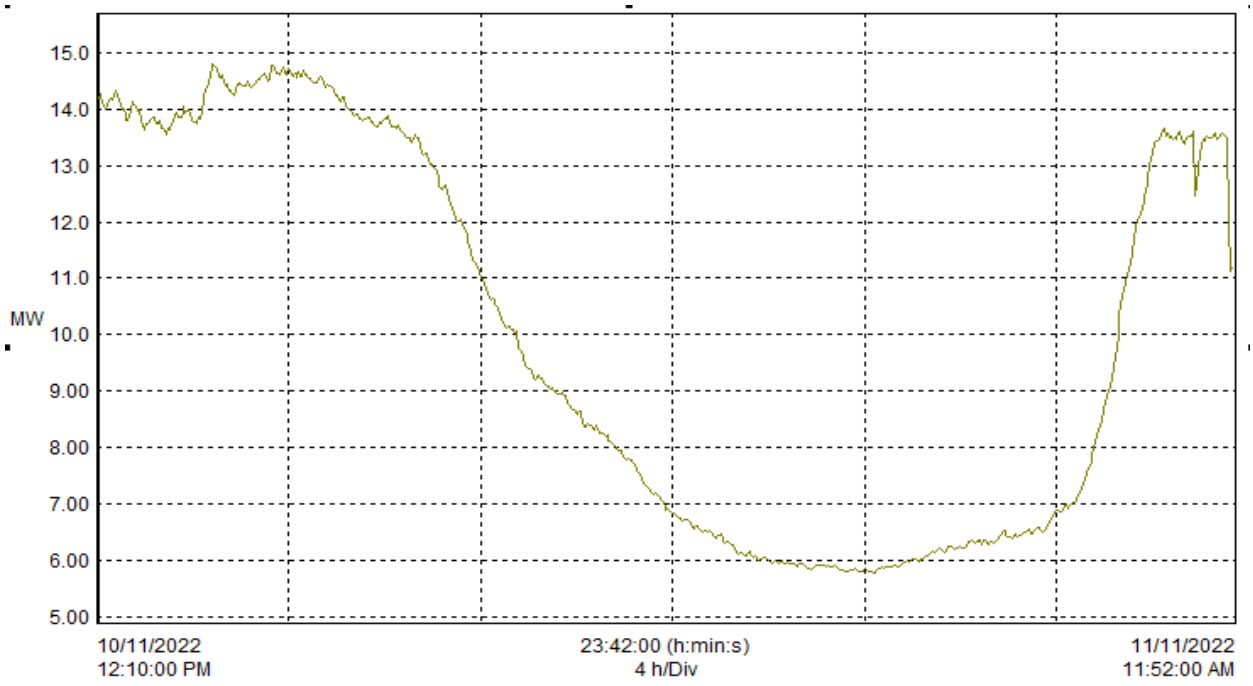

Figure 10: Power variations – continuous logged data

8.2.2. Demand variations – incomer

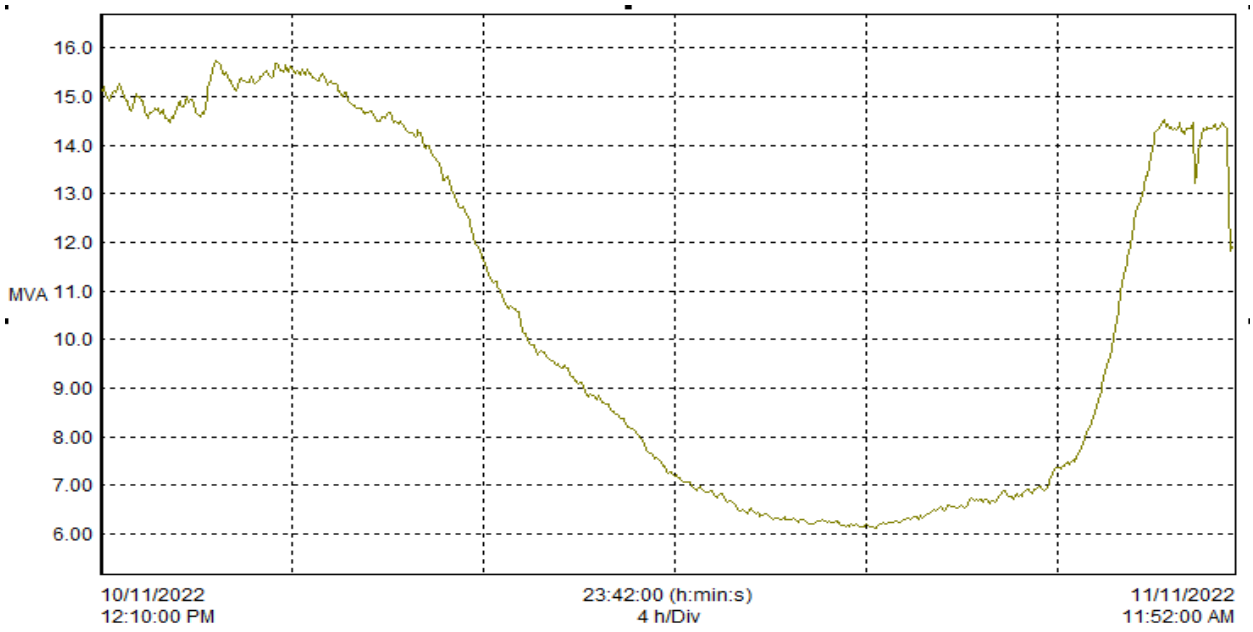

Figure 11: Demand variations – continuous logged data

- The maximum demand registered in 02-minute cycle in the continuous logging of 24-hour measurement at 110 kV incomer is 15.73 MVA.

8.2.3. Power factor variations - Incomer

Figure 12: Power factor – variations

8.2.4. Power quality

Harmonics study revolves around the use of non-linear loads that are connected to electric power systems including static power converters, arc discharge devices, saturated magnetic devices and to a lesser degree, rotating machines. Static power converters of electric power are the largest non-linear loads and are used in industry for a variety of purposes such as electro- chemical power supplies, adjustable speed drives, and uninterruptible power supplies.

Classification, effects and standards are given in tables below.

TABLE 30: HARMONICS CLASSIFICATION

	1st order	2nd order	3rd order	3rd order	4th order	5th order	6th order
Frequency Hz	50	100	150	200	250	300	350
Sequence	+	-	0	+	-	0	+

Table 31: CURRENT HARMONICS LIMIT (IEEE 519-2014)

Maximum harmonic current distortion in percent of I_L						
Individual harmonic order (odd harmonics)[a, b]						
I_{SC}/I_L	$3 \le h < 11$	$11 \le h < 17$	$17 \le h < 23$	$23 \le h < 35$	$35 \le h \le 50$	TDD
< 20[c]	4.0	2.0	1.5	0.6	0.3	5.0
$20 < 50$	7.0	3.5	2.5	1.0	0.5	8.0
$50 < 100$	10.0	4.5	4.0	1.5	0.7	12.0
$100 < 1000$	12.0	5.5	5.0	2.0	1.0	15.0
> 1000	15.0	7.0	6.0	2.5	1.4	20.0

[a]Even harmonics are limited to 25% of the odd harmonic limits above.

[b]Current distortions that result in a dc offset, e.g., half-wave converters, are not allowed.

[c]All power generation equipment is limited to these values of current distortion, regardless of actual I_{sc}/I_L.

where

I_{sc} = maximum short-circuit current at PCC

I_L = maximum demand load current (fundamental frequency component) at the PCC under normal load operating conditions

Table 32: VOLTAGE HARMONICS LIMIT (IEEE 519-2014)

Voltage distortion limits		
Bus voltage at PCC	**Individual voltage distortion %**	**Total voltage harmonics distortion %**
V ≤ 01 kV	5.0	8.0
01 kV < V ≤ 69 kV	3.0	5.0
69.001 kV < V ≤ 161 kV	1.5	2.5
161.001 kV and above	1.0	1.5

Thus, harmonic limits at the TCED 110 kV incomer is given in the table below:

Table 33: Standard limits as per the IEEE 519-2014 – at TCED incomer

1. Normal range of Isc/I_L at TCED incomer	-	<20
2. Maximum standard Total demand distortion – current	-	5%
3. Maximum standard Total harmonic distortion – voltage	-	2.5%

Harmonic values at the TCED incomer are given in the table below:

Table 34: Harmonics values – TCED incomer

Particulars	THDv max	THDa max	Remarks
	%	%	
Permissible limit	**2.5**	**5**	
Incomer 110 kV	2	6.6	THDa Outside limits
Incomer 66 kV	NA	NA	Not able to measure

8.2.5. Harmonic spectrum

Voltage harmonic spectrum:

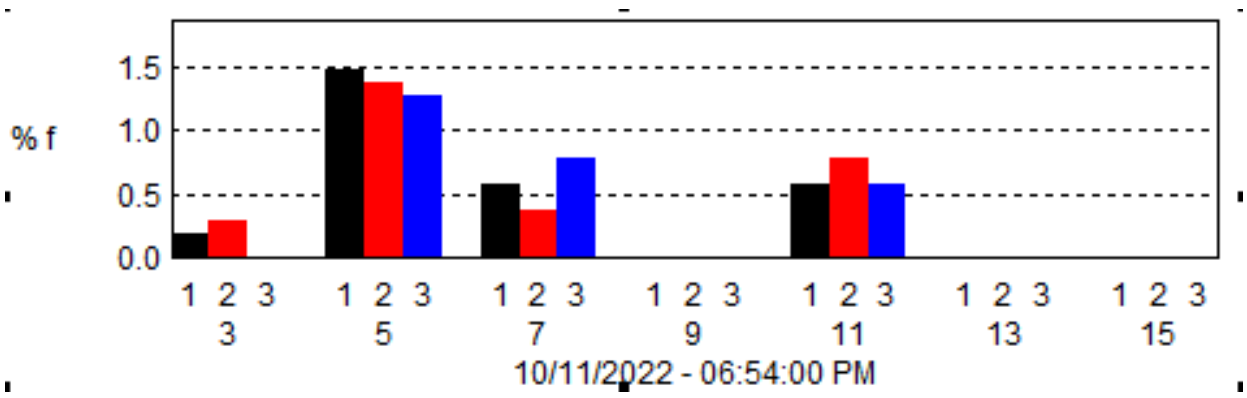

Figure 13: Voltage harmonic spectrum

Current harmonic spectrum:

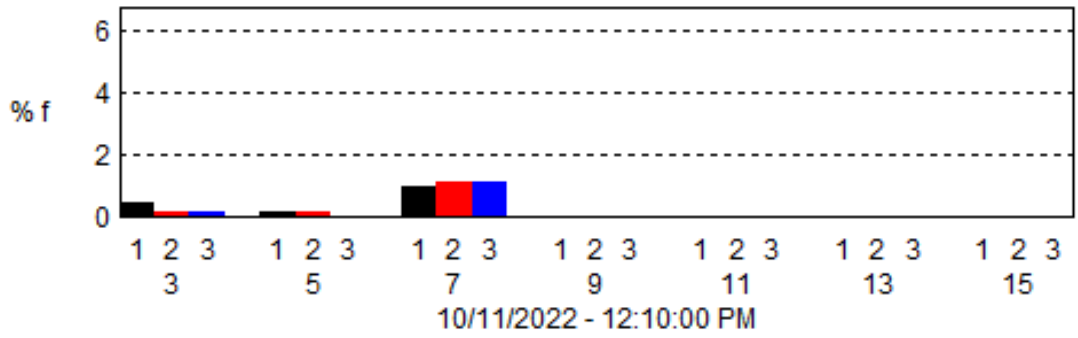

Figure 14: Current harmonic spectrum

9. OBSERVATIONS AND RECOMMENDATION – ELECTRICAL NETWORK CONFIGURATION

Table 35: Observations & recommendation – electrical network configuration

Observation	Recommendation	Benefit
Incomer measurement evaluation		
• Real time Demand variation shows that the maximum demand registered at normal period (4 pm) and it was 15.73 MVA. • The high demand in the normal period is due to the effect of commercial buildings in the DISCOM area, mainly due to the Air conditioning loads in those buildings.	• NIL	• NIL
Energy & power quality analysis		
• The measured per day consumption through the 110-kV s/s is 0.236 MU (equals to 86.14 MU/annum) which is similar to the annual consumption of 87 MU in the feeder.	• The current THD values are outside the IEEE 519 standard limit (<5%). • The voltage THD values are within the IEEE 519 standard limit (<2.5%)	• NIL

TECHNICAL & DISTRIBUTION LOSS ANALYSIS

1. TECHNICAL LOSSES

Technical losses are subdivided into Four categories:

1. HT OH line & cable losses
2. Transformer loading & losses
3. LT OH line loss &
4. LT cable losses

The detailed calculation and the loss evaluation for 4 feeders is given in the sections below.

1.1. BINI FEEDER

Table 36: Loss analysis – Bini feeder

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss			
From Map no	Map no	Pole/transformer /AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Capacity of DT	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/ month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/month	kVA	kW	kWh/ month
	SS	Substation														
SS	2P	2P			UG	10										
P2	RMU-30801	RMU-30801			UG	10										
RMU-30801	2	TT Devassy	Client	HT	UG	20.02										
					UG	104.47	8648	0.02								
					OH	374.22	8648	0.21								
P20	P7,29	Vadakke chira	Department	LT	OH	159.34										
					UG	74.45	11811	0.02	10840	551.99	11392.33	4.71	11398.60	250	0.69	412.2
					OH	785.4	11811	0.62			11392.33	1.557				
P8	4	Lake View	Client	LT	UG	30.78										
					UG	105.23	4493	0.00			4275	0.310	4274.81	160	0.36	217.7
					OH	811.85	4493	0.09								
P7	ABI-50802	ABI-50802			OH	0										
P10	5	Seethal Apartment	Client	LT	UG	51.05										
					UG	125.5	5244	0.01			4838	1.361	4839.78	250	0.67	403.8
					OH	979.19	5244	0.15								

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss			
From Map no	Map no	Pole/transformer /AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Capacity of DT	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/ month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/month	kVA	kW	kWh/ month
P10-1	6	Kalyan Jewellers	Client	HT	UG	71.37										
					UG	71.37	18376	0.08								
					UG	74.45	18376	0.07								
					OH	1001.79	18376	2.56								
P12	1	Mangala Tower	Client	HT	UG	20.92										
					UG	20.92	3918	0.00								
					UG	74.45	3918	0.00								
					OH	454.18	3918	0.05								
P13	3	Paliyam Road	Department	LT	OH	7.4										
					UG	74.45	34927	0.18	30089	4309.25	34397.75	34.4	34432.16	250	0.82	494.8
					OH	573.15	34927	3.96								
P13-1	26	Ashiana Apartments	Client	LT	UG	55.64										
					UG	55.64	9849	0.01								
					UG	74.45	9849	0.01			9302	1.558	9303.72	315	0.91	545.0
					OH	573.35	9849	0.32								
P14	ABL-50803	ABL-50803			OH	125.93										
ABL-50803	10	Pallithammam	Department	LT	UG	92.23										
					UG	92.23	14671	0.05								
					UG	74.45	14671	0.03	14212	240.37	14245	4.122	14252.82	250	0.70	417.9

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss			
From Map no	Map no	Pole/transformer /AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Capacity of DT	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/ month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/month	kVA	kW	kWh/ month
					OH	785.68	14671	0.96			14245	3.443				
10	LBS,16	SBI- Pallithammam	Client	HT	UG	22.13										
					UG	22.13	14773	0.02								
					UG	92.23	14773	0.07								
					UG	74.45	14773	0.04								
					OH	785.68	14773	1.30								
LBS	12	Elite Supermarket (Pallithammam)	Client	HT	UG	6.2										
					UG	6.2	28866	0.02								
					UG	92.23	28866	0.25								
					UG	74.45	28866	0.16								
					OH	785.68	28866	4.95								
LBS	11	Pallithammam (Indoor)	Client	LT	UG	15.31										
					UG	15.31	13778	0.01								
					UG	92.23	13778	0.04								
					UG	74.45	13778	0.03			13222	6.356	13228.11	315	0.92	550.1
					OH	785.68	13778	0.85								
10	LBS,14	LBS, Kairali Sree Theatre 2	Client	HT	UG	15.99										
					UG	15.31	7901	0.00								
					UG	15.99	7901	0.00								
					UG	74.45	7901	0.01								
					OH	785.68	7901	0.37								

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss			
From Map no	Map no	Pole/transformer /AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Capacity of DT	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/ month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/month	kVA	kW	kWh/ month
LBS	13	Kairali Sree Theatre 1	Client	LT	**UG**	54.46										
					UG	15.31	1560	0.00								
					UG	15.99	1560	0.00								
					UG	74.45	1560	0.00			1229	0.230	1229.65	200	0.55	330.2
					OH	785.68	1560	0.01								
P15	7	AGS Office	Department	LT	**OH**	7.15										
					UG	74.45	6575	0.01			6305	0.513	6305.51	100	0.45	269.7
					OH	807.38	6575	0.20								
7	8	Cochin Dewasm Board	Department	LT	**OH**	7.81										
					UG	74.45	26092	0.10	25310	40.12	25350	79.51	25441.29	500	1.08	650.8
					OH	815.19	26092	3.14			25350	11.57				
P16-2	9	Kailasam	Client	LT	**UG**	42.11										
					UG	116.56	1599	0.00			1383	0.058	1382.97	160	0.36	216.2
					OH	943.67	1599	0.01								
P16-3	25	Bini Tourist Home	Client	HT	**UG**	57.45										
					UG	57.45	3384	0.00								
					UG	74.45	3384	0.00								
					OH	873.82	3384	0.08								
G2	24	Vegetable	Department	LT	**UG**	308.92										
					UG	390.37	14545	0.16			13990	3.975	13993.64	315	0.92	551.3

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss			
From Map no	Map no	Pole/transformer /AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Capacity of DT	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/ month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/month	kVA	kW	kWh/ month
					OH	814.23	14545	0.98								
24	G2				**UG**											
G2	17	Dhanalakshmi Bank	Client	HT	**UG**	74										
					UG	464.37	23237	0.66								
					OH	814.23	23237	3.32								
P18	15	Chemmannur	Client	HT	**UG**	63.97										
					UG	63.97	7552	0.01								
					UG	390.37	7552	0.06								
					OH	840.94	7552	0.36								
G7	21	Naduvilal(Pooma)	Department	LT	**UG**	21.66										
					UG	850.05	22521	0.86			22079	2.700	22081.20	250	0.73	440.2
					OH	814.23	22521	2.34								
21	20	Pooma Complex	Client	LT	**UG**	30.66										
					UG	30.66	12720	0.02								
					UG	880.71	12720	0.28			12169	3.332	12171.92	315	0.91	548.5
					OH	814.23	12720	0.75								
P23	23, P23-1	Naduvial Shopping complex, Post	Department	LT	**OH**	61.03										
					UG	850.05	5981	0.06			5576	0.947	5576.86	250	0.67	404.4
					OH	882.77	5981	0.18								
P23-1	19	Sidish Complex	Client	LT	**OH**	18.57										
					UG	850.05	1779	0.01			1520	0.246	1520.08	100	0.43	258.7

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss			
From Map no	**Map no**	**Pole/transformer /AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Capacity of DT**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kVA**	**kW**	**kWh/ month**
					OH	901.34	1779	0.02								
G8	AB-Ayodhya	AB			**UG**	92.68										
AB-Ayodhya	18	Ayodhya centre	Client	LT	**UG**	32.72										
					UG	32.72	15544	0.03								
					UG	942.73	15544	0.45			14989	2.053	14991.22	315	0.92	553.0
					OH	882.77	15544	1.21								
P24	AB-Chungath	AB			**OH**	17.39										
AB-Chungath	22	P22,Chugath Jewellery	Client	HT	**UG**	10										
					UG	860.05	6181	0.09								
					OH	904.67	6181	0.26								
P24	RMU-30802, 28	RMU-30802, National Lodge	Client	HT	**UG**	48.75										
					UG	908.8	4265	0.04								
					OH	887.28	4265	0.12								
P26	27	Maheswari Apartment	Client	HT	**UG**	29.47										
					UG	879.52	2411	0.01								
					OH	932.65	2411	0.04								
	NET SUM							**33.41**		**5141.7**		**162.99**				**7264.6**

1.2. RAMANILAYAM FEEDER

Table 37: Loss analysis – Ramanilayam feeder

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/ transformer/AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/ month	kW	kWh/month
	S-S	Substation feeder													
P2	ABL51102	ABl51102			**OH**	0									
P4	1	Stadium West	Department	LT	**OH**	10.33									
					UG	62	2016	0.00045			1613	0.03	1614	0.67	402.2
					OH	212.53	2016	0.00444			1613	0.28			
P8	2, ABL51103	Stadium East	Department	LT	**OH**	189.16									
					UG	62	21527	0.06	18688	2362.31	21050	31.06	21090	0.73	436.8
					OH	391.36	21527	1.03			21050	9.00			
G1	23	Indoor Stadium	Client	HT	**UG**	10.02									
					UG	72.02	3182	0.002							
					OH	391.36	3182	0.03							
P11	ABL51104	ABL51104			**OH**	0									
P12	AB Ramanilayam	AB			**OH**	0									
AB Ramanilayam	3	Ramanilayam	Department	LT	**OH**	32.75									
					UG	254.4	3119	0.005			2842	0.2	2841.89	0.46	277.3

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/ transformer/AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/ month	kW	kWh/month
					OH	570.2	3119	0.03							
P12	ABI51105	ABI51105			**OH**	12.47									
P11	ABL51106	ABL51106			**OH**	196.57									
ABL51106	AB Pulimoottil	AB			**OH**	3.43									
AB Pulimoottil	4	Pulimoottil	Client	HT	**UG**	37.7									
					UG	292.1	32043	0.264							
					OH	688.25	32043	1.78							
P13	AB Kaliyath, Chungath	AB			**OH**	35.26									
AB Chungath	11	Chungath Jewellery	Client	HT	**UG**	50.29									
					UG	50.29	8294	0.019							
					UG	254.4	8294	0.046							
					OH	749.27	8294	0.39							
AB Kaliyath	10	Kaliyath	Client	LT	**UG**	52.72									
					UG	52.72	7465	0.006			6802	1	6803.05	1.10	661.9
					UG	254.4	7465	0.06			6802	0			
					OH	749.27	7465	0.24							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/ transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kW**	**kWh/month**
AB Kaliyath	AB-YMCA	AB			**OH**	14.61									
AB-YMCA	8	YMCA	Client	HT	**UG**	70.27									
					UG	70.27	2861	0.003							
					UG	254.4	2861.3	0.006							
					OH	763.88	2861.3	0.05							
AB Kaliyath	AB Chiriyan Kandath	AB			**OH**	12.03									
AB Chiriyan Kandath	12	Chiriyan Kandath	Client	LT	**UG**	45.61									
					UG	254.4	11153	0.063			10836	4	10840.24	0.52	312.7
					UG	45.61	11153	0.02							
					OH	761.3	11153	0.54							
AB Chiriyan Kandath	AB Kalyan	AB			**OH**	41									
AB-YMCA	9	Josco	Client	HT	**UG**	70.27									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/ transformer/AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/ month	kW	kWh/month
					UG	70.27	1107	0.0005							
					UG	254.4	1107	0.0008							
					OH	802.3	1107	0.007							
AB Kalyan	RMU31103, 14, 13	Kalyan Silks	Client	HT	**UG**	21.7									
					UG	21.7	77515	0.557							
					UG	254.4	77515	4.044							
					OH	802.3	77515	36.42							
AB Kalyan	AB Vrindhavan	AB			**OH**	30.77									
G4	15	Vrindhavan Apartment	Client	LT	**UG**	62.14									
					UG	62.14	10336	0.03			9922	5	9926	0.68	409.7
					UG	254.4	10336	0.054							
					OH	833.07	10336	0.50							
AB Vrindhavan	P13-1, 25	AB Josco, AB Kalanikethan, Kalanikethan	Department	LT	**OH**	51.77									
					UG	254.4	16791	0.17	16161	299.40	16460	7.33	16467	0.54	323.7
					OH	884.84	16791	1.72							
G6	19	New Josco	Client	HT	**UG**	103.87									
					UG	103.87	23238	0.240							
					UG	254.4	23238	0.363							
					OH	884.84	23238	3.61							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/ transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kW**	**kWh/month**
P15	P16, 16	Swapana Theatre	Department	LT	**OH**	24.42									
					UG	254.4	18186	0.15	17405	349.43	17755	6.43	17761	0.71	424.7
					OH	981.39	18186	1.69							
P16	ABL51107	AB Kollanur			**OH**	31.38									
AB Kollanur	24	Kollanur	Client	LT	**UG**	27.83									
					UG	27.83	11191	0.01			10875	22	10898	0.49	293.1
					UG	254.4	11191	0.063							
					OH	1012.77	11191	0.72							
P18	21	Paremekkavu(Neeranjali)	Client	LT	**OH**	20.97									
					UG	254.4	18502	0.17			18035	39.4	18075	0.71	427.6
					OH	1097.36	18502	2.13							
P18	AB Statue& Alukkas, 17	Statue	Department	LT	**OH**	37.49									
					UG	254.4	18539	0.16	16833	1270.36	18103	10.08	18114	0.71	425.3
					OH	1113.88	18539	1.97							
P19	AB Paramekavu Temple	AB			**OH**	36.2									
G9	20	Paramekavu Temple	Client	LT	**UG**	134.32									
					UG	388.72	4022	0.01			3619	0.40	3619	0.67	402.9

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/ transformer/AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/ month	kW	kWh/month
					OH	1171.93	4022	0.11							
G12	18	Alukkas	Department	LT	UG	108.82									
					UG	363.22	24839	0.44	23217	1101.26	24318	65.32	24395	0.74	444.2
					OH	1113.88	24839	3.89			24318	11.26			
P13	AB BVB	AB			OH	14.85									
AB BVB	RMU31102	RMU			UG										
G9	28	Paramekavu SBI	Client	HT	UG	134.32									
					UG	134.32	16337	0.032							
					OH	472.04	16337	0.32							
RMU31102	27	Bharatiyar Vidhya Kendra	Client	HT	UG	148.13									
					UG	148.13		0.000							
					UG	254.4	0	0.000							
					OH	728.86	0	0.00							
AB BVB	AB SNDP	AB			OH	82.58									
AB SNDP	RMU31101, 26	SNDP	Client	LT	UG	27.22									
					UG	27.22	549	0.00			273	0.0072	273	0.46	276.0
					UG	254.4	549	0.000							
					OH	811.44	549	0.00							
P21	ABI50802	AB			OH	61.17									
P23	AB Capital Legend	AB			OH	8.69									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/ transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kW**	**kWh/month**
AB Capital Legend	7	Capital Legend	Client	LT	**UG**	25.35									
					UG	25.35	1616	0.00			1357	0.0523	1357	0.43	258.5
					UG	254.4	1616	0.001							
					OH	942.81	1616	0.01							
G15	AB ESI, 5	ESI	Department	LT	**UG**	284.1									
					UG	284.1	20419	0.48	19102	869.74	19972	11.57	19988	0.72	430.8
					UG	254.4	20419	0.210			19972	4.75			
					OH	684.82	20419	1.62							
P24-1	AB Capital City	AB			**OH**	43.57									
AB Capital City	22	Capital City	Client	LT	**UG**	41.47									
					UG	325.57	23895	0.75			23313	9.7863	23323	0.95	572.4
					UG	254.4	23895	0.288							
					OH	728.39	23895	2.36							
P25	AB Perinchery	AB			**OH**	33.12									
AB Perinchery	6	Perinchery	Client	LT	**UG**	68.13									
					UG	68.13	16070	0.06			15395	5.4713	15400	1.12	669.6
					UG	284.1	16070	0.296							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/ transformer/AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/ month	kW	kWh/month
					UG	254.4	16070	0.13							
					OH	717.94	16070	1.05							
	NET SUM							**71.48**		**6252.49**		**245.08**			**7449.64**

1.3. SHORNUR ROAD FEEDER

Table 38: Loss analysis – Shornur road feeder

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/ AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/Month	kWh/ month	kWh/Month	kWh/ month	kWh/month	kWh/ month	kWh/month	kW	KWh/month
ss		Substation													
SS	2P	Post			UG	0									
2P	G1	Ground			UG	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/ AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/Month	kWh/ month	kWh/Month	kWh/ month	kWh/month	kWh/ month	kWh/month	kW	KWh/month
G1	ABL51502	AB			**UG**	125.79									
ABL51502	RMU31501, 35-Bismi	RMU31501, Bismi	Client	HT	**UG**	29.41									
					UG	155.2	22642.5	0.191							
					OH	0	22643	0.000							
RMU31501	36- Bismi	Bismi	Client	LT	**UG**	47.16									
					UG	202.36	0	0.000				0.00	0	0.00	0.0
					OH	0	0	0.000							
RMU31501	G2	Ground			**UG**	0									
G2	G3	Ground			**UG**	0									
G3	RMU31502, 45-Pranavam Apartment	Pranavam Apartment	C/D	LT	**UG**	111.04									
					UG	266.24	21211	0.233	19690.3	998.72	20689	86.86	20776	0.73	435.1
					OH	0	21211	0.000							
RMU31502	G4	Ground			**UG**	0									
G4	RMU31503	RMU			**UG**	0									
RMU31503	46 - Top Orchid Apartment	Top Orchid Apartment	Client	LT	**UG**	115.83									
					UG	115.83	7108.0	0.019			6824.6	0.71	6825	0.47	282.7
					UG	266.24	7108	0.027							
					OH	0	7108	0.000							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
ABL51502	P3	Post			**OH**	36.38									
P3	G7	Ground			**UG**	0									
G7	G8	Ground			**UG**	0									
G8	G9	Ground			**UG**	0									
G9	01- Sree Hari Apartments	Sree Hari Apartments	Client	LT	**UG**	138.59									
					UG	264.38	2484	0.003			2224	0.07	2224	0.43	259.5
					OH	36.38	2484	0.001			2224	0.77			
P3	P1	Post			**OH**	32.88									
P1	AB-Sree	AB-Sree Lakshmi			**OH**	6.33									
AB-Sree	2-Sreelakshmi Silks	Sreelakshmi Silks	Client	LT	**UG**	52.52									
					UG	52.52	11313	0.027			10975.2	24.40	11000	0.52	313.1
					UG	125.79	11313	0.032							
					OH	75.59	11313	0.055							
P1	P2	Post			**OH**	0									
P2	AB-Daffodils	AB			**OH**	79.58									
AB-Daffodils	G5	Ground			**UG**	0									
G5	G6	Ground			**UG**	0									
G6	03- Daffodils	Daffodils	Client	LT	**UG**	53.14									
					UG	53.14	4110	0.004			3832.1	0.18	3832	0.46	278.1
					UG	125.79	4110	0.004							
					OH	148.84	4110	0.014							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
P1	AB-Rukmani1	AB			**OH**	74.51									
AB-Rukmai1	G10	Ground			**UG**	0									
G10	AB-Rukmani2	AB			**UG**	137.19									
AB-Rukmani2	26 - Rukmani Temple Park	Rukmani Temple Park	Client	LT	**UG**	47.92									
					UG	47.92	4303	0.004			3971.3	0.12	3971	0.55	331.7
					UG	262.98	4303	0.010							
					OH	143.77	4303	0.015							
AB-Rukmai1	P5, 4- Karthayani	Post, Karthayani	Department	LT	**OH**	43.21									
					UG	125.79	71463	1.248	63568.0	6939.48	70507	170.83	70678	1.31	785.0
					OH	186.98	71463	5.298							
P5	AB, 23- K.R Bakery	K.R Bakery	Department	LT	**OH**	16.52									
					UG	15									
					UG	140.79	35409	0.343	31714.5	2282.49	33997	16.72	34761	1.08	648.6
					OH	203.5	35409	1.416			33997	41.39			
											33997	705.48			
P5	G11	Ground			**UG**	0									
G11	G12	Ground			**UG**	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
G12	5-Pazhoor Arcades	Pazhoor Arcades	Client	LT	**UG**	64.81									
					UG	64.81	5617	0.008			5345.9	3.48	5351	0.44	266.5
					UG	125.79	5617	0.008			5346	1.25			
					OH	186.98	5617	0.033							
P5	ABL51503	AB			**OH**	34.81									
ABL51503	P6-1	Post			**OH**	0									
P6-1	P6	Post			**OH**	47.69									
P6	P7	Post			**OH**	0									
P7	P8	Post			**OH**	46.8									
P8	G13	Ground			**UG**	0									
G13	21-Saraswathy	Saraswathy	Client	LT	**UG**	49.95									
					UG	175.74	3919	0.005			3505	1.19	3516	0.67	403.0
					OH	316.28	3919	0.028			3505	0.07			
											3505	9.30			
P8	P9	Post			**OH**	125.36									
P9	22 -Unique Ardent	Unique Ardent	Department	LT	**UG**	28.24									
					UG	28.53	8616	0.008	8000.9	184.53	8185	0.97	8209	0.68	407.2
					UG	125.79	8616	0.018			8185	1.00			
					OH	441.64	8616	0.182			8185	21.74			
P9	ABI50903	AB			**OH**	28.53									
P6	AB-Panikath, RMU31504	AB, RMU			**OH**	44.75									
					UG	10									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
RMU31504	49-Panikath Mall	Panikath Mall	Client	LT	**UG**	47.38									
					UG	47.38	12407	0.023			11856.8	2.11	11859	0.91	548.4
					UG	135.79	12407	0.041							
					OH	314.23	12407	0.268							
AB-Panikath	P39	Post			**OH**	0									
P39	P40	Post			**OH**	0									
P40	P41, 18-Varnam	Post/Varnam	Department	LT	**OH**	171.77									
					UG	125.79	65522	1.049	55274.0	9369.22	64643	75.57	64737	1.31	784.4
					OH	486	65522	11.576			64643	18.42			
P41	P42	Post			**OH**	14.05									
P42	19-Omega Panthlon	Omega Panthlon	Client	LT	**UG**	43.27									
					UG	43.27	4375	0.003			4043.0	0.25	4043	0.55	331.8
					UG	125.79	4375	0.005							
					OH	500.05	4375	0.053							
P42	P43	Post			**OH**	20.94									
P43	RMU31505	RMU			**UG**	3.72									
RMU31505	43-Prasad Arcade	Prasad Arcade	Client	LT	**UG**	29.76									
					UG	159.27	8830	0.024			8415	0.53	8422	0.68	407.6
					OH	520.99	8830	0.225			8415	6.87			
RMU31505	RMU31506	RMU			**UG**	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
RMU31506	48-CKM Heights	CKM Heights	Client	LT	**UG**	85.06									
					UG	214.57	0	0.000				0.00	0	0.00	0.0
					OH	520.99	0	0.000							
P43	P45	Post			**OH**	64.05									
P45	G46	Ground			**UG**	0									
G46	G47	Ground			**UG**	0									
G47	G48	Ground			**UG**	0									
G48	G49	Ground			**UG**	0									
G49	G50	Ground			**UG**	0									
G50	20-Nandhanam	Nandhanam	Client	LT	**UG**	311.95									
					UG	437.74	2899	0.007			2621.0	0.67	2622	0.46	277.0
					OH	585.04	2899	0.027			2621	0.03			
ABL51503	P10	Post			**UG**	0									
P10	G14	Ground			**UG**	0									
G14	G15	Ground			**UG**	0									
G15	P11	Post			**UG**	186.31									
P11	P38	Post			**OH**	0									
P38	6-Kasturi	Kasturi (Bhramasam Madam)	Client	LT	**OH**	45.94									
					UG	312.1	3292	0.007			3031.0	0.70	3032	0.43	260.7
					OH	267.73	3292	0.016							
P11	G16	Ground			**UG**	0									
G16	G17	Ground			**UG**	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/ AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/Month	kWh/ month	kWh/Month	kWh/ month	kWh/month	kWh/ month	kWh/month	kW	KWh/month
G17	7-Sreepriya	Sreepriya	Client	LT	**UG**	109.63									
					UG	421.73	3554	0.010			3251.0	1.78	3253	0.50	301.1
					OH	221.79	3554	0.016							
P11	P12	Post			**OH**	55.07									
P12	RMU31507	RMU			**UG**	21.25									
RMU31507	42-Thrissur Service Coperative Bank	Thrissur Service Coperative Bank	Client	HT	**UG**	32.28									
					UG	32.28	5008	0.003							
					UG	333.35	5008	0.020							
					OH	276.86	5008	0.048							
P12	P13	Post			**OH**	21.86									
P13	AB-Krishna	AB			**OH**	3.74									
AB-Krishna	51-Capital Krishna	Capital Krishna	Client	LT	**UG**	33.82									
					UG	33.82	2923	0.001			2646	0.08	2646	0.46	277.0
					UG	312.1	2923	0.005							
					OH	302.46	2923	0.015							
P13	P14	Post			**OH**	39.19									
P14	P15	Post			**OH**	0									
P15	P16	Post			**OH**	44.78									
P16	9-Forus Mathura	Forus Mathura	Client	LT	**OH**	2.78									
					UG	312.1	4953	0.015			4672.0	2.04	4674	0.47	279.2
					OH	385.47	4953	0.054							
P16	G18	Ground			**UG**	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/ AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/Month	kWh/ month	kWh/Month	kWh/ month	kWh/month	kWh/ month	kWh/month	kW	KWh/month
G18	G19	Ground			**UG**	0									
G19	AB-MRG	AB-MRG Sree Valstam			**UG**	168.01									
AB-MRG	40 - MRG Sree Valstam	MRG Sree Valstam	Client	LT	**UG**	25.35									
					UG	25.35	7692	0.006			7285	1.66	7287	0.68	405.8
					UG	480.11	7692	0.052							
					OH	382.69	7692	0.118							
P14	P17	Post			**OH**	51.73									
P17	AB-AR	AB-AR Tower			**OH**	17.89									
AB-AR	27-A.R. Tower	A R Tower	Client	LT	**UG**	20.39									
					UG	20.39	3696	0.001			3435.0	0.26	3435	0.44	261.2
					UG	312.1	3696	0.008							
					OH	407.53	3696	0.029							
P17	P18	Post			**OH**	30.98									
P18	8-Krishna(Thiruvambadi-2)	Krishna(Thiruvambadi-2)	Department	LT	**OH**	8.83									
					UG	312.1	5287	0.016	4822.0	60.34	4882	0.41	4883	0.67	403.7
					OH	429.45	5287	0.063			4882	0.16			
											4882	0.25			
P18	P19	Post			**OH**	37.28									
P19	28-Friends Mall	Friends Mall	Client	LT	**OH**	12.25									
					UG	312.1	3935	0.009			3530.0	1.90	3532	0.67	402.9
					OH	470.15	3935	0.038							
P19	ABL51504	AB			**OH**	22.82									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
ABL51504	RMU31508	RMU			**UG**	0									
RMU31508	47-Oushadhi Panchakarma	Oushadhi Panchakarma	Client	HT	**UG**	80.62									
					UG	392.72	10376	0.102							
					OH	480.72	10376	0.355							
ABL51504	P20	Post			**OH**	0									
P20	P21	Post			**OH**	78.06									
P21	P22	Post			**OH**	44.69									
P22	P23, 11-Oushadhi	Oushadhi	Department	LT	**OH**	31.54									
					UG	312.1	42138	1.100	38027	3350.99	41378	53.75	41496	1.07	642.6
					OH	635.01	42138	6.388			41378	64.03			
P23	RMU31509	RMU			**UG**	17.37									
RMU31509	G20	Ground			**UG**	0									
G20	G21	Ground			**UG**	0									
G21	G22	Ground			**UG**	0									
G22	41-Top Tower	Top Tower	Client	LT	**UG**	145.97									
					UG	475.44	4499	0.018			4197	0.47	4197	0.50	301.8
					OH	635.01	4499	0.067							
RMU31509	G29	Ground			**UG**	0									
G29	G30	Ground			**UG**	0									
G30	RMU31510	RMU			**UG**	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
RMU31510	44-Kalyan Hypermarket	Kalyan Hypermarket	Client	HT	**UG**	402.87									
					UG	1055.25	65948.8	11.024							
					OH	635.01	65949	18.943							
P23	G20	Ground			**UG**	0									
G20	G21	Ground			**UG**	0									
G21	G23	Ground			**UG**	0									
G23	G24	Ground			**UG**	0									
G24	G25	Ground			**UG**	0									
G25	G26	Ground			**UG**	0									
G26	G27	Ground			**UG**	0									
G27	P24	Post			**UG**	341.79									
P24	10-Thiruvambadi (Lekshmi)	Thiruvambadi (Lekshmi)	Department	LT	**OH**	1.42									
					UG	653.89	87207	9.867	64810	21045.58	85856	367.56	86223	1.64	984.1
					OH	636.43	87207	27.422							
P24	G28	Ground			**UG**	0									
G28	24-Narayani	Narayani	Client	LT	**UG**	101.28									
					UG	755.17	2739	0.011			2462	0.09	2462	0.46	276.9
					OH	635.01	2739	0.027							
P22	P25	Post			**OH**	63.17									
P25	34- K.A Kumaran	K.A Kumaran	Department	LT	**OH**	9.55									
					UG	312.1	10968	0.074	10408	135.69	10544	10.16	10557	0.68	410.7

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/ AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/Month	kWh/ month	kWh/Month	kWh/ month	kWh/month	kWh/ month	kWh/month	kW	KWh/month
					OH	676.19	10968	0.461			10544	3.49			
P25	P26	Post			OH	0									
P26	P27	Post			OH	151.68									
P27	G31	Ground			UG	0									
G31	AB-Saroja	AB			UG	0									
AB-Saroja	25- Saroja	Saroja	Client	HT	UG	89.31									
					UG	401.41	24199.3	0.565							
					OH	818.32	24199	3.287							
P27	P28	Post			OH	0									
P28	P29	Post			OH	0									
P29	ABL51505	AB			OH	171.71									
ABL51505	P30	Post			UG	45.91									
P30	12-Suharsha	Suharsha	Client	LT	UG	25.81									
					UG	25.81	22594	0.053			21893.0	21.58	21915	1.13	679.4
					UG	358.01	22594	0.363							
					OH	990.03	22594	2.863							
P30	G32	Ground			UG	0									
G32	RMU31511	RMU			UG	87.82									
RMU31511	50-Coperative Hospital	Coperative Hospital	Client	HT	UG	39.53									
					UG	485.36	22299.8	0.580							
					OH	990.03	22300	3.377							
RMU31511	AB-Coperative	AB			UG	15.04									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
AB-Cooperative	13- Coperative Hospital	Coperative Hospital	Department	LT	**OH**	1.69									
					UG	460.87	67914	4.218	59009	8069.10	67078	101.28	67179	1.22	734.7
					OH	991.72	67914	25.915							
AB-Cooperative	G33	Ground			**UG**	0									
G33	P31	Post			**UG**	101.82									
P31	P32	Post			**OH**	27.81									
P32	AB-Athulya	AB			**UG**	0									
AB-Athulya	16-Athulya Chundari	Athulya Chundari	Client	LT	**UG**	32.82									
					UG	595.51	3649	0.016			3371	0.28	3371	0.46	277.6
					OH	1017.84	3649	0.077							
P32	P33	Post			**OH**	17.01									
P33	G34	Ground			**UG**	0									
G34	G35	Ground			**UG**	0									
G35	G36	Ground			**UG**	0									
G36	G37	Ground			**UG**	0									
G37	G38	Ground			**UG**	0									
G38	G39	Ground			**UG**	0									
G39	LBS	LBS			**UG**	166.19									
LBS	14-City Centre 1	City Centre 1	Client	LT	**UG**	2.68									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/ AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted to consumer	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/Month	kWh/ month	kWh/Month	kWh/ month	kWh/month	kWh/ month	kWh/month	kW	KWh/month
					UG	2.68	34923	0.013			Busbar Connected		34130	1.32	793.4
					UG	728.88	34923	1.764							
					OH	1034.85	34923	7.151							
LBS	15-City Centre 2	City Centre 2	Client	LT	UG	12.42									
					UG	12.42	2174	0.000			1897.0	0.09	1897	0.46	276.5
					UG	728.88	2174	0.007							
					OH	1034.85	2174	0.028							
P31	ABL51506	AB			OH	54.84									
ABL51506	G40	Ground			UG	0									
G40	G41	Ground			UG	0									
G41	39-Alukkas Nest	Alukkas Nest	Client	LT	UG	159.31									
					UG	722	6560	0.062			6225	0.94	6226	0.56	333.9
					OH	1044.87	6560	0.255							
ABL51506	33-Malabar Eye Clinic	Malabar Eye Clinic	Department	LT	OH	35.05									
					UG	562.69	11501	0.136	10863	197.36	11060	0.51	11090	0.68	410.9
					OH	1079.92	11501	0.745			11060	2.50			
											11060	26.65			
ABL51506	G42	Ground			UG	0									
G42	G43	Ground			UG	0									
G43	G44	Ground			UG	0									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
G44	AB-Shivam	AB			**UG**	217.78									
AB-Shivam	17-Shivam	Shivam			**UG**	41.69									
					UG	822.16	5261	0.045			4857	0.18	4857	0.67	403.8
					OH	1044.87	5261	0.164							
AB-Shivam	P34	Post			**UG**	29.39									
P34	P35	Post			**OH**	52.93									
P35	29-Ramdas Theatre	Ramdas Theatre	Client	HT	**UG**	35.92									
					UG	845.78	2912.2	0.017							
					OH	1097.8	2912	0.064							
P35	AB-Peninsula	AB			**OH**	3.08									
AB-Peninsula	30-Peninsula	Peninsula	Client	HT	**UG**	128.86									
					UG	128.86	7679	0.037							
					UG	809.86	7679	0.115							
					OH	1100.88	7679	0.445							
P35	G45	Ground			**UG**	0									
G45	ABI50808	AB			**UG**	137.61									
P34	P36	Post			**OH**	27.46									
P36	P36-1	AB			**OH**	8.49									
P36-1	31-Wintage Royal	Wintage Royal	Client	LT	**UG**	62.68									
					UG	62.68	6462	0.011			6157.0	0.46	6157	0.51	304.1
					UG	809.86	6462	0.067							
					OH	1080.82	6462	0.256							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/ AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted to consumer**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/Month**	**kWh/ month**	**kWh/Month**	**kWh/ month**	**kWh/month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/month**
P36	P37	Post			**OH**	53.31									
P37	37-Top Heritage	Top Heritage	Client	LT	**UG**	40.1									
					UG	40.1	1833	0.001			1557.0	0.05	1557	0.46	276.3
					UG	809.86	1833	0.005							
					OH	1125.64	1833	0.021							
P37	P37-1	AB			**OH**	10.04									
P37-1	38-Forus Cosynest	Forus Cosynest	Client	LT	**UG**	35.76									
					UG	35.76	3538	0.002			3260.0	0.32	3260	0.46	277.5
					UG	809.86	3538	0.020							
					OH	1135.68	3538	0.081							
	NET SUM							**151.77**		**52633.50**		**1854.60**			**16735.57**

1.4. CHEMBUKAVU

Table 39: Loss analysis - Chembukavu

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
	S-S	Substation feeder													
P2	AB bb	AB Big Bazar			**OH**	9.38									
AB bb	1	Big Bazar	Client	HT	**UG**	53.23									
					UG	164.99	41508.00	0.75							
					OH	9.38	41508.00	0.12							
G7	11	Swathy Residency	Client	LT	**UG**	84.01									
					UG	84.01	6673.90	0.01							
					UG	365.75	6673.90	0.03			6266.92	1.90	6268.82	0.68	405.08
					OH	0	6673.90	0.00							
P3	RMU31401, 2	Jawahar	Department	LT	**UG**	126.321									
					UG	492.071	53315.57	2.78	50856.92	1619.90	52476.81	178.00	52696.14	1.03	619.43
					OH	0	53315.57	0.00			52476.81	41.32			
G11	ABL51402	AB			**UG**	382.14									
P6	AB KSFE	AB			**OH**	20.58									
AB KSFE	15	KSFE	Client	HT	**UG**	26.71									
					UG	26.71	12738.00	0.01							
					UG	874.211	12738.00	0.38							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
					OH	111	12738.00	0.14							
P8	ABI51105	AB			**OH**	112.96									
P8	ABI51403	AB			**OH**	91.12									
P9	AB Central Hotel	AB			**OH**	12.3									
AB Central Hotel	10	Central Hotel	Client	HT	**UG**	54									
					UG	54	6227.17	0.01							
					UG	874.211	6227.17	0.09							
					OH	245.38	6227.17	0.07							
G13	RMU31402	RMU			**UG**	0									
RMU31402	13	Agro	C/D	LT	**UG**	145.21									
					UG	1019.421	35003.28	2.48	29760.83	4659.68	34420.52	87.52	34508.04	0.83	495.24
					OH	182.18	35003.28	1.26							
G15	4, 5	Exchange 1& 2	Client	HT	**UG**	244.46									
					UG	244.46	95034.00	7.19							
					UG	874.211	95034.00	20.89							
					OH	410.62	95034.00	28.01							
P10	9	Museum	Department	LT	**OH**	18.85									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
					UG	874.211	43229.60	3.24	31442.50	10990.55	42433.05	133.01	42584.97	1.07	644.63
					OH	429.47	43229.60	4.55			42433.05	18.91			
P10	ABL51404	AB			**OH**	0									
ABL51404	ABL51405	AB			**OH**	284.47									
G21	G22, 3	Co-operative Road	Department	LT	**UG**	209.48									
					UG	1083.691	34715.07	2.59	29256.25	5092.70	34348.95	39.22	34388.17	0.54	326.90
					OH	713.94	34715.07	4.87							
P11	P12, 14	Mana Line	Department	LT	**OH**	117.46									
					UG	874.211	26039.42	1.18	24107.33	1637.94	25745.27	15.91	25761.19	0.46	278.24
					OH	831.4	26039.42	3.19							
G24	6	Sougandhika	Client	LT	**UG**	54.05									
					UG	933.261	1098.79	0.00			840.25	0.33	840.58	0.43	258.21
					OH	846.81	1098.79	0.01							
P13	AB Navani	AB			**OH**	178.72									
AB Navani	12	Navani Holy View	Client	LT	**UG**	36.46									
					UG	36.46	3635.68	0.00							
					UG	874.211	3635.68	0.02			3230.58	2.28	3232.86	0.67	402.82
					OH	1025.53	3635.68	0.08							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
P14	AB KMP	AB			**OH**	10.92									
AB KMP	30	KMP Swapnapuri	Client	LT	**UG**	35.42									
					UG	35.42	2862.58	0.00							
					UG	874.211	2862.58	0.01			2645.67	0.25	2645.92	0.36	216.66
					OH	1119.87	2862.58	0.05							
P16	AB Caza		Client	LT	**OH**	15.62									
AB Caza	7	Cheloor Cazeblanka	Client	LT	**UG**	43.87									
					UG	43.87	3749.39	0.00							
					UG	874.211	3749.39	0.02			3531.92	0.30	3532.22	0.36	217.17
					OH	881.81	3749.39	0.07							
P17	P18, 8	Southern	Department	LT	**OH**	68.57									
					UG	874.211	26409.54	1.21	22735.00	3204.88	25939.88	14.91	25954.79	0.76	454.75
					OH	934.76	26409.54	3.69							
P18	AB Atreya	AB			**OH**	245.76									
AB Atreya	RMU31403	RMU			**UG**	0									
RMU31403	16	Divya Ram Hospital (Atreya)	Client	HT	**UG**	60.96									
					UG	935.171	27662.08	1.89							
					OH	1180.52	27662.08	6.82							

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
P19	AB Bishop Palace	AB			**UG**	1.98									
AB Bishop Palace	RMU 31404, 28	Bishop Palace	Client	HT	**UG**	27									
					UG	903.191	12539.17	0.38							
					OH	1315.92	12539.17	1.56							
P19	ABL51406	AB			**OH**	0									
ABL51406	AB BP, 17	Bishop Palace	Department	LT	**OH**	151.4									
					UG	874.211	49055.34	4.17	45680.33	2613.82	48294.15	86.15	48380.30	1.13	675.05
					OH	1467.32	49055.34	20.01							
P20	18	Kings fort	Department	LT	**OH**	13.58									
					UG	874.211	5355.24	0.05	4918.75	30.31	4949.06	2.26	4951.32	0.67	403.92
					OH	1514.29	5355.24	0.25							
					OH	13.58	5355.24	0.00							
P21	ABI51410	AB			**OH**	0									
P22	ABL51407	AB			**OH**	0									
P24	AB Sky Line	AB			**UG**	0									
AB Sky Line	23	Skyline Garland	Client	LT	**UG**	64.34									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	Map no	Pole/transformer/AB	Transformer ownership	Metering point	Cable	Total distance	Energy transmitted	HT OH line loss	Energy transmitted	LT OH line loss	Energy at pole near transformer	LT Cable line loss	Transmission at transformer secondary	Transformer loss	Transformer loss
						m	kWh/ Month	kWh/ month	kWh/ Month	kWh/ month	kWh/ month	kWh/ month	kWh/month	kW	KWh/ month
					UG	938.551	9701.22	0.18			9077.67	3.42	9081.09	1.03	620.13
					OH	1851.68	9701.22	0.99							
P24	AB Sodavarky, 20	Sodavarky	Department	LT	**OH**	42.86									
					UG	874.211	57309.27	5.70	49032.58	7528.81	56561.39	94.53	56655.93	1.09	653.34
					OH	1894.54	57309.27	35.25							
P25	21	Sarayu Apartment	Department	LT	**OH**	44.44									
					UG	874.211	32998.31	1.89	29616.58	2746.80	32363.38	23.21	32513.54	0.81	484.77
					OH	1970.59	32998.31	12.16			32363.38	126.94			
P27	ABL51409	AB			**OH**	164.27									
ABL51409	AB Kollanur Oriental	AB			**OH**	12.25									
G26	24	Kollanur Oriental	Client	LT	**UG**	81.49									
					UG	955.701	6517.18	0.08			6212.42	0.58	6213.00	0.51	304.19
					OH	2102.67	6517.18	0.51							
P31	ABI50409, 22	Panmukkumpilly Sastha Temple	Department	LT	**OH**	33.51									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
					UG	874.211	44804.81	3.48	41034.92	3163.84	44198.76	36.08	44249.50	0.93	555.31
					OH	2263.95	44804.81	25.75			44198.76	14.66			
P21	ABL51408	AB			**OH**	0									
P34	AB CTR	AB			**OH**	14.86									
AB CTR	19	Cheloor Tudoor Rose	Client	LT	**UG**	26.98									
					UG	901.191	3845.05	0.03			3627.50	0.32	3627.82	0.36	217.23
					OH	1760.8	3845.05	0.15							
P35	AB Gayathri	AB Gayathri			**OH**	6.04									
AB Gayathri	26	Gayathri Apartment	Client	LT	**UG**	27.13									
					UG	901.341	5956.99	0.06			5551.83	0.75	5552.58	0.67	404.41
					OH	1834.56	5956.99	0.37							
P36	25	Keeramkulangara	Department	LT	**OH**	66.33									
					UG	874.211	15817.03	0.43	15136.17	430.47	15566.63	2.24	15578.27	0.40	238.76
					OH	1894.85	15817.03	2.69			15566.63	9.40			
P38	AB Sreyas	AB			**OH**	2.96									
G27	27	Sreyas Apartment	Client	LT	**UG**	57.68									

Mapping details					Up to Transformer primary or HT metering				From consumer		LT cable - secondary of transformer		Transformer loss		
From Map no	**Map no**	**Pole/transformer/AB**	**Transformer ownership**	**Metering point**	**Cable**	**Total distance**	**Energy transmitted**	**HT OH line loss**	**Energy transmitted**	**LT OH line loss**	**Energy at pole near transformer**	**LT Cable line loss**	**Transmission at transformer secondary**	**Transformer loss**	**Transformer loss**
						m	**kWh/ Month**	**kWh/ month**	**kWh/ Month**	**kWh/ month**	**kWh/ month**	**kWh/ month**	**kWh/month**	**kW**	**KWh/ month**
					UG	931.891	5377.50	0.05			4973.08	0.48	4973.56	0.67	403.94
					OH	1750.81	5377.50	0.29							
G30	RMU31405	RMU			**UG**	0									
RMU31405	29	Forus Apartment	Client	LT	**UG**	330.19									
					UG	1239.731	216.00	0.00				0.00	0.00	0.36	216.00
					OH	1747.85	216.00	0.00							
		NET SUM						**214.20**		**43719.69**		**934.91**			**9496.17**

2. TECHNICAL LOSSES – SUMMARY

The technical losses comprising all the section above is estimated in feeder wise and given in the following tables.

1. Bini feeder

Table 40: T & D loss summary – Bini feeder

Particulars	Units	Percentage
	kWh/annum	%
Net energy sales - annual	**38,50,453**	**96.22**
LT Overhead line loss	61,701	**1.54**
LT Cable loss	1,956	**0.05**
Transformer Loss	87,175	**2.18**
HT overhead & cable line loss	401	**0.01**
Total loss	**1,51,232**	**3.78**
Estimated Consumption at feeder level	40,01,685	
Registered consumption at feeder level meter	**46,87,000**	

2. Ramanilayam feeder

Table 41: T & D loss Summary – Ramanilayam feeder

Particulars	Units	Percentage
	kWh/annum	%
Net energy sales - annual	**45,70,371**	**96.45**
LT Overhead line loss	75,030	**1.58**
LT Cable loss	2,941	**0.06**
Transformer Loss	89,396	**1.89**
HT overhead & cable line loss	858	**0.018**
Total loss	**1,68,224**	**3.55**
Estimated Consumption at feeder level	**47,38,595**	
Registered consumption at feeder level meter	**51,62,000**	

3. Shornur road feeder

Table 42: T & D loss – Shornur road feeder

Particulars	Units	Percentage
	kWh/annum	%
Net energy sales - annual	**85,04,638**	**90.85**
LT Overhead line loss	6,31,602	**6.75**

LT Cable loss	22,255	**0.24**
Transformer Loss	2,00,827	**2.15**
HT overhead & cable line loss	1,821	**0.02**
Total loss	**8,56,505**	**9.15**
Estimated Consumption at feeder level	**93,61,143**	
Registered consumption at feeder level meter	**97,54,000**	

4. Chembukavu feeder

Table 43: T & D loss – Chembukavu feeder

Particulars	**Units**	**Percentage**
	kWh/annum	**%**
Net energy sales - annual	**73,96,597**	**91.89**
LT Overhead line loss	5,24,636	**6.52**
LT Cable loss	11,219	**0.14**
Transformer Loss	1,13,954	**1.42**
HT overhead & cable line loss	2,570	**0.03**
Total loss	**6,52,380**	**8.11**
Estimated Consumption at feeder level	**80,48,977**	
Registered consumption at feeder level meter	**40,44,000**	

- ***The variation or high mismatch in the actual feeder meter reading and the calculated reading through the loss analysis, is due to the back feeding among the feeders during the power failures or maintenance.***
- *During energy audit period, auditors attempted to verify the error in the meters by analysing the feeder meters at the substation using the power quality analysers and hereby summarised in commercial losses section.*

3. COMMERCIAL LOSSES

The auditors could not able to ascertain commercial losses/non-technical losses in the DISCOM during the FY 2020-21 due to the following factors.

1. Back feeding of one feeder to another during any failure in service, resulted in mixing up of consumption at the Feeder meter.
2. The record of meter errors was not readily available in section office to ascertain the losses caused in each feeder.
3. There is no theft reported in any sections during the audit period thus if any loss occurs in the commercial it could be due to the meter errors or damage.

Metering deviation was done in sample basis in order to derive an energy balance between purchase and sale. The energy meters at feeder incomer was cross checked using calibrated meters like Krykard ALM 35/ ALM 31.

3.1. DEVIATION OF METERING

3.1.1. Deviation of incomer meters

The TCED incomer energy meters at the 110-kV substation were verified with power quality analysers and given in the table below.

Table 44: TCED incomer meter – deviation with PQ analyser

Sl no	Meter	Hours of measurement	KSEBL meter	Power analyser reading	KSEBL meter vs Power analyser
		Hours	kWh	kWh	%
1	110kV incomer	12	106000	103340	**-2.57**

3.1.2. Deviation of feeder meters

Table 45: Deviation of feeder meters

Sl no	Feeder name	Hours of measurement	Panel reading	Average PF	Power analyser reading	Difference in consumption	% of error
		Hours	kWh		kWh	kWh	%
1	Bini	4.34	8000	1	8207	207	2.52
2	Poonkunnam	4	4000	0.93	3823	-177	-4.63
3	Keralavarma	3.5	4000	0.94	3886	-114	-2.93
4	Vivekodayam	1	1200	0.98	1187	-13	-1.10
5	Jubilee Medical College	4	4500	0.98	4469	-31	-0.69
6	District Hospital	2	2110	0.98	2120	10	0.47
7	East fort	1.5	3200	0.98	3140	-60	-1.91
8	**Shornur Road**	**2**	**4380**	**0.98**	**3916**	**-464**	**-11.85**
9	Chembukavu	1.25	660	0.99	659	-1	-0.15
10	Kottappuram	1	700	0.91	712	12	1.69
11	M.O Road	2	4270	0.99	4290	20	0.47
12	Ramanilayam	1.5	1815	0.98	1813	-2	-0.11
13	Aranattukkara	1.5	2400	0.97	2476	76	3.07
14	Mission Quarters	1.5	1920	0.97	1915	-5	-0.26
15	Veliyanoor	2	2880	0.98	2884	4	0.14
16	Koorkanchery	1.5	1490	0.97	1491	1	0.07
17	Paravattani	1.5	2190	0.97	2185	-5	-0.23
18	Vanjikulam	4	6000	0.98	6086	86	1.41
	Summary		**55715**		**55259**	**-456**	**-0.83**

- *Considering the CT class variation among the Feeder meter and power analyzer, the errors observed are minimal.*
- *The overall difference between feeder panel meter and the power analyzer is 0.83% which is good.*
- *During the period of audit (Dec 2022), the feeder numbers are increased from the FY 2020-21 and reached 18 nos.*
- ***The Poothole feeder was bifurcated to Poonkunnam and Keralavarma in FY 2021-22, meanwhile, Kottappuram feeder in the name of Kottappuram and Vanjikulam in FY 2022-23.***

4. HT/LT RATIO

The total length of the LT line from the transformer to the consumer end at the period of audit is 285.675 km. However, the separation of OH and UG among the LT side is still in the process for the RDSS implementation.

The total 11kV HT line length from the switching station to the DT or HT consumers are 178.316 km. Among this, HT OH line length shares the most with 106.98 km, UG cable with 69.54 km and ABC with 1.85 km

HT/LT ratio is the total distance of HT line to the LT lines in a system. The HT/LT ratio has calculated with respect to the total LT line where;

HT:LT = 1: 1.6, registered during the FY 2021-22 which is higher than the recommended level of 1:1.

Two more feeders were added on later as of 31/12/2022 during the audit period which increased the HT line length slightly. The calculations are yet to be done for the same.

5. CATEGORY OF DIVISION WISE LOSSES – FY 2020-21

The consumer details, energy parameter and the overall circle wise T&D Losses are mentioned in the table below:

Table 46: Division wise losses

Division Wise Losses												
Name of circle	Period from April 2020 to March 2021											
	Consumer profile					Energy parameters					Losses	
	Consumer category	No of connection metered (Nos)	No of connection Un-metered (Nos)	Total Number of connections (Nos)	% of number of connections	Input energy (MU)	Billed energy (MU)			% of energy consumption	T&D loss (MU)	T&D loss (%)
							Metered energy	Unmetered/ assessment energy	Total energy			
TCED	Residential	21812	0	21812	53.9%	129.33	43.143	0	43.143	36%	8.25	6.38%
	Agricultural	188	0	188	0.5%		0.0666	0	0.0666	0.05%		
	Commercial/ Industrial-LT	18038	0	18038	44.6%		44.233	0	44.233	37%		
	Commercial /Industrial-HT	126	0	126	0.3%		32.301	0	32.301	27%		
	Others + Feedback	272	0	272	0.7%		1.340	0	1.340	1%		
Sub-total		**16023**	**0**	**40436**	**100%**	**129.33**	**121.08**	**0**	**121.08**	**100%**	**8.25**	**6.38%**

Methodology for T&D loss computation:

- $T\&D\ Losses\ (MU) of\ a\ circle = Sum\ of\ Input\ Energy\ of\ the\ circle\ (MU) - Sum\ of\ Metered\ energy\ of\ all\ categories\ within\ the\ circle\ (MU) - Feedabck\ Energy\ (MU)$
- $T\&D\ Losses\ in\ \% = \frac{T\&D\ Losses\ (MU)}{Input\ Energy\ to\ the\ circle\ (MU)} * 100$
- $T\&D\ Losses\ (MU) of\ a\ DISCOM = \frac{Sum\ of\ circlewise\ T\&D\ Losses\ \ (MU)}{Cummulative\ Sum\ of\ \ Input\ Energy\ (MU)\ to\ all\ circle} * 100$

6. AGGREGATE TECHNICAL & COMMERCIAL (AT&C) LOSS:

Aggregate Technical & Commercial Loss (AT&C Loss) is defined as the summation of all technical as well as commercial power loss that occurs due to electrical power flow through sub-transmission and distribution network.

Technical Loss is defined as the summation of power loss through 33 kV, 11 kV line and LT line loss including transformer loss and others.

Commercial Loss is defined as the summation of power loss occurring due to theft/ pilferage, deficient meter, inefficiency in billing & unrealized revenue due to collection inefficiency.

Computation of AT& C Loss:

Aggregate Technical & Commercial Loss (AT&C) is computed from the actual meter readings of the meter installed at various locations in the system.

- **Overall Billing Efficiency (%)** = Total Sale in MU/ Total input in MU
- **Overall Collection Efficiency (%)** = Total Collection Received (Rs. in Crs.) / Total Billing to Consumers (Rs. in Crs.)

- **AT & C Loss (%)** = 1- (Collection Efficiency % * Bill Efficiency%)

As the collection efficiency is 96.43% the AT&C loss of TCED registered was 9.72% during the FY 2020-21.

Table 47: AT & C loss – FY 2020-21

S. No	Name of circle	Period from April 2020 to March 2021									
		Consumer profile	Energy parameters			Losses		Commercial Parameter			AT & C loss (%)
		Consumer category	Input energy (MU)	Metered energy	% Of energy consumption	T&D loss (MU)	T&D loss (%)	Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	
1	TCED	Residential	129.33	43.143	36%	8.25	6.38%	28.483	27.823	97.68%	
		Agricultural		0.067	0.05%			0.0272	0.0230	84.64%	
		Commercial/ Industrial-LT		44.233	37%			49.281	47.936	97.27%	
		Commercial/ Industrial-HT		32.301	27%			33.214	31.879	95.98%	
		Others		1.340	1%			0.644	0.000	0.00%	
Sub-total			**129.33**	**121.08**	**100%**	**8.25**	**6.38%**	**111.650**	**107.661**	**96.43 %**	**9.72%**

MAPPING – DT & 11 KV OH LINE

Mapping of the transformer, pole and 11 kV consumers were done to evaluate the distance which helps to calculate the HT line loss in TCED.

GPS mapping was made using the Google map/ GPS meter collecting the latitude and longitude, and later projected into the relevant free software by naming the specific pole, DT and 11 kV consumer with serial numbers. The GPS mapping of HT lines done for 9 feeders out of 16 and the details are analyzed in this section.

Feeder wise HT line mapping is given below in charts in representation purpose and the distance of the DT from each substation is given in the table below.

Note: AEA has mapped HT line and transformer for 9 out of 16 feeders during the audit period.

1. BINI FEEDER

The following table shows the HT line distance of the 11 kV lines.

Table 48: HT line distance – Bini feeder

From Map no	Map no	Pole/transformer/ AB	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
SS	2P	2P	10.535256	76.214482	**UG**	XLPE	300		10	10
2P	P1	Post	10.535166	76.214903	**UG**	XLPE	300	56.45	8	64.45
P1	P19	Post	10.531830	76.215107	**OH**	Racoon				0
P19	P2	Post	10.534960	76.215040	**OH**	Racoon		374.22		374.22
P2	RMU-30801	RMU-30801	10.531838	76.215015	**UG**	XLPE	300		10	10
RMU-30801	2	TT Devassy	10.531879	76.214960	**UG**	XLPE	300	18.02	2	20.02
P2	P3	Post	10.531335	76.215078	**OH**	Racoon				0
P3	P4	Post	10.531049	76.215114	**OH**	Racoon				0
P4	P5	Post	10.529577	76.214890	**OH**	Racoon		251.84		251.84
P5	P6	Post	10.529488	76.215092	**OH**	Racoon				0
P6	P20	Post	10.52926	76.21616	**OH**	Racoon				0
P20	P7,29	Vadakke chira	10.529356	76.216230	**OH**	Racoon		159.34		159.34
P7	P8	Post	10.529546	76.216378	**OH**	Racoon		26.45		26.45
P8	4	Lake View	10.529449	76.216594	**UG**	XLPE	300	25.78	5	30.78
P7	ABI-50802	ABI-50802	10.529068	76.216227	**OH**	Racoon				0
P7	P9	Post	10.528870	76.216152	**OH**	Racoon				0
P9	P10	Post	10.527645	76.215877	**OH**	Racoon		193.79		193.79
P10	5	Seethal Apartment	10.527505	76.216275	**UG**	XLPE	300	46.05	5	51.05
P10	P10-1	Post	10.527543	76.216062	**OH**	Racoon		22.6		22.6
P10-1	6	Kalyan Jewellers	10.527462	76.216232	**UG**	XLPE	240	21.37	50	71.37
P5	P11	Post	10.529458	76.214614	**OH**	Racoon		33.69		33.69
P11	P12	Post	10.529484	76.214194	**OH**	Racoon		46.27		46.27
P12	1	Mangala Tower	10.529553	76.214261	**UG**	XLPE	185	10.92	10	20.92
P12	P21	Post	10.52949	76.21346	**OH**	Racoon				0
P21	P13	Post	10.529547	76.213178	**OH**	Racoon		111.57		111.57
P13	3	Paliyam Road	10.529485	76.213167	**OH**	Racoon		7.4		7.4

From Map no	Map no	Pole/transformer/ AB	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P13	P13-1	Post	10.529615	76.213168	**OH**	Racoon		7.6		7.6
P13-1	26	Ashiana Apartments	10.529910	76.213040	**UG**	XLPE	240	35.64	20	55.64
P11	P14	Post	10.529163	76.214639	**OH**	Racoon				0
P14	ABL-50803	ABL-50803	10.528369	76.214367	**OH**	Racoon		125.93		125.93
ABL-50803	10	Pallithammam	10.528262	76.213578	**UG**	XLPE	240	87.23	5	92.23
10	LBS,16	SBI- Pallithammam	10.528090	76.213650	**UG**	XLPE	185	20.13	2	22.13
LBS	12	Elite Supermarket (Pallithammam)	10.528137	76.213650	**UG**	XLPE	185	5.2	1	6.2
LBS	11	Pallithammam(Indoor)	10.528185	76.213651	**UG**	XLPE	185	5.31	10	15.31
10	LBS,14	LBS, Kairali Sree Theatre 2	10.528141	76.213761	**UG**	XLPE	240	12.99	3	15.99
LBS	13	Kairali Sree Theatre 1	10.528073	76.213925	**UG**	XLPE	240	19.46	35	54.46
ABL-50803	P15	Post	10.528289	76.214548	**OH**	Racoon		21.7		21.7
P15	7	AGS Office	10.528266	76.214609	**OH**	Racoon		7.15		7.15
7	8	Cochin Dewasm Board	10.528197	76.214594	**OH**	Racoon		7.81		7.81
ABL-50803	P17	Post	10.528113	76.214334	**OH**	Racoon		28.55		28.55
P17	P16	Post	10.527645	76.214347	**OH**	Racoon				0
P16	P16-1	Post	10.527677	76.214684	**OH**	Racoon				0
P16-1	P16-2	Post	10.527742	76.215051	**OH**	Racoon		129.44		129.44
P16-2	9	Kailasam	10.527841	76.215127	**UG**	XLPE	300	14.11	28	42.11
P17	P16	Post	10.527645	76.214347	**OH**	Racoon		51.79		51.79
P16	P16-3	Post	10.527616	76.214282	**OH**	Racoon		7.8		7.8
P16-3	25	Bini Tourist Home	10.527769	76.214029	**UG**	XLPE	185	32.45	25	57.45
P17	G1	Ground	10.527570	76.214301	**UG**	XLPE	300		7	7
G1	G2	Ground	10.526835	76.212525	**UG**	XLPE	300			0
G2	24	Vegetable	10.527160	76.212504	**UG**	XLPE	300	303.92	5	308.92
24	G2				**UG**	XLPE				
G2	17	Dhanalakshmi Bank	10.52686	76.212190	**UG**	XLPE	300	74		74
24	P18	Post	10.527319	76.212319	**OH**	Racoon		26.71		26.71
P18	15	Chemmannur	10.52732	76.212100	**UG**	XLPE	240	23.97	40	63.97
24	G2	Ground	10.526835	76.212525	**UG**	XLPE	300			0
G2	G3	Ground	10.526539	76.212193	**UG**	XLPE	300			0

From Map no	Map no	Pole/transformer/ AB	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
G3	G4	Ground	10.526090	76.212030	**UG**	XLPE	300			0
G4	G5	Ground	10.524329	76.212023	**UG**	XLPE	300			0
G5	G6	Ground	10.524184	76.211864	**UG**	XLPE	300			0
G6	G7	Ground	10.524039	76.21133	**UG**	XLPE	300	438.02		438.02
G7	21	Naduvilal(Pooma)	10.523870	76.211293	**UG**	XLPE	300	15.66	6	21.66
21	20	Pooma Complex	10.523813	76.211424	**UG**	XLPE	150	15.66	15	30.66
P25-1	P25	Post	10.523930	76.21127	**OH**	Racoon		7.51		7.51
P25	P23	Post	10.523980	76.21168	**OH**	Racoon				0
P23	23, P23-1	Naduvial Shopping complex, Post	10.524120	76.21164	**OH**	Racoon		61.03		61.03
P23-1	19	Sidish Complex	10.52425	76.21153	**OH**	ABC		18.57		18.57
P23-1	G6	Ground	10.524184	76.211864	**UG**	XLPE	300			
G6	G5	Ground	10.524329	76.212023	**UG**	XLPE	300			
G5	G8	Ground	10.52468	76.212010	**UG**	XLPE	300			
G8	AB-Ayodhya	AB	10.52466	76.211960	**UG**	XLPE	300	92.68		92.68
AB-Ayodhya	18	Ayodhya centre	10.52467	76.211780	**UG**	XLPE	150	20.72	12	32.72
P25	P24	Post	10.52383	76.21069	**OH**	Racoon		65.54		65.54
P24	AB-Chungath	AB	10.52398	76.21069	**OH**	Racoon		17.39		17.39
AB-Chungath	22	P22,Chugath Jewellery	10.52398	76.21069	**UG**	XLPE	300		10	10
P24	RMU-30802, 28	RMU-30802, National Lodge	10.5237	76.21069	**UG**	XLPE	300	13.75	35	48.75
P24	P26	Post	10.52377	76.21028	**OH**	Racoon		45.37		45.37
P26	27	Maheswari Apartment	10.52369	76.210190	**UG**	XLPE	300	12.47	17	29.47

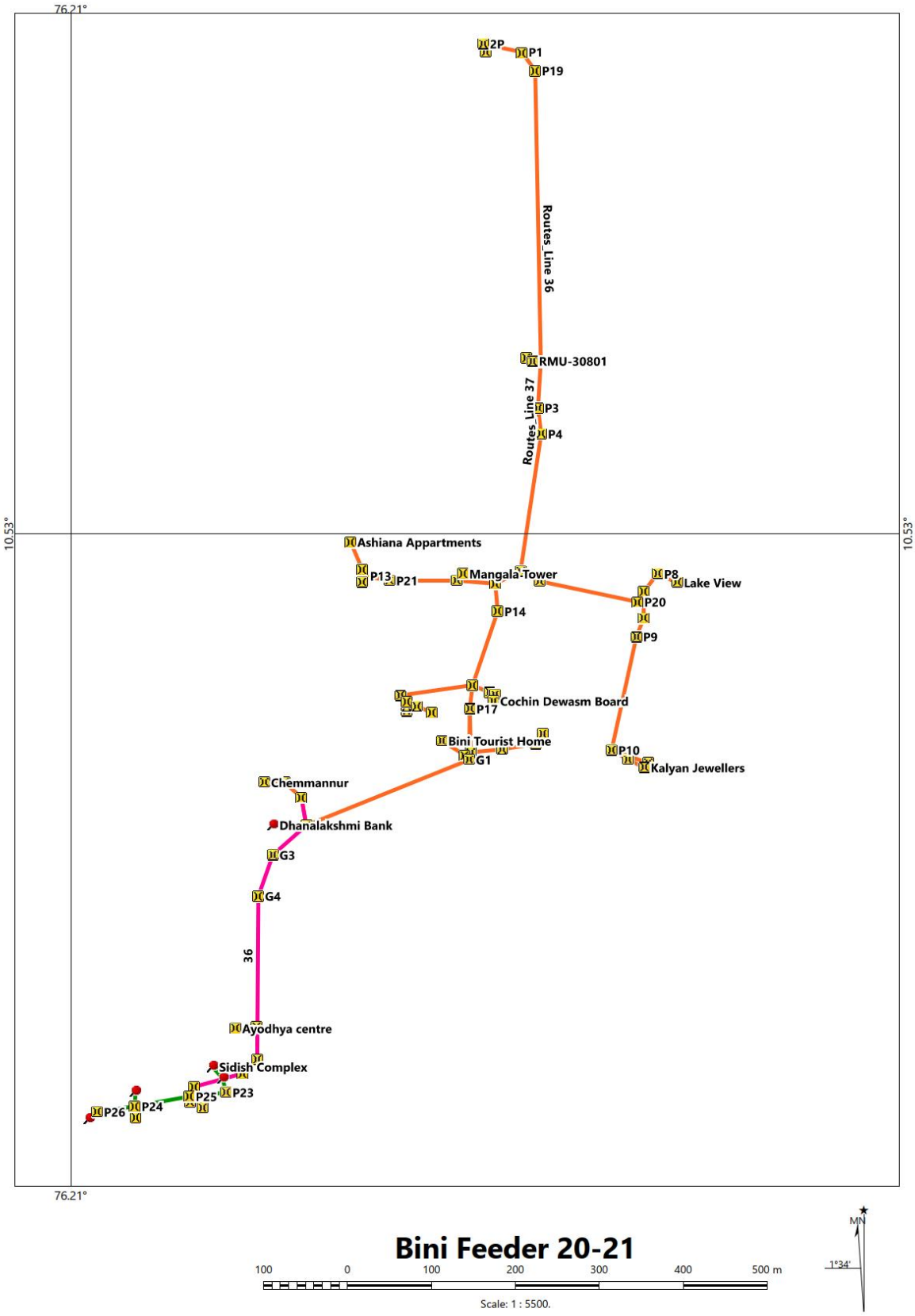

Figure 15: Bini feeder

2. CHEMBUKAVU FEEDER

The following table shows the 11-kV line distance in the Chembukavu feeder.

Table 49: HT line distance – Chembukavu feeder

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
	S-S	Substation feeder		10.53517	76.21455						
S-S	P1	Post		10.535240	76.214603	**UG**	XLPE	300		30	30
P1	G1	Ground		10.535189	76.214889	**UG**	XLPE	300			0
G1	P2	Post		10.534928	76.215162	**UG**	XLPE	300	81.76		81.76
P2	AB bb	AB Big Bazar		10.534974	76.215234	**OH**	Racoon		9.38		9.38
AB bb	1	Big Bazar	HT	10.534844	76.215636	**UG**	XLPE	300	46.23	7	53.23
P2	G2	Ground		10.53519	76.215239	**UG**	XLPE	300			0
G2	G3	Ground		10.535286	76.215405	**UG**	XLPE	300			0
G3	G4	Ground		10.535349	76.216771	**UG**	XLPE	300			0
G4	G5	Ground		10.535251	76.216929	**UG**	XLPE	300			0
G5	P3	Post		10.534976	76.216992	**UG**	XLPE	300	253.99		253.99
P3	G6	Ground		10.534987	76.217098	**UG**	XLPE	280			0
G6	G7	Ground		10.534900	76.217125	**UG**	XLPE	280			0
G7	11	Swathy Residency	LT	10.535036	76.217486	**UG**	XLPE	280	64.01	20	84.01
P3	RMU31401, 2	Jawahar	LT	10.533837	76.217074	**UG**	XLPE	300	126.321		126.321
RMU31401	G8	Ground		10.533219	76.217274	**UG**	XLPE	300		4	4
G8	P4	Post		10.532999	76.217193	**UG**	XLPE	300			0
P4	G9	Ground		10.533104	76.217351	**UG**	XLPE	300			0
G9	G10	Ground		10.532870	76.219178	**UG**	XLPE	300			0
G10	G11	Ground		10.532621	76.219306	**UG**	XLPE	300			0
G11	ABL51402	AB		10.532394	76.219318	**UG**	XLPE	300	382.14		382.14

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
ABL51402	P5	Post		10.532375	76.219396	**OH**	Racoon				0
P5	P6	Post		10.531637	76.219399	**OH**	Racoon		90.42		90.42
P6	AB KSFE	AB		10.531489	76.219285	**OH**	Racoon		20.58		20.58
AB KSFE	15	KSFE	HT	10.531484	76.219105	**UG**	XLPE	240	19.71	7	26.71
P6	P7	Post		10.531032	76.219422	**OH**	Racoon				0
P7	P8	Post		10.530808	76.219429	**OH**	Racoon		91.76		91.76
P8	ABI51105	AB		10.530816	76.218397	**OH**	Racoon		112.96		112.96
P8	ABI51403	AB		10.529985	76.219392	**OH**	Racoon		91.12		91.12
P8	P9	Post		10.530807	76.219894	**OH**	Racoon		50.9		50.9
P9	AB Central Hotel	AB		10.530901	76.219834	**OH**	Racoon		12.3		12.3
AB Central Hotel	10	Central Hotel	HT	10.531321	76.219899	**UG**	XLPE	240	47	7	54
P8, AB Agro Bazar	G12	Ground		10.530807	76.219895	**UG**	XLPE	300			0
AB Agro Bazar	G13	Ground		10.530797	76.220654	**UG**	XLPE	300			0
G13	RMU31402	RMU		10.530761	76.220646	**UG**	XLPE	300			0
RMU31402	13	Agro	LT	10.530756	76.220664	**UG**	XLPE	300	140.21	5	145.21
P9	P10	Post		10.530809	76.221516	**OH**	Racoon		177.54		177.54
P10	G14	Ground		10.530814	76.22142	**UG**	XLPE	240			0
G14	G15	Ground		10.529275	76.221392	**UG**	XLPE	240			0
G15	4	Exchange 1	HT	10.529062	76.221863	**UG**	XLPE	240	237.46	7	244.46
G15	5	Exchange 2	HT	10.529062	76.221863	**UG**	XLPE	240	237.46	7	244.46
P10	9	Museum	LT	10.530829	76.221687	**OH**	Racoon		18.85		18.85
P10	ABL51404	AB		10.530897	76.223431	**OH**	Racoon				0
ABL51404	ABL51405	AB		10.530910	76.224284	**OH**	Racoon		284.47		284.47
ABL51405	G16	Ground		10.530589	76.224176	**UG**	XLPE	300			0

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
G16	G17	Ground		10.530093	76.224199	**UG**	XLPE	300			0
G17	G18	Ground		10.529944	76.224188	**UG**	XLPE	300			0
G18	G19	Ground		10.529764	76.224177	**UG**	XLPE	300			0
G19	G20	Ground		10.529615	76.223911	**UG**	XLPE	300			0
G20	G21	Ground		10.529547	76.223655	**UG**	XLPE	300			0
G21	G22, 3	Co-operative Road	LT	10.529555	76.223553	**UG**	XLPE	300	202.48	7	209.48
ABL51405	P11	Post		10.531048	76.224375	**OH**	Racoon				0
P11	P12, 14	Mana Line	LT	10.531945	76.22436	**OH**	Racoon		117.46		117.46
P12	P13	Post		10.532084	76.224351	**OH**	Racoon		15.41		15.41
P13	G23	Ground		10.532116	76.224258	**UG**	XLPE	300		5	5
G23	G24	Ground		10.532425	76.224301	**UG**	XLPE	300			0
G24	6	Sougandhika	LT	10.532419	76.224316	**UG**	XLPE	300	47.05	7	54.05
P13	AB Navani	AB		10.532341	76.222739	**OH**	Racoon		178.72		178.72
AB Navani	12	Navani Holy View	LT	10.532599	76.222672	**UG**	XLPE	185	29.46	7	36.46
AB Navani	P14	Mana Line	LT	10.532444	76.221984	**OH**	Racoon		83.42		83.42
P14	AB KMP	AB		10.532354	76.221943	**OH**	Racoon		10.92		10.92
AB KMP	30	KMP Swapnapuri	LT	10.532223	76.221895	**UG**	XLPE	185	15.42	20	35.42
ABL51405	P15	Post		10.530937	76.224358	**OH**	XLPE				0
P15	P16	Post		10.530953	76.22567	**OH**	XLPE		152.25		152.25
P16	AB Caza		LT	10.531038	76.225556	**OH**	XLPE		15.62		15.62
AB Caza	7	Cheloor Cazeblanka	LT	10.531311	76.225649	**UG**	XLPE	185	31.87	12	43.87
P16	P17	Post		10.530955	76.226264	**OH**	Racoon				0
P17	P18, 8	Southern	LT	10.530926	76.22625	**OH**	Racoon		68.57		68.57
P18	AB Atreya	AB		10.528705	76.226187	**OH**	Racoon		245.76		245.76
AB Atreya	RMU31403	RMU		10.528705	76.226680	**UG**	XLPE	300			0

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
RMU31403	16	Divya Ram Hospital (Atreya)	HT	10.528705	76.226680	**UG**	XLPE	300	53.96	7	60.96
AB Atreya	P19	Post		10.527482	76.226134	**OH**	Racoon		135.4		135.4
P19	AB Bishop Palace	AB		10.527476	76.226151	**UG**	XLPE	300	1.98		1.98
AB Bishop Palace	RMU 31404, 17	Bishop Palace	HT	10.527635	76.226238	**UG**	XLPE	300	20	7	27
P19	ABL51406	AB		10.527103	76.22612	**OH**	Racoon				0
ABL51406	AB BP, 28	Bishop Palace	LT	10.526115	76.226065	**OH**	Racoon		151.4		151.4
AB BP	P20	Post		10.525691	76.226041	**OH**	Racoon		46.97		46.97
P20	18	Kings fort	LT	10.525695	76.225917	**OH**	ABC		13.58		13.58
P20	P21	Post		10.525335	76.226022	**OH**	Racoon		39.43		39.43
P21	ABI51410	AB		10.524497	76.225966	**OH**	Racoon				0
P21	P22	Post		10.525432	76.226059	**OH**	Racoon				0
P22	ABL51407	AB		10.525533	76.226316	**OH**	Racoon				0
ABL51407	P23	Post		10.525941	76.227409	**OH**	Racoon				0
P23	P24	Post		10.526431	76.228472	**OH**	Racoon		297.96		297.96
P24	AB Sky Line	AB		10.526609	76.228458	**UG**	XLPE	300			0
AB Sky Line	G25	Ground		10.526875	76.228303	**UG**	XLPE	300			0
AB Sky Line	23	Skyline Garland	LT	10.526894	76.22833	**UG**	XLPE	300	57.34	7	64.34
P24	AB Soda varky, 20	Soda varky	LT	10.526630	76.228808	**OH**	Racoon		42.86		42.86
AB Soda varky	P25	Post		10.526696	76.229089	**OH**	Racoon		31.61		31.61
P25	21	Sarayu Apartment	LT	10.527064	76.228926	**OH**	Racoon		44.44		44.44
P25	P26	Post		10.526895	76.229619	**OH**	Racoon				0
P26	P27	Post		10.527108	76.230063	**OH**	Racoon				0
P27	ABL51409	AB		10.52733	76.23044	**OH**	Racoon		164.27		164.27

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
ABL51409	AB Kollanur Oriental	AB		10.527431	76.230394	**OH**	Racoon		12.25		12.25
AB Kollanur Oriental	G26	Ground		10.527670	76.23025	**UG**	XLPE	300			0
G26	24	Kollanur Oriental	LT	10.527703	76.230158	**UG**	XLPE	300	41.49	40	81.49
ABL51409	P28	Post		10.527652	76.230830	**OH**	Racoon				0
P28	P29	Post		10.527749	76.230871	**OH**	Racoon				0
P29	P30	Post		10.527888	76.231176	**OH**	Racoon				0
P30	P31	Post		10.528096	76.231451	**OH**	Racoon		140.02		140.02
P31	ABI50409, 22	Panmukkumpilly Sastha Temple	LT	10.528261	76.231702	**OH**	Racoon		33.51		33.51
P21	ABL51408	AB		10.525272	76.225681	**OH**	Racoon				0
ABL51408	P31	Post		10.525176	76.22527	**OH**	Racoon				0
P31	P32	Post		10.524753	76.224435	**OH**	Racoon				0
P32	P33	Post		10.52467	76.224341	**OH**	Racoon		206.83		206.83
P33	P34	Post		10.524940	76.224318	**OH**	Racoon		32.36		32.36
P34	AB CTR	AB		10.525019	76.224222	**OH**	Racoon		14.86		14.86
AB CTR	19	Cheloor Tudoor Rose	LT	10.525106	76.224062	**UG**	XLPE	300	19.98	7	26.98
P34	P35	Post		10.525685	76.224243	**OH**	Racoon		82.58		82.58
P35	AB Gayathri	AB Gayathri		10.525663	76.224283	**OH**	Racoon		6.04		6.04
AB Gayathri	26	Gayathri Apartment	LT	10.525638	76.224343	**UG**	XLPE	300	7.13	20	27.13
P35	P36	Post		10.526207	76.224215	**OH**	Racoon				0
P36	25	Keeramkulangara	LT	10.526226	76.224118	**OH**	Racoon		66.33		66.33
P33	P37	Post		10.524628	76.224362	**OH**	Racoon				0
P37	P38	Post		10.524441	76.224230	**OH**	Racoon		34.27		34.27
P38	AB Sreyas	AB		10.524423	76.224250	**OH**	Racoon		2.96		2.96
AB Sreyas	G27	Ground		10.524223	76.224260	**UG**	XLPE	300			0

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
G27	27	Sreyas Apartment	LT	10.524157	76.224478	**UG**	XLPE	300	50.68	7	57.68
P38	G28	Ground		10.524239	76.22398	**UG**	XLPE	300	35.33		35.33
G28	G29	Ground		10.523659	76.222731	**UG**	XLPE	300			0
G29	G30	Ground		10.523352	76.221706	**UG**	XLPE	300			0
G30	RMU31405	RMU		10.523778	76.221623	**UG**	XLPE	300			0
RMU31405	29	Forus Apartment	LT	10.523746	76.221569	**UG**	XLPE	300	323.19	7	330.19

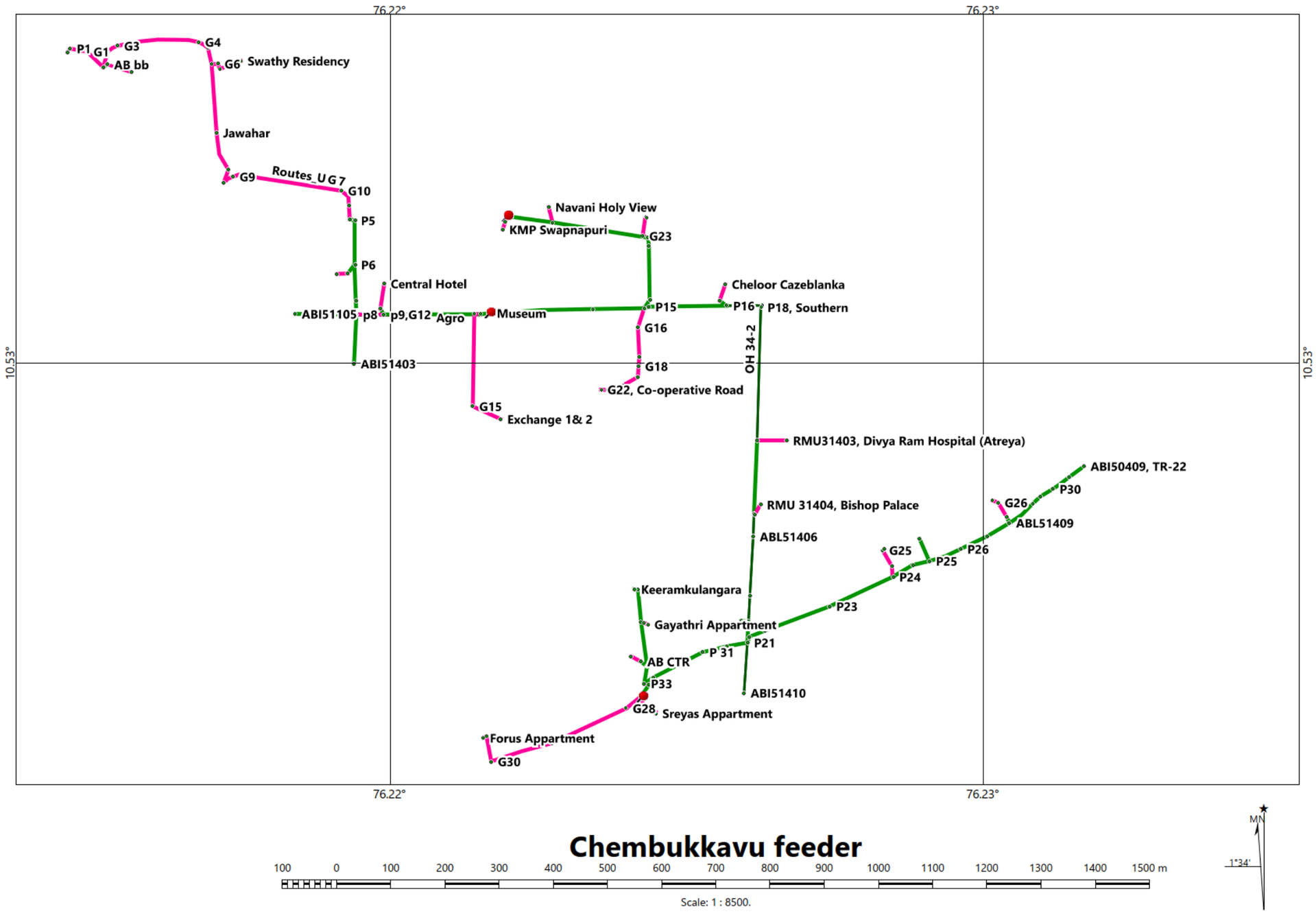

Figure 16: Chembukavu feeder

3. EAST FORT FEEDER

The following table shows the 11-kV line distance in the East fort feeder.

Table 50: HT line distance – East fort feeder

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
SS	2P	Substation feeder		10.535185	76.214764	**UG**	300		25	25
2P	G1	Ground		10.534967	76.215221	**UG**				0
G1	G2	Ground		10.533556	76.215243	**UG**				0
G2	G2-1	Ground		10.533400	76.21523	**UG**				0
G2-1	G2-2	Ground		10.53342	76.21589	**UG**				0
G2-2	G2-3	Ground		10.53323	76.21627	**UG**				0
G2	G3	Ground		10.532946	76.216472	**UG**				0
G3	P1	Post (2 Pole)		10.532962	76.216747	**UG**	300		10	10
P1	G4	Ground		10.532924	76.217225	**UG**				0
G4	G4-1	Ground		10.53312	76.21738	**UG**				0
G4-1	G4-2	Ground		10.53287	76.2191	**UG**				0
G4-2	G4-3	Ground		10.53274	76.21957	**UG**				0
G4-3	P2	Post (2 Pole)		10.532900	76.219594	**UG**	300		10	10
P2	G4-4	Ground		10.53283	76.21958	**UG**				0
G4-4	G5	Ground		10.532100	76.224381	**UG**				0
G5	G6	Ground		10.531829	76.226241	**UG**				0
G6	P3	Post(2 Pole)		10.530592	76.226214	**UG**	300		10	10
P3	G6-1	Ground		10.529120	76.22618	**UG**				0
G6-1	AB1	ABL 51702		10.521957	76.225890	**UG**	300	2590.34	55	2645.34
AB1	P4	Post		10.521644	76.225868	**OH**		35.07		35.07
P4	AB2	ABI50104		10.521295	76.225861	**OH**		38.45		38.45
ABI50104	G12	Ground		10.521256	76.225075	**UG**				0

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
G12	RMU1/22	RMU31708, East Avenue	LT	10.521319	76.225052	**UG**	300	93.55		93.55
RMU1	G13	Ground		10.521291	76.225548	**UG**				0
G13	RMU2/15	RMU31709, Navya Bakery	HT	10.521329	76.225487	**UG**	300	57.58		57.58
P4	AB3	ABL51705		10.521868	76.225349	**OH**		64.38		64.38
ABL51705	10	Sun Tower	LT	10.522057	76.225372	**UG**	300	21.06	7	28.06
ABL51705	32	E P Jose Commercial Building	LT	10.521747	76.225340	**OH**		13.42		13.42
ABL51705	G7	Ground		10.521932	76.225158	**UG**				0
G7	G8	Ground		10.522397	76.224891	**UG**				0
G8	P16	ABL Selex Mall		10.522444	76.224764	**UG**				0
P16	Selex Mall			10.522863	76.224550	**UG**	300	150.01	7	157.01
ABL51705	AB6	ABL 51706		10.521605	76.224235	**OH**		125.85		125.85
ABL 51706	G11	Ground		10.522369	76.224089	**UG**				0
G11	11	Sindhooram Apartment	LT	10.522313	76.223704	**UG**	300	131.97	5	136.97
ABL 51706	P11	Post		10.521541	76.223908	**OH**		36.49		36.49
P11	1	Thomson Casa	LT	10.521514	76.223921	**UG**	300	3.31	10	13.31
P11	P12, 12	Pallikulam	LT	10.521295	76.22264	**OH**		141.44		141.44
P12	P13	Post		10.521248	76.221944	**OH**		76.36		76.36
P13	P23,33	AB-Chaldian,Chaldian	LT	10.521223	76.22196	**OH**		3.52		3.52
P13	P13-1	Post		10.521246	76.221521	**OH**				0
P13-1	34	Brothers Lane	LT	10.520909	76.221433	**OH**		85.79		85.79
P13	P14	Post		10.521225	76.220351	**OH**				0
P14	P14-1, 13	Sakthan Tower	LT	10.521234	76.220207	**OH**		190.14		190.14
P14-1	AB7	ABL51707		10.521199	76.219330	**OH**		92.24		92.24
AB7	P15	Post		10.521578	76.218757	**OH**				0
P15	P15-1, 14	Post/Puthenpally	LT	10.521453	76.218811	**OH**		134.02		134.02
P15-1	RMU7,17	RMU31707,P I Babu	LT	10.521527	76.218937	**UG**	300	24.38		24.38
ABL51707	AB8	ABI 51611		10.521603	76.219432	**UG**		44.99		44.99

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
ABL 51702	P5	Post		10.522575	76.225910	**OH**		74.53		74.53
P5	AB4/04	ABL51704/Spoon (City Castle)	LT	10.522825	76.225582	**OH**		40.88		40.88
ABL51704	G9	Ground		10.522925	76.225207	**UG**	300			0
G9	6,5	Reliance-2(City Palace-2), Reliance-1(City Palace-1)	LT	10.522600	76.225175	**UG**	300	75.24	25	100.24
ABL51704	P6	Post		10.522925	76.22507	**OH**				0
P6	P7	Post		10.523061	76.225125	**OH**		54.48		54.48
P7	P21, 24	AB- Fort Street, Fort Street	LT	10.523125	76.225360	**OH**		18.69		18.69
P21	7	Fort City	LT	10.523202	76.225611	**OH**		28.76		28.76
P7	P17	AB-Bharathakshemam		10.523251	76.224112	**OH**		122.07		122.07
P17	8	Bharathakshemam	LT	10.523825	76.223926	**UG**	300	66.68	5	71.68
AB-Bharathakshemam	P8	Post		10.523121	76.222649	**OH**		161.71		161.71
P8	P18	AB-Emmatty Tower		10.522751	76.222719	**OH**		40.14		40.14
P18	9	Emmatty Tower	LT	10.522778	76.222897	**UG**	400	21.45	5	26.45
P18	P19	AB-Candela		10.522713	76.222713	**OH**		5.83		5.83
P19	RMU3	RMU31706		10.522709	76.222770	**UG**	185			0
RMU3	16	Candela Apartment	LT	10.522545	76.222937	**UG**	185	31.47	6	37.47
P8	P20	AB St-Thomas		10.523305	76.220894	**OH**		199.2		199.2
P20	25	St-Thomas College	HT	10.523294	76.220941	**UG**	300	11.02	5	16.02
AB St-Thomas	26/ABI 51604	Iyyunni	LT	10.523312	76.220588	**OH**		27.82		27.82
P5	P22	AB-Seemas		10.522861	76.226168	**OH**		49.98		49.98
P22	2	Seemas	HT	10.523156	76.22624	**UG**	300	33.57	20	53.57
P22	P10	Post		10.522819	76.226316	**OH**		16.98		16.98
P10	23	Kings Way Project	LT	10.523318	76.226419	**UG**	300	60.18	30	90.18
P10	AB5	ABL 51708		10.522765	76.226348	**OH**		6.27		6.27

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
ABL 51708	3	Honest Bakery	LT	10.522603	76.226276	**OH**		19.58		19.58
ABL 51708	RMU4, 20	RMU31703, Angelic Tower	LT	10.522515	76.226922	**UG**	300	70.72	10	80.72
ABL 51708	G10	Ground		10.522163	76.227959	**UG**				0
G10	RMU5, 19	RMU 31704, Lorde Pally	HT	10.522281	76.227955	**UG**	300	200.15		200.15
RMU5	G10	Ground		10.522163	76.227959	**UG**				0
G10	RMU6	RMU31705		10.52219	76.227216	**UG**				0
RMU6	18	East Fort Tower	LT	10.522085	76.227209	**UG**	300	111.34		111.34
P5	AB9	ABL51703		10.524137	76.225960	**OH**		170.23		170.23
ABL51703	RMU8	RMU31701		10.52449	76.225809	**UG**	300	51.38		51.38
RMU8	30/31	E Forts Unlimited (HT), E Forts (LT)	HT, LT	10.524479	76.225461	**UG**	150	42.91	30	72.91
RMU8	RMU9	RMU31702		10.524017	76.225757	**UG**	300			
RMU9	21	Rappai & Sons	LT	10.524231	76.225612	**UG**	300	94.61	210	304.61

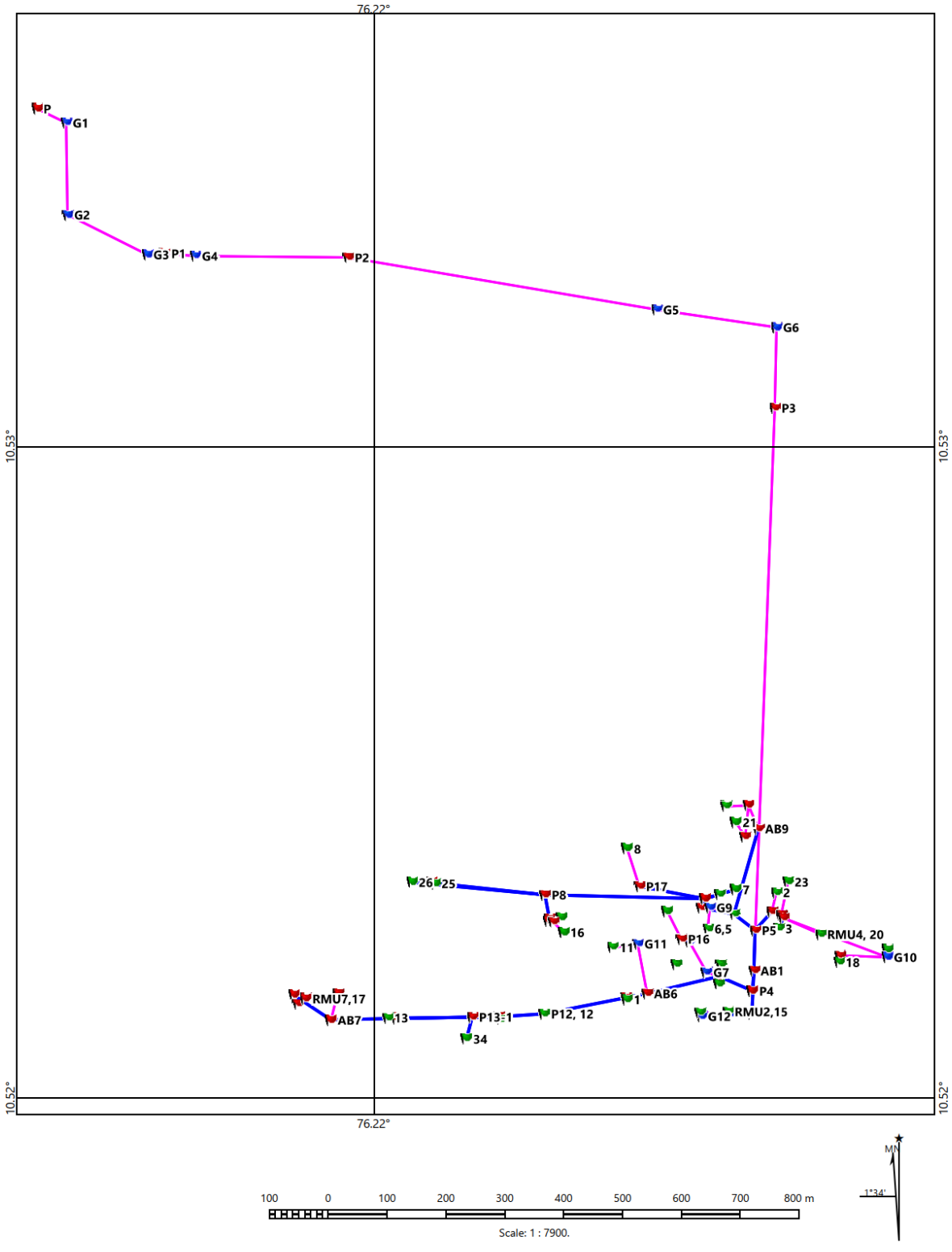

Figure 17: East fort feeder

4. JUBILEE MISSION FEEDER

Jubilee mission feeder is the only dedicated feeder inside the DISCOM. The supply provided from the 66-kV substation in the Aswini. The details of mapping of the feeder is given in the table below.

Table 51: HT line distance – Jubilee mission feeder

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
SS		Substation feeder		10.535185	76.214764	**UG**	XLPE	300		10	10
SS	P1	Post		10.535247	76.214725	**UG**	XLPE	300			0
P1	G1	Ground		10.535184	76.214900	**UG**	XLPE	300			0
G1	G2	Ground		10.534978	76.215035	**UG**	XLPE	300			0
G2	G3	Ground		10.533455	76.215075	**UG**	XLPE	300			0
G3	G4	Ground		10.533382	76.216132	**UG**	XLPE	300			0
G4	G5	Ground		10.533006	76.216531	**UG**	XLPE	300			0
G5	G6	Ground		10.532984	76.217128	**UG**	XLPE	300			0
G6	G7	Ground		10.533180	76.217414	**UG**	XLPE	300			0
G7	G8	Ground		10.532808	76.219361	**UG**	XLPE	300			0
G8	G9	Ground		10.532399	76.222235	**UG**	XLPE	300			0
G9	G10	Ground		10.531810	76.226219	**UG**	XLPE	300			0
G10	G11	Ground		10.531020	76.226247	**UG**	XLPE	300			0
G11	G12	Ground		10.530896	76.226196	**UG**	XLPE	300			0
G12	G13	Ground		10.527708	76.226094	**UG**	XLPE	300			0
G13	G14	Ground		10.525349	76.225990	**UG**	XLPE	300			0
G14	G15	Ground		10.523079	76.225892	**UG**	XLPE	300			0
G15	G16	Ground		10.521214	76.225809	**UG**	XLPE	300			0
G16	G17	Ground		10.520915	76.225789	**UG**	XLPE	300			0
G17	01, 02 - Jubilee Mission	Jubilee Mission	HT	10.520737	76.226735	**UG**	XLPE	300	2806.34	5	2811.34

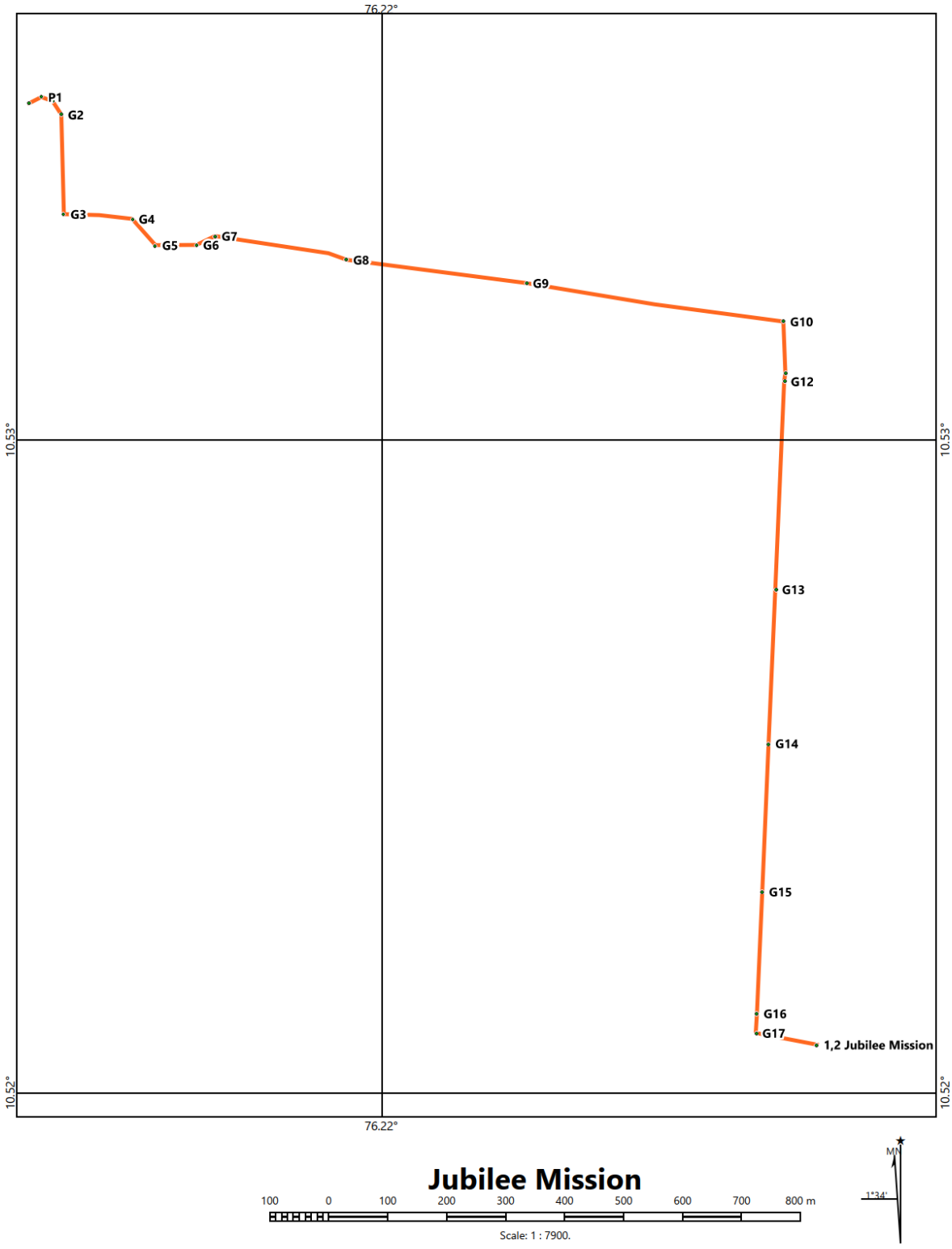

Figure 18: Jubilee mission feeder

5. KOORKANCHERY FEEDER

The following table shows the 11-kV line distance in the Koorkanchery feeder.

Table 52: HT line distance – Koorkanchery feeder

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
	S-S	Substation feeder		10.517135	76.219407					
S-S	P1	Post		10.517229	76.219394	**UG**	300	10.74		10.74
P1	P2	Post		10.516079	76.217681	**OH**		216.87		216.87
P2	RMU1	RMU-30301		10.515940	76.217541	**UG**	300	21.71		21.71
RMU1	G11	Ground		10.516020	76.21746	**UG**	300	12.85		12.85
G11	RMU2	RMU-30201		10.516002	76.217265	**UG**	300	21.57	10	31.57
RMU1	G12	Ground		10.5159	76.2176	**UG**	300	8.32		8.32
G12	G1	Ground		10.515281	76.217852	**UG**	300		5	5
G1	G2	Ground		10.514711	76.217816	**UG**	300			0
G2	G13	Ground		10.51448	76.21773	**UG**	300			0
G13	G14	Ground		10.51412	76.2175	**UG**	300	210.82		210.82
G14	G3	Ground		10.513983	76.217229	**UG**	300	33.69		33.69
G3	P3	Post		10.513975	76.216334	**UG**	300	98.52	3	101.52
P3	P4	Post		10.513948	76.215683	**UG**	300	69.7	2	71.7
P4	G15	Ground		10.51401	76.21548	**UG**	300	23.96		23.96
G15	G16	Ground		10.51409	76.21315	**UG**	300	254.48		254.48
G16	G17	Ground		10.51393	76.21249	**UG**	300	74.71		74.71
G17	AB1	ABL-50302		10.513734	76.211497	**UG**	300	112.76	15	127.76
	1	**Commercial**	**LT**	**10.513734**	**76.211497**					
AB1	G4	Ground		10.513728	76.211744	**UG**	300	30.74		30.74
G4	**2**	**Casino**	**HT**	**10.513226**	**76.211783**	**UG**	**240**	**57.28**	**10**	**67.28**
AB1	P5	Post		10.513803	76.210648	**OH**		92.93		92.93
P5	AB2	ABI-50208		10.513877	76.210741	**OH**		13.06		13.06
P5	P23	Post		10.51373	76.21073	**OH**		12.44		12.44
P23	P6	Post		10.513250	76.210612	**OH**		54.71		54.71
P6	G5	Ground		10.513396	76.209860	**UG**	300			0
G5	3	Smart Centre	LT	10.513500	76.209873	**UG**	300	98.37	5	103.37

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P6	P7	Post		10.512421	76.210760	**OH**		93.2		93.2
P7	G6	Ground		10.512229	76.210821	**UG**	300		10	10
G6	4	Sree Sailam	LT	10.511936	76.210050	**UG**	300	115.91		115.91
P8	P9	Post		10.510568	76.211192	**OH**		213.63		213.63
P9	P9-1	Post		10.510568	76.211075	**OH**		12.81		12.81
P9-1	5	Metro	HT	10.510538	76.210265	**UG**	185	94.41	10	104.41
P9	P10	Post		10.510099	76.211150	**OH**		52.08		52.08
P10	RMU3	RMU-30303		10.509968	76.211192	**UG**	300		10	10
RMU3	26	CK Plaza	LT	10.510005	76.211451	**UG**	300	43.85	10	53.85
P10	6	Alumkulam	LT	10.509821	76.211194	**OH**		27.23		27.23
6	G7	Ground		10.508329	76.211218	**UG**	240			0
G7	10	Thankamani	LT	10.508311	76.210904	**UG**	240	198.69		198.69
10	P11	Post		10.508220	76.210012	**OH**		98.16		98.16
P11	P11-1	Post		10.508349	76.210006	**OH**		14.28		14.28
P11-1	8	Skyline	LT	10.508474	76.210213	**UG**	300	26.54	5	31.54
P11	P12	Post		10.508144	76.209292	**OH**				0
P12	P13	Post		10.508169	76.208953	**OH**		116.47		116.47
P13	P13-1	Post		10.508270	76.208858	**OH**		15.16		15.16
P13-1	9	Love-Shore	LT	10.508759	76.208660	**UG**	150	58.27	50	108.27
P13	7	Kaja	LT	10.508194	76.208521	**OH**		47.37		47.37
6	P14	Post		10.508329	76.211218	**OH**		165.57		165.57
P14	P15	Post		10.507600	76.211206	**OH**		80.78		80.78
P15	RMU4	RMU-30304		10.507486	76.211638	**UG**	300		30	30
RMU4	11	Mannanthara Agencies	LT	10.507486	76.211638	**UG**	300	52.33	5	57.33
P15	P16	Post		10.505500	76.211316	**OH**		233.02		233.02
P16	P17	Post		10.505174	76.211337	**OH**		36.13		36.13
P17	15	Smart City	LT	10.505162	76.211205	**OH**		14.51		14.51
15	24	I-Vision	HT	10.504276	76.211012	**UG**	300	136.81	5	141.81
P17	P18	Post		10.504101	76.211411	**OH**		118.96		118.96
P18	17	Hi-Life	LT	10.504280	76.212928	**UG**	300	167.51	5	172.51
P18	AB3	ABL-50310		10.503620	76.211479	**OH**		53.48		53.48
AB3	RMU5	RMU-30306		10.503614	76.211526	**UG**	300		15	15
RMU5	25	Shangri-La-Fortune	LT	10.503609	76.211899	**UG**	300	48.07	5	53.07

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
AB3	P19	Post		10.503380	76.211524	**OH**				0
AB3	P19	Post		10.503380	76.211524	**OH**				0
P19	AB4	ABL-50311		10.503186	76.211440	**OH**				0
AB4	16	Sun City	LT	10.503186	76.211440	**OH**		50.8		50.8
P16	P20	Post		10.505332	76.210463	**OH**		95.21		95.21
P20	P21	Post		10.505025	76.210402	**OH**				0
P21	13	Kanjirangadi	LT	10.503952	76.209568	**OH**		184.34		184.34
13	P22	Post		10.502503	76.208480	**OH**				0
P22	AB5	AB		10.502738	76.208187	**OH**		209.19		209.19
AB5	G8	Ground		10.502661	76.207606	**UG**	300			0
G8	14	Q-Apartment	LT	10.502879	76.207473	**UG**	300	92.34	5	97.34
P20	12	Kinar	LT	10.505326	76.210208	**OH**		27.92		27.92
P5	18	Veterinary	LT	10.513811	76.210537	**OH**		12.18		12.18
18	19	Dee Pee Plaza	LT	10.513914	76.209943	**OH**		66.01		66.01
19	P21	Post		10.514150	76.208370	**OH**				174.15
P21	20	Dhanya	LT	10.514088	76.208363	**OH**				6.9
P21	P21-1	Post		10.514143	76.208116	**OH**		27.81		27.81
P21-1	22,23	Railway	HT,HT	10.515153	76.208195	**UG**	185	117.75	10	127.75
P21-1	RMU6	RMU-30302		10.514273	76.207036	**UG**	300	119.09	10	129.09
20	AB6	ABL-50308		10.513104	76.208221	**OH**		109.95		109.95
AB6	21	Ice Plant	LT	10.512922	76.208477	**OH**		34.5		34.5
AB6	G9	Ground		10.511743	76.207351	**UG**	300			0
G9	G10	Ground		10.508494	76.206378	**UG**	300			0
G10	RMU7	RMU-30305		10.508207	76.207788	**UG**	300	718.81		718.81
RMU7	27	Forus Apartment	LT	10.508007	76.207782	**UG**	150	22.13		22.13

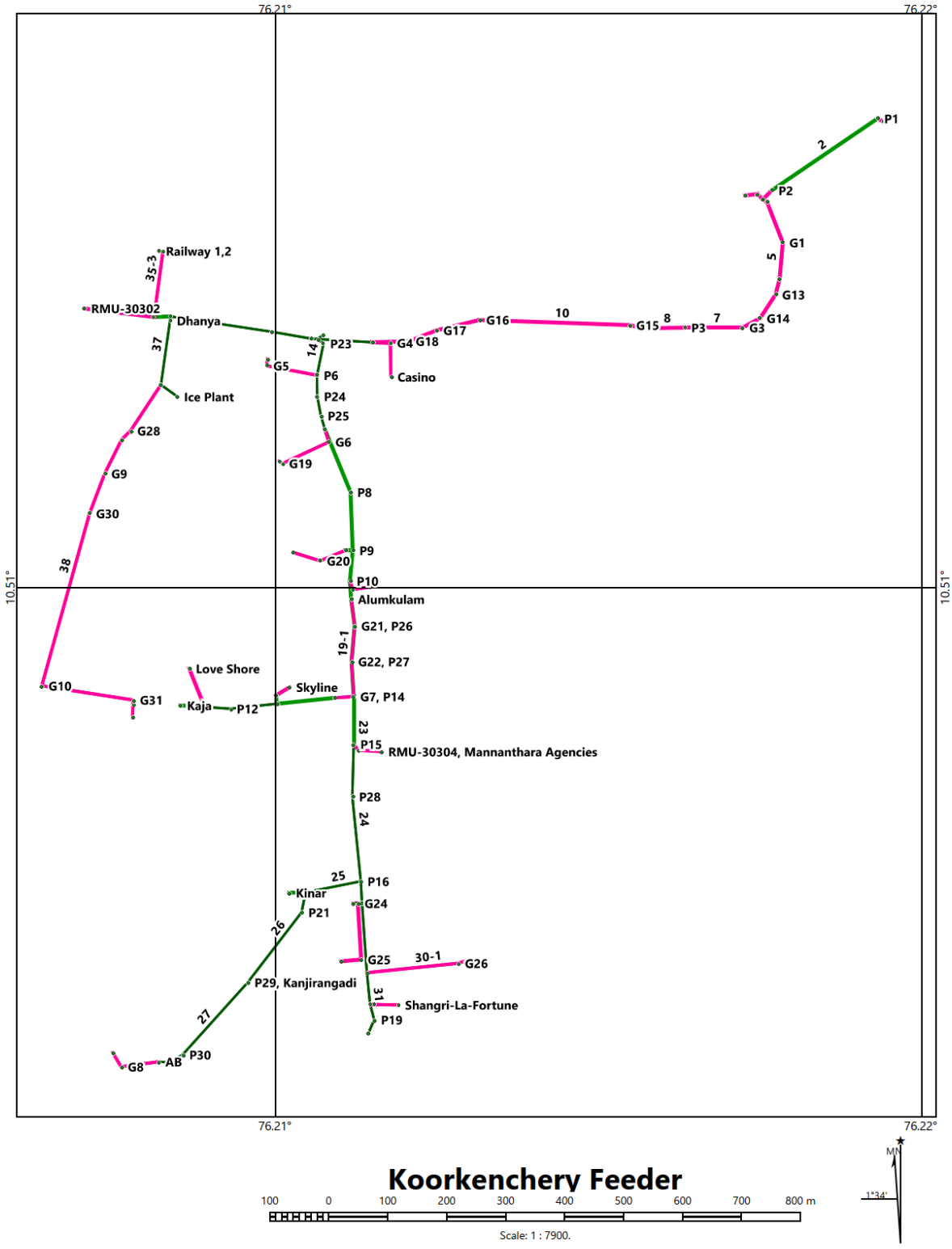

Figure 19: Koorkanchery feeder

6. RAMANILAYAM FEEDER

The following table shows the 11-kV line distance in the Ramanilayam feeder.

Table 53: HT line distance – Ramanilayam feeder

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
	S-S	Substation feeder		10.535182	76.21455						
S-S	P1	Post		10.535115	76.214826	**UG**	XLPE	300		37	37
P1	P2	Post		10.534981	76.215004	**UG**	XLPE	300	10	15	25
P2	ABL51102	ABl51102		10.534982	76.215185	**OH**	Racoon				0
ABL51102	P3	Post		10.533549	76.215227	**OH**	Racoon				0
P3	P4	Post		10.53397	76.215342	**OH**	Racoon		202.2		202.2
P4	1	Stadium West	LT	10.533257	76.215292	**OH**	Racoon		10.33		10.33
P4	P5	Post		10.533420	76.215841	**OH**	Racoon				
P5	P6	Post		10.533401	76.216003	**OH**	Racoon				
P6	P7	Post		10.533325	76.216275	**OH**	Racoon				
P7	P8	Post		10.532954	76.216447	**OH**	Racoon				
P8	2, ABL51103	Stadium East	LT	10.532928	76.21671	**OH**	Racoon		189.16		189.16
ABL51103	G1	Ground		10.532945	76.216659	**UG**	XLPE	300			0
G1	23	Indoor Stadium	HT	10.532891	76.216673	**UG**	XLPE	300		10.02	10.02
ABL51103	G2	Ground		10.532986	76.217108	**UG**	XLPE	300			0
G2	P9	Post		10.531025	76.217042	**UG**	XLPE	300		192.4	192.4
P9	P10	Post		10.530901	76.217115	**OH**	Racoon				0
P10	P11	Post		10.530852	76.217868	**OH**	Racoon			96.89	96.89
P11	ABL51104	ABL51104		10.530848	76.218143	**OH**	Racoon				0
ABL51104	P12	Post		10.530847	76.218303	**OH**	Racoon			49.2	49.2
P12	AB Ramanilayam	AB		10.531074	76.2183	**OH**	Racoon				0

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
AB Ramanilayam	3	Ramanilayam	LT	10.531143	76.218297	**OH**	Racoon			32.75	32.75
P12	ABI51105	ABI51105		10.530836	76.218591	**OH**	Racoon			12.47	12.47
P11	ABL51106	ABL51106		10.529097	76.217916	**OH**	Racoon		196.57		196.57
ABL51106	AB Pulimoottil	AB		10.529117	76.217892	**OH**	Racoon		3.43		3.43
AB Pulimoottil	4	Pulimoottil	HT	10.529174	76.217798	**UG**	XLPE	300	12.7	25	37.7
ABL51106	P13	Post		10.528838	76.217967	**OH**	Racoon		29.19		29.19
P13	AB Kaliyath, Chungath	AB		10.528519	76.218008	**OH**	Racoon		35.26		35.26
AB Chungath	11	Chungath Jewellery	HT	10.528557	76.217719	**UG**	XLPE	150	30.29	20	50.29
AB Kaliyath	10	Kaliyath	LT	10.528383	76.217532	**UG**	XLPE	150	52.72		52.72
AB Kaliyath	AB-YMCA	AB		10.528555	76.218122	**OH**	Racoon		14.61		14.61
AB-YMCA	8	YMCA	HT	10.528522	76.218248	**UG**	XLPE	150	14.27	56	70.27
AB Kaliyath	AB Chiriyan Kandath	AB		10.528363	76.218016	**OH**	Racoon		12.03		12.03
AB Chiriyan Kandath	12	Chiriyan Kandath	LT	10.528236	76.217919	**UG**	XLPE	150	17.61	28	45.61
AB Chiriyan Kandath	AB Kalyan	AB		10.528002	76.218023	**OH**	Racoon		41		41
AB-YMCA	9	Josco	HT	10.528522	76.218248	**UG**	XLPE	150	14.27	56	70.27
AB Kalyan	RMU31103, 14, 13	Kalyan Silks	HT	10.527997	76.217974	**UG**	XLPE	185	6.7	15	21.7
AB Kalyan	AB Vrindhavan	AB		10.5277180	76.2180790	**OH**	Racoon		30.77		30.77
AB Vrindhavan	G3	Ground		10.527808	76.218060	**UG**	XLPE	150			0
G3	G4	Ground		10.527792	76.217670	**UG**	XLPE	150			0
G4	15	Vrindhavan Apartment	LT	10.527757	76.217654	**UG**	XLPE	150	57.14	5	62.14
AB Vrindhavan	P13-1, 25	AB Josco, AB Kalanikethan, Kalanikethan	LT	10.527250	76.218086	**OH**	Racoon		51.77		51.77

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P13-1	G5	Ground		10.526945	76.218110	**UG**	XLPE	185			0
G5	G6	Ground		10.526774	76.218067	**UG**	XLPE	185			0
G6	19	New Josco	HT	10.526655	76.218267	**UG**	XLPE	185	81.87	22	103.87
P13-1	P14	Post		10.526928	76.218102	**OH**	Racoon				0
P14	P15	Post		10.526621	76.218002	**OH**	Racoon		72.13		72.13
P15	P16, 16	Swapana Theatre	LT	10.526400	76.217896	**OH**	Racoon		24.42		24.42
P16	ABL51107	AB Kollanur		10.526172	76.217769	**OH**	Racoon		31.38		31.38
AB Kollanur	24	Kollanur	LT	10.526363	76.217829	**UG**	XLPE	150	22.83	5	27.83
ABL51107	P17	Post		10.525925	76.217624	**OH**	Racoon				
P17	P18	Post		10.52568	76.217467	**OH**	Racoon		63.62		63.62
P18	21	Paremekkavu(Neeranjali)	LT	10.525591	76.217623	**OH**	Racoon		20.97		20.97
P18	AB Statue& Alukkas, 17	Statue	LT	10.525351	76.217298	**OH**	Racoon		37.49		37.49
AB Statue	P19	Post		10.525196	76.217228	**OH**	Racoon		21.85		21.85
P19	AB Paramekavu Temple	AB		10.524878	76.217206	**OH**	Racoon		36.2		36.2
AB Pt	G7	Ground		10.524458	76.217412	**UG**	XLPE	300			0
G7	G8	Ground		10.524189	76.217556	**UG**	XLPE	300			0
G8	G9	Ground		10.524185	76.217676	**UG**	XLPE	300			0
G9	20	Paramekavu Temple	LT	10.523848	76.217592	**UG**	XLPE	300	134.32		134.32
AB PT	P20	Post		10.524444	76.216941	**OH**	Racoon				0
P20	ABI51108	Post		10.523784	76.216893	**OH**	Racoon		128.57		128.57
AB Statue	G10	Ground		10.525409	76.217312	**UG**	XLPE	300			0
G10	G11	Ground		10.525497	76.217342	**UG**	XLPE	300			0
G11	G12	Ground		10.525525	76.217061	**UG**	XLPE	300			0
G12	18	Alukkas	LT	10.526008	76.217048	**UG**	XLPE	300	88.82	20	108.82
P13	AB BVB	AB		10.528943	76.21796	**OH**	Racoon		14.85		14.85

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
AB BVB	RMU31102	RMU		10.528833	76.217238	**UG**	XLPE	150			
G9	28	Paramekavu SBI	HT	10.523848	76.217592	**UG**	XLPE	300	134.32		134.32
RMU31102	27	Bharatiyar Vidhya Kendra	HT	10.528617	76.216965	**UG**	XLPE	150	138.13	10	148.13
AB BVB	AB SNDP	AB		10.528883	76.217151	**OH**	Racoon		82.58		82.58
AB SNDP	RMU31101, 26	SNDP	LT	10.528929	76.217222	**UG**	XLPE	185	7.22	20	27.22
AB SNDP	P21	Post		10.528919	76.216847	**OH**	Racoon		35.26		35.26
P21	ABI50802	AB		10.529136	76.216338	**OH**	Racoon		61.17		61.17
P21	P22	Post		10.528642	76.216753	**OH**	Racoon				0
P22	P23	Post		10.528149	76.216669	**OH**	Racoon		87.42		87.42
P23	AB Capital Legend	AB		10.528101	76.216744	**OH**	Racoon		8.69		8.69
AB Capital Legend	7	Capital Legend	LT	10.528040	76.216870	**UG**	XLPE	150	15.35	10	25.35
ABL51106	G13	Ground		10.528943	76.21796	**UG**	XLPE	150			0
G13	G14	Ground		10.528820	76.216780	**UG**	XLPE	150			0
G14	G15	Ground		10.527667	76.216618	**UG**	XLPE	150			0
G15	AB ESI, 5	ESI	LT	10.527679	76.216584	**UG**	XLPE	150	279.1	5	284.1
AB ESI	P24	Post		10.527667	76.216618	**OH**	Racoon				0
P24	P24-1	Post		10.527733	76.216695	**OH**	Racoon				0
P24-1	AB Capital City	AB		10.527742	76.216957	**OH**	Racoon		43.57		43.57
AB Capital City	22	Capital City	LT	10.527424	76.216993	**UG**	XLPE	150	36.47	5	41.47
AB ESI	P24	Post		10.527667	76.216618	**OH**	Racoon				0
P24	P25	Post		10.527478	76.21657	**OH**	Racoon				0
P25	AB Perinchery	AB		10.527403	76.216597	**OH**	Racoon		33.12		33.12
AB Perinchery	6	Perinchery	LT	10.527259	76.216628	**UG**	XLPE	185	24.13	44	68.13

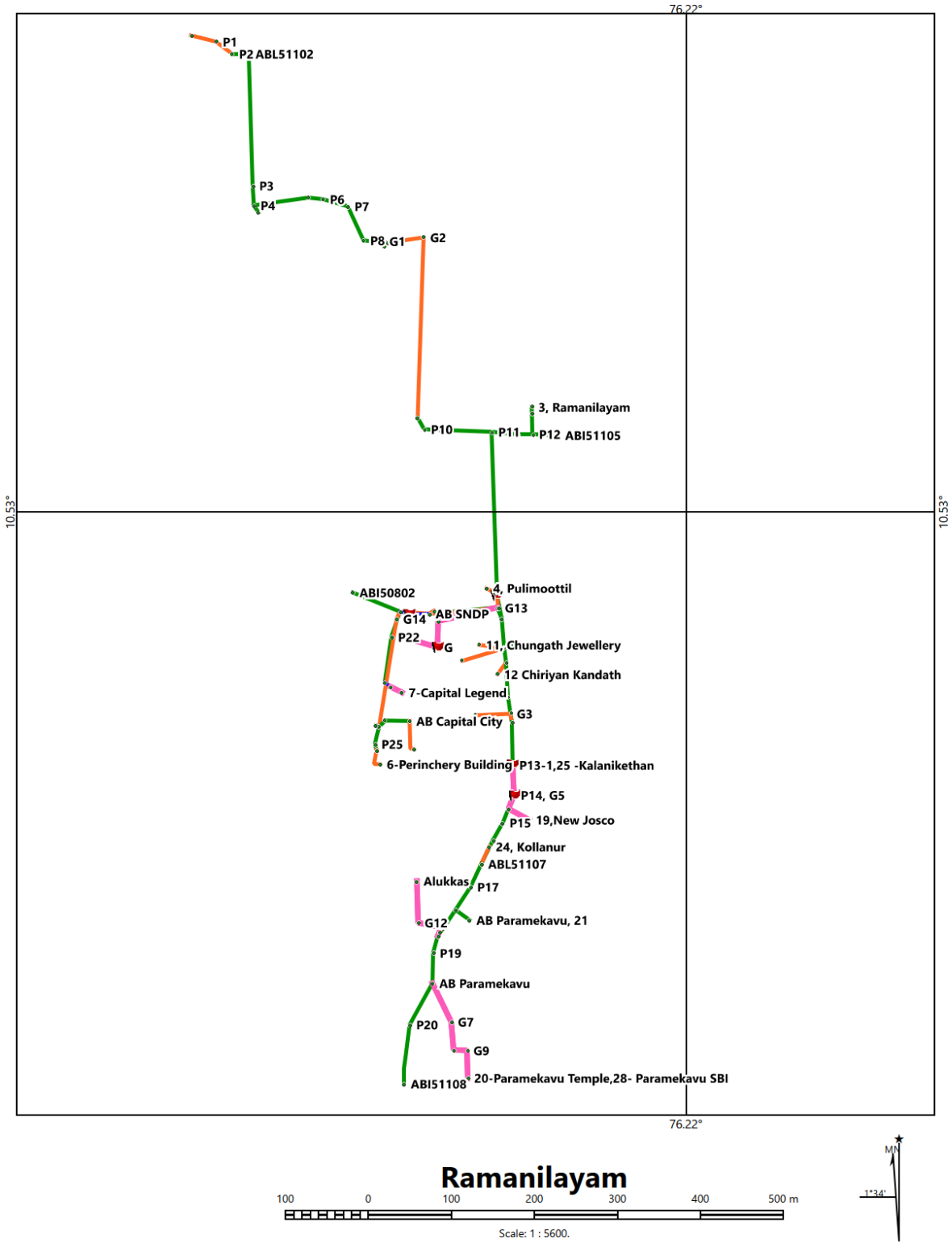

Figure 20: Ramanilayam feeder

7. SHORNUR ROAD FEEDER

The following table shows the 11-kV line distance in the Shornur road feeder

Table 54: HT line distance – Shornur road feeder

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
ss		Substation		10.535032	76.214680						
SS	2P	Post		10.535226	76.214462	**UG**	XLPE	300			0
2P	G1	Ground		10.535310	76.214458	**UG**	XLPE	300			0
G1	ABL51502	AB		10.535327	76.213772	**UG**	XLPE	300	95.79	30	125.79
ABL51502	RMU31501, 35-Bismi	RMU31501, Bismi	HT	10.535520	76.213630	**UG**	XLPE	300	26.41	3	29.41
RMU31501	36- Bismi	Bismi	LT	10.535688	76.213811	**UG**	XLPE	300	27.16	20	47.16
RMU31501	G2	Ground		10.535438	76.213605	**UG**	XLPE	300			0
G2	G3	Ground		10.535432	76.213177	**UG**	XLPE	300			0
G3	RMU31502, 45-Pranavam Apartment	Pranavam Apartment	LT	10.535874	76.213136	**UG**	XLPE	300	111.04		111.04
RMU31502	G4	Ground		10.536289	76.213188	**UG**	XLPE	185			0
G4	RMU31503	RMU		10.536289	76.213296	**UG**	XLPE	185			0
RMU31503	46 - Top Orchid Apartment	Top Orchid Apartment	LT	10.536466	76.213430	**UG**	XLPE	185	85.83	30	115.83
ABL51502	P3	Post		10.535355	76.213445	**OH**	Racoon		36.38		36.38
P3	G7	Ground		10.535344	76.213345	**UG**	XLPE	300			0
G7	G8	Ground		10.534936	76.213325	**UG**	XLPE	300			0
G8	G9	Ground		10.534944	76.213137	**UG**	XLPE	300			0
G9	01- Sree Hari Apartments	Sree Hari Apartments	LT	10.534460	76.213069	**UG**	XLPE	300	128.59	10	138.59
P3	P1	Post		10.535361	76.213138	**OH**	Racoon		32.88		32.88
P1	AB-Sree	AB-Sree Lakshmi		10.535280	76.213127	**OH**	Racoon		6.33		6.33
AB-Sree	2-Sreelakshmi Silks	Sreelakshmi Silks	LT	10.535189	76.213059	**UG**	XLPE	150	12.52	40	52.52
P1	P2	Post		10.535441	76.213146	**OH**	Racoon				0

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P2	AB-Daffodils	AB		10.536055	76.213150	**OH**	Racoon		79.58		79.58
AB-Daffodils	G5	Ground		10.536081	76.213142	**UG**	XLPE	150			0
G5	G6	Ground		10.536057	76.212907	**UG**	XLPE	150			0
G6	03- Daffodils	Daffodils	LT	10.536280	76.212880	**UG**	XLPE	150	53.14		53.14
P1	AB-Rukmani1	AB		10.535360	76.212459	**OH**	Racoon		74.51		74.51
AB-Rukmai1	G10	Ground		10.535359	76.212212	**UG**	XLPE	300			0
G10	AB-Rukmani2	AB		10.534427	76.212201	**UG**	XLPE	300	132.19	5	137.19
AB-Rukmani2	26 - Rukmani Temple Park	Rukmani Temple Park	LT	10.534266	76.212454	**UG**	XLPE	150	32.92	15	47.92
AB-Rukmai1	P5, 4- Karthayani	Post, Karthayani	LT	10.535365	76.212067	**OH**	Racoon		43.21		43.21
P5	AB, 23- K.R Bakery	K.R Bakery	LT	10.535502	76.212076	**OH**	Racoon		16.52		16.52
P5	G11	Ground		10.535356	76.211946	**UG**	XLPE	150			0
G11	G12	Ground		10.535035	76.211949	**UG**	XLPE	150			0
G12	5-Pazhoor Arcades	Pazhoor Arcades	LT	10.534924	76.212057	**UG**	XLPE	150	64.81		64.81
P5	ABL51503	AB		10.535290	76.211750	**OH**	Racoon		34.81		34.81
ABL51503	P6-1	Post		10.535363	76.211656	**OH**	Racoon				0
P6-1	P6	Post		10.535337	76.211394	**OH**	Racoon		47.69		47.69
P6	P7	Post		10.535305	76.211192	**OH**	Racoon				0
P7	P8	Post		10.535304	76.210928	**OH**	Racoon		46.8		46.8
P8	G13	Ground		10.535326	76.210625	**UG**	XLPE				0
G13	21-Saraswathy	Saraswathy	LT	10.535447	76.210615	**UG**	XLPE	300	49.95		49.95
P8	P9	Post		10.535319	76.209827	**OH**	Racoon			125.36	125.36
P9	22 -Unique Ardent	Unique Ardent	LT	10.535463	76.209744	**UG**	XLPE	150	23.24	5	28.24
P9	ABI50903	AB		10.535324	76.209518	**OH**	Racoon		28.53		28.53
P6	AB-Panikath, RMU31504	AB, RMU		10.535694	76.211515	**OH**	Racoon		44.75		44.75
RMU31504	49-Panikath Mall	Panikath Mall	LT	10.535755	76.211320	**UG**	XLPE	185	22.38	25	47.38
AB-Panikath	P39	Post		10.536430	76.211975	**OH**	Racoon				0

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P39	P40	Post		10.536711	76.212055	**OH**	Racoon				0
P40	P41, 18-Varnam	Post/Varnam	LT	10.537105	76.212019	**OH**	Racoon		171.77		171.77
P41	P42	Post		10.537232	76.212017	**OH**	Racoon		14.05		14.05
P42	19-Omega Panthlon	Omega Panthlon	LT	10.537190	76.211716	**UG**	XLPE	185	33.27	10	43.27
P42	P43	Post		10.537421	76.212006	**OH**	Racoon		20.94		20.94
P43	RMU31505	RMU		10.537422	76.211972	**UG**	XLPE	300	3.72		3.72
RMU31505	43-Prasad Arcade	Prasad Arcade	LT	10.537428	76.211929	**UG**	XLPE	300	4.76	25	29.76
RMU31505	RMU31506	RMU		10.537224	76.212110	**UG**	XLPE	300			0
RMU31506	48-CKM Heights	CKM Heights	LT	10.537127	76.212224	**UG**	XLPE	300	55.06	30	85.06
P43	P45	Post		10.538000	76.212016	**OH**	Racoon		64.05		64.05
P45	G46	Ground		10.538033	76.211330	**UG**	XLPE	300			0
G46	G47	Ground		10.538166	76.211151	**UG**	XLPE	300			0
G47	G48	Ground		10.538509	76.211107	**UG**	XLPE	300			0
G48	G49	Ground		10.538548	76.210785	**UG**	XLPE	300			0
G49	G50	Ground		10.539008	76.210873	**UG**	XLPE	300			0
G50	20-Nandhanam	Nandhanam	LT	10.539011	76.210180	**UG**	XLPE	300	301.95	10	311.95
ABL51503	P10	Post		10.535146	76.211513	**UG**	XLPE	300			0
P10	G14	Ground		10.534919	76.211464	**UG**	XLPE	300			0
G14	G15	Ground		10.534555	76.211461	**UG**	XLPE	300			0
G15	P11	Post		10.534539	76.211384	**UG**	XLPE	300	106.31	80	186.31
P11	P38	Post		10.534848	76.211409	**OH**	Racoon				0
P38	6-Kasturi	Kasturi (Bhramasam Madam)	LT	10.534838	76.211515	**OH**	Racoon		45.94		45.94
P11	G16	Ground		10.534562	76.211042	**UG**	XLPE				0
G16	G17	Ground		10.534500	76.210738	**UG**	XLPE				0
G17	7-Sreepriya	Sreepriya	LT	10.534474	76.210642	**UG**	XLPE	300	82.63	27	109.63

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P11	P12	Post		10.534044	76.211321	**OH**	Racoon		55.07		55.07
P12	RMU31507	RMU		10.534086	76.211424	**UG**	XLPE	300	11.25	10	21.25
RMU31507	42-Thrissur Service Coperative Bank	Thrissur Service Coperative Bank	HT	10.534001	76.211658	**UG**	XLPE	185	27.28	5	32.28
P12	P13	Post		10.533857	76.211321	**OH**	Racoon		21.86		21.86
P13	AB-Krishna	AB		10.533834	76.211275	**OH**	Racoon		3.74		3.74
AB-Krishna	51-Capital Krishna	Capital Krishna	LT	10.533834	76.211030	**UG**	XLPE	150	26.82	7	33.82
P13	P14	Post		10.533494	76.211287	**OH**	Racoon		39.19		39.19
P14	P15	Post		10.533371	76.211138	**OH**	Racoon				0
P15	P16	Post		10.533361	76.210934	**OH**	Racoon		44.78		44.78
P16	9-Forus Mathura	Forus Mathura	LT	10.533326	76.210930	**OH**	Racoon		2.78		2.78
P16	G18	Ground		10.533345	76.210194	**UG**	XLPE				0
G18	G19	Ground		10.533335	76.209948	**UG**	XLPE				0
G19	AB-MRG	AB-MRG Sree Valstam		10.533346	76.209556	**UG**	XLPE	300	151.01	17	168.01
AB-MRG	40 - MRG Sree Valstam	MRG Sree Valstam	LT	10.533188	76.209505	**UG**	XLPE	150	18.35	7	25.35
P14	P17	Post		10.533027	76.211313	**OH**	Racoon		51.73		51.73
P17	AB-AR	AB-AR Tower		10.533183	76.211270	**OH**	Racoon		17.89		17.89
AB-AR	27-A.R. Tower	A R Tower	LT	10.533111	76.211209	**UG**	XLPE	150	10.39	10	20.39
P17	P18	Post		10.532747	76.211321	**OH**	Racoon		30.98		30.98
P18	8-Krishna(Thiruvambadi-2)	Krishna(Thiruvambadi -2)	LT	10.532713	76.211394	**OH**	Racoon		8.83		8.83
P18	P19	Post		10.532410	76.211320	**OH**	Racoon		37.28		37.28
P19	28-Friends Mall	Friends Mall	LT	10.532439	76.211428	**OH**	Racoon		12.25		12.25
P19	ABL51504	AB		10.532204	76.211308	**OH**	Racoon		22.82		22.82
ABL51504	RMU31508	RMU		10.531837	76.211354	**UG**	XLPE	300			0
RMU31508	47-Oushadhi Panchakarma	Oushadhi Panchakarma	HT	10.531810	76.211423	**UG**	XLPE	300	60.62	20	80.62

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
ABL51504	P20	Post		10.531825	76.211261	**OH**	Racoon				0
P20	P21	Post		10.531502	76.211285	**OH**	Racoon		78.06		78.06
P21	P22	Post		10.531118	76.211380	**OH**	Racoon		44.69		44.69
P22	P23, 11-Oushadhi	Oushadhi	LT	10.531137	76.211653	**OH**	Racoon		31.54		31.54
P23	RMU31509	RMU		10.531134	76.211604	**UG**	XLPE	300	5.37	12	17.37
RMU31509	G20	Ground		10.531110	76.211372	**UG**	XLPE	300			0
G20	G21	Ground		10.531420	76.211300	**UG**	XLPE				0
G21	G22	Ground		10.531624	76.211243	**UG**	XLPE				0
G22	41-Top Tower	Top Tower	LT	10.531572	76.210898	**UG**	XLPE	300	125.97	20	145.97
RMU31509	G29	Ground		10.531147	76.213005	**UG**	XLPE	300			0
G29	G30	Ground		10.531152	76.214519	**UG**	XLPE	300			0
G30	RMU31510	RMU		10.531392	76.214558	**UG**	XLPE	300			0
RMU31510	44-Kalyan Hypermarket	Kalyan Hypermarket	HT	10.531569	76.214622	**UG**	XLPE	300	372.87	30	402.87
P23	G20	Ground		10.531110	76.211372	**UG**	XLPE	300			0
G20	G21	Ground		10.531420	76.211300	**UG**	XLPE				0
G21	G23	Ground		10.531849	76.211248	**UG**	XLPE				0
G23	G24	Ground		10.532051	76.210712	**UG**	XLPE				0
G24	G25	Ground		10.532151	76.210608	**UG**	XLPE				0
G25	G26	Ground		10.532276	76.210085	**UG**	XLPE				0
G26	G27	Ground		10.532309	76.210146	**UG**	XLPE				0
G27	P24	Post		10.533034	76.210120	**UG**	XLPE	300	331.79	10	341.79
P24	10-Thiruvambadi(Lekshmi)	Thiruvambadi(Lekshmi)	LT	10.533034	76.210133	**OH**	Racoon		1.42		1.42
P24	G28	Ground		10.532486	76.210111	**UG**	XLPE	300			0
G28	24-Narayani	Narayani	LT	10.532437	76.210025	**UG**	XLPE	300	74.28	27	101.28
P22	P25	Post		10.530537	76.211480	**OH**	Racoon		63.17		63.17

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P25	34- K.A Kumaran	K.A Kumaran	LT	10.530561	76.211584	**OH**	Racoon		9.55		9.55
P25	P26	Post		10.529469	76.211775	**OH**	Racoon				0
P26	P27	Post		10.529221	76.211838	**OH**	Racoon		151.68		151.68
P27	G31	Ground		10.529309	76.211808	**UG**	XLPE	300			0
G31	AB-Saroja	AB		10.529252	76.211497	**UG**	XLPE				0
AB-Saroja	25- Saroja	Saroja	HT	10.529209	76.211353	**UG**	XLPE	300	59.31	30	89.31
P27	P28	Post		10.528352	76.212106	**OH**	Racoon				0
P28	P29	Post		10.527754	76.212235	**OH**	Racoon				0
P29	ABL51505	AB		10.527750	76.212203	**OH**	Racoon		171.71		171.71
ABL51505	P30	Post		10.527691	76.211899	**UG**	XLPE	300	33.91	12	45.91
P30	12-Suharsha	Suharsha	LT	10.527802	76.211990	**UG**	XLPE	150	15.81	10	25.81
P30	G32	Ground		10.527776	76.211485	**UG**	XLPE	300			0
G32	RMU31511	RMU		10.527492	76.211395	**UG**	XLPE	300	72.82	15	87.82
RMU31511	50-Coperative Hospital	Coperative Hospital	HT	10.527558	76.211451	**UG**	XLPE	300	9.53	30	39.53
RMU31511	AB-Coperative	AB		10.527447	76.211388	**UG**	XLPE	300	5.04	10	15.04
AB-Coperative	13- Coperative Hospital	Coperative Hospital	LT	10.527462	76.211391	**OH**	Racoon		1.69		1.69
AB-Coperative	G33	Ground		10.527325	76.211332	**UG**	XLPE	300			0
G33	P31	Post		10.526755	76.211249	**UG**	XLPE	300	81.82	20	101.82
P31	P32	Post		10.526681	76.211499	**OH**	Racoon		27.81		27.81
P32	AB-Athulya	AB		10.526493	76.211527	**UG**	XLPE	300			0
AB-Athulya	16-Athulya Chundari	Athulya Chundari	LT	10.526437	76.211437	**UG**	XLPE	300	32.82		32.82
P32	P33	Post		10.526654	76.211652	**OH**	Racoon		17.01		17.01
P33	G34	Ground		10.526620	76.211739	**UG**	XLPE	300			0
G34	G35	Ground		10.526438	76.211747	**UG**	XLPE	300			0
G35	G36	Ground		10.526376	76.211712	**UG**	XLPE	300			0

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
G36	G37	Ground		10.526357	76.211587	**UG**	XLPE	300			0
G37	G38	Ground		10.525998	76.211592	**UG**	XLPE	300			0
G38	G39	Ground		10.525996	76.211637	**UG**	XLPE	300			0
G39	LBS	LBS		10.525804	76.211084	**UG**	XLPE	300	166.19		166.19
LBS	14-City Centre 1	City Centre 1	LT	10.525785	76.211087	**UG**	XLPE	150	2.68		2.68
LBS	15-City Centre 2	City Centre 2	LT	10.525840	76.211080	**UG**	XLPE	150	4.42	8	12.42
P31	ABL51506	AB		10.526780	76.210751	**OH**	Racoon		54.84		54.84
ABL51506	G40	Ground		10.527703	76.210718	**UG**	XLPE	300			0
G40	G41	Ground		10.528060	76.210860	**UG**	XLPE				0
G41	39-Alukkas Nest	Alukkas Nest	LT	10.527986	76.210965	**UG**	XLPE	300	159.31		159.31
ABL51506	33-Malabar Eye Clinic	Malabar Eye Clinic	LT	10.526870	76.210444	**OH**	Racoon		35.05		35.05
ABL51506	G42	Ground		10.526747	76.210648	**UG**	XLPE	300			0
G42	G43	Ground		10.526233	76.210630	**UG**	XLPE				0
G43	G44	Ground		10.525134	76.210667	**UG**	XLPE	300			0
G44	AB-Shivam	AB		10.525158	76.210847	**UG**	XLPE	300	207.78	10	217.78
AB-Shivam	17-Shivam	Shivam		10.525080	76.210919	**UG**	XLPE	300	11.69	30	41.69
AB-Shivam	P34	Post		10.525152	76.210670	**UG**	XLPE	300	19.39	10	29.39
P34	P35	Post		10.524674	76.210693	**OH**	Racoon		52.93		52.93
P35	29-Ramdas Theatre	Ramdas Theatre	HT	10.524432	76.210736	**UG**	XLPE	300	30.92	5	35.92
P35	AB-Peninsula	AB		10.524647	76.210686	**OH**	Racoon		3.08		3.08
AB-Peninsula	30-Peninsula	Peninsula	HT	10.524161	76.210655	**UG**	XLPE	150	53.86	75	128.86
P35	G45	Ground		10.524632	76.210242	**UG**	XLPE	300			0
G45	ABI50808	AB		10.523928	76.210241	**UG**	XLPE	300	130.61	7	137.61
P34	P36	Post		10.525399	76.210645	**OH**	Racoon		27.46		27.46
P36	P36-1	AB		10.525436	76.210713	**OH**	Racoon		8.49		8.49
P36-1	31-Wintage Royal	Wintage Royal	LT	10.525355	76.210795	**UG**	XLPE	185	12.68	50	62.68

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P36	P37	Post		10.525881	76.210646	**OH**	Racoon		53.31		53.31
P37	37-Top Heritage	Top Heritage	LT	10.525845	76.210826	**UG**	XLPE	150	20.1	20	40.1
P37	P37-1	AB		10.525819	76.210579	**OH**	Racoon		10.04		10.04
P37-1	38-Forus Cosynest	Forus Cosynest	LT	10.525893	76.210456	**UG**	XLPE	150	15.76	20	35.76

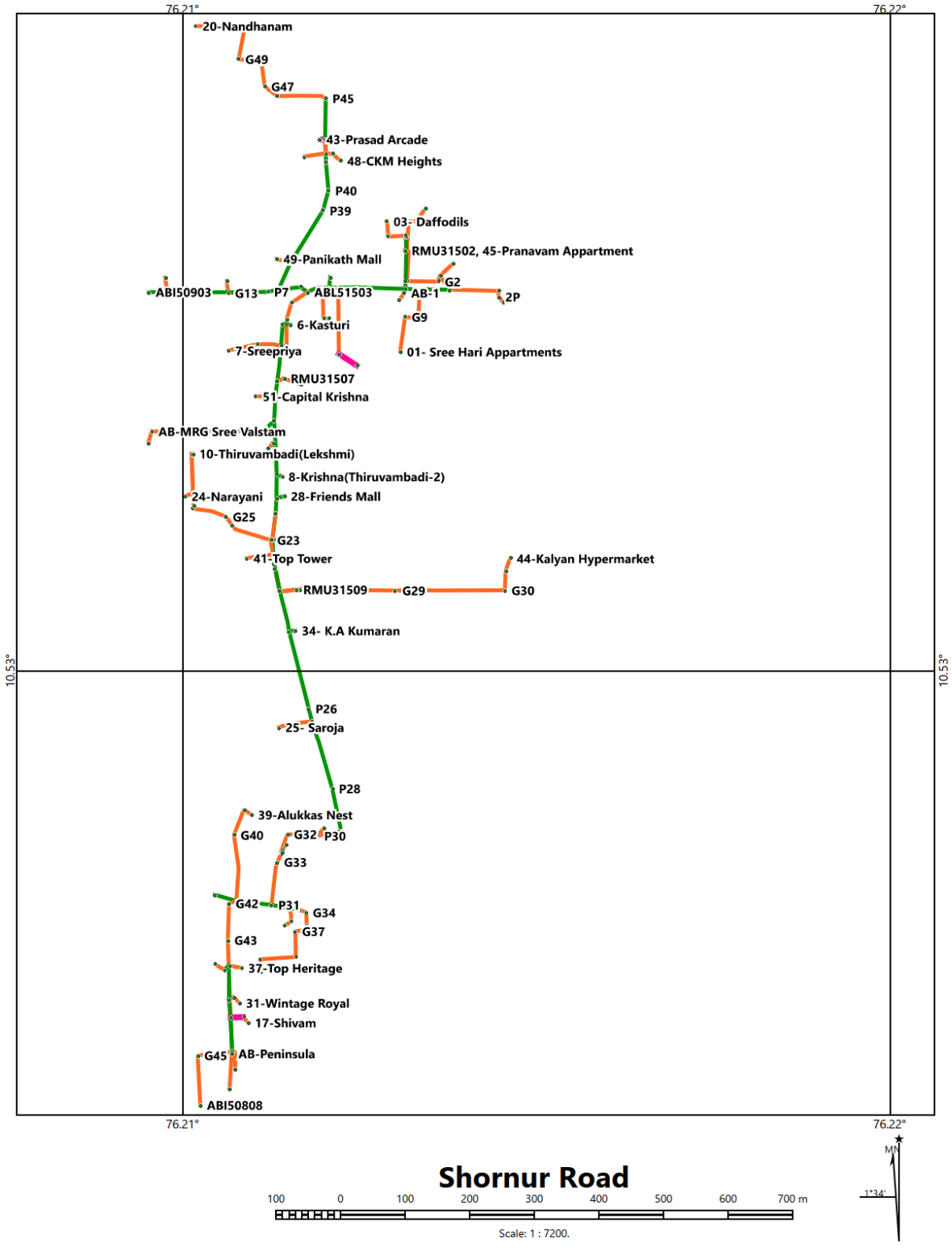

Figure 21: Shornur road feeder

8. VELIYANOOR

The following table shows the 11-kV line distance in the Veliyanoor feeder

Table 55: HT line distance – Veliyanoor feeder

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
	S-S	Substation feeder		10.517355	76.219663						
S-S	P1	Post		10.517120	76.219563	**UG**	XLPE	300	28.2	32	60.2
P1	P2	Post		10.517085	76.219594	**OH**	Racoon		7.68		7.68
P2	1	Assay Hall Marking	LT	10.517240	76.219773	**OH**	Racoon		26.7		26.7
P1	P3, 21	Airtel Tower	LT	10.517268	76.219442	**OH**	Racoon		19.76		19.76
P3	P24	AB Manorama		10.517096	76.219261	**OH**	Racoon		21.27		21.27
P24	2	Manorama	HT	10.516767	76.219534	**UG**	XLPE	300	48	7	55
P2	G14-1	Ground		10.517000	76.219530	**UG**	XLPE	300			0
G14-1	G14-2			10.517180	76.219360	**UG**	XLPE	300			0
G14-2	G14			10.516906	76.218968	**UG**	XLPE	300			0
G14	22	Chicago	LT	10.516700	76.218968	**UG**	XLPE	300	117.95	10	127.95
P24	P25	Post		10.516706	76.218659	**OH**	Racoon		78.25		78.25
P25	3	C J Tower	LT	10.516875	76.218557	**OH**	Racoon		24.38		24.38
P25	P26	Post		10.516106	76.217811	**OH**	Racoon		114.59		114.59
P26	P27	Post		10.516010	76.217036	**UG**	XLPE	300	326.13	10	336.13
P27	RMU30201	RMU		10.515988	76.217010	**UG**	XLPE	300	5.67	9	14.67
P27	AB Sakthan Market, 4	Sakthan Market	LT	10.515958	76.216764	**OH**	Racoon		30.32		30.32
AB Sakthan Market	RMU30206	RMU		10.515919	76.216744	**UG**	XLPE	300	4.84		4.84
RMU30206	26	Edu Mart	HT	10.515732	76.216878	**UG**	XLPE	240	25.36	7	32.36
P27	P28	Post		10.516006	76.217500	**OH**	Racoon				
P28	ABL50203	AB		10.516365	76.217354	**OH**	Racoon				
ABL50203	P29	Post		10.517367	76.217196	**OH**	Racoon				

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P29	P30	Post		10.517411	76.217316	**OH**	Racoon				
P30	P31	Post		10.517614	76.217937	**OH**	Racoon				
P31	P31-1	Post		10.518050	76.217844	**OH**	Racoon		25		25
RMU30201	G15	Ground		10.516405	76.217503	**UG**	XLPE	300			
G15	G16	Ground		10.517390	76.217294	**UG**	XLPE	300			
G16	G17	Ground		10.517614	76.217937	**UG**	XLPE	300			
G17	G18	Ground		10.518070	76.217907	**UG**	XLPE	300			
G18	RMU30202	RMU		10.518060	76.217850	**UG**	XLPE	300			
RMU30202	14	Latin Palli		10.518050	76.217844	**UG**	XLPE	300	323.63		323.63
RMU30202	G19	Ground		10.518082	76.217924	**UG**	XLPE	300			0
G19	G20	Ground		10.518431	76.218937	**UG**	XLPE	300			0
G20	RMU30203, 24	Vivid Press	LT	10.517753	76.219192	**UG**	XLPE	300	209.44	10	219.44
RMU30202	G24	Ground		10.517670	76.217912	**UG**	XLPE	300			0
G24	G25	Ground		10.517456	76.217245	**UG**	XLPE	300			0
G25	G26	Ground		10.517981	76.216941	**UG**	XLPE	300			0
G26	G27	Ground		10.518525	76.216588	**UG**	XLPE	300			0
G27	G28	Ground		10.519618	76.216723	**UG**	XLPE	300			0
G28	RMU30204	RMU		10.520465	76.216858	**UG**	XLPE	300	488.48		488.48
RMU30204	G31	Ground		10.520568	76.216720	**UG**	XLPE	300			0
G31	G32	Ground		10.520477	76.216184	**UG**	XLPE	300			0
G32	RMU30205, 25	Sakunthala	HT	10.520222	76.215997	**UG**	XLPE	300	141.99		141.99
RMU30204	G29	Ground		10.520481	76.216802	**UG**	XLPE	300			0
G29	G30	Ground		10.521385	76.216822	**UG**	XLPE	300			0
G30	RMU31606	RMU		10.522609	76.216895	**UG**	XLPE	300	245.44		245.44
AB Sakthan	P4	Post		10.515999	76.216432	**OH**	Racoon		36.62		36.62
P4	G1	Ground		10.515939	76.215913	**UG**	XLPE	300			0

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
G1	RMU30207	RMU		10.515870	76.215930	**UG**	XLPE	300			0
RMU30207	G2	Ground		10.515853	76.215567	**UG**	XLPE	300			0
G2	G3	Ground		10.516028	76.215361	**UG**	XLPE	300			0
G3	AB OWC	AB		10.516210	76.214917	**UG**	XLPE	300	186.3		186.3
AB OWC	20	OWC Plant	LT	10.516223	76.214920	**OH**	Racoon		4.02		4.02
AB OWC	AB Police Commissioner	AB		10.516574	76.214587	**UG**	XLPE	300	53.71		53.71
AB Police Commissioner	G21	Ground		10.516240	76.215451	**UG**	XLPE	300			0
G21	G22	Ground		10.516392	76.215671	**UG**	XLPE	300			0
G22	G23	Ground		10.518324	76.215873	**UG**	XLPE	300			0
G23	RMU30208	RMU		10.518371	76.215651	**UG**	XLPE	300			0
RMU30208	27	Office of commissioner of Police	HT	10.518777	76.215659	**UG**	XLPE	300	416.45	50	466.45
AB Police Commissioner	P5	Post		10.517182	76.213144	**OH**	Racoon				0
P5	P6	Post		10.517245	76.212674	**OH**	Racoon				0
P6	ABL50204, 05	Ramanchira madom	LT	10.517227	76.212519	**OH**	Racoon		240.67		240.67
ABL50204	G2-1	Ground		10.517629	76.212579	**UG**	XLPE	300			0
G2-1	G3-1	Ground		10.517600	76.212537	**UG**	XLPE	300			0
G3-1	G4	Ground		10.518388	76.212586	**UG**	XLPE	300			0
G4	RMU31211	RMU		10.518355	76.212265	**UG**	XLPE	300	169.98		169.98
ABL50204	G5	Ground		10.517096	76.212591	**UG**	XLPE	300			
G5	P7	Post		10.516916	76.212593	**UG**	XLPE	300			
P7	P8	Post		10.516703	76.212606	**UG**	XLPE	300	60.01	40	100.01
P8	13	Hari Sree Apartment	LT	10.516706	76.212583	**OH**	Racoon			2.54	2.54

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P8	G7	Ground		10.515926	76.212675	**UG**	XLPE	300			0
G7	G8	Ground		10.515914	76.213156	**UG**	XLPE	300			0
G8	G9	Ground		10.515340	76.213290	**UG**	XLPE	300			0
G9	G10	Ground		10.514978	76.213209	**UG**	XLPE	300			0
G10	ABL50207, 7	Rashtra Deepika	LT	10.515052	76.212532	**UG**	XLPE	300	321.88		321.88
ABL50207	RMU30209	RMU		10.515076	76.212603	**UG**	XLPE	300	8.21		8.21
RMU30209	16	Rastra Deepika Press	HT	10.515136	76.212605	**UG**	XLPE	185	6.64		6.64
ABL50207	P19	Post		10.515046	76.212713	**OH**	Racoon				0
P19	AB Joys palace	AB		10.514975	76.212697	**OH**	Racoon		27.87		27.87
AB Joys palace	8	Joy palace	HT	10.514889	76.212808	**UG**	XLPE	185	15.43	15	30.43
ABL50207	P20	Post		10.515069	76.212060	**OH**	Racoon		51.7		51.7
P20	9	MRG Flat	LT	10.514961	76.212087	**OH**	Racoon		12.31		12.31
P20	P21	Post		10.515140	76.211393	**OH**	Racoon		73.1		73.1
P21	G11	Ground		10.515177	76.211227	**UG**	XLPE	300			
G11	G12	Ground		10.515603	76.211381	**UG**	XLPE	300			
G12	RMU30210	RMU		10.515593	76.211409	**UG**	XLPE	300			
RMU30210	23	New Jwala Diamond Jewellery	HT	10.515598	76.211671	**UG**	XLPE	300	101.3	45	146.3
P21	P22	Post		10.515052	76.211590	**OH**	Racoon				0
P22	P23	Post		10.514674	76.210980	**OH**	Racoon		73.35		73.35
P23	AB Inland	AB		10.514677	76.210917	**OH**	Racoon		6.9		6.9
AB Inland	G13	Ground		10.514686	76.210722	**UG**	XLPE	185			0
G13	10	inland	LT	10.514755	76.210960	**UG**	XLPE	185	34.44	6	40.44
P23	ABI50208	AB		10.513886	76.210747	**OH**	Racoon		90.82		90.82
ABL50204	P9	Post		10.517186	76.212176	**OH**	Racoon				0
P9	P10	Post		10.517253	76.211889	**OH**	Racoon				0

From Map no	Map no	Pole/transformer/ AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	Mapping distance (m)	Loose distance (m)	Total distance (m)
P10	P11	Post		10.517364	76.211622	**OH**	Racoon		104.99		104.99
P11	P12	Post		10.517145	76.211564	**OH**	Racoon		23.55		23.55
P12	P13	Post		10.517039	76.211527	**OH**	Racoon				0
P13	AB PPY	AB PP Yohanan		10.517024	76.211514	**OH**	Racoon		15.32		15.32
AB PPY	15	P P Yohanan				**UG**	XLPE	240	Not Connected		
P12	ABL50206	AB		10.517170	76.211392	**UG**	XLPE	300	16.4		16.4
ABL50206	AB Jwala 1	AB		10.517155	76.211030	**OH**	Racoon		39.93		39.93
AB Jwala 1	G6	Ground		10.516730	76.210961	**UG**	XLPE	300			0
G6	AB Jwala 2, 11	Jwala Diamond	LT	10.516670	76.211082	**UG**	XLPE	300	65.9	12	77.9
AB Jwala 1	P14	Post		10.517166	76.210722	**OH**	Racoon				0
P14	P15	Post		10.517160	76.210540	**OH**	Racoon				0
P15	P16	Post		10.517056	76.209794	**OH**	Racoon		134.8		134.8
P16	AB Malabar Tower	AB		10.517035	76.209804	**OH**	Racoon		4.09		4.09
AB Malabar Tower	12	Malabar Tower	LT	10.516946	76.209910	**UG**	XLPE	185	10.32	50	60.32
P16	AB Emerald	AB		10.517213	76.209596	**OH**	Racoon		30.9		30.9
AB Emerald	18, 19	Emerald 1, Emerald 2	HT, LT	10.517180	76.209539	**UG**	XLPE	300	7.23	30	37.23
P11	P17	Post		10.517725	76.211781	**OH**	Racoon		45.34		45.34
P17	AB Mani	AB		10.517658	76.211842	**OH**	Racoon		11.93		11.93
AB Mani	6	Manichitra Arcades	LT	10.517661	76.212197	**UG**	XLPE	300	38.86	5	43.86
P17	P17-1	Post		10.517876	76.211815	**OH**	Racoon				
P17-1	AB EMK	AB		10.518064	76.211849	**OH**	Racoon		37.56		37.56
AB EMK	17	EMKE Silks	HT	10.517785	76.211397	**UG**	XLPE	300	69.52	10	79.52
P17	P17-1	Post		10.517876	76.211815	**OH**	Racoon				
P17-1	P18	Post		10.518412	76.211925	**OH**	Racoon		77.22		77.22

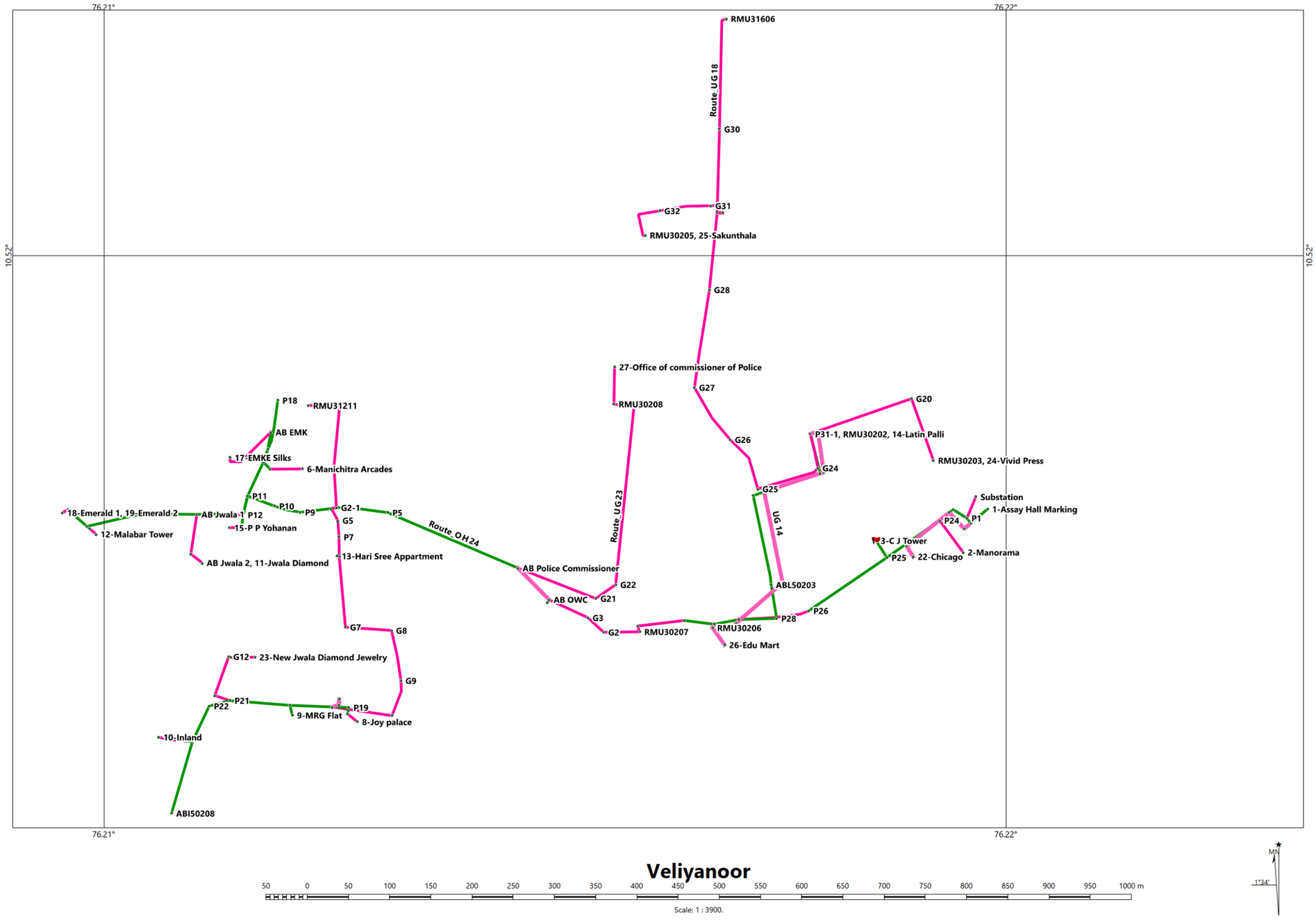

Figure 22: Veliyanoor feeder

9. VIVEKODAYAM FEEDER

The following table shows the 11-kV line distance in the Vivekodayam feeder

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	No of runs	Mapping distance (m)	Loose distance (m)	Total distance (m)
SS		Substation		10.535194	76.214591							
SS	P1	Substation feeder		10.535198	76.214825	**UG**	XLPE	300	1	25.62	55	80.62
P1	P2	Post		10.535236	76.214901	**OH**	Racoon			9.32		9.32
P2	P3	Post		10.534813	76.214965	**OH**	Racoon			47.31		47.31
P3	P4	Post		10.534748	76.215028	**OH**	Racoon			9.96		9.96
P4	P29	AB aswani		10.534517	76.215031	**OH**	Racoon			25.55		25.55
P29	31	Aquatic (Sai)	LT	10.534494	76.21496	**OH**	Racoon			8.18		8.18
P29	G1	Ground		10.534560	76.215007	**UG**	XLPE	300	1			
G1	G2	Ground		10.534597	76.214725	**UG**	XLPE					
G2	LBS	Aswani Hospital				**UG**	XLPE	300	1	41.36		41.36
LBS	01,02	Aswini Hospital	HT	10.534563	76.214736	**UG**	XLPE	150	2		40	40
P29	P5	Post		10.533255	76.215052	**OH**	Racoon			134.68		134.68
P5	P30	AB SG Complex		10.531338	76.215073	**OH**	Racoon			217		217
P30	G3	Ground		10.531405	76.215063	**UG**	XLPE	240	1			0
G3	15	SG Complex	HT	10.531427	76.214973	**UG**	XLPE	240		17.52		17.52
P30	P5-1	Post		10.531050	76.215095	**OH**	Racoon			31.95		31.95
P5	P6	Post		10.533251	76.214487	**OH**	Racoon			62.6		62.6
P6	P7	Post		10.533346	76.213460	**OH**	Racoon					0
P7	P7-1	Post		10.533444	76.213114	**OH**	Racoon					0
P7-1	P31	AB Govind Apartment		10.533484	76.213114	**OH**	Racoon			156.85		156.85
P31	G4	Ground		10.533604	76.213125	**UG**	XLPE	240	1			0
G4	3	Govind Apartment	LT	10.533616	76.213024	**UG**	XLPE	240	1	24.46		24.46

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	No of runs	Mapping distance (m)	Loose distance (m)	Total distance (m)
P6	AB1,P32, P32'29	AB Swimming pool, AB silver rox, ABL50702, Swimming Pool TR	LT	10.532844	76.214458	**OH**	Racoon			49.23		49.23
P32'	G5	Ground		10.532888	76.213808	**UG**	XLPE	300	1			0
G5	RMU1	RMU30701		10.532755	76.213804	**UG**	XLPE	300	1	86.03		86.03
RMU1	28	Silver Roxx	LT	10.532661	76.213848	**UG**	XLPE	240	1	11.46		11.46
P32'	P8	Post		10.532428	76.214427	**OH**	Racoon			46.14		46.14
P8	P33	AB Kalindi		10.532444	76.214264	**OH**	Racoon			17.93		17.93
P33	14	Kalindi	LT	10.532383	76.214074	**UG**	XLPE	300	1	21.86	35	56.86
AB1	G6	Ground		10.532239	76.214421	**UG**	XLPE	300	1			0
G6	G7	Ground		10.532109	76.214662	**UG**	XLPE					0
G7	G8	Ground		10.531113	76.214438	**UG**	XLPE					0
G8	P34	AB Bhima		10.531109	76.214133	**UG**	XLPE	300	1	243.12		**243.12**
P34	G19	Ground				**UG**	XLPE	300				0
G19	4	Bhima	HT	10.530717	76.213987	**UG**	XLPE	300	1	61.77		61.77
P34	P9	Post		10.531108	76.212977	**OH**	Racoon			126.53		126.53
P9	P9-1	Post		10.530778	76.212920	**OH**	Racoon					0
P9-1	P35	AB vanvita		10.530742	76.212816	**OH**	Racoon			49.09		49.09
P35	5	Vanvita	HT	10.530800	76.212816	**UG**	XLPE	300	1	6.42	25	31.42
P9	AB2,AB3	ABI50703,ABL50704		10.531138	76.211802	**OH**	Racoon			128.65		128.65
AB2	G9	Ground		10.531077	76.211470	**UG**	XLPE	300	1	16.92		16.92
G9	G10	Ground		10.529868	76.211727	**UG**	XLPE			141.47		141.47
G10	G11	Ground		10.529850	76.211628	**UG**	XLPE			11.02		11.02
G11	P10	Post		10.529501	76.211025	**UG**	XLPE	300	1	76.46		76.46
P10	6	Capital Manner	LT	10.529441	76.211055	**OH**	Racoon			7.4		7.4
P10	P11	Post		10.529294	76.210639	**OH**	Racoon			49.57		49.57
P11	P12	Post		10.529927	76.210698	**OH**	Racoon					0

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	No of runs	Mapping distance (m)	Loose distance (m)	Total distance (m)
P12	P13	Post		10.530257	76.210091	**OH**	Racoon					0
P13	P14	Post		10.530857	76.209991	**OH**	Racoon					0
P14	P14-1	Post		10.530990	76.209990	**OH**	Racoon					
P14-1	P36	AB1 sreekrishna		10.531005	76.210070	**OH**	Racoon			234.55		234.55
P36	G12	Ground		10.531012	76.210437	**UG**	XLPE	300	1			0
G12	G13	Ground		10.530867	76.210518	**UG**	XLPE					0
G13	P37	AB2 sreekrishna		10.530883	76.210721	**UG**	XLPE	300	1			0
P37	11	Sree Krishna Apartment	LT	10.530753	76.210736	**UG**	XLPE	300	1	92.48	16	108.48
P11	P15	Post		10.528695	76.210305	**OH**	Racoon			72.99		72.99
P15	P38,07	AB-Souparnika, Souparnika	LT	10.528683	76.210264	**OH**	Racoon			3.57		3.57
P38	G22	Ground		10.52834	76.210220	**UG**	XLPE					0
G22	G22-1	Ground		10.52809	76.209960	**UG**	XLPE					0
G22-1	G22-2	Ground		10.527890	76.209830	**UG**	XLPE					0
G20-2	AB4	ABL50705		10.526901	76.209650	**UG**	XLPE	300	1	213.31		213.31
AB4	AB5	ABL50706		10.526969	76.209495	**OH**	Racoon			13.28		13.28
AB5	G12-1	Ground		10.52695	76.20954	**UG**	XLPE	300	1			0
G12-1	G12	Ground		10.527281	76.209642	**UG**	XLPE					0
G12	RMU2, 16	RMU30702, Mukundha Apartment	LT	10.527293	76.209615	**UG**	XLPE	300	1	45.93	2	47.93
AB5	G12-1	Ground		10.52695	76.20954	**UG**	XLPE					
G12-1	G12	Ground		10.527281	76.209642	**UG**	XLPE					
G12	G12-2	Ground		10.52764	76.20974	**UG**	XLPE					
G12-2	P39	AB satyam		10.527662	76.209686	**UG**	XLPE	300	1	87.27		87.27
P39	8	Satyam	LT	10.527851	76.209558	**UG**	XLPE	300	1	28.23	20	48.23
P39	LBS(G)	Ground(LBS)		10.527433	76.209679	**UG**	XLPE	300	1			0
LBS(G)	12	Shivam	LT	10.527509	76.209558	**UG**	XLPE	300	1	39.37		39.37

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	No of runs	Mapping distance (m)	Loose distance (m)	Total distance (m)
AB4	P16	Post		10.526846	76.209493	**OH**	Racoon					0
P16	P16-1	Post		10.52664	76.20958	**OH**	Racoon					
P16-1	P17	Post		10.526361	76.209679	**OH**	Racoon					0
P17	P18	Post		10.525921	76.209726	**OH**	Racoon			122.07		122.07
P18	P40	AB sreehari		10.525945	76.209758	**OH**	Racoon			2.65		2.65
P40	9	Sree Hari	LT	10.525937	76.210051	**UG**	XLPE	240	1	32.08		32.08
P18	P19	Post		10.525819	76.209586	**OH**	Racoon					0
P19	P20	Post		10.524283	76.209863	**OH**	Racoon					0
P20	P20-1	Post		10.524239	76.209763	**OH**	Racoon			202.93		202.93
P20-1	13	Mannath Lane(NP Tower)	LT	10.524206	76.209846	**OH**	Racoon			6.58		6.58
P20-1	P41	AB-Ambika Arcades		10.523845	76.209846	**OH**	Racoon			42.71		42.71
P41	24	Ambika Arcades	LT	10.523921	76.209577	**UG**	XLPE	300	1	30.62	30	60.62
P41	P27	Post		10.523688	76.209783	**OH**	Racoon			18.6		18.6
P27	P45, 23	AB-Music Park, Music Park	LT	10.523625	76.209808	**OH**	Racoon			7.09		7.09
P27	P46	AB-Anamya Tower		10.523638	76.209755	**OH**	Racoon			6.55		6.55
P46	G19-1	Ground		10.52361	76.20962	**UG**	XLPE					0
G19-1	25	Anamya Tower	LT	10.523412	76.20964	**UG**	XLPE	300	1	37.27	15	52.27
P27	P28, 26	Post, Karuvan	LT	10.523523	76.209204	**OH**	Racoon			73.52		73.52
P27	G28-1	Ground		10.52357	76.2092	**UG**	XLPE					
G28-1	RMU4,30	RMU30703, Brahmasam Madom	LT	10.523343	76.209189	**UG**	XLPE	300	1	33.52	15	48.52
P28	AB6	ABI50504		10.523420	76.208130	**OH**	Racoon			110.55		110.55
P27	P21	Post		10.523664	76.209784	**OH**	Racoon			40.31		40.31
P21	G20	Ground		10.523410	76.210170	**UG**	XLPE					
G20	P47	AB-Capital Heritage		10.523416	76.210200	**UG**	XLPE	300	1	38.79		38.79
P47	22	Capital Heritage	LT	10.523399	76.210428	**UG**	XLPE	300	1	11.61	15	26.61

From Map no	Map no	Pole/transformer/AB	Metering point	Latitude	Longitude	Cable	Cable type	Cable size (sq mm)	No of runs	Mapping distance (m)	Loose distance (m)	Total distance (m)
P47	G20	Ground		10.523410	76.210170	**UG**	XLPE					
G20	G20-1	Ground		10.523190	76.2102	**UG**	XLPE					
G20-1	P48, AB7	AB-Temple Tree, ABL50707		10.523157	76.210224	**UG**	XLPE	300	1	31.55		31.55
P48	G21	Ground		10.52321	76.21048	**UG**	XLPE					
G21	21	Temple Tree	LT	10.522941	76.210513	**UG**	XLPE	300	1	57.72	30	87.72
AB7	AB8,P49	ABL50708, AB-Karthiayini1		10.523022	76.210176	**OH**	Racoon			15.83		15.83
P49	G14	Ground		10.522815	76.210240	**UG**	XLPE	300	1			0
G14	P50	AB-Karthiayini 2		10.522852	76.210672	**UG**	XLPE	300	1			0
P50	19	Karthiayini	LT	10.522676	76.210571	**UG**	XLPE	185	1	93.8	30	123.8
AB7	G15	Ground		10.522792	76.210359	**UG**	XLPE	300	1			0
G14	P51	AB-Leo Enterprises		10.523217	76.211669	**UG**	XLPE	300	1	200.51		200.51
P51	20	Leo Enterprises	HT	10.523058	76.211697	**UG**	XLPE	300	1	18.45	32	50.45
P51	P52	AB-Hall Mark		10.523250	76.211843	**OH**	ABC			18.02		18.02
P52	18	Cochin Hall Mark	HT	10.523162	76.211928	**UG**	XLPE	300	1	16.26	5	21.26
AB8	G14	Ground		10.522805	76.210311	**UG**	XLPE					
G14	G15	Ground		10.522792	76.210359	**UG**	XLPE					
G15	G16	Ground		10.522205	76.210385	**UG**	XLPE					
G16	G16-1	Ground		10.521597	76.210125	**UG**	XLPE					
G16-1	G16-2			10.52175	76.21023	**UG**	XLPE					
G16-2	G17			10.52158	76.21012	**UG**	XLPE					
G17	G18	Ground		10.521044	76.210204	**UG**	XLPE					
G18	G18-1			10.52115	76.21065	**UG**	XLPE					
G18-1	RMU5, 17	RMU30704,Thiruvambadi Devasm	HT	10.521188	76.211064	**UG**	XLPE	300	1	337.27		337.27
RMU5	27	Vrindavan Hotel	HT	10.521279	76.211033	**UG**	XLPE	300	1	10.62	40	50.62

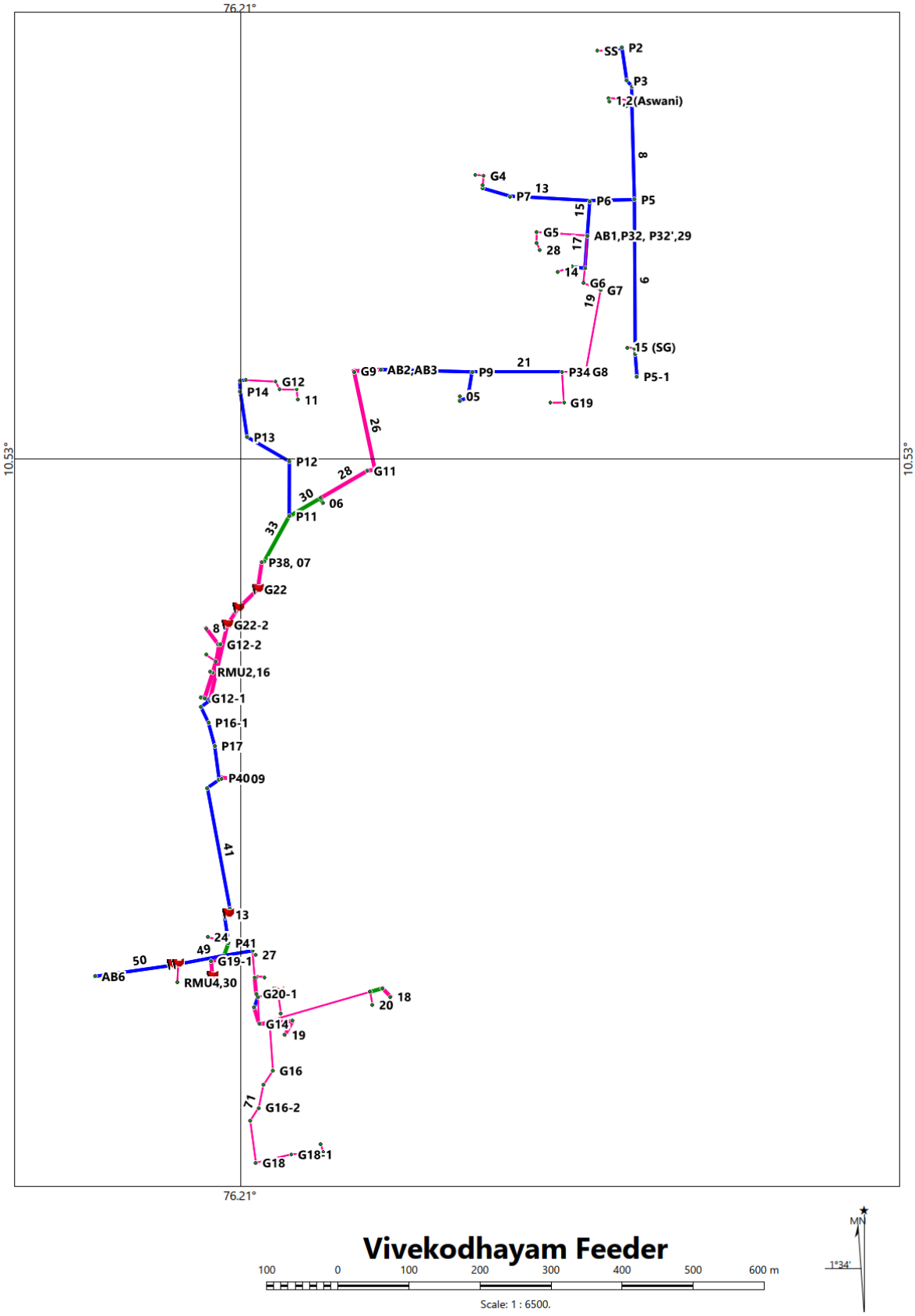

Figure 23: Vivekodayam feeder

FINANCIAL IMPLICATIONS AND RELATIVES AS PER FINANCE SCOPE

1. AVERAGE BILLING RATE (ABR)

ABR for a consumer category is determined by dividing total expected revenue from the category by total expected sale to that category. Mathematically, it can be represented as:

$$ABR\ of\ a\ category\ of\ consumer = \frac{Total\ Expected\ revenue\ from\ a\ category}{Total\ Sale\ of\ power\ to\ that\ category}$$

The ABR (Average rate /kWh) of each category as per the audited sheet of TCED is given below. The net average rate/unit is given as **Rs 8.47/kWh**.

Note: There is no tariff subsidy for the DISCOM consumers as per the KSERC regulations

Figure 24: Average billing rate – category wise

S.No.	Particulars	Number of consumers	Number of consumers billed	Connected Load of consumers	Units Sold (MU)	Average rate/kwh	Sub-total	Avg. realisation per KWh (Excluding ED & Govt.levies @)
				KW	MU	paisa/kwh	**(Rs)**	
1	**2**	**3**	**4**	**5**	**6**	**12**	**23**	**24**
	LT Categories							
1	***LTIA***	21,812.00	21,812.00	976	43.14	5.95	**2,567.27**	**5.95**
2	***LTIV***	505.00	505.00	8027	2.57	7.25	**189.42**	**7.37**
3	***LTVA***	186.00	186.00	290	0.06	3.27	**2.08**	**3.67**
4	***LTVB***	2.00	2.00	140	0.01	1.41	**0.17**	**1.70**
5	***LTVIA***	247.00	247.00	7637	1.76	7.43	**136.32**	**7.76**
6	***LTVIB***	453.00	453.00	6203	2.22	7.75	**171.87**	**7.75**
7	***LTVIC***	496.00	496.00	23444	4.10	11.19	**461.56**	**11.27**
8	***LTVID***	28.00	28.00	413	0.05	2.32	**1.23**	**2.32**
9	***LTVIE***	39.00	39.00	608	0.05	6.55	**3.34**	**6.55**
10	***LTVIF***	662.00	662.00	7919	4.50	9.90	**445.21**	**9.90**
11	***LTVIG***	78.00	78.00	25859	0.99	10.09	**99.52**	**10.09**
12	***LTVIIA***	13,933.00	13,933.00	4992	27.30	10.84	**2,963.67**	**10.86**
13	***LTVIIB***	1,500.00	1,500.00	603	0.58	7.07	**41.73**	**7.18**

S.No.	Particulars	Number of consumers	Number of consumers billed	Connected Load of consumers	Units Sold (MU)	Average rate/kwh	Sub-total	Avg. realisation per KWh (Excluding ED & Govt.levies @)
				KW	MU	paisa/kwh	**(Rs)**	
1	**2**	**3**	**4**	**5**	**6**	**12**	**23**	**24**
	LT Categories							
14	***LTVIIC***	10.00	10.00	40441	0.06	13.54	**15.75**	**26.29**
15	***LTVIIIB***	272.00	272.00	586	1.34	4.74	**63.50**	**4.74**
16	***LTII***	1.00	1.00	22200	0.00	28.40	**0.29**	**28.40**
17	***LT IX***	85.00	85.00	6658	0.06	21.39	**13.62**	**21.39**
18	***LT III***	1.00	1.00	-	0.00	54.55	**0.02**	**54.55**
						-		
	HT Categories					-		
1	***HT-1A***	4.00	4.00	266715	0.47	8.12	**39.39**	**8.30**
3	***HT-2A***	6.00	6.00	362725	0.98	7.92	**77.59**	**7.93**
4	***HT-2B***	27.00	27.00	879295	15.70	8.65	**1,343.27**	**8.55**
5	***HT-4***	89.00	89.00	596483	15.15	10.66	**1,625.22**	**10.73**
	Self-consumption				**0.11**	**6.99**	**7.71**	**6.99**
	Gross Revenue From Sale of Power	40,436.00	40,436.00	22,62,214.	121.19	255.98	11,081.83	**9.14**
30	Less: i) Electricity Duty Payable to Govt. (Contra)	-	-	-	-	-	**812.09**	
	Net Revenue from Sale of Power (A29-A30)	**40,436.00**	**40,436.00**	**22,62,214**	**121.19**	**255.98**	**10,269.74**	**8.47**

- ***Source****: Truing up and financial year statement 2020-21*

2. AVERAGE POWER PURCHASE COST PER UNIT

Average per unit cost power purchase for a consumer category is determined by dividing total unit purchase cost from the category by total input purchase in units. Mathematically, it can be represented as:

$$APC\ of\ a\ category\ of\ consumer = \frac{Total\ Purchase\ cost\ from\ a\ category}{Total\ input\ purchase\ units}$$

The net average power purchase cost per unit of the DISCOM is available from the Trueing up document and summarised in the table below.

Table 56: Average purchase cost – DISCOM

FY	Total input energy purchased (MU)**	Total purchase cost (Rs lakhs)	APC (Rs/unit)
2019-20	162.4	12625.06	7.77
2020-21	129.33	8878.80	6.86

***Total input energy purchased (MU) = Input energy (MU) at the DISCOM*

- ***Source**: Truing up statement 2020-21*

3. ACS – ARR GAP ANALYSIS

The Average cost of supply (ACS) and the average revenue realised (ARR) is conducted in the DISCOM during the energy audit and summarized in the below table and chart.

Table 57: ACS- ARR gap

	Input energy (MU)**	Total expenditure (Rs in lakhs)	Total revenue (Rs)	ACS (Rs/ kWh)	ARR (Rs/ kWh)	ACS - ARR gap (Rs/ kWh)
2019-20	162.4	13242.25	13341.19	8.15	8.22	0.06
2020-21	129.33	13615.48	13230.11	10.53	10.23	-0.30

***Total input energy purchased (MU) = total Input energy (MU) at incomer*

- ***Source**: Audited balance sheet and financial year statement 2020-21*

ANNEXURE-1

1. ENERGY CONSERVATION MEASURES – DETAILED

1.1. REPLACING HT & LT OVERHEAD LINES WITH UG CABLES

Background

As the location, Thrissur, is known for various festivals yearly, the crowd and the risk possess in the transmission of power through overhead line stays. TCED has initiated to change all the major location, identified disaster prone areas, with UG cables, especially in the HT side. Also, this will reduce the overall loss in the system.

The details of the HT & LT overhead lines in TCED for the audited 4 feeders are summarized in the table given below as sample basis. The distance given below in table are considered for the calculation.

TABLE 58 : OVERHEAD LINES DETAILS

OH Line type	Voltage level	Distance in km	Resistance of the line Ω/km
Racoon	11 kV	8.273	0.3712
Rabbit	415 V	20.97	0.543

Proposal

1. The resistance per line length for UG cables is 0.13 Ω/km for 300 sqmm XLPE which will reduce the power loss through HT overhead line and thereby the net power losses in the system. Estimated reduction in energy loss is 70% from the present losses.
2. The detailed calculation for savings has been done for 4 feeders which is applicable to remaining 12 feeders and financial viability is shown in the table given below.

Calculation

TABLE 59 : ECM 01

Particulars	Units	Equation	Bini	Ramanilayam	Chembukavu	Shornur road
Present HT Line loss	kWh/ annum	A	401	858	2570	1822
Present LT line loss	kWh/ annum	B	61701	75030	524636	631602
Estimated HT line loss after reconductoring with UG**	kWh/ annum	C = A x 0.13/0.3712	140	300	900	638
Estimated LT line loss after reconductoring with UG	kWh/ annum	D = B x 0.13/0.543	14747	17932	125388	150953
Annual Savings	**kWh/ annum**	E = C + D	**47215**	**57656**	**400918**	**481833**
HT line Distance to be reconductored with UG	km	F	1.71	1.128	3.317	2.118
LT line Distance to be reconductored with UG	km	G	2.805	3	6.605	8.56
Total distance	km	H = F + G	4.515	4.128	9.922	10.678
Energy charges	Rs/kWh	J	6.05	6.05	6.05	6.05
Reconductoring charges as per TCED estimate	Rs/km	K	6,00,000	6,00,000	6,00,000	6,00,000
Annual Financial savings	Rs/ annum	L = E x J	2,85,651	3,48,816	24,25,557	29,15,092
Investment cost	**Rs**	M = K x H	**27,09,000**	**24,76,800**	**59,53,200**	**64,06,800**
Net Annual Financial Savings	**Rs**	N = Total of L	**59,75,116**			
Net Investment	**Rs**	P = Total of M	**1,75,45,800**			
Simple Pay Back Period	**Months**	Q = P x 12/N	**35**			

***Resistance of UG cable = 0.13 Ω/km*
Resistance of HT Racoon OH line cable = 0.3712 Ω/km
Resistance of LT Rabbit OH line cable = 0.543 Ω/km

1.2. REPLACEMENT OF OLD TRANSFORMER WITH ENERGY EFFICIENT

Background & proposal

The replacement of transformers is proposed in locations where the age of transformer is greater than 30 years. It is proposed to replace the old transformers with new star rated transformer which will significantly reduce transformer losses in distribution.

Some of the transformer identified for the replacement under the RDSS scheme also comes under our 4 feeders for which we were able to analyse the actual loss variation.
The identified transformers for the replacement are given in the table below.

Sl.no	Transformer name	Capacity in (KVA)	Year of Manufacturing	Feeder
1	Varnam	315	1987	Shornur road
2	Trichur/ Malabar Eye Clinic	250	1988	Shornur road

The calculation for the saving through replacement of transformer is given in the table below:

Table 60: ECM 02

Particulars	Units	Equation	Values
Present unit loss in above transformers	kWh/annum	A	14,343
Estimated unit loss in energy efficient transformers - considering the same transmitted power based on FY 2020-21 value	kWh/annum	B	2,292
Difference in unit loss	kWh/annum	C = A-B	12,052
Energy charges	Rs/kWh	D	6.05
Annual financial savings	Rs/annum	E = D x C	72,913
Estimated investment cost for transformer replacement - for 250 kVA transformer	Rs/unit	F	7,00,000
Number of units that need replacement – similar cost considered	Nos	G	2
Net investment	Rs	H = F x G	14,00,000
Simple payback period	Months	J = H x 12/E	230
	Years	K = H / E	19

Note: Losses considered for transformer replacement evaluation is mentioned in the table below.

	kVA	*Iron loss*	*Cu loss*
Present transformer	*250*	*670*	*2650*
	315	*900*	*3200*
Energy efficient transformer	*250*	*100*	*670*
	315	*100*	*900*

1.3. POWER FACTOR IMPROVEMENT TO NEARY UNITY

Background

1. The average power factor during the measurement period (24-hour logging) at 110kV incomer was 0.94 lagging.
2. However, while measuring the feeder level power parameters during the audit period, at the substation, auditors noticed that the PF was lower in the following feeders.

TABLE 61: PF & REACTIVE POWER OF MAJOR FEEDERS

Sl no	Feeder name	Average PF	Measured KVAR - Avg	Incomer
1	Poothole	0.93 lag	426	66kV
2	Kottappuram	0.91 lag	247	110kV
3	Aranattukkara	0.97 lag	389	66kV
4	Mission Quarters	0.97 lag	268	110kV
5	Koorkanchery	0.97 lag	261	110kV
6	Paravattani	0.97 lag	310	110kV

3. The average PF during the period from April-2020 to March-2021 at the 110kV as well as 66kV incomer was registered as 0.95 lagging.
4. The power factor has come down below 0.95 at the 66kV incomer for 6 months and TCED has paid a penalty of Rs 6.08 lakhs towards low power factor.

Proposal

1. Install LT capacitors of 60kVAr rating at 5 locations, ie; at the secondary side of selected 5 distribution transformers, for the above-mentioned feeders under 66kV incomer.
2. Install LT capacitors of 120kVar rating at 15 locations, ie; at the secondary side of selected 15 distribution transformers, for the above-mentioned feeders under 110kV incomer.
3. Awareness campaign shall be given to major consumers to install capacitors especially for the commercial buildings and apartment flats which will significantly reduce the losses in the respective feeders along with the improvement in PF.
4. KSEBL is entitled to give power factor incentive considering the agreement between the TCED which signed on 1949. However, the incentive was denied and in dispute.

Table 62: ECM 03

66 KV INCOMER						
Month	**Power Factor present**	**Billing Demand**	**Proposed PF**	**Billing Demand after PF improvement**	**Reduction in Billing Demand**	**Reduction in Demand Charges**
		kVA		**kVA**	**kVA**	**Rs**
Apr-20	0.96	6624	0.99	6423.1	200.7	68245
May-20	0.96	8371.4	0.99	8117.7	253.7	86251
Jun-20	0.95	7553	0.99	7247.8	305.2	103758
Jul-20	0.94	6948.8	0.99	6597.9	350.9	119323
Aug-20	0.94	7027	0.99	6672.1	354.9	120666
Sep-20	0.94	7112.2	0.99	6753.0	359.2	122129
Oct-20	0.94	6924	0.99	6574.3	349.7	118897
Nov-20	0.95	7551.8	0.99	7246.7	305.1	103742
Dec-20	0.94	7541.4	0.99	7160.5	380.9	129499
Jan-21	0.94	7916.8	0.99	7517.0	399.8	135945
Feb-21	0.95	8333.6	0.99	7996.9	336.7	114482
Mar-21	0.96	10694.8	0.99	10370.7	324.1	110189
Annual reduction in demand charges						13,33,125
Annual energy charges (Rs/Annum)						25,32,57,840
Present average annual PF						0.95
Incentives towards improving PF from 0.95 to 0.99 (Rs/Annum)						50,65,157
Present annual penalty paid towards low power factor (Rs/Annum)						6,08,455
Net annual savings via PF improvement (Rs/Annum)						70,06,736
Estimated investment cost for the improvisation (awareness campaign among major consumers, Installation of 60 kVAr LT capacitors each in 5 locations)						7,50,000
Simple payback period (Months)						1

110 kV incomer						
Month	**Power Factor present**	**Billing Demand**	**Proposed PF**	**Billing Demand after PF improvement**	**Reduction in Billing Demand**	**Reduction in Demand Charges**
		kVA		**kVA**	**kVA**	**Rs**
Apr-20	0.95	13555	0.99	13006.9	547.7	186205
May-20	0.96	18432	0.99	17873.6	558.6	189908
Jun-20	0.95	17139	0.99	16446.7	692.5	235448
Jul-20	0.95	15779	0.99	15141.8	637.6	216768
Aug-20	0.95	16905	0.99	16222.4	683.0	232236
Sep-20	0.95	16517	0.99	15849.5	667.3	226897
Oct-20	0.96	15938	0.99	15454.6	483.0	164206
Nov-20	0.96	18262	0.99	17709.0	553.4	188158
Dec-20	0.96	18189	0.99	17638.2	551.2	187406
Jan-21	0.95	19306	0.99	18526.0	780.0	265214
Feb-21	0.95	20704	0.99	19867.5	836.5	284419
Mar-21	0.96	24782	0.99	24031.0	751.0	255330
Annual reduction in demand charges (Rs/Annum)						26,32,192
Annual energy charges (Rs/Annum)						52,91,80,190
Present average annual PF						0.95
Incentives towards improving PF from 0.95 to 0.99 (Rs/Annum)						1,05,83,604
Present annual penalty paid towards low power factor (Rs/Annum)						Nil
Net annual savings via PF improvement (Rs/Annum)						1,32,15,796
Estimated investment cost for the improvisation (awareness campaign among major consumers, Installation of 120 kVAr LT capacitors each in 15 locations)						30,00,000
Simple payback period (Months)						3

ANNEXURE-2

1. MINUTES OF THE MEETING

BEE-DISCOM 1247/22

തൃശ്ശൂർ കോർപ്പറേഷൻ
വൈദ്യുതി വിഭാഗം
ഓഫീസ് കുറിപ്പ്

13.IX.2022
11.30 AM

EMC Energy Audit as per BEE Regln 2021.
Kick off Meeting for above Audit

1. Jose. T.J
2. SANTHOSH.A AEE
3. ASHOK.KMP AEC
4. B.Nikhil AE
5. Shemeer.N AE-1
6. Shyne M.V AE
7. Baburaj SA
8. Jaya V K SA
9. Madhusudanan.K.B.
10. Francis P.X.

Minutes

1. പ്രാഥമിക report BEE, EMC ക്ക് email ചെയ്യുന്നതിനും തീരുമാനിച്ചു.
2. List of requirements ആവശ്യമായ EMC (Athul) email ചെയ്യുവാനും തീരുമാനിച്ചു.
3. ഇൻഡസ്ട്രിയൽ energy audit report എടുക്കുവാൻ EMC (Athul) തയ്യാറാകുന്നു.
4. Free software ഉപയോഗിച്ച് consumer end data mapping നടത്തുവാനും തീരുമാനിച്ചു.
5. ആദ്യം 1300 hrs ന് തന്നെ തുടങ്ങുന്നതിനും.

2. DETAILS OF DT WISE LOSSES

Note: The DT level input energy is not recorded by the DISCOM that results in non-evaluation of DT level losses.

3. BALANCE SHEET – FY 2020-21

Form D BS

Balance Sheet at the end of the year

Name of Distribution Business/Licensee — **TCED**
Licensed Area of Supply — **Thrissur Corporation**

S.No.	Particulars	Ref	2020-21	2021-22	Remarks
1	2	3	4	5	6
A	**EQUITY AND LIABILITIES**				
1	**Shareholders funds**				
	(a) Share Capital		4,040.60	4,040.60	
	(b) Reserve and Surplus (Reserves+surplus/deficit)		3,975.48	5,134.96	
2	**Contribution, Grants and other long term Reserve funds**		566.82	690.76	
3	**Non Current liabilities**				
	(a) Long Term borrowings (Capital liabilities)				
	(b) Other long term liabilities (SD from consumers)		3,906.41	4,004.39	
	(c) Long term provisions (Reserve funds+provision for int. On bonds/payrevision)		49.26	49.26	
4	**Current liabilities**				
	(a) Short Term borrowings (Borrowing for working capital)				
	(b) Trade Payables (payment due to CGS/Others)		976.60	1,023.72	
	(c) Other short term liabiliites (other current liabilies except payment to CGS)		1,660.80	1,552.04	
	(d) Short Term provisions		747.73	854.80	
	TOTAL EQUITY & LIABILITIES		**15,923.70**	**17,350.53**	
B	**ASSETS**				
1	**Non Current Assets**				
	(a) Fixed Assets				
	(i) Tangible Assets		3,543.50	3,398.21	
	(ii)Intabgible Assets				
	(iii) Capital work in progress		-	-	
	(b) Non-Current investment				
	(c) Long term loans and Advances				
	(d) Other non-current assets				
2	**Current Assets**				
	(a) Current investments		-	-	
	(b) Inventories (Stocks)		71.03	63.58	
	(c) Trade receivables		732.26	1,892.29	
	(d) Cash and Cash equivalents		5,708.67	5,337.91	
	(e)Short term loans and advances		5,399.07	6,376.87	
	(f) Other current assets		469.17	281.67	
	TOTAL ASSETS		**15,923.70**	**17,350.53**	

എൻ.കെ. കൃഷ്ണകുമാർ/N. K. KRISHNAKUMAR M.A, LL.M.
അസിസ്റ്റന്റ് സെക്രട്ടറി/ASSISTANT SECRETARY
വൈദ്യുതി വിഭാഗം/ELECTRICITY DEPARTMENT
തൃശ്ശൂർ കോർപ്പറേഷൻ/THRISSUR CORPORATION
പെൻ നമ്പർ/Pen No: 743648
ഫോൺ/Phone - 0487 2422470
മൊബൈൽ/Mobile - 8921037758
ഇമെയിൽ/Email : electricitydepartment@yahoo.co.in
പിൻ/PIN : 680 001

VASU & SIVARAM CHARTERED ACCOUNTANTS
Capital City
10th Floor
Korappath Lane
Round North
Thrissur-680 020

THRISSUR MUNICIPAL CORPORATION
ELECTRICITY DEPARTMENT

For VASU & SIVARA
Chartered Accountants
Firm Registration No. 0045

CA. C.K. VASUDEVAN, F
Partner
Membership No. 018979

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4. PROFIT & LOSS STATEMENT – FY 2020-21

Form D P&L

Profit & Loss Account

Name of Distribution Business/Li **TCED**
Licensed Area of Supply **Thrissur Corporation**

S.No	Particulars	Ref	2020-21	2021-22	Remarks
1	2	3	4	5	6
	I.INCOME				
	a. Revenue from Sale of Power		10,269.74	11,033.50	
	b. Revenue Subsidies and Grants		-	-	
	c. Other Income		643.85	570.44	
	Total (a+b+c)		**10,913.60**	**11,603.94**	
	II. EXPENDITURE				
	a. Repairs and Maintenance.		89.91	74.51	
	b. Employee Cost		1,267.37	1,273.18	
	c. Administration and General Expenses		217.25	221.20	
	d.Depreciation		264.95	207.39	
	e.Interest and Finance charges		179.80	168.60	
	f. Subtotal (a+b+c+d+e)		**2,019.27**	**1,944.89**	
	g. Less Capitalised Expenses:				
	- Interest & Finance Charges		-	-	
	- Other Expenses		-	-	
	h. Other Debits		-	-	
	I. Extra Ordinary Items		-	-	
	(i) Provisioning for loss of Asset		49.26	-	
	(ii) Provision for Salary Pay revision		747.73	107.07	
	j. Purchase of power		8,886.06	9,511.93	
	k.Generation of Power				
	Total Expenditure (f-g+h+i+j+k)		**11,702.32**	**11,563.88**	
	III. Profit /(Loss) before Tax (I-II)		**(788.72)**	**40.06**	
	IV. Provision for Income Tax		-	-	
	V.Net Prior period credits (Charges)		-	-	
	VI. Surplus (Deficit)		**(788.72)**	**40.06**	
	VII. Net Assets at the beginning of the year (Less consumer's Contribution)		3,226.56	2,963.31	
	VIII. Rate of Return (VI/ VII)		**-24.44%**	**1.35%**	

N.K. KRISHNAKUMAR M.A, LL.M.
ASSISTANT SECRETARY
ELECTRICITY DEPARTMENT
THRISSUR CORPORATION
Pen No: 743648
Phone - 0487 2422470
Mobile - 8921037758
electricitydepartment@yahoo.co.in
PIN : 680 001

THRISSUR MUNICIPAL CORPORATION ELECTRICITY DEPARTMENT

VASU & SIVARAM CHARTERED ACCOUNTANTS

For VASU & SIVARAM
Chartered Accountants
Firm Registration No. 004554S

CA. C. K. VASUDEVAN, FCA
Partner
Membership No. 018979

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5. ELECTRICITY BILL – 110 KV INCOMER

KERALA STATE ELECTRICITY BOARD LIMITED

Office of the Special Officer(Revenue), Pattom,Thiruvananthapuram

DEMAND NOTICE FOR APRIL 2021

(As per CHAPTER VII OF KERALA ELETRICITY SUPPLY CODE -2014)

Con. Code	1336680002643	Bill Date	**03-Apr-2021**	Due Date	**12-Apr-2021**	Bill.No	1102811873147 Ver : 0		
Tariff	Licensee: ThrissurCorporation			Last Date	**27-Apr-2021**	CD(cash)	57742190	BG	57742190

ASSISTANT SECRETARY, THRISSUR CORPORATION
ELECTRICITY DEPARTMENT, ,
CORPORATION OFFICE,THRISSUR,
Thrissur,,680002
Mobile no--9446143072
LCN :21/Thr.Corp

SBI Virtual A/c No(IFS Code:SBIN0070493)-null

Consumer GSTIN_ID- 32AAALT1623J1Z7/KSEB (L)GST ID=32AAECK2277NBZ1

Arrears as on 28-Feb-2021			
Disputed	0	Undisputed	0

Contract Demand(kVA)	75% of CD (KVA)	130% of CD (KVA)	Connected Load (KW)
0.0	0.0	0.0	0

Date of Previous Reading	28-Feb-2021	Email: electricitydepartment@yahoo.co.		
Date of Present Reading	31-Mar-2021	Supply Voltage	110 kV	EHT

Average		
MD (kVA)	Consumption (kWh)	PF
19530.23	7937233	0.96

Billing Type	Non-DPS
Section	110 KV Sub Station,Viyyur
Circle	Transmission Circle,

Reading Details of meter KSEB0000020"-Working (KVA,KWh,KVAh & KVArh) for 03-2021

1. Energy Consumption(KWh)

Zone	FR	IR	MF	Units
1	2218162.00	2190967.00	200.000	5439000
2	735439.00	726198.00	200.000	1848200
3	902717.00	890506.00	200.000	2442200
			Total	9729400

2. Energy Consumption(KVAh)

Zone	FR	IR	MF	Units
1	2360487.00	2332042.00	200.000	5689000
2	776370.00	766770.00	200.000	1920000
3	963616.00	950945.00	200.000	2534200
			Total	10143200

Ave.PF=KWh/KVAh 0.96

3. Energy Consumption(KVArh) Lag and kVARh (Lead)

Zone	FR	IR	MF	Units	FR	IR	Units
1	802340.0	794008.0	200.000	1666400	5.00	5.00	0
2	246739.0	244150.0	200.000	517800	0.00	0.00	0
3	333781.0	330424.0	200.000	671400	0.00	0.00	0
			Total kVArh(Lag)	2855600	kVArh(Lead)		0

4. Demand (KVA)	Readings	MF	Units
1	123.91	200.000	24782.0
2	104.36	200.000	20872.0
3	70.832	200.000	14166.4
5.Factory Lighting			0.0
6.Colony Lighting			0.0
7.Generator			0

INVOICE

	Unit	Rate (Rs)	Amount (Rs)
1.Total Demand Charge			
a. Demand Charge	24782.0	340.000	8425880.00
b.	0.0	340.000	0.00
c.	0.0	340.000	0.00
d. Excess Demand Charge	0	170.000	0.00
e.		170.000	0.00
f.		170.000	0.00
Sub Total (a+b+c+d+e+f)			**8425880.00**
2.Total Energy Charges			
a. Energy charges	9729400.0	6.050	58862870.00
b.		9.075	0.00
c.		4.538	0.00
Sub Total(a+b+c)			**58862870.00**
3.PF Incentive / Disincentive			0.00
Total Energy Charge			**58862870.00**
4.Energy Charges on Lighting load			
a.Factory Lighting	0	0.1	
b.Colony Lighting	0	0.1	0.00
Sub Total(a+b)			
5.Electricity Duty	58862870	0.100	
6.Ele. Surcharge	9729400	0.025	
7.Duty on self generated energy	0	0.012	0.00
8.Penalty for non-segn. of light load			

	Amount
9.Other Charges	
Meter Rent	1000.00
Central GST Amount@9%	90.00
State GST Amount@9%	90.00
Reconnection Fee	0.00
Kerala Flood Cess	0.00
10.Total(add 1 to 9)	**67289930.00**
Plus/Minus (Round off)	0.00
UnDisputed Arr Amount	0.00
Less 1. Advance / Credit	
2. CD Interest	0.00
3. CD Refund	0.00
Net Payable	**67289930.00**

(Rupees Six Crore Seventy Two Lakh Eighty Nine Thousand Nine Hundred Thirty Only)

E & O.E

Balance Advance at Credit, if any

Please follow our official Facebook page fb.com/ksebl for information & announcements.

(instructions overleaf)

SPECIAL OFFICER (REVENUE)

Please Detach and enclose with the DD

1336680002643 **1102811873147** **Rs.67289930.00** **April 2021**

ASSISTANT SECRETARY, THRISSUR CORPORATION

Date D D M M Y Y Y Y

DD/Payment Instruction

Name of the Bank

Signature

6. ELECTRICITY BILL – 66 KV INCOMER

KERALA STATE ELECTRICITY BOARD LIMITED

Office of the Special Officer(Revenue), Pattom,Thiruvananthapuram

DEMAND NOTICE FOR APRIL 2021

(As per CHAPTER VII OF KERALA ELETRICITY SUPPLY CODE -2014)

Con. Code	1336680002662	Bill Date	**03-Apr-2021**	Due Date	**12-Apr-2021**	Bill.No	1102811873146 Ver : 0		
Tariff	Licensee: ThrissurCorporation			Last Date	**27-Apr-2021**	CD(cash)	28515195	BG	28515195

ASSISTANT SECRETARY, THRISSUR CORPORATION
ELECTRICITY DEPARTMENT, CORPORATION OFFICE,
THRISSUR,
Thrissur 680001,,
Mobile no--9446143072

LCN :21/1029

SBI Virtual A/c No(IFS Code:SBIN0070493)-KSEBHT21C1029

Consumer GSTIN_ID- 32AAALT1623J1Z7/KSEB (L)GST ID=32AAECK2277NBZ1

Arrears as on 28-Feb-2021			
Disputed	0	Undisputed	0

Contract Demand(kVA)	75% of CD (KVA)	130% of CD (KVA)	Connected Load (KW)
8000.0	6000.0	10400.0	0

Date of Previous Reading	28-Feb-2021	Email: electricitydepartment@yahoo.co.	
Date of Present Reading	31-Mar-2021	Supply Voltage	66 kV EHT

Average		
MD (kVA)	Consumption (kWh)	PF
8160.40	3661033	0.95

Billing Type	Non-DPS
Section	110 KV Sub Station,Viyyur
Circle	Transmission Circle,

Reading Details of meter KSEB0000021"-Working (KVA,KWh,KVAh & KVArh) for 03-2021

1. Energy Consumption(KWh)

Zone	FR	IR	MF	Units
1	523207.00	511331.00	200.000	2375200
2	171488.00	167489.00	200.000	799800
3	242839.00	236620.00	200.000	1243800
			Total	4418800

2. Energy Consumption(KVAh)

Zone	FR	IR	MF	Units
1	553063.00	540634.00	200.000	2485800
2	180104.00	175936.00	200.000	833600
3	259853.00	253322.00	200.000	1306200
			Total	4625600
Ave.PF=KWh/KVAh		0.96		

3. Energy Consumption(KVArh) Lag and kVARh (Lead)

Zone	FR	IR	MF	Units	FR	IR	Units
1	178309.0	174651.0	200.000	731600	200.00	200.00	0
2	54724.00	53555.00	200.000	233800	0.00	0.00	0
3	91208.00	89233.00	200.000	395000	0.00	0.00	0
			Total kVArh(Lag)	1360400	kVArh(Lead)		0

4. Demand (KVA)	Readings	MF	Units
1	53.474	200.000	10694.8
2	42.814	200.000	8562.8
3	35.917	200.000	7183.4
5.Factory Lighting			0.0
6.Colony Lighting			0.0
7.Generator			0

INVOICE

	Unit	Rate (Rs)	Amount (Rs)
1.Total Demand Charge			
a. Demand Charge	10695.0	340.000	3636300.00
b.	0.0	340.000	0.00
c.	0.0	340.000	0.00
d. Excess Demand Charge	0	170.000	0.00
e.		170.000	0.00
f.		170.000	0.00
Sub Total (a+b+c+d+e+f)			**3636300.00**
2.Total Energy Charges			
a. Energy charges	4418800.0	6.050	26733740.00
b.		9.075	0.00
c.		4.538	0.00
Sub Total(a+b+c)			**26733740.00**
3.PF Incentive / Disincentive			0.00
Total Energy Charge			**26733740.00**
4.Energy Charges on Lighting load			
a.Factory Lighting	0	0.1	
b.Colony Lighting	0	0.1	0.00
Sub Total(a+b)			
5.Electricity Duty	26733740	0.100	
6.Ele. Surcharge	4418800	0.025	
7.Duty on self generated energy	0	0.012	0.00
8.Penalty for non-segn. of light load			

9.Other Charges		
Reconnection Fee		0.00
10.Total(add 1 to 9)		**30370040.00**
Plus/Minus (Round off)		0.00
UnDisputed Arr Amount		0.00
Less 1. Advance / Credit		
2. CD Interest		0.00
3. CD Refund		0.00
Net Payable		**30370040.00**

(Rupees Three Crore Three Lakh Seventy Thousand Forty Only)

E & O.E

Balance Advance at Credit, if any

Please follow our official Facebook page fb.com/ksebl for information & announcements.

(instructions overleaf)

SPECIAL OFFICER (REVENUE)

Please Detach and enclose with the DD

1336680002662 **1102811873146** **Rs.30370040.00** **April 2021**

ASSISTANT SECRETARY, THRISSUR CORPORATION

Date D D M M Y Y Y Y

DD/Payment Instruction

Name of the Bank

Signature

7. MONTHLY ENERGY BILL DETAILS – FY 2020-21

Table 63: Energy bill summary – FY 2020-21- 110 kV incomer

	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Sum
kVA Normal	13554.6	18432.2	17139.2	15779.4	16905.4	16516.8	15937.6	18262.4	18189.4	19306	20704	24782	215509.00
kVA Peak	11009.2	14035.8	13885.8	14267.8	14861.2	14290.4	14674.6	16369.2	16593	17475	17684.4	20872	186018.40
kVA Off Peak	12266	12301.8	9608.8	9594	9332.6	9045	9214.4	9895.8	10129	10436	12116.4	14166.4	128106.20
CONTRACT DEMAND CHARGE	4608700	6266880	5827260	5364860	5747700	5615780	5418920	6209080	6184260	6564040	7039360	8425880	73272720.00
TOTAL CONTRACT DEMAND CHARGE	4608700	6266880	5827260	5364860	5747700	5615780	5418920	6209080	6184260	6564040	7039360	8425880	73272720.00
KWH NORMAL	2989600	4153600	3709800	3682600	3882400	3836600	4017000	4222200	4406600	4599800	4383000	5439000	49322200.00
KWH PEAK	1049000	1186000	1113000	1154800	1234600	1220600	1311000	1361400	1477800	1567200	1480800	1848200	16004400.00
KWH OFFPEAK	2133800	2134600	1602400	1585000	1621000	1555000	1695800	1819600	1822800	1876600	1852400	2442200	22141200.00
TOTAL KWH	6172400	7474200.00	6425200.00	6422400.00	6738000.00	6612200.00	7023800.00	7403200.00	7707200.00	8043600.00	7716200.00	9729400.00	87467800.00
KWH CHARGE	37343020	45218910	38872460	38855520	40764900	40003810	42493990	44789360	46628560	48663780	46683010	58862870	529180190.00
PF	0.95	0.96	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.95	0.95	0.96	11.45
METER RENT	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	12000.00
CENTRAL GST	90	90	90	90	90	90	90	90	90	90	90	90	1080.00
STATE GST	90	90	90	90	90	90	90	90	90	90	90	90	1080.00
OTHERS	0	0	2211	0	8974	2616	36910.58	2114	0	0	0	0	52825.58
GRAND TOTAL	41952900.00	51486970.00	44703111.00	44221560.00	46522754.00	45623386.00	47951000.58	51001734.00	52814000.00	55229000.00	53723550.00	67289930.00	602519895.58
Advance/credit/CD interest/CD refund/Arr Amount	64716160	292390	-3354104	294601	294601	303575	306191	0	0				62853414.00
NET Payable	**106669060.00**	**51779360.00**	**41349007.00**	**44516161.00**	**46817355.00**	**45926961.00**	**48257191.58**	**51001734.00**	**52814000.00**	**55229000.00**	**53723550.00**	**67289930.00**	**665373309.58**

Table 64: Energy bill summary – FY 2020-21- 66 kV incomer

	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Sum
kVA Normal	6624	8371.4	7553	6948.8	7027	7112.2	6924	7551.8	7541.4	7916.8	8333.6	10694.8	92598
kVA Peak	5974	6225.8	5934.60	6097.8	6248.4	6244.8	6322	6683.8	6656.6	6995.8	7275	8562.8	79221
kVA Off Peak	6377	6589.6	5234	4683	4913.4	4874.4	5002	5377.6	5093.2	5322.8	5959.2	7183.4	66609
CONTRACT DEMAND CHARGE	2252160	2846140	2568020	2362660	2389180	2418080	2354160	2567680	2563940	2691780	2833560	3636300	31483660
TOTAL CONTRACT DEMAND CHARGE	2252160	2846140	2568020	2362660	2389180	2418080	2354160	2567680	2563940	2691780	2833560	3636300	31483660
KWH NORMAL	1671600	2049000	1757400.00	1750600	1790200	1757400	1900600	1924600	1952600	2007000	1903200	2375200	22839400
KWH PEAK	584600	637600	545400	552800	583000	567000	617200	627000	648200	670200	626200	799800	7459000
KWH OFFPEAK	1124600	1162600	848600.00	827800	861000	823400	894800	948400	944600	965800	917000	1243800	11562400
TOTAL KWH	3380800	3849200	3151400	3131200	3234200	3147800	3412600	3500000	3545400	3643000	3446400	4418800	41860800
KWH CHARGE	20453840	23287660	19065970	18943760	19566910	19044190	20646230	21175000	21449670	22040150	20850720	26733740	253257840
PF	0.96	0.96	0.95	0.94	0.94	0.94	0.94	0.95	0.94	0.94	0.95	0.96	11
PF INCENTIVE/PENALTY	0	0	0	94718.8	97834.55	95220.95	103231.15	0	107248.35	110200.75	0	0	608455
OTHERS	0	0	5301	6914	10797	7172	24232.7	7035			0	0	61451
GRAND TOTAL	22707180.00	26133800.00	21639291.00	21408052.80	22064721.55	21564662.95	23127853.85	23749715.00	24120858.35	24842130.75	23684280.	30370040.	262705406
Advance/credit/CD interest/CD refund/Arr Amount	700949	700949	700949	706250	807883	916515	1018908	0	0				4851454
NET Payable	**23408129.00**	**26834749.00**	**22340240.00**	**22114302.80**	**22872604.55**	**22481177.95**	**24146761.85**	**23749715.00**	**24120858.35**	**24842130.75**	**23684280.**	**30370040**	**267556860**

8. TRANSFORMER DETAILS – FEEDER WISE - DETAILED

Table 65: Feeder wise transformer details - Detailed

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Ramanilayam					
1	**Stadium West**	1	Department	250	Yes
2	**Stadium East**	2	Department	250	Yes
3	**Ramanilayam**	3	Department	150	Yes
4	**Kaliyath**	10	Client	400	No
5	**Chiriyan Kandath**	12	Client	200	No
6	**Vrindhavan Apartment**	15	Client	250	No
7	**Kalanikethan**	25	Department	160	Yes
8	**Swapana Theatre**	16	Department	250	Yes
9	**Kollanur**	24	Client	160	No
10	**Paramekavu Temple**	20	Client	250	No
11	**Alukkas**	18	Department	250	Yes
12	**SNDP**	26	Client	160	Yes
13	**Paramekavu Neeranjali**	21	Client	250	Yes
14	**Statue**	17	Department	250	Yes
15	**Capital Legend**	7	Client	100	No
16	**Capital City**	22	Client	315	No
17	**Perinchery**	6	Client	400	No
18	**ESI**	5	Department	250	Yes
Bini					
1	**Vadakke chira**	40	Department	250	Yes
2	**Lake View**	4	Client	160	No
3	**Seethal Apartment**	5	Client	250	No
4	**Paliyam Road**	3	Department	250	Yes
5	**Ashiana Apartments**	37	Client	315	No
6	**Pallithammam**	10	Department	250	Yes
7	**Pallithammam(Indoor)**	11	Client	315	Yes
8	**LBS, Kairali Sree Theatre 1**	13	Client	200	No
9	**AGS Office**	7	Department	100	Yes
10	**Cochin Dewasm Board**	8	Department	500	Yes
11	**Kailasam**	9	Client	160	No
12	**Vegetable**	15	Department	315	Yes
13	**Naduvilal(Pooma)**	22	Department	250	Yes
14	**Pooma Complex**	21	Client	315	Yes
15	**Naduvilal Shopping Complex**	34	Department	250	No
16	**Ayodhya Centre**	19	Client	315	Yes
17	**Sidish Complex**	20	Client	100	Yes
Chembukavu					
1	**Swathy Residency**	11	Client	250	Yes
2	**Jawahar**	2	Department	250	Yes
3	**Agro Bazzar**	13	Client/Department	250	Yes

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Chembukavu					
4	**Museum**	9	Department	315	Yes
5	**Co-operative Road**	3	Department	160	Yes
6	**Mana Line**	14	Department	160	Yes
7	**Sougandhika**	6	Client	100	Yes
8	**Navani Holy View**	12	Client	250	No
9	**KMP Swapnapuri Apartment**	30	Client	160	No
10	**Cheloor Cazeblanka**	7	Client	160	No
11	**Southern**	8	Department	250	Yes
12	**Bishop Palace**	28	Department	315	Yes
13	**Kings fort**	18	Department	250	Yes
14	**Skyline Garland**	23	Client	500	Yes
15	**Soda varky**	20	Department	250	Yes
16	**Sarayu Apartment**	21	Department	250	Yes
17	**Kollanur Oriental Apartment**	24	Client	200	Yes
18	**Panmukkumpilly Sastha Temple**	22	Department	250	Yes
19	**Cheloor Tudoor Rose**	19	Client	160	Yes
20	**Gayathri Apartment**	26	Client	250	Yes
21	**Keeramkulangara**	25	Department	160	Yes
22	**Sreyas Apartment**	27	Client	250	No
23	**Forus Apartment**	29	Client	200	Yes
Shornur Road					
1	**Pranavam**	45	C/D	250	Yes
2	**Top Orchid**	46	Client	160	Yes
3	**Daffodils**	3	Client	160	Yes
4	**Sreehari**	1	Client	100	No
5	**Sreelakshmi**	2	Client	200	Yes
6	**Rukmani Temple Park**	26	Client	200	Yes
7	**K.R Bakery**	23	C/D	500	Yes
8	**Karthayani**	4	Department	250	Yes
9	**Pazhoor Arcades**	5	Client	100	No
10	**Saraswathy**	21	Client	250	No
11	**Unique Ardent**	22	Department	250	Yes
12	**Top tower**	41	Client	200	Yes
13	**Thiruvambadi(Lakshmi)**	10	Department	250	Yes
14	**Narayani**	24	Client	160	Yes
15	**K.A Kumaran**	34	Department	250	Yes
16	**A.R Tower**	27	Client	100	Yes
17	**Krishna(Thiruvambadi-2)**	8	Department	250	Yes
18	**Friends Mall**	28	Client	250	Yes
19	**Oushadhi**	11	Department	315	Yes
20	**Suharsha**	12	Client	400	No
21	**Coperative Hospital**	13	Department	500	Yes
22	**Athulya Chundari**	16	Client	160	No
23	**Citycentre-1**	14	Client	800	No

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Shornur Road					
24	**Citycentre-2**	15	Client	160	No
25	**Alukkas Nest**	39	Client	215	Yes
26	**Malabar Eye Clinic**	33	Department	250	Yes
27	**Shivam**	17	Client	250	No
28	**Wintage Royal**	31	Client	200	Yes
29	**Top Heritage**	37	Client	160	Yes
30	**Forus Cosynest**	38	Client	160	No
31	**Kasturi**	6	Client	100	No
32	**Panikath Mall**	49	Client	315	Yes
33	**Varnam**	18	Department	315	Yes
34	**Omega**	19	Client	200	No
35	**Prasad Arcade**	43	Client	250	Yes
36	**Nandhanam**	20	Client	160	No
37	**Sreepriya**	7	Client	200	No
38	**Forus Mathura**	9	Client	160	No
39	**Capital Krishna**	51	Client	160	Yes
40	**MRG SreeValstan**	40	Client	250	Yes
East Fort					
1	**Sun Tower**	10	Client	630	No
2	**E P Jose Commercial Building**	32	Department	250	Yes
3	**Selex Mall (LT)**	29	Client	400	No
4	**Spoon(City Castle)**	4	Department	315	No
5	**Iyyunni**	26	Department	250	Yes
6	**Reliance 1 (City Palace 1)**	5	Client	315	No
7	**Reliance 2 (City Palace 2)**	6	Client	315	No
8	**Bharathakshemam**	8	Client	200	No
9	**Emmatty Tower**	9	Client	400	No
10	**Candela Apartment**	16	Client	500	No
11	**Honest Bakery**	3	Department	315	Yes
12	**Sindhooram Apartment**	11	Client	160	No
13	**Thomson Casa**	1	Department	160	Yes
14	**Pallikulam**	12	Department	160	Yes
15	**Chaldian**	33	Department	315	Yes
16	**East Fort Tower(Indoor)**	18	Client	200	No
17	**Fort Street**	24	Client	315	No
18	**Fort City**	7	Department	160	No
19	**Kings Way Project**	23	Client	100	No
20	**Angelic Tower**	20	Department	315	Yes
21	**Brothers Lane**	34	Department	250	Yes
22	**Sakthan Tower**	13	Department	100	No
23	**P I Babu**	17	Department	250	No
24	**Puthenpally**	14	Department	250	No
25	**Rappai and Sons Building**	21	Client	250	No
26	**E Forts**	31	Client	200	No

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
East Fort					
27	**East Avenue**	22	Client	160	No
Koorkenchery					
1	**Commercial**	1	Department	250	Yes
2	**Smart Centre**	3	Client	100	No
3	**Sree Sailam**	4	Client	250	Yes
4	**CK Plaza**	26	Client	160	Yes
5	**Alumkulam**	6	Department	250	Yes
6	**Thankamani**	10	Department	250	Yes
7	**Skyline**	8	Client	630	No
8	**Love-Shore**	9	Client	700	Yes
9	**Kaja**	7	Department	250	Yes
10	**Mannanthara Agencies**	11	Client	160	No
11	**Smart City**	15	Client	250	Yes
12	**Hi-Life**	17	Department	100	No
13	**Shangri-La-Fortune**	25	Client	400	No
14	**Sun City**	16	Client	315	Yes
15	**Kanjirangadi**	13	Department	250	Yes
16	**Q-Apartment**	14	Client	100	No
17	**Kinar**	12	Department	250	Yes
18	**Veterinary**	18	Department	250	Yes
19	**Dee Pee Plaza**	19	Department	315	Yes
20	**Dhanya**	20	Department	250	Yes
21	**Ice Plant**	21	Department	100	Yes
22	**Forus Apartment**	27	Client	160	No
Veliyanoor					
1	**OWC Plant**	20	Department	250	No
2	**Ramanchiramadom**	5	Department	250	Yes
3	**Jwala Diamond**	11	Department	250	Yes
4	**Malabar Tower**	12	Client	250	Yes
5	**Emerald Tower2**	19	Client	160	Yes
6	**Manichitra Arcades**	6	Client	200	No
7	**Hari Sree Apartment**	13	Client	160	No
8	**Rashtra Deepika**	7	Department	250	Yes
9	**MRG Flat**	9	Client	250	No
10	**Inland**	10	Client	315	No
11	**Assay Hall Marking**	1	Department	160	Yes
12	**Airtel Tower**	21	Department	250	Yes
13	**Chicago**	22	Client	400	Yes
14	**C J Tower**	3	Client/Department	250	No
15	**Sakthan Market**	4	Department	315	Yes
16	**Latin Palli**	14	Department	250	No
17	**Vivid Press**	24	Client	100	No

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Veliyanoor					
18	**Yohanan**	15	Client	250	Not Connected
Vivekodayam					
1	**Aquatic**	31	Department	250	Yes
2	**Govind Apartment**	3	Client	200	Yes
3	**Swimming Pool Road**	29	Department	250	Yes
4	**Silver Roxx**	28	Client	200	Yes
5	**Kallindi**	14	Client	315	No
6	**Capital Mannar**	6	Client	250	Yes
7	**Sree Krishna**	11	Client	250	Yes
8	**Souparnika**	7	Department	315	Yes
9	**Mukhundha Apartment**	16	Client	160	Yes
10	**Satyam**	8	Client	160	Yes
11	**Shivam**	12	Client	160	No
12	**Sri Hari**	9	Client	160	No
13	**Mannath Lane**	13	Client	250	Yes
14	**Ambika Arcades**	24	Client	250	No
15	**Music Park**	23	Department	315	Yes
16	**Anamya Tower**	25	Client	250	No
17	**Karuvan**	26	Department	315	Yes
18	**Brahmasam Madom**	30	Client	1000	Yes
19	**Capital Heritage**	22	Client	160	No
20	**Temple Tree**	21	Client	250	No
21	**Karthiyayni**	19	Client	160	No
Arnattukkara					
1	**Ambilikala Arcade**	3	Client	250	No
2	**VRM tower**	5	Client	160	No
3	**Krishnamani**	16	Department	315	No
4	**Pentarc**	17	Client	630	No
5	**Ashtapathi Apartment**	7	Client	315	No
6	**Routh Tower**	14	Client	400	No
7	**Centre Point**	20	Client	160	No
8	**Kochu Bhavan**	22	Department	250	No
9	**HDFC**	21	Client	250	No
10	**Parayil Lane**	10	Department	315	Yes
11	**Presidency**	24	Department	100	No
12	**MRG Samyuktha Apartment**	30	Department	250	Yes
13	**VIP Apartment**	31	Department	315	No
14	**Mental Hospital**	29	Department	250	Yes
15	**Nethaji Ground**	6	Department	250	Yes
16	**Toppin Moola**	32	Department	160	Yes
17	**Confident Gemini**	2	Client	315	No
18	**Malayalam School**	33	Department	250	Yes

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Arnattukkara					
19	**Aranattukara Market**	34	Department	315	Yes
20	**Laloor**	35	Department	250	Yes
21	**Global Plaza**	38	Client	160	Yes
22	**Leshore**	39	Client	315	No
23	**Maani**	37	Department	250	No
24	**Kizhakkepuram**	15	Department	250	Yes
25	**AAZ Complex**	36	Client	250	Yes
26	**Excise**	13	Department	250	Yes
27	**Cheloor**	12	Department	750	Yes
28	**C A Arcade**	28	Client	250	Yes
29	**P& T Poothole**	4	Department	315	Yes
DH					
1	**Kerala Water Authority**	37	Department	500	Yes
2	**Vyapari Vyavasai**	36	Client	250	No
3	**Cheloor Golden Enclave**	1	Client	250	No
4	**Classic Fortune**	42	Department	100	Yes
5	**Menachery**	3	Client	160	No
6	**Cheloor Platinum Heights**	4	Client	315	No
7	**Alfa Breeza**	41	Client	160	Yes
8	**Navani**	5	Client	250	No
9	**CSB**	6	Department	250	Yes
10	**Sky line**	9	Client	250	No
11	**Lalitha Heights**	10	Client	100	No
12	**Navani**	8	Client	200	No
13	**DH College Road**	11	Department	315	Yes
14	**DH Solar**	39	Department	160	No
15	**Dt.HS Palakkal**	12	Department	315	Yes
16	**Dt.HS Palakkal**	13	Department	315	Yes
17	**Ariyagadi**	22	Department	250	Yes
18	**Kuttans**	23	Department	250	Yes
19	**CT Plaza**	29	Client	160	Yes
20	**East end plaza**	27	Client	160	No
21	**Adam bazar**	28	Client	315	No
22	**Sadanadhan**	33	Client	200	Yes
23	**Park Land**	30	Client	160	Yes
24	**Shalimar Shopping Complex**	38	C/D	250	No
25	**34-Holy Space Shopping Complex**	34	Client	250	No
26	**Holy Heights**	24	Client	400	No
27	**Erinjeri Ariyangadi**	25	Department	250	Yes
28	**High Road**	26	Department	250	Yes
29	**Fashion Fabrics**	21	Department	315	Yes
30	**8 Pole 2**	15	Department	250	No
31	8 Pole 3	16	Department	250	No

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
DH					
32	8 Pole 1	14	Department	315	Yes
33	**8 Pole 4 (Jos Theater)**	17	Department	160	No
Kottappuram					
1	**Arikkariya**	1	Client	250	No
2	**Ram Devi**	2	Department	250	Yes
3	**Mookambika**	3	Client	100	No
4	**Tangerine**	30	Client	160	Yes
5	**Ram Devi 3**	4	Department	315	Yes
6	**Vigneshwara**	15	Client	250	Yes
7	**Maithree Apartment**	27	Client	250	No
8	**MRG Sabari**	33	Client	315	Yes
9	**Kayson Apartmemnt**	5	Client	315	No
10	**Samruthi Apartment**	25	Client	100	Yes
11	**Sree Ram Apartment**	26	Client	160	Yes
12	**Indivar**	29	Client	200	Yes
13	**Vykundam**	19	Client	160	Yes
14	**Omega royal**	6	Client	250	Yes
15	**Prarthana**	7	Client	250	Yes
16	**IRA Apartment**	22	Client	100	Yes
17	**Aldebaren**	18	Client	200	Yes
18	**Athira Abode**	17	Client	315	Yes
19	**Cheloor Citadel**	21	Client	250	Yes
20	**Kottappuram Vyduthi Bhavan**	8	Department	250	Yes
21	**Sreesakthi**	14	Client	160	Yes
22	**Ragamalikapuram**	9	Client	250	Yes
23	**Zodiac**	13	Client	160	Yes
24	**Cheloor Vintage**	10	Client	200	Yes
25	**Cheloor Heights**	20	Client	500	Yes
26	**Vaigai**	28	Client	400	Yes
27	**Swetha**	23	Client	315	Yes
28	**Achutan**	24	Client	160	Yes
29	**SivaPuri**	31	Client	160	Yes
30	**Pankaj**	16	Client	250	Yes
31	**Vellan**	11	Client	250	Yes
32	**Love Dale**	12	Client	250	No
Vanjikulam (New feeder – bifurcated from Kottappuram)					
1	**Raya Complex**	1	Department	250	Yes
2	**Shankaraiyar Road**	2	Department	250	Yes
3	**Modern**	3	Client	250	Yes
4	**Grand mall**	8	Client	315	Yes
5	**Maruthi Apartment**	10	Client	500	No
6	**Fimat**	14	Client	100	No
7	**Sunny Diamonds**	12	Client	400	Yes
8	**Sunny Diamonds**	13	Client	400	Yes

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Vanjikulam (New feeder – bifurcated from Kottappuram)					
9	**Hawa**	15	Client	250	Yes
10	**Bhavani**	17	Client	315	No
11	**Sudharsan**	18	Client	160	No
12	**Kaveri Apartment**	20	Department	250	Yes
13	**Sainic Gas**	24	Client	250	No
14	**LIC**	25	Client	160	No
15	**South Plaza**	26	Client	250	Yes
16	**Refrigeration**	23	Department	500	Yes
17	**Art of living**	21	Client	100	Yes
18	**Sitharam Heritage**	27	C/D	250	Yes
19	**KMJ**	28	Client	250	Yes
20	**State Hotel**	31	Client	250	Yes
21	**Global Plaza/Global Tower**	30	Client	315	No
M O Road					
1	**Exhibition**	49	Department	250	Yes
2	**Pathans**	11	Client	160	Yes
3	**Baby Paul**	50	Client	160	Yes
4	**Lavish**	15	Client	400	No
5	**Store**	9	Department	250	No
6	**Janardhanan Complex**	8	Department	315	Yes
7	**Corporation Office**	1	Department	315	Yes
8	**BSNL CTD 2**	3	Client	250	Yes
9	**Jai Hind Market**	52	Department	250	No
10	**CP Tower**	13	Client	315	No
11	**Jonsons**	20	Client	160	Yes
12	**Manappuram Hotel**	22	Client	100	Yes
13	**Kuriland**	29	Client	100	No
14	**Vattekkat Arcade**	45	Client	63	Yes
15	**Lafame (Sayooja Apartment)**	23	Department	250	No
16	**Omega Paradise**	24	Client	200	No
17	**Kovilakam**	30	Client	250	Yes
18	**Sagara Apartment**	27	Client	10	No
19	**Pearl Dept.**	51	Department	250	Yes
20	**Kuruppam Road 1**	32	Department	500	No
21	**Kuruppam Road 2**	33	Department	500	No
22	**Jaya Palace**	7	Client	160	No
23	**Enark Apartment**	34	Client	315	No
24	**Nest Shopping**	35	Client	160	No
25	**Trade Centre 2**	37	Client	315	No
26	**Pooram Residency 1**	41	Client	160	No
27	**Pathayyapura**	12	Client	400	No
Mission Quarters					
1	**Navani Hieghts**	1	Client	315	Yes
2	**Fathima Nagar (Solar)**	2	Department	250	Yes

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Mission Quarters					
3	**Muttichurkaran (Solar)**	3	Department	250	Yes
4	**Kallu Shapp (Solar)**	4	Department	250	Yes
5	**Xavy Thekkath (Solar)**	5	Client	100	Yes
6	**Swimming Pool (Solar)**	6	Department	200	Yes
7	**Avenue Road (Solar)**	7	Department	250	Yes
8	**Semitheri (Solar)**	8	Department	250	Yes
9	**Micro Wave (M.Q)**	9	Department	100	Yes
10	**SKY TOWER -**	11	Client	160	Yes
11	**Chemmannam**	12	Client	200	No
12	**St.Joseph**	13	Department	250	No
13	**South Indian Bank -1**	14	Department	500	No
14	**Mulburry Apartment**	18	Client	250	Yes
15	**Federal Residency**	19	Client	500	No
16	**Retreat Apartment**	20	Client	315	Yes
17	**Navani Garden**	21	Client	250	Yes
18	**Skyline Infinity (Mundupalam)**	22	Client	400	Yes
19	**Plesant Hill**	23	Client	160	No
20	**SN Temple**	24	Department	250	Yes
21	**Millenium Kuries**	25	Client	250	Yes
22	**Asset Anchorage Homes**	26	Client	400	Yes
23	**Alice Legacy**	27	Client	400	Yes
24	**Aquatic**	29	Client	160	Yes
25	**Kalyan Hypermarket**	30	Client	250	Yes
26	**Precious Homes**	32	Client	250	Yes
27	**Mulburry Department**	33	Department	160	Yes
28	**JAZZ TOWER(ESAF)**	34	Client	160	Yes
Paravattany					
1	**Andrews (Solar)**	2	Department	250	Yes
2	**Unni Moosa**	3	Department	250	Yes
3	**Ottu Company (Solar)**	4	Department	250	Yes
4	**Paravattani - Park**	5	Department	500	Yes
5	**Paravattani**	6	Department	250	Yes
6	**Kangapaddan**	7	Department	250	Yes
7	**Wheels Apartment**	8	Client	160	Yes
8	**Manjaly Enclave**	9	Client	160	Yes
9	**Gopi Moothedeth (Fortune Apartment)**	10	Client	200	Yes
10	**Jose Poothokkanam**	11	Client	200	no
11	**Cedar Apartment**	12	Client	400	Yes
12	**Sundale Apartment**	14	Client	200	Yes
13	**Homeo**	16	Department	100	Yes
14	**Double Horse**	17	Department	100	Yes
15	**Store**	18	Department	160	Yes
16	**Pookuzhy Paadam**	19	Department	250	Yes

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Paravattany					
17	**Mystic Rose**	20	Client	250	Yes
18	**Sister's**	22	Department	250	Yes
19	**CIDBI Appt.**	23	Client	400	Yes
20	**Pentark East Park**	25	Client	200	Yes
21	**Asset Precious (Apartment)**	26	Client	400	Yes
Poonkunam (Poothole feeder splitted up)					
1	**Omega Swami Saranam(SOLAR)**	1	Department	160	Yes
2	**Classic Park**	2	Department	100	Yes
3	**Capital Harmony**	3	Client	160	No
4	**Omega Crown**	4	Client	200	Yes
5	**Ramadhevi -1 (SOLAR)**	5	Department	500	Yes
6	**Lakshmi Apartment**	6	Department	100	Yes
7	**Sitaram Mill**	8	Department	250	Yes
8	**Sree Sailam**	10	Department	250	Yes
9	**Capital Horizon**	11	Client	160	Yes
10	**Ram Nikethan**	12	Client	250	Yes
11	**Pushpagiri**	13	Department	500	Yes
12	**Vijay Sai**	14	Client	200	Yes
13	**Capital Garden**	15	Client	160	Yes
14	**Capital Villege**	16	Client	630	No
15	**Ushas**	17	Department	500	No
16	**Pallissery Tower**	18	Department	250	No
17	**Kingsway**	19	Client	160	No
18	**Cheloor Residency**	20	Client	160	No
19	**Westend Krishna Apartment**	21	Client	200	No
20	**Neelambari Apartment**	22	Client	400	Yes
21	**Asset Mid Town Poonkunnam**	23	Client	160	Yes
22	**Vincent Tower**	24	Client	160	No
23	**Ramachandra Apartment**	26	Client	160	Yes
24	**Gulmohar Apartment**	27	Client	100	Yes
25	**Sarang Homes Apartment**	28	Client	250	Yes
26	**Aricaria Jyothi Nest**	29	Client	200	Yes
27	**Ground Water Transformer**	30	Department	250	Yes
28	**Pallissery Apartment**	31	Client	160	No
29	**Top Tulip**	34	Client	160	Yes
30	**Krishna Saketh**	35	Client	160	Yes
31	**SAFA**	36	Client	250	Yes
32	**Sayooj Haridas**	37	Client	200	Yes
Keralavarma (Poothole feeder split up)					
1	**Omega Genting Palace**	1	Client	160	No
2	**CIDBI - Chaithram**	2	Client	400	No
3	**Sreesankari**	3	Department	160	No
4	**City (CA)Arcade**	4	Client	100	No
5	**Coral Apartment**	5	Client	315	No

Sl No	Name	Trfr No:	Trfr ownership	Capacity of Trfr	DTR metering
				kVA	
Keralavarma (Poothole feeder split up)					
6	**KeralaVarma Bus Stop**	6	Department	250	Yes
7	**Keralavarma Hostel (SOLAR)**	7	Department	250	Yes
8	**Kerala Varma College (SOLAR)**	8	Client	315	Yes
9	**Temple Tower**	9	Client	250	No
10	**Maha Maya Apartment**	10	Client	100	No
11	**Sreedurga Apartment**	11	Department	100	No
12	**Blue Hills**	12	Client	100	No
13	**N.P. Tower**	13	Department	315	Yes
14	**Badhra Apartment**	14	Client	160	No
15	**Capital Symphony**	15	Client	200	No
16	**Haya Tower**	17	Client	250	No
17	**Padinjare Kotta**	18	Department	250	No
18	**Calvery**	19	Department	250	Yes
19	**West Fort Tower**	20	Department	315	No
20	**Central Park**	21	Client	200	No
21	**Chungham (SOLAR)**	22	Department	250	Yes
22	**Bindu Theatre**	24	Client	250	Yes
23	**Falkland**	25	Client	160	Yes
24	**P V Arcade**	26	Client	200	Yes
25	**Chirag Apartment**	27	Client	200	Yes
26	**Chowalloor Tower**	28	Client	400	Yes
27	**Jyothi Tower**	29	Client	250	Yes
28	**Capital Green Apartment**	30	Client	400	No
29	**Palaise Grande Apartment**	31	Client	250	Yes
30	**Forus Apartment**	32	Client	160	No
31	**Ansari Complex**	33	Client	400	Yes
32	**MC Tower**	34	Client	315	Yes
33	**Model Road**	35	Department	100	No

9. SUMMARY OF AUDITED FEEDERS - DT

9.1. Bini Feeder

Sl no	Transformer	Transformer name	Consumer type	No:of Consumers	Connected load	KWH/year
				Nos	kW	
1	10802	TT Devassy	HT	1	125	103776
2	10829	Vadakkechira	LT	83	201.62	130084
3	10804	Lake view	LT	29	203	51294
4	10805	Seethal apartment	LT	31	214	58061
5	10806	Kalyan jewellers	HT	1	199.03	220506
6	10801	Mangala Tower	HT	1	176	47016
7	10803	Paliyam Road	LT	210	765.28	361062
8	10826	Ashiana Apartments	LT	54	437	111626
9	10810	Pallithammam	LT	72	264.86	170943
10	10816	SBI- Pallithammam	HT	1	223.9	177278
11	10812	Elite Supermarket (Pallithammam)	HT	1	125.48	346386
12	10811	Pallithammam (Indoor)	LT	16	276	158661
13	10814	Kairali Sree Theatre 2	HT	1	274	94815
14	10813	Kairali Sree Theatre 1	LT	30	39.42	14753
15	10807	AGS Office	LT	1	76	75660
16	10808	Cochin Dewasm Board	LT	93	481.5	303721
17	10809	Kailasam	LT	14	51.66	16595
18	10825	Bini Tourist Home	HT	1	154	40603
19	10824	Vegetable	LT	105	245.04	167876
20	10817	Dhanalakshmi Bank	HT	1	137	278841
21	10815	Chemmannur	HT	1	83.58	90624
22	10821	Naduvilal(Pooma)	LT	103	534.62	264942
23	10820	Pooma Complex	LT	19	309.98	146023
24	10823	Naduvilal Shopping Complex	LT	46	109.58	66911
25	10819	Sidish Complex	LT	27	103	18238
26	10818	Ayodhya centre	LT	2	150	179870
27	10822	Chugath Jewellery	HT	1	83.65	74169
28	10828	National Lodge	HT	1	83	51182
29	10827	Maheswari Apartment	HT	1	45	28937
		Total		**947**	**6172**	**3850453**

9.2. Ramanilayam

Sl no	Transformer No	Transformer name	Consumer type	No: of Consumers	Connected load	KWH/year
				nos	kW	
1	11123	Indoor Stadium	HT	1	276.53	38178
2	11104	Pulimootil	HT	1	342	384520
3	11111	Chungath	HT	1	137.28	99528
4	11109	Josco	HT	1	173	13278
5	11108	YMCA	HT	1	87.45	34335
6	11113, 11114	Kalyan Silks-1	HT	1	695.96	930174
7	11119	New Josco	HT	1	257	278859
8	11120 (11128)	Parmekavu SBI	HT	1	115	196046
9	11101	Stadium West	LT	1	47	19360
10	11102	Stadium East	LT	106	381.62	224256
11	11103	RAMANILAYAM	LT	3	32	34100
12	11110	Kaliyath	LT	67	269.64	81624
13	11112	Chiriyan Kandath	LT	5	136	130030
14	11115	Vrindhavan Apartment	LT	53	301.74	119058
15	11125	Kalanikethan	LT	18	111	193929
16	11116	SWAPNA THEATRE	LT	42	205.32	208863
17	11124	Kollanur	LT	10	114	130502
18	11121	Paremekkavu (Neeranjali)	LT	29	243	216423
19	11117	STATUE	LT	89	393.37	201997
20	11120	Parammekkavu Temple	LT	6	75	43422
21	11118	Alukkas	LT	50	459.12	278605
22	11126	SNDP	LT	2	55	3280
23	11107	Capital Legend	LT	13	125	16286
24	11105	ESI	LT	72	372.62	229226
25	11122	Capital City	LT	29	426	279753
26	11106	Perinchery	LT	18	354.19	184739
		Total		**621**	**6185.84**	**4570371**

9.3. Chembukavu

Sl no	Transformer No	Transformer name	Consumer type	No:of Consumers	Connected load	KWH/year
				nos	kW	
1	11408	Southern	LT	155	550.31	272820
2	11418	Kings fort	LT	8	118.65	59025
3	11423	Skyline Garland	LT	62	810	108932
4	11421	Sarayu Apartment	LT	168	641	355399
5	11424	Kollanur Oriental	LT	31	215	74549

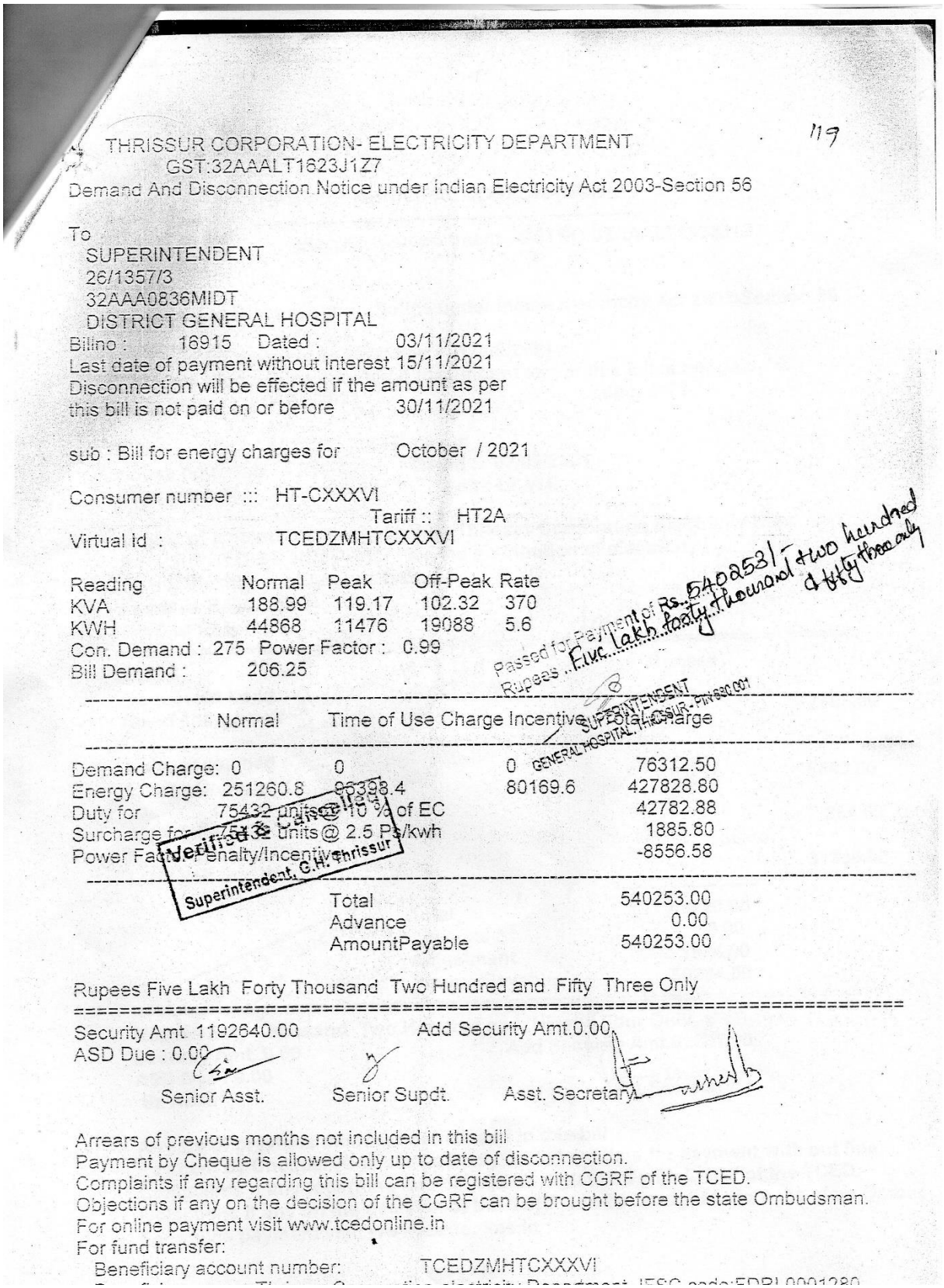
Sl no	Transformer No	Transformer name	Consumer type	No:of Consumers	Connected load	KWH/year
				nos	kW	
6	11422	Panmukkumpilly Sastha Temple	LT	244	976	492419
7	11419	Cheloor Tudoor Rose	LT	22	186	43530
8	11426	Gayathri Apartment	LT	38	354	66622
9	11427	Sreyas Apartment	LT	40	315	59677
10	11425	Keeramkulangara	LT	92	290.47	181634
11	11420	Soda varky	LT	305	940.29	588391
12	11401	Big Bazar	HT	1	661.5	498096
13	11415	KSFE	HT	1	140	152856
14	11410	Central Hotel	HT	1	160	74726
15	11404	Exchange 1 & 2	HT	1	315	1140408
16	11417	Bishop Palace	LT	302	911	548164
17	11428	Bishop Palace	HT	1	396	150470
18	11416	Divya Ram Hospital (Atreya)	HT	1	357.22	331945
19	11411	Swathy Residency	LT	23	232	75203
20	11413	Agro	LT	140	675.55	370794
21	11402	Jawahar	LT	234	795.97	610283
22	11409	Museum	LT	133	612.73	377310
23	11403	Co-operative Road	LT	185	474.93	351075
24	11414	Mana Line	LT	125	567.54	289288
25	11406	Sougandhika	LT	11	79	10083
26	11412	Navani Holy View	LT	22	172	38767
27	11430	KMP Swapnapuri	LT	23	246	31748
28	11407	Cheloor Cazeblanka	LT	19	154	42383
				2388	**12347.16**	**7396597**

9.4. Shornur road

Sl no	Transformer No	Transformer name	Consumer type	No:of Consumers	Connected load	KWH/year
				nos	kW	
1	11535	Bismi	HT	1	236	271710
2	11542	TCR Service Co-op. Bank	HT	1	80	60095
3	11547	Oushadhi Panchakarma	HT	1	342	124516
4	11544	Kalyan Hypermarket	HT	1	750	791385
5	11525	SAROJA NURSING HOME	HT	1	124	290391
6	11550	Coperative Hospital	HT	1	239	267597
7	11529	RAMDAS	HT	1	150.73	34946
8	11530	HOTEL PENINSULA	HT	1	178.54	94928
9	11536	Bismi	LT			
10	11518	Varnam	LT	348	983.44	663293
11	11519	Omega Panthion	LT	24	201	48514

Sl no	Transformer No	Transformer name	Consumer type	No:of Consumers	Connected load	KWH/year
				nos	kW	
12	11534	K A Kumaran	LT	27	205	124901
13	11548	CKM Hieghts	LT			
14	11520	Nandhanam	LT	21	155.4	31450
15	11506	Kasturi	LT	17	85	36371
16	11507	Sree Priya	LT	24	169	39013
17	11551 (11532)	Capital Krishna	LT	16	131.2	31753
18	11509	Forus Mathura	LT	18	159	56063
19	11540	M R G Sree Valtsam	LT	44	409	87422
20	11527	A R Tower	LT	9	80.03	41215
21	11508	Krishna (Thiruvambadi-II)	LT	52	120.99	57863
22	11528	Friends Mall	LT	29	98	42355
23	11511	Oushadhi	LT	189	776.98	456320
24	11541	Top Tower	LT	38	258	50369
25	11510	Thiruvambady I (lekshmi)	LT	464	1346.77	777714
26	11524	Narayani	LT	20	191	29545
27	11543	Prasad Arcade	LT	9	136.81	100978
28	11512	Suharsha	LT	57	401.03	262718
29	11514	City Centre - I	LT	91	913.01	409554
30	11515	City Centre - II	LT	3	46	22758
31	11513	Co-operative Hospital	LT	308	1219.33	708112
32	11516	Athulya Chundari	LT	24	170	40456
33	11539	Alukkas nest	LT	37	414	74700
34	11533	Malabar Eye Clinic	LT	51	187.44	130361
35	11517	Shivam	LT	35	246	58279
36	11531	Wintage Royal	LT	33	274	73882
37	11537	Top Heritage	LT	13	109	18680
38	11538	Forus Cosynest	LT	17	204	39115
39	11545	Pranavam Apartment	LT	135	600.54	236283
40	11546	Top Orchid Apartment	LT	43	280	81895
41	11501	Sree Hari	LT	12	94.45	26682
42	11502	Sree Lakshmi Silks	LT	10	97	131702
43	11503	Daffodils	LT	21	186	45985
44	11526	Rukmini Temple Park	LT	28	267	47656
45	11504	Karthiyayani	LT	269	886.97	762816
46	11523	K.R.Bakery	LT	198	833.78	380574
47	11505	Pazhoor Arcade	LT	19	69.01	64151
48	11521	Saraswathy	LT	29	180	42063
49	11522	Unique Ardent	LT	51	89.64	96011
50	11549	Panikkath Mall	LT	8	220	142282
				2849	**15595.09**	**8507422**

10. SAMPLE ELECTRICITY BILL OF HT CONSUMER – BY TCED



119

THRISSUR CORPORATION- ELECTRICITY DEPARTMENT
GST:32AAALT1623J1Z7
Demand And Disconnection Notice under Indian Electricity Act 2003-Section 56

To
SUPERINTENDENT
26/1357/3
32AAA0836MIDT
DISTRICT GENERAL HOSPITAL

Billno : 16915 Dated : 03/11/2021
Last date of payment without interest 15/11/2021
Disconnection will be effected if the amount as per this bill is not paid on or before 30/11/2021

sub : Bill for energy charges for October / 2021

Consumer number ::: HT-CXXXVI
Tariff :: HT2A
Virtual Id : TCEDZMHTCXXXVI

Reading	Normal	Peak	Off-Peak	Rate
KVA	188.99	119.17	102.32	370
KWH	44868	11476	19088	5.6

Con. Demand : 275 Power Factor : 0.99
Bill Demand : 206.25

Passed for Payment of Rs. 540253/- Rupees Five Lakh forty thousand two hundred & fifty three only
SUPERINTENDENT GENERAL HOSPITAL THRISSUR - PIN 680 001

	Normal	Time of Use Charge	Incentive	Total Charge
Demand Charge:	0	0	0	76312.50
Energy Charge:	251260.8	95398.4	80169.6	427828.80
Duty for	75432 units	@ 10 % of EC		42782.88
Surcharge for	75432 units	@ 2.5 P/kwh		1885.80
Power Factor Penalty/Incentive				-8556.58
		Total		540253.00
		Advance		0.00
		AmountPayable		540253.00

Verified
Superintendent, G.H. Thrissur

Rupees Five Lakh Forty Thousand Two Hundred and Fifty Three Only

Security Amt 1192640.00 Add Security Amt.0.00
ASD Due : 0.00

Senior Asst. Senior Supdt. Asst. Secretary

Arrears of previous months not included in this bill
Payment by Cheque is allowed only up to date of disconnection.
Complaints if any regarding this bill can be registered with CGRF of the TCED.
Objections if any on the decision of the CGRF can be brought before the state Ombudsman.
For online payment visit www.tcedonline.in
For fund transfer:
Beneficiary account number: TCEDZMHTCXXXVI

11. SIGNED PERFORMA

1. General information

General Information				
1	**Name of the DISCOM**	THRISSUR CORPORATION ELECTRICITY DEPARTMENT (TCED)		
2	**i) Year of Establishment**	1937		
	ii) Government/Public/Private	GOVERNMENT		
3	**DISCOM's Contact details & Address**			
i	City/Town/Village	THRISSUR		
ii	District	THRSSUR		
iii	State	KERALA	Pin	680001
iv	Telephone	0487-2422470	Fax	
4	**Registered Office**			
i	Company's Chief Executive Name	Assistant Secretary		
ii	Designation	Assistant Secretary		
iii	Address	THRISSUR CORPORATION ELECTRICITY DEPARTMENT, MO ROAD		
iv	City/Town/Village	THRISSUR	P.O.	680001
v	District	THRISSUR		
vi	State	KERALA	Pin	680001
vii	Telephone	0487-2422470	Fax	
5	**Nodal Officer Details***			
i	Nodal Officer Name (Designated at DISCOM's)	JOSE TS		
ii	Designation	ELECTRICAL ENGINEER		
iii	Address	TCED, THRISSUR CORPORATION ELECTRICITY DEPARTMENT, MO ROAD		
iv	City/Town/Village	THRISSUR	P.O.	680001
v	District	THRISSUR		
vi	State	KERALA	Pin	680001
vii	Telephone	0487-2423559	Fax	
6	**Energy Manager Details***			
i	Name	B NIKHIL		
ii	Designation	ASSISTANT ENGINEER	Whether EA or EM	EA
iii	EA/EM Registration No.	EA-24811		
iv	Telephone		Fax	
v	Mobile	9037192013	E-mail ID	electricitydepartment@yahoo.co.in
7	**Period of Information**			
	Year of (FY) information including Date and Month (Start & End)	01-APRIL-2020 TO 31-MARCH 2021		

Assistant Engineer
Electricity Department
Thrissur Corporation

JOSE.T.S
Electrical Engineer
Electricity Depa...nt
Thrissur Corpor...
Tel:24235...

SANTHOSH
Accredited Energy Auditor
AEA-0275

എൻ. കെ. കൃഷ്ണകുമാർ/N. K. KRISHNAKUMAR M.A, I
അസിസ്റ്റന്റ് സെക്രട്ടറി/ASSISTANT SECRETARY
വൈദ്യുതി വിഭാഗം/ELECTRICITY DEPARTMENT
തൃശ്ശൂർ കോർപറേഷൻ/THRISSUR CORPORATION
പെൻ നമ്പർ/Pen No: 743648
ഫോൺ/Phone - 0487 2422470
മൊബൈൽ/Mobile - 8921037758
ഇമെയിൽ/Email : electricitydepartment@yahoo.co
പിൻ/PIN : 680 001

2. Performance Summary of DISCOM – Form-1

Performance Summary of Electricity Distribution Companies			
1	Period of Information Year of (FY) information including Date and Month (Start & End)	01-APRIL-2020 TO 31-MARCH 2021	
2	**Technical Details**		
(a)	**Energy Input Details**		
(i)	Input Energy Purchase (From Generation Source)	Million kwh	129.33
(ii)	Net input energy (at DISCOM Periphery after adjusting the transmission losses and energy traded)	Million kwh	129.33
(iii)	Total Energy billed (is the Net energy billed, adjusted for energy traded))	Million kwh	121.08
(b)	Transmission and Distribution (T&D) loss Details	Million kwh	8.25
		%	6.38
	Collection Efficiency	%	96.43%
(c)	Aggregate Technical & Commercial Loss	%	9.72%

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

Authorised Signatory and Seal

Name of Authorised Signatory
Name of the DISCOM:
Full Address:-

Seal

എൻ. കെ. കൃഷ്ണകുമാർ/ N. K. KRISHNAKUMAR M.A, LL.M.
അസിസ്റ്റന്റ് സെക്രട്ടറി/ASSISTANT SECRETARY
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ഇമെയിൽ/Email : electricitydepartment@yahoo.co.in
പിൻ/PIN : 680 001

JOSE.T.S
Electrical Engineer
Electricity Department
Thrissur Corporation
Tel:2423559

Signature:-
Name of energy manager:
Registration Number:

SANTHOSH
Accredited Energy Auditor
AEA-0275

Assistant Engineer
Electricity Department
Thrissur Corporation
NIKHIL B
EA-24811

3. Details of Division wise losses

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

Division Wise Losses

Period From April 2020 to March 2021

S.No	Name of circle	Circle code	Name of Division	Consumer profile: Consumer category	No of connection metered (Nos)	No of connection Un-metered (Nos)	Total Number of connections (Nos)	% of number of connections	Connected Load metered (MW)	Connected Load Un-metered (MW)	Total Connected Load (MW)	% of connected load	Energy parameters: Input energy (MU)	Billed energy (MU): Metered energy	Billed energy (MU): Unmetered/assessment energy	Billed energy (MU): Total energy	% of energy consumption	Losses: T&D loss (MU)	Losses: T&D loss (%)	Commercial Parameter: Billed Amount in Rs. Crore	Collected Amount in Rs. Crore	Collection Efficiency	AT & C loss (%)
1	TCED	TCED	TCED	Residential	21812	0	21812	53.9%	101.754	0	101.754	47.53%	129.33	43.143	0	43.143	35.63%	8.25	6.38%	28.483	27.823	97.68%	
				Agricultural	188	0	188	0.5%	0.434	0	0.434	0.20%		0.067	0	0.067	0.05%			0.0272	0.0230	84.64%	
				Commercial/Industrial-LT	18038	0	18038	44.6%	71.835	0	71.835	33.55%		44.233	0	44.233	36.53%			49.281	47.936	97.27%	
				Commercial/Industrial-HT	126	0	126	0.3%	39.726	0	39.726	18.56%		32.301	0	32.301	26.68%			33.214	31.879	95.98%	
				Others	272	0	272	0.7%	0.337	0	0.337	0.16%		1.340	0	1.340	1.11%			0.644	0.000	0.00%	
Sub-total					**40436**	**0**	**40436**	**100%**	**214.09**	**0**	**214.09**	**100%**	**129.33**	**121.08**	**0**	**121.08**	**100%**	**8.25**	**6.38%**	**111.650**	**107.661**	**96.43%**	**9.72%**
2				Residential	0	0	0	0%	0	0	0	0%	0	0	0	0	0%	0	0%	0	0	0.00%	
				Agricultural	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%	
				Commercial/Industrial-LT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%	
				Commercial/Industrial-HT	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%	
				Others	0	0	0	0%	0	0	0	0%		0	0	0	0%			0	0	0.00%	
Sub-total					**0**	**0**	**0**	**100%**	**0**	**0**	**0**	**100%**	**0**	**0**	**0**	**0**	**100%**	**0**	**0%**	**0**	**0**	**0.00%**	**100%**
76	Total			Residential	21812	0	21812	53.9%	101.754	0	101.754	47.53%	129.33	43.14	0	43.14	35.63%	8.25	6.38%	28.48	27.82	97.68%	
				Agricultural	188	0	188	0.5%	0.434	0	0.434	0.20%		0.07	0	0.07	0.05%			0.0272	0.02	84.64%	
				Commercial/Industrial-LT	18038	0	18038	44.6%	71.835	0	71.835	33.55%		44.23	0	44.23	36.53%			49.28	47.94	97.27%	
				Commercial/Industrial-HT	126	0	126	0.3%	39.726	0	39.726	18.56%		32.30	0	32.30	26.68%			33.21	31.88	95.98%	
				Others	272	0	272	0.7%	0.337	0	0.337	0.16%		1.34	0	1.34	1.11%			0.64	0.00	0.00%	
77	At company level				**40436**	**0**	**40436**	**100%**	**214.09**	**0**	**214.09**	**100%**	**129.33**	**121.08**	**0**	**121.08**	**100%**	**8.25**	**6.38%**	**111.65**	**107.66**	**96.43%**	**9.72%**

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

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

Authorised Signatory and Seal

Name of Authorised Signatory:

Name of the DISCOM:

Full Address:-

Seal

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ഇമെയിൽ/Email : electricitydepartment@yahoo.co.in
പിൻ/PIN : 680 001

JOSE.T.S
Electrical Engineer
Electricity Depart...
Thrissur Corpn...
Tel:2...

Signature:-

Name of Energy Manager:

Registration Number:

NIKHILS
EM-24811

Assistant Engineer
Electricity Department
Thrissur Corporation

SANTHOSH
Accredited Energy Auditor
AEA-0275

4. Details of infrastructure

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 circles	1	1	1	
ii	Number of divisions	1	1	1	
iii	Number of sub-divisions	1	1	1	
iv	Number of feeders	16	16	4	25% of the Total feeder
v	Number of DTs	441	441	97	21.9% of the total DT covered. Transformers of HT consumers not included in the list
vi	Number of consumers	40436	40436	6702	16.6% of the total consumers
2	**Parameters**	**66kV and above**	**33kV**	**11/22kV**	**LT**
a. i.	Number of conventional metered consumers	-	-	-	7913
ii	Number of consumers with 'smart' meters	-	-	-	-
iii	Number of consumers with 'smart prepaid' meters	-	-	-	-
iv	Number of consumers with 'AMR' meters	-	-	-	-
v	Number of consumers with 'non-smart prepaid' meters	-	-	126	32397
vi	Number of unmetered consumers	-	-	-	
vii	**Number of total consumers**	-	-	126	40310
b.i.	Number of conventionally metered Distribution Transformers	-	-	-	-
ii	Number of DTs with communicable meters	-	-	-	274
iii	Number of unmetered DTs	-	-	-	167
iv	**Number of total Transformers**			0	441
c.i.	Number of metered feeders			-	
ii	Number of feeders with communicable meters			16	
iii	Number of unmetered feeders			-	
iv	**Number of total feeders**			16	
d.	Line length (ct km)		4.2	117.976	285.675
e.	Length of Aerial Bunched Cables			1.85	-
f.	Length of Underground Cables		2.565	54.29	4.525
3	**Voltage level**	**Particulars**	**MU**	**Reference**	**Remarks (Source of data)**
i	66kV and above	Long-Term Conventional	129.33	Includes input energy for franchisees	
		Medium Conventional	0		
		Short Term Conventional	0		
		Banking	0		
		Long-Term Renewable energy	0.000		
		Medium and Short-Term RE	0		
		Captive, open access input	0		
		Sale of surplus power	0		
		Quantum of inter-state transmission loss	0		
		Power procured from inter-state sources	129.33		
		Power at state transmission boundary	129.33		
iii		**Input in DISCOM wires network**	129.33		
v	11 kV	Renewable Energy Procurement	0.4585	Self generation = solar power plant in own buildings + 11 kV export received	
		Small capacity conventional/ biomass/ hydro plants Procurement	0.00		
		Sales Migration Input	0.00		
vi	LT	Renewable Energy Procurement	1.114	Total LT export from consumers	
		Sales Migration Input	0		
vii		**Energy Embedded within DISCOM wires network**	0.00		
viii		**Total Energy Available/ Input**	129.33		

4	Voltage level	Energy Sales Particulars	MU	Reference	
i	LT Level	DISCOM' consumers	88.78	Include sales to consumers in franchisee areas, unmetered consumers	Total Lt Sales
		Demand from open access, captive	0.00		
		Embedded generation used at LT level	1.114	Demand from embedded generation at LT level	Total LT generation used
		Sale at LT level	88.78		
		Quantum of LT level losses	8.08	Included the LT OH line length, Transformer loss, LT cable, Switch gear & Commercial losses	
		Energy Input at LT level	96.86		
ii	11 kV Level	DISCOM' consumers	32.30	Include sales to consumers in franchisee areas, unmetered consumers	
		Demand from open access, captive	0.00	Non DISCOM's sales	
		Embedded generation at 11 kV level used	0.4585	Demand from embedded generation at 11kV level	
		Sales at 11 kV level	32.30		
		Quantum of Losses at 11 kV	0.16	EHT + HT losses	
		Energy input at 11 kV level	32.47		
		Total Energy Requirement	**129.33**		
		Total Energy Sales	**121.08**		

Energy Accounting Summary

5	DISCOM	Input (in MU)	Sale (in MU)	Loss (in MU)	Loss %
i	LT				
ii	11 Kv	129.33	121.08	8.25	6.38
iii	33 kv				
iv	> 33 kv				
6	**Open Access, Captive**	**Input (in MU)**	**Sale (in MU)**	**Loss (in MU)**	
i	LT				
ii	11 Kv				
iii	33 kv				
iv	> 33 kv				

Loss Estimation for DISCOM	
T&D loss (MU)	8.25
D loss (MU)	8.25
T&D loss (%)	6.38
D loss (%)	6.38

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5. Details of consumers and consumption

(Details of Consumers)						
Summary of Energy						
Period From April 2020 to March 2021						
S.No	Type of Consumers	Category of Consumers (EHT/HT/LT/Others)	Voltage Level (kV)	No of Consumers	Total Consumption (In MU)	Remarks (Source of data)
1	Domestic	LT	0.415	21812	43.14	
2	Commercial	LT	0.415	17220	37.63	
3	IP Sets					
4	Hor. & Nur. & Coffee/Tea & Rubber (Metered)					
5	Hor. & Nur. & Coffee/Tea & Rubber (Flat)					
6	Heating and Motive Power					
7	Water Supply					
8	Public Lighting	LT	0.415	272	1.34	VIII B
9	HT Water Supply					
10	HT Industrial	HT	11	4	0.47	HT IA
11	Industrial (Small)	LT	0.415	505	2.57	LT IV
12	Industrial (Medium)					
13	HT Commercial	HT	11	89	15.15	HT 4A,4B,SPS
14	Applicable to Government Hospitals & Hospitals					
15	Lift Irrigation Schemes/Lift Irrigation Societies					
16	HT Res. Apartments Applicable to all areas					
17	Mixed Load					
18	Government offices and department	LT	0.415	313	4.03	
19	HT general	HT	11	19	12.79	HT 2A,2B
20	Agriculture	LT	0.415	188	0.07	LT V
21	Government offices and department	HT	11	14	3.89	
22	Others-5 (if any , specify in remarks)					
23	Others-5 (if any , specify in remarks)					
24						
25						
			Total	40436	121.08	

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6. Details of input energy sources

A. Summary of energy input & Infrastructure

S.No	Parameters	Period From April 2020 to March 2021	Remarks (Source of data)
A.1	Input Energy purchased (MU)	129.33	Electricity bill
A.2	Transmission loss (%)	0%	
A.3	Transmission loss (MU)	0	
A.4	Energy sold outside the periphery(MU)	0.00	
A.5	Open access sale (MU)	0	
A.6	EHT sale	0	
A.7	Net input energy (received at DISCOM periphery or at distribution point)-(MU)	129.33	Total feeder input
A.8	Is 100% metering available at 66/33 kV (Select yes or no from list)		
A.9	Is 100% metering available at 11 kV (Select yes or no from list)	62%	274 out of 441 transformers
A.10	% of metering available at DT	100%	
A.11	% of metering available at consumer end	0	
A.12	No of feeders at 66kV voltage level	0	
A.13	No of feeders at 33kV voltage level	16	
A.14	No of feeders at 11kV voltage level	0	Not available
A.15	No of LT feeders level	0	
A.16	Line length (ckt. km) at 66kV voltage level	4.20	Measured through HT line mapping
A.17	Line length (ckt. km) at 33kV voltage level	117.976	Measured through HT line mapping
A.18	Line length (ckt. km) at 11kV voltage level	285.675	Estimated through LT line mapping
A.19	Line length (km) at LT level	1.85	Measured through HT line mapping
A.20	Length of Aerial Bunched Cables	54.29	Site measurement
A.21	Length of Underground Cables	1/1.6	
A.22	HT/LT ratio		

B. Meter reading of input energy at injection points

S.No	Zone	Circle	Voltage Level (kV)	Division (KVA)	Sub-Division (KVA)	Feeder ID	Feeder Name	Feeder Metering Status (Metered/ unmetered/ AMI/AMR)	Status of Meter (Functional/Non-functional)	Metering Date	Feeder Type (Agri/ Industrial/Mixed)	Status of Communication			Period From April 2020 to March 2021				Sales	Remarks (Source of data)
										Date of last actual meter reading/ communication		% data received through automatically if feeder AMR	Number of hours when meter was unable to communicate in period	Total Number of hours in the period	Meter S.No	CT/PT ratio	Import (MU)	Export (MU)		
B.1			110			21/Thrissur corp	VIPL	Metered	Functioning	01-04-2021	Mixed	0	0	NA	X2005320	200/1	87.47	-		110 kV s/s
B.2			66			21/1D29	OLVI	Metered	Functioning	01-04-2021	Mixed	0	0	NA	17052040	200/1	41.86	-		66 kV s/s
B.3																				
B.4																				
B.5																				
B.6																				
B.7																				
B.8																		129.33	0.00	
B.1001	Total (MU)																		129.33	
B.1002	Net input energy at DISCOM periphery (MU)																			

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

Authorised Signatory and Seal
Name of Authorised Signatory
Name of the DISCOM:
Full Address:-
Seal

Signature:-
Name of Energy Manager:
Registration Number:

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7. Details of feeder wise losses

(Details of Feeder-wise losses)

Period From April 2020 to March 2021

Sl No.	Zone	Received at Circle (In MU)	Received at Division (In MU)	Received at Sub-division (In MU)	Name of the Station	Feeder Code/ID	Feeder Name	Type of Feeder (Urban/Mixed/Industrial/Agricultural/Rural)	Type of feeder meter (AMI/AMR/Other)	Received at Feeder (Final in MU)	Feeder Consumption (In MU)	Final Net Export at Feeder Level (In MU)	T&D losses	AT&C losses	% Data Received through Automatically (if feeder AMR/AMI)	Remarks
1	TCED						Mission quarters	Urban	Others						Nil	
2	TCED						Veliyanoor	Urban	Others						Nil	
3	TCED						Koorkenchery	Urban	Others						Nil	
4	TCED						Paravattani	Urban	Others						Nil	
5	TCED						Aranattukara	Urban	Others						Nil	
6	TCED						Jubilee medical college	Urban	Others	7.15	7.12		0.44	0.44	Nil	4 feeders out of 16 feeders analysed for energy audit. Jubilee medical college is dedicated feeder.
7	TCED						Vivekodayam	Urban	Others						Nil	
8	TCED						Bini	Urban	Others	4.00	3.85		3.78	5.32	Nil	
9	TCED						Poothole	Urban	Others						Nil	
10	TCED						Ramanilayam	Urban	Others	4.74	4.57		3.55	5.09	Nil	
11	TCED						MO road	Urban	Others						Nil	
12	TCED						Kottappuram	Urban	Others						Nil	
13	TCED						Chembukavu	Urban	Others	8.05	7.40		8.11	9.58	Nil	
14	TCED						Shornur road	Urban	Others	9.36	8.51		9.15	10.60	Nil	
15	TCED						DH feeder	Urban	Others						Nil	
16	TCED						East fort	Urban	Others						Nil	

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8. Division wise status of DT level metering

a. Division wise status of DT level metering

Zone name	Circle name	Division name	Feeder name	Total no of DT on feeder	No of unmetered DTs	No of metered DTs			No. of DTs with	
						AMR metered (communicable)	AMI metered (communicable)	Non-AMR / AMI metered (non-communicable)	Communicating (Total No out of 7 and 8)	Non-communicating (Total No. out of 7,8 and 9)
1	2	3	4	5=(6+7+8+9)	6	7	8	9	10	11
TCED	TCED		Ramanilayam	18	8		10		10	
TCED	TCED		Bini	17	6		11		11	
TCED	TCED		Chembukavu	23	4		19		19	
TCED	TCED		Shornur Road	40	14		26		26	
TCED	TCED		East Fort	27	19		8		8	
TCED	TCED		Koorkenchery	22	7		15		15	
TCED	TCED		Veliyanoor	18	9		9		9	
TCED	TCED		Vivekodhayam	21	8		13		13	
TCED	TCED		Arnattukkara	29	14		15		15	
TCED	TCED		DH	33	17		16		16	
TCED	TCED		Kottappuram	53	12		41		41	
TCED	TCED		M O Road	27	16		11		11	
TCED	TCED		Mission Quarters	28	5		23		23	
TCED	TCED		Paravattani	20	1		19		19	
TCED	TCED		Poothole	65	27		38		38	
TCED	TCED		Jubilee Mission	Dedicated feeder						

b. Details of DT-wise losses

Sub-station ID	Feeder ID	Feeder Name	DT Id no	DT Capacity (kVA)	Predominant consumer type of DT (Domestic/Industrial/Agriculture/Mixed)	Type of metering (Unmetered/AMI/AMR/Other)	Status of meter (functional/non-functional)	% of data received automatically (if AMI/AMR)	No. of connected consumers	Input Energy (MU)	Billed Energy (MU)	Loss of Energy (MU)	% Loss
		1	2						3	4	5	6 = 4-5	(7)= [(6)/(4)]* 100
Not available as 100% DT metering not done also the DT measurement not yet commenced													

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9.

12. PICTURES

1. General photos

110 KV substation

110 kV substation

13. ABBREVIATIONS

ABR	:	Average billing rate
ACSR	:	Aluminium core steel reinforced
ANAN	:	Air natural air natural
APFC	:	Automatic Power Factor controller
AVG	:	Average
BD	:	Billing demand
BDV	:	Breakdown voltage
BEE	:	Bureau of energy efficiency
CEA	:	Central electrical authority
CFL	:	Compact fluorescent lamp
CFM	:	Feet cube per minute
CT	:	Current transformer
DB	:	Distribution Board
DC	:	Designated consumer
DT	:	Distribution transformer
EC	:	Energy Conservation
FD	:	Forced draft
HPSV	:	High pressure sodium vapour
HT	:	High Tension
IEC	:	International electro technical commission
IEEE	:	The Institute of electrical and electronics engineers
IS	:	Indian Standard
KG	:	Kilo gram
KSEB	:	Kerala state electricity board
KVA	:	Kilo Volt Ampere
KVAH	:	Kilo volt Ampere Hour
KVAR	:	Kilo volt ampere
KW	:	Kilo Watts
KWH	:	Kilo watt hour
LED	:	Light emitting diode
LT	:	Low tension
MAX	:	Maximum
MH	:	Metal halide
MU	:	Million units
MVA	:	Mega volt ampere
MW	:	Mega watt
NEMA	:	National Electrical Manufacturers Association
ONAN	:	Oil natural air natural
PCC	:	Point of common coupling
PF	:	Power factor
PSI	:	Pound square inch
PT	:	Protentional transformer
R/km	:	Resistance per kilometre
RDSS	:	Revamped Distribution Sector Scheme
RMD	:	Registered Maximum demand
SDA	:	State designated agency
SEC	:	Specific electricity consumption
SFU	:	Switch Fuse Unit
SLD	:	Single Line Diagram
TDD	:	Total demand distortion
THD	:	Total harmonics distortion
TOD	:	Time of day
TOE	:	Tonne of oil equivalent
TPEA	:	Third party energy auditor
UG	:	Underground
UPS	:	Uninterruptible power supply
VFD	:	Variable frequency drive