AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

INDEX

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

"PLASTIC FREE CAMPUS"

No plastic day And Swaccha Bharat Abhiyan

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

Agnihotri College of Pharmacy offers many initiatives and engages in numerous activities. Its 2.00 acre campus is home to roughly 300 students, 20 faculty members who teach, and 20 non-teaching staff members. At least one green space can be seen on the Agnihotri College of Pharmacy campus. Flexes are posted around campus with messages like "Restricted use of plastic," "Optimal use of electricity- Save electricity," and "Optimal use of water- Save water" to alert visitors and strangers. The Agnihotri College of Pharmacy has performed environmental audits with a focus on water waste to find ways to conserve water and energy audits with a focus on electricity use to find ways to save electricity. Agnihotri College of Pharmacy has created policy under "Green Initiatives" based on the audit report. Beyond the parking area, entry for cars is prohibited in order to promote the usage of pedestrian routes on campus. For the purpose of limiting and reducing plastic use in the college's facilities, nonessential plastic use must be prohibited. The goal of rainwater collection is to decrease rainwater loss. WhatsApp group is used to distribute notices to students, teaching personnel, and non-teaching employees. For the maintenance of the vegetation on college campuses, tree planting is done annually. Agnihotri College of Pharmacy uses National Social Service Scheme (NSS) volunteers to spread "Green initiative" concepts to the surrounding community.

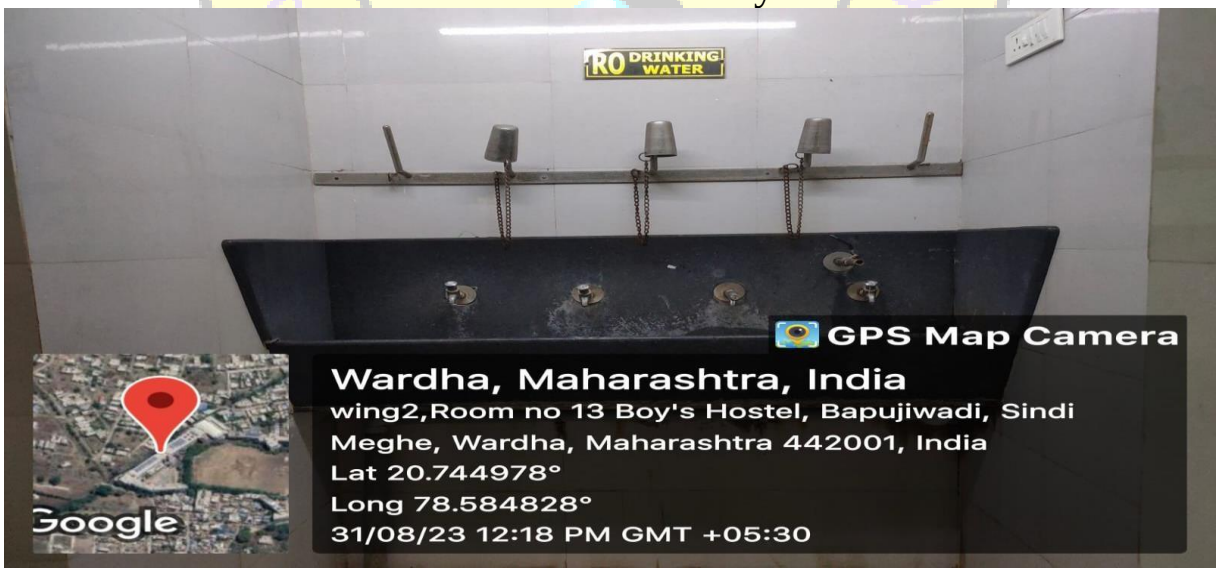
Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

Pedestrain Pathway



RO TAP Photo

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

Tree Plantation Rally

Tree Plantation

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

AGNIHOTRI COLLEGE OF PHARMACY

Bapuji Wadi, Sindi (Meghe)Wardha-442 001 (M.S)

Water Conservation Rally

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

7.1.3.

GREEN CAMPUS INITIATIVE POLICIES

Despite having a campus that is approximately 2.00 acres in size and more than 300 students, Agnihotri College of Pharmacy had consistently implemented initiatives in many different activities. Faculty has 22 teaching and 20+ non-teaching staff. The pharmacy campus of Agnihotri College is almost entirely covered with flora.

Students and faculty are taking the effort to conserve a lot of electricity. They created a pulley to conserve energy and reduced the electricity use by utilizing solar power plant and LED light all over in the campus.

Volunteers from the institute of National Social Service (NSS) program are visiting the neighborhood area to spread these concepts and raise awareness.

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

GREEN CAMPUS INITIATIVES POLICIES

1. GREEN PRACTICES

Public Transport/ Bus facility

The students at Agnihotri College of Pharmacy have access to the bus services.

Local students and female residents of the hostel are urged to travel to the campus on bicycles or on foot.

Every college bus and vehicle used by college students has a PUC certification that is periodically renewed.

Paperless office

The office has a 2-sided photocopy/printer machine installed to save paper waste, and printouts are only made when the data has been finalized in soft copy.
Most formal correspondence includes announcements of various staff and student meetings. Program interaction, greetings for special occasions, and other communications take place via email and other social media like WhatsApp.

Green landscaping with trees and plants.

Every year, as part of NSS activity, tree planting is done to encourage eco-friendly behaviors and the preservation of trees.
Numerous trees have been planted throughout the campus area of the college and the surrounding area.
Potted plants are also arranged in rows along college halls.

Pedestrian Friendly Roads

The entrance gate to the Main Campus is roughly 300 meters away from Agnihotri College of Pharmacy. Students and staff members who live nearby choose to stroll to the college because the main entry gate and college building are connected by a coaltar road.

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

2. PLASTIC FREE CAMPUS

Flex banners saying "RESTRICTED PLASTIC USE IN THE PREMISES" are erected in the campus as the part of an effort to create a plastic-free campus.

3. SOLID WASTE MANAGEMENT

Separate dustbins with lids and standard-compliant color coding are used for the collection of solid trash. After collection, collected solid waste is sent to a Grampanchayat rubbish collection vehicle.

4. LIQUID WASTE MANAGEMENT

Laboratory liquid waste is discharged into a separate drainage system that is connected to a separate septic tank.

The microbiology laboratory's microbiological trash and the pharmacology lab's biomedical waste are properly burned.

The earth contains dangerous compounds that are deeply buried. College doesn't employ any radioactive materials.

5. E-WASTE MANAGEMENT

Electrical and E-waste collection by a responsible party.

Waste evaluation and classification as either reusable or rubbish.

Place trash in the designated place.

Speak with a certified recycler or dismantler.

6. WATER CONSERVATION MANAGEMENT

The open ground of Agnihotri College of Pharmacy has not been cemented on purpose. Pavers are used to cover the ground instead of cement so that rainwater can soak into the soil and raise the level of groundwater.

Through NSS, we educate the college's students, faculty, and general public about the advantages of rainwater collection throughout our social activities.

Building a compound wall prevents the rainwater from draining from the campus, which eventually helps to elevate ground water levels in the well.

Agnihotri College of Pharmacy WARDHA

PRINCIPAL
Agnihotri College of Pharmacy
WARDHA

Energy Audit Report

Prepared for

Agnihotri College of Pharmacy

Bapuji Wadi, Ramnagar Wardha-442001

Date of Audit-28/03/2023

Prepared By,

Saurabh Engineering Services

Shake Hand with Us, To Save Energy

Shake Hand with Us, To Save Life and Property

H. No. 569/11, Shri Niwas Apartment, Walker Road,

Mahal, Nagpur-440032, Maharashtra.

☎:- 9763190151, 7972427997, 0712-2730112

Email: saurabhes@gmail.com,sdbhattad@gmail.com

www.saurabhengineering.com

ACKNOWLEDGEMENT

We are very grateful for cooperation and assistance received from ***Mr.Prasad p. Jumade, Principal & Mr. Ram Bawankar Sir*** *and other Team Members of Agnihotri college of Pharmacy, Bapunagar Wardha.*

Place: Nagpur

For Saurabh Engineering Services

INDEX

Executive Summary

Details of electrical system of are as under

Description	Details
Supply Voltage	11 KV
Contract Demand	200 KVA
Transformer Rating	200 KVA
Solar power Plant Capacities in KW	
Solar Power Plant capacity	200 kw
Estimated Annual Electricity Consumption (kWh)	163347
Estimated Annual Electricity Cost (Rs)	3206028

- **Observation and Recommendation:**

Field measurements are carried out for Voltage, Current, Power, Harmonics and data is recorded. Power parameters are further analyzed for Voltage Unbalance, Current Unbalance, Total Harmonics distortions, individual harmonics etc.

Following are the observations from First Power Measurements at Main Incomer Pharmacy College.

- Voltage unbalance is within limit.
- Current unbalance is considerable.
- Total Voltage harmonics distortion is there.
- Total Current Harmonics distortion is there and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.
- Average measured power factor is 0.96

Location	1st Measurement of Main Incomer Pharmacy College			
THD Voltage (%)	**Name**	**Avg**	**Min**	**Max**
	U1 THD (%)	1.913	1.7	2.3
	U2 THD (%)	1.976	1.7	2.3
	U3 THD (%)	1.974	1.7	2.3

	Total Voltage Harmonic Distortion is there.			
	5th & 7th order individual voltage harmonics have noticeable presence.			
THD current (%)	**Name**	**Avg**	**Min**	**Max**
	A1 THD (%)	4.412	3.7	9.2
	A2 THD (%)	5.543	4.6	9.4
	A3 THD (%)	4.457	2.5	6.1
	Total current harmonics distortion is there and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.			
	2nd, 3rd & 5th order individual current harmonics have noticeable presence.			

Following are the observations from second Power Measurements at Main Incomer Pharmacy College.

- Voltage unbalance is within limit.
- Current unbalance is considerable.
- Total Voltage harmonics distortion is there.
- Total Current Harmonics distortion is there and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.
- Average measured power factor is 0.96

Location	2nd measurement of Main Incomer Pharmacy College			
THD Voltage (%)	**Name**	**Avg**	**Min**	**Max**
	U1 THD (%)	2.04	1.8	2.3
	U2 THD (%)	2.07	1.9	2.4
	U3 THD (%)	2.12	1.9	2.4
	Total Voltage Harmonic Distortion is there.			
	5th & 7th order individual voltage harmonics are noticeable presence.			
THD current (%)	**Name**	**Avg**	**Min**	**Max**
	A1 THD (%)	3.57	2.7	4.7
	A2 THD (%)	2.79	1.5	5.8

	A3 THD (%)	3.29	2.3	5.1
	Total current harmonics distortion is not considerable			
	3rd & 5th order individual current harmonics have noticeable presence.			

❒ Energy Bill Analysis

Energy bills for last one year is analyzed & following are the observations

- Contract demand is 200 KVA and & highest maximum demand is 157 KVA.
- Average cost of electricity units is Rs. 14.10 per KVAH. excluding demand charge.
- Energy charges is Rs. 8.96 per KVAH
- Average billing power factor is 0.96.

❒ Potential Saving by Improvement in Power Factor

Billing power factor is varying from 0.934 to 0.974, more savings can be achieved with above 0.99 pf.

Hence there is scope for further improvement in power factor to 0.99 and above. This will result into potential saving of **Rs. 99096/- per annum** by reduction in kVAh consumption

❒ Potential Energy Saving in Lighting Consumption

In Agnihotri college pharmacy, lighting system consists of mainly following type of luminaries

- LED
- Tube Light with copper choke

College is already using energy efficient LED lights at most of the places. Further Energy saving can be achieved in energy consumption of Lighting by following measures.

1. Replacement of Tube Light with copper choke Fitting 36 W with LED tube light 18 W.

By implementing above suggested measures, there is potential of energy saving of about **2145 kWh/annum** costing **Rs. 29744/- per annum** with payback period of **15 months.**

- Lux level is found low at following location:-
  - Principle Room
  - Smart class Room-1
  - Administrative Office
  - Computer Room
  - Pharmacology Lab
  - Practical Chemistry Room
  - Smart class Room-3
  - Library
  - Pharmaceutics R. Lab.

Proper Lighting arrangement should be done for sufficient illumination.

❒ **Saving in Ceiling Fan**

Energy saving can be achieved by replacement of Existing Fans by Energy Efficient Brushless DC motors fans.

By implementing the measures, there is potential of energy saving of about **6037 kWh per annum** which will save **Rs. 83735/- per annum** with approximate investment of **Rs. 310000/-.**

❒ **Energy Monitoring, Awareness and Participation of end user in Energy Management Systems**

Energy Monitoring and awareness of operating staff & officers towards the Energy management is very important. **"You cannot manage what you don't measure and what you do not understand".**

Awareness, trainings and participation of Technical O & M staff and users who are directly controlling energy consuming equipment's, will definitely improve the energy efficiency because though energy is consumed by technical systems, But technical systems are operated by people. People can dramatically influence the level of energy consumption.

1. Introduction

1.1 Preamble

The energy audit is a feasibility study. It not only serves to identify energy use among the various services and to identify opportunities for energy conservation, but it is also a crucial first step in establishing an energy management programme. The audit will produce the data on which such a programme is based. The study should reveal to the owner, manager, or management team of utility the options available for reducing energy waste, the costs involved, and the benefits achievable from implementing those energy-conserving opportunities (ECOs).

1.2 Objectives

The main objective of this energy audit is to identify the energy conservation opportunities and to evolve measures to minimize energy losses so that energy utilization could be improved and the specific energy consumption can be reduced further.
The report also contains observations and recommendations to minimize the Energy loss, to reduce energy cost and to reduce building down time.

1.3 Introduction:

The energy audit is a systematic study for controlling energy consumption pattern. It is to reduce waste of energy and money to the minimum permitted by the climate. It establishes and maintains an efficient balance between annual functional energy requirements and its annual actual energy consumption.

1.4 Detail of Electrical System:-

Table No. 1.1:

Description	Details
Supply Voltage	11 KV
Contract Demand	200 KVA
Transformer Rating	200 KVA
Solar Power Plant Capacities in KW	
Solar Power plant capacity	200 KW

2. Study of Power Parameters

Measurement of Power parameter, Voltage & Current unbalance & Harmonics

Data logging is carried out for different power parameters like voltage, current, PF, kW, Current unbalance, Voltage unbalance, THD, etc.

2.1. About Instruments:-

We have used highly sophisticated instrument ALM 35 from Krycard for the purpose of different power parameters measurement & data logging.

2.2. About Harmonics

What are Harmonics?

In electrical system, Harmonics are multiples of fundamental frequency (i.e.50 or 60 Hz). In simple terminology, it is also known as distortion in sinusoidal waveforms of voltage & current.

What are the sources of Harmonics?

Non-linear loads are principal sources of harmonics, as they draw current that is not proportional to the applied Voltage.

When current is driven by a sinusoidal voltage that is applied across a linear resistance, all of the current flow occurs at the fundamental frequency. In this case there will not be any harmonics.

2.3. Harmonics and their limits as per IEEE for current and voltage:

Harmonics are generated due to the presence of non-linear switching loads such as UPS, VFD, Thyristor drives, display units, PAC, and HVAC controls in the circuit. Harmonics, when exceeding a certain limit in a system cause undesirable effects. The undesirable effects caused by the presence of harmonics are malfunctioning of protective relay equipment, de-rating of equipment capacity, premature failure due to increased stress on the electrical system, energy loss etc.

The presence of higher harmonics affects the power factor negatively and increases the KVA demand requirement for any KW load

IEEE 519 standards specify the limit for both voltage and current harmonics. The current harmonics limit depends on the ratio of Short Circuit Current (SCC) at PCC to average Load Current of maximum demand over 1 year. Thus the current harmonic limit is a function of system design. Also the voltage harmonics depends on the bus voltage. Typically, the voltage harmonic limit at 415V bus is 5%.

Excessive harmonic currents can overload wiring and transformers, leading to additional losses. Therefore, it is necessary to maintain the harmonics levels in the electrical system as recommended in the IEEE 519 standards.

The permissible limit for voltage harmonics varies with the voltage level of operation. Below Table 2.1 shows the permissible voltage harmonic limit in percentage for various distribution voltage levels.

Table No.: 2.1 Voltage Harmonic Levels for various Distribution Voltage Levels

Bus Voltage at PCC (kV)	Individual Harmonic Voltage Distortion (%)	Total Harmonic Voltage Distortion VT (%)
V ≤ 1.0 kV	5	8
1 kV < V ≤ 69 kV	3	5
69 kV < V ≤ 161 kV	1.5	2.5
161 kV < V	1	1.5

The permissible limit for current harmonics as per IEEE standards is specified in table 2.2 Current distortion limits for general distribution systems end user limits (From 120V to 69 kV)

Table No.: 2.2 Allowable Current Harmonic Distortions Limit for various Isc/IL ratios

Maximum harmonic current distortion in percent of *I*L						
Individual harmonic order (odd harmonics)[a,b]						
ISC/IL	3 ≤ h <11	11≤ h < 17	17 ≤ h < 23	23 ≤ h < 35	35 ≤ h ≤ 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 results 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.

2.4. Total harmonic distortion (THD)

The Total harmonic distortion (THD) of a signal is a measurement of the harmonic distortion present and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency.

❒ **Study of power parameters for Main Incomer is as follows:**

Table No. 2.3 First Measurement of Power Parameters for Main Incomer

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:05:00 AM	50.03	423.9	422.6	425.7	15.42	15.46	17.9	3.57	3.62	4.28	11.48	0.959
11:05:20 AM	50.04	423.2	421.8	425.1	15.98	15.45	17.96	3.73	3.62	4.29	11.64	0.962
11:05:40 AM	50.04	423.9	422	425.9	15.91	15.44	17.92	3.71	3.62	4.29	11.62	0.962
11:06:00 AM	50.03	424.2	422.1	425.4	15.86	15.43	17.91	3.70	3.61	4.28	11.60	0.961
11:06:20 AM	50.02	424.8	422.6	426.3	16.25	15.44	17.92	3.76	3.61	4.29	11.67	0.958
11:06:40 AM	50.02	423.4	422	425.3	18.1	15.45	17.93	4.11	3.61	4.28	12.00	0.953
11:07:00 AM	50.01	422.9	421.8	424.3	20.85	15.43	18.03	4.85	3.62	4.28	12.75	0.961
11:07:20 AM	50.01	423.3	422	424.3	22.21	15.74	18.08	5.21	3.69	4.29	13.19	0.963
11:07:40 AM	50.03	423.4	422	425.1	22.66	17.67	18.11	5.31	4.14	4.30	13.75	0.962
11:08:00 AM	50.02	422.9	421.3	424.4	22.58	18.44	18.13	5.29	4.31	4.30	13.90	0.962
11:08:20 AM	50.01	422.2	420.5	424	22.54	19.43	18.16	5.27	4.52	4.30	14.09	0.961
11:08:40 AM	50.02	422.8	421.6	424.8	22.54	19.49	18.17	5.27	4.54	4.31	14.12	0.96
11:09:00 AM	50.02	423.7	422	425.2	22.54	19.77	18.18	5.28	4.60	4.31	14.19	0.959
11:09:20 AM	50.03	423.2	422	424.6	22.77	19.93	18.18	5.31	4.63	4.31	14.26	0.958
11:09:40 AM	50.02	423	421.9	424.4	23.09	19.93	18.16	5.37	4.63	4.30	14.30	0.957
11:10:00 AM	50.02	423.3	422	424.9	23.12	19.93	18.15	5.38	4.63	4.31	14.31	0.957
11:10:20 AM	50.02	423.5	422.3	425.2	23.12	19.94	18.23	5.38	4.63	4.33	14.34	0.956
11:10:40 AM	50.01	424.3	423	425.9	23.17	19.98	18.93	5.40	4.64	4.48	14.51	0.954
11:11:00 AM	50.01	424.9	423.1	426.6	23.19	19.98	18.98	5.40	4.64	4.49	14.53	0.953
11:11:20 AM	50.02	423.7	421.9	425.4	23.08	19.94	18.94	5.37	4.62	4.47	14.46	0.954
11:11:40 AM	50.04	423.4	421.9	425.1	23.23	19.93	18.92	5.39	4.62	4.47	14.48	0.953
11:12:00 AM	50.04	423.9	422.4	425.2	23.69	19.95	18.94	5.50	4.63	4.47	14.60	0.954

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:12:20 AM	50.01	424.5	423.4	425.5	24.51	20.01	18.93	5.67	4.64	4.48	14.79	0.951
11:12:40 AM	50	425.1	424.1	426.4	24.92	20.03	18.93	5.76	4.65	4.49	14.89	0.95
11:13:00 AM	49.99	424.3	423.1	425.7	25.11	20	18.9	5.80	4.63	4.47	14.90	0.95
11:13:20 AM	49.99	423.3	422.1	424.9	25.56	19.98	18.86	5.86	4.62	4.45	14.93	0.949
11:13:40 AM	49.98	423.6	422.3	425.1	25.5	19.98	18.86	5.86	4.62	4.45	14.93	0.949
11:14:00 AM	49.96	424.2	423	425.9	25.5	20.02	18.88	5.86	4.63	4.46	14.95	0.948
11:14:20 AM	49.95	426.1	423.5	426.2	25.43	20.24	19.12	5.88	4.68	4.51	15.07	0.947
11:14:40 AM	49.96	424.9	422.1	424.2	25.35	20.19	19.25	5.85	4.66	4.53	15.04	0.949
11:15:00 AM	49.97	423.9	421.8	423.5	25.27	20.04	21.1	5.80	4.62	4.90	15.32	0.945
11:15:20 AM	49.97	424.6	421.9	423.9	25.22	20.15	24.3	5.79	4.61	5.71	16.11	0.944
11:15:40 AM	49.97	424.4	421.6	423.7	24.64	20.15	24.32	5.68	4.62	5.72	16.02	0.947
11:16:00 AM	49.98	424.3	421.6	423.5	24.65	20.21	24.59	5.69	4.63	5.78	16.10	0.948
11:16:20 AM	49.99	423.6	420.4	422.5	24.62	20.19	24.72	5.68	4.62	5.80	16.11	0.949
11:16:40 AM	50	424.1	420.3	422.8	24.67	20.21	24.88	5.69	4.62	5.84	16.16	0.948
11:17:00 AM	50.01	424.5	420.9	423.4	24.7	20.48	25.06	5.70	4.68	5.90	16.28	0.948
11:17:20 AM	50.02	424.5	421.2	423.3	25.85	20.92	25.17	5.96	4.76	5.92	16.63	0.945
11:17:40 AM	50.01	424.3	421.5	423.5	26.5	21	25.32	6.12	4.77	5.96	16.85	0.946
11:18:00 AM	50	423.9	421.5	422.9	27.3	20.99	25.45	6.30	4.77	5.99	17.06	0.946
11:18:20 AM	49.99	423.7	421.5	422.7	28.15	21	25.55	6.49	4.77	6.01	17.27	0.946
11:18:40 AM	49.98	423.4	421.2	422.4	28.15	20.95	25.68	6.48	4.76	6.04	17.28	0.946
11:19:00 AM	49.98	423.7	421.6	422.2	28.52	20.99	25.83	6.55	4.77	6.08	17.40	0.945
11:19:20 AM	49.98	422.8	420.9	421	31.13	20.97	25.97	7.15	4.76	6.10	18.01	0.946
11:19:40 AM	49.97	422.8	420.6	421.3	31.05	20.96	26.11	7.14	4.76	6.13	18.03	0.947
11:20:00 AM	49.96	423.5	420.8	421.8	31.07	20.98	26.22	7.15	4.76	6.17	18.08	0.946
11:20:20 AM	49.95	424.1	421.1	422.5	31.05	21.02	26.33	7.15	4.77	6.20	18.12	0.946
11:20:40 AM	49.96	424.7	421.1	422.8	31	21.05	26.41	7.16	4.78	6.22	18.15	0.945

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:21:00 AM	49.96	424.5	421.4	422.7	31.02	21.06	26.53	7.16	4.78	6.25	18.19	0.946
11:21:20 AM	49.96	424.8	421.4	423.5	31.14	21.07	26.63	7.19	4.78	6.29	18.26	0.946
11:21:40 AM	49.97	424.5	421.2	422.9	31.21	21.04	26.73	7.20	4.77	6.30	18.28	0.946
11:22:00 AM	49.97	424.3	420.8	422	31.87	21.91	27	7.33	4.99	6.36	18.68	0.947
11:22:20 AM	49.96	424	420.5	421.6	33.91	22.42	27.78	7.86	5.13	6.56	19.54	0.952
11:22:40 AM	49.96	423.7	420.1	421.3	36	23.18	28.47	8.39	5.37	6.71	20.47	0.958
11:23:00 AM	49.97	423.8	420.8	421.5	36.93	23.37	28.68	8.63	5.43	6.77	20.82	0.96
11:23:20 AM	49.97	424.3	420.8	422.3	36.87	23.82	28.73	8.62	5.56	6.79	20.97	0.961
11:23:40 AM	49.97	423.4	419.5	421.2	36.85	23.72	29.21	8.59	5.53	6.86	20.98	0.96
11:24:00 AM	49.97	423.6	419.6	421.4	36.71	23.74	28.97	8.57	5.53	6.82	20.93	0.961
11:24:20 AM	49.96	423	419.3	421.4	36.28	23.69	28.83	8.49	5.52	6.81	20.82	0.963
11:24:40 AM	49.94	423.7	419.9	422.2	37.13	23.79	28.71	8.71	5.55	6.79	21.05	0.963
11:25:00 AM	49.92	422.7	419.4	421.7	37.57	23.67	28.64	8.81	5.51	6.77	21.09	0.964
11:25:20 AM	49.91	423.1	419.3	421.7	37.52	23.62	28.66	8.80	5.51	6.77	21.07	0.964
11:25:40 AM	49.91	422.8	419.2	421.4	37.49	23.56	28.7	8.79	5.49	6.78	21.05	0.963
11:26:00 AM	49.92	422.5	419.4	421.5	37.41	23.52	28.73	8.76	5.48	6.79	21.03	0.964
11:26:20 AM	49.93	422.9	419.6	421.1	37.34	23.58	28.78	8.75	5.50	6.80	21.05	0.964
11:26:40 AM	49.94	422.3	419.1	420.3	37.33	23.56	28.82	8.74	5.49	6.80	21.03	0.965
11:27:00 AM	49.93	422	418.9	419.8	38.94	23.58	28.85	9.09	5.49	6.80	21.38	0.964
11:27:20 AM	49.93	421.9	419	419.6	40.7	23.58	28.88	9.49	5.49	6.80	21.78	0.963
11:27:40 AM	49.92	421.2	418.8	419	40.65	23.54	28.83	9.47	5.48	6.78	21.74	0.964
11:28:00 AM	49.91	421.3	418.9	419.3	40.71	23.57	28.83	9.49	5.49	6.79	21.77	0.964
11:28:20 AM	49.91	420.9	418.6	419.4	40.7	24.7	28.84	9.48	5.72	6.79	21.99	0.962
11:28:40 AM	49.9	420.9	418.6	419.4	40.67	25.96	28.86	9.46	6.02	6.79	22.27	0.962
11:29:00 AM	49.9	420.8	418.8	419.6	40.73	27.83	28.88	9.46	6.49	6.80	22.75	0.963
11:29:20 AM	49.9	420.3	418.7	419.6	40.62	27.67	28.87	9.43	6.45	6.81	22.69	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:29:40 AM	49.91	420.1	418.3	419.3	40.54	27.62	28.86	9.41	6.44	6.80	22.64	0.964
11:30:00 AM	49.91	420.1	418.2	419.7	40.85	27.61	28.91	9.48	6.43	6.81	22.73	0.964
11:30:20 AM	49.91	420.4	418.9	419.7	41.48	27.72	28.93	9.61	6.47	6.82	22.90	0.964
11:30:40 AM	49.91	419.8	418.6	419.3	42.46	27.72	28.95	9.83	6.47	6.81	23.11	0.964
11:31:00 AM	49.91	420	419.2	419.4	43.84	27.77	28.96	10.11	6.48	6.82	23.41	0.962
11:31:20 AM	49.91	419.6	418.8	418.9	43.82	27.73	28.97	10.10	6.47	6.81	23.38	0.962
11:31:40 AM	49.91	420.5	419.8	419.7	43.79	27.74	28.98	10.10	6.49	6.83	23.42	0.962
11:32:00 AM	49.91	420	419.1	418.7	43.7	27.68	28.94	10.07	6.47	6.80	23.35	0.962
11:32:20 AM	49.89	420.2	419.5	419	43.71	27.72	28.96	10.08	6.48	6.82	23.37	0.962
11:32:40 AM	49.88	420.1	419.8	419.1	43.38	27.71	28.97	10.02	6.48	6.82	23.32	0.963
11:33:00 AM	49.88	420.1	419.6	419	43.23	27.68	31.4	9.99	6.46	7.39	23.84	0.962
11:33:20 AM	49.88	419.4	419	418.6	43.26	28.16	31.73	9.98	6.55	7.46	24.00	0.962
11:33:40 AM	49.87	419.5	418.8	418.7	44.55	29.03	31.76	10.30	6.74	7.46	24.50	0.962
11:34:00 AM	49.87	419.7	419.2	418.5	45.54	29.03	31.82	10.54	6.75	7.47	24.76	0.962
11:34:20 AM	49.85	419.4	419.2	418.8	45.48	28.96	31.83	10.52	6.73	7.48	24.73	0.962
11:34:40 AM	49.85	419.3	419	419	45.41	28.93	31.83	10.51	6.72	7.48	24.71	0.962
11:35:00 AM	49.85	419.1	418.4	418.6	45.36	28.89	31.81	10.49	6.71	7.46	24.67	0.962
11:35:20 AM	49.86	419.6	418.5	418.4	45.37	28.89	31.82	10.50	6.72	7.46	24.68	0.962
11:35:40 AM	49.87	419.9	418.8	418.6	45.46	28.9	31.82	10.53	6.72	7.47	24.72	0.962
11:36:00 AM	49.87	419.7	418.7	418.9	45.74	28.86	31.86	10.60	6.71	7.48	24.79	0.962
11:36:20 AM	49.87	419.4	419	418.6	45.75	28.84	31.74	10.60	6.71	7.44	24.75	0.962
11:36:40 AM	49.87	419.6	419.4	418.8	45.67	28.91	31.75	10.58	6.73	7.44	24.76	0.962
11:37:00 AM	49.87	419.3	419.3	418.8	45.59	28.87	31.75	10.56	6.72	7.44	24.73	0.962
11:37:20 AM	49.87	419.2	418.8	418.8	45.66	28.82	31.72	10.58	6.70	7.44	24.72	0.962
11:37:40 AM	49.88	419.5	418.4	418.2	45.6	28.87	31.73	10.57	6.72	7.42	24.71	0.963
11:38:00 AM	49.89	419.7	418.4	418.2	45.59	28.85	31.74	10.57	6.72	7.43	24.72	0.962

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:38:20 AM	49.88	420.1	418.2	418.3	45.57	28.9	31.72	10.58	6.73	7.42	24.72	0.962
11:38:40 AM	49.87	420.1	418.2	419	45.61	28.87	31.72	10.59	6.72	7.43	24.74	0.963
11:39:00 AM	49.87	419.9	417.6	418.5	46.25	28.89	31.69	10.71	6.72	7.41	24.84	0.962
11:39:20 AM	49.87	420.5	418.1	419.2	46.05	28.9	31.71	10.67	6.72	7.43	24.82	0.961
11:39:40 AM	49.88	419.8	417.9	418.7	45.87	28.86	31.7	10.61	6.71	7.42	24.74	0.961
11:40:00 AM	49.9	419.4	417.9	418.1	45.76	28.87	31.68	10.58	6.71	7.41	24.71	0.962
11:40:20 AM	49.9	419.7	418.4	418.9	45.75	28.86	31.71	10.59	6.72	7.43	24.73	0.962
11:40:40 AM	49.89	419.8	418.1	418.5	45.66	28.88	31.7	10.57	6.72	7.41	24.70	0.961
11:41:00 AM	49.89	419.2	417.7	418.3	45.58	28.78	31.7	10.53	6.69	7.41	24.64	0.962
11:41:20 AM	49.88	419.3	417.7	418.2	45.05	28.77	31.69	10.44	6.69	7.41	24.54	0.962
11:41:40 AM	49.89	419.7	417.7	418.3	45.04	28.78	31.73	10.45	6.69	7.42	24.56	0.963
11:42:00 AM	49.89	419.6	418	418.5	45.03	28.81	31.72	10.45	6.71	7.42	24.58	0.963
11:42:20 AM	49.9	420	418.7	419	45.04	28.83	31.75	10.46	6.72	7.44	24.62	0.963
11:42:40 AM	49.89	419.4	418.3	418.5	45.15	28.72	31.7	10.47	6.68	7.42	24.57	0.963
11:43:00 AM	49.89	420.1	418.8	418.6	45.11	28.82	31.71	10.47	6.71	7.42	24.61	0.963
11:43:20 AM	49.9	420.6	419.2	418.9	45.21	28.91	31.73	10.51	6.74	7.44	24.68	0.963
11:43:40 AM	49.89	420.3	419.4	418.3	48.43	29.02	31.85	11.33	6.78	7.43	25.54	0.964
11:44:00 AM	49.88	420.1	419	418.1	46.06	29	31.87	10.72	6.77	7.45	24.94	0.964
11:44:20 AM	49.88	420	419.2	418	46.76	29.07	31.95	10.90	6.79	7.46	25.16	0.964
11:44:40 AM	49.88	420	418.9	418.1	46.31	29.04	31.96	10.78	6.78	7.47	25.04	0.964
11:45:00 AM	49.89	420.1	419	418.5	45.93	29.04	31.96	10.69	6.78	7.48	24.95	0.964
11:45:20 AM	49.9	420.2	419.4	418.6	45.24	29.08	31.98	10.52	6.79	7.49	24.80	0.963
11:45:40 AM	49.9	421.5	420.6	420	45.99	29.12	31.99	10.73	6.82	7.52	25.06	0.963
11:46:00 AM	49.89	421.3	420.4	420.7	46.46	29.06	31.97	10.86	6.79	7.52	25.17	0.963
11:46:20 AM	49.88	420.5	419.2	419.7	46.56	28.98	31.95	10.87	6.76	7.49	25.12	0.964
11:46:40 AM	49.88	420.5	418.9	419.2	45.96	28.98	31.93	10.71	6.76	7.48	24.96	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:47:00 AM	49.88	421.1	419.6	419.8	46.38	29.04	31.96	10.83	6.79	7.50	25.12	0.964
11:47:20 AM	49.9	421.1	419.4	420	46.13	29.01	31.9	10.76	6.77	7.50	25.03	0.963
11:47:40 AM	49.9	421.2	419.8	420.4	47.18	29.04	31.91	11.00	6.78	7.50	25.28	0.963
11:48:00 AM	49.89	421.3	419.8	420.6	46.62	29.04	31.92	10.86	6.78	7.51	25.15	0.962
11:48:20 AM	49.88	421.5	420.2	420.7	46.74	29.07	31.94	10.89	6.79	7.51	25.20	0.962
11:48:40 AM	49.88	421.1	419.7	420.4	45.93	29.02	31.88	10.67	6.77	7.50	24.94	0.962
11:49:00 AM	49.89	420.2	418.9	419.6	46.15	28.97	31.89	10.71	6.75	7.49	24.95	0.963
11:49:20 AM	49.91	421.3	419.8	420.6	46.13	29.01	31.89	10.73	6.77	7.51	25.01	0.962
11:49:40 AM	49.9	422.2	420.3	421.1	46.17	29.06	31.92	10.75	6.79	7.51	25.06	0.962
11:50:00 AM	49.9	422.9	420.3	421.4	45.72	29.06	31.91	10.69	6.80	7.51	25.00	0.963
11:50:20 AM	49.9	422.3	420.1	420.9	45.38	29.03	31.89	10.59	6.79	7.50	24.89	0.963
11:50:40 AM	49.91	421.7	419.1	420	45.26	29	31.87	10.55	6.78	7.48	24.81	0.963
11:51:00 AM	49.92	422.1	419.7	420.5	45.28	29.01	31.9	10.57	6.78	7.50	24.85	0.963
11:51:20 AM	49.93	422.5	420.5	421.1	45.23	29.02	31.93	10.56	6.80	7.52	24.88	0.963
11:51:40 AM	49.92	421.6	419.2	420.2	45.17	28.97	31.9	10.53	6.77	7.50	24.80	0.963
11:52:00 AM	49.92	421	419.6	420.4	45.23	28.94	32	10.54	6.77	7.53	24.83	0.964
11:52:20 AM	49.92	420.8	420.1	420.5	45.23	28.91	32.19	10.53	6.76	7.59	24.88	0.964
11:52:40 AM	49.92	420.9	420.2	420.5	45.22	28.91	32.18	10.53	6.76	7.58	24.87	0.964
11:53:00 AM	49.92	421.5	421.5	421.2	45.29	28.92	32.19	10.54	6.78	7.61	24.93	0.963
11:53:20 AM	49.93	421	420.7	420.9	45.23	28.86	32.15	10.52	6.76	7.59	24.87	0.964
11:53:40 AM	49.95	420.8	420.2	420.6	45.19	28.85	31.99	10.51	6.76	7.56	24.83	0.965
11:54:00 AM	49.98	421.1	420.1	420.6	45.21	28.84	32.12	10.52	6.76	7.58	24.86	0.964
11:54:20 AM	50.01	421.4	420	420.4	45.22	28.82	32.15	10.53	6.75	7.58	24.87	0.964
11:54:40 AM	50.04	421.7	420.5	421	45.28	28.82	32.17	10.55	6.76	7.60	24.91	0.964
11:55:00 AM	50.06	422.5	421.6	422.1	45.33	28.88	32.22	10.58	6.78	7.63	24.99	0.964
11:55:20 AM	50.07	422.8	422.4	422.3	45.3	28.92	32.22	10.58	6.80	7.64	25.02	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
11:55:40 AM	50.07	422.7	422.3	422.3	45.32	28.95	32.23	10.59	6.81	7.64	25.03	0.964
11:56:00 AM	50.08	421.2	421.1	420.9	45.65	29.13	32.19	10.62	6.83	7.61	25.06	0.964
11:56:20 AM	50.08	421.7	421.4	421.8	45.92	29.59	32.2	10.68	6.92	7.62	25.21	0.962
11:56:40 AM	50.07	421.7	421.3	421.8	45.95	29.62	31.92	10.69	6.92	7.56	25.17	0.963
11:57:00 AM	50.06	422.2	422.3	422.2	45.84	29.63	31.78	10.66	6.94	7.55	25.16	0.963
11:57:20 AM	50.03	420.8	420.9	420.7	45.72	29.53	31.76	10.60	6.90	7.52	25.02	0.963
11:57:40 AM	50	420.6	420.7	420.3	45.67	29.53	31.77	10.58	6.90	7.52	25.00	0.963
11:58:00 AM	50	421.3	421.3	420.9	45.71	29.59	32.53	10.60	6.92	7.72	25.24	0.963
11:58:20 AM	50	422	422	421.6	45.41	29.6	31.87	10.56	6.94	7.56	25.06	0.963
11:58:40 AM	49.99	423	423.3	422.9	45.19	29.65	31.83	10.54	6.96	7.57	25.08	0.963
11:59:00 AM	49.99	421.8	422.2	421.7	45.09	29.57	31.79	10.50	6.93	7.54	24.98	0.964
11:59:20 AM	49.98	421.7	421.8	421.5	45.15	29.57	31.8	10.51	6.93	7.54	24.98	0.963
11:59:40 AM	49.97	421	421.1	421.1	45.21	29.52	31.76	10.52	6.91	7.52	24.94	0.964
12:00:00 PM	49.96	420.7	420.9	420.4	45.12	29.52	31.76	10.48	6.90	7.52	24.90	0.964
12:00:20 PM	49.94	421.6	421.6	420.9	45.09	29.58	31.79	10.49	6.93	7.53	24.95	0.963
12:00:40 PM	49.93	421.9	422.2	421.6	45.14	29.58	31.82	10.51	6.93	7.54	24.98	0.963
12:01:00 PM	49.93	421.8	422.6	421.7	45.14	29.59	31.83	10.51	6.93	7.55	24.99	0.963
12:01:20 PM	49.92	421.5	422.3	421.3	45.06	29.59	31.82	10.48	6.93	7.55	24.96	0.963
12:01:40 PM	49.92	420.9	421.6	420.6	45.03	29.57	31.82	10.47	6.92	7.53	24.92	0.964
12:02:00 PM	49.92	420.2	421.3	419.9	45.2	29.57	32.34	10.49	6.92	7.65	25.07	0.964
12:02:20 PM	49.93	421.5	422.4	421.5	45.44	29.63	32.11	10.58	6.94	7.62	25.14	0.964
12:02:40 PM	49.91	421.4	421.6	421.1	45.36	29.62	31.85	10.56	6.93	7.54	25.04	0.963
12:03:00 PM	49.89	421.2	421.7	421.3	45.43	29.54	31.84	10.57	6.91	7.54	25.03	0.963
12:03:20 PM	49.88	421.4	421.8	421.8	45.61	29.54	32.41	10.62	6.90	7.69	25.22	0.963
12:03:40 PM	49.88	421.5	420.9	421.7	45.65	29.47	31.76	10.63	6.88	7.53	25.04	0.963
12:04:00 PM	49.88	420	419.2	420.3	45.57	29.36	31.71	10.59	6.83	7.49	24.91	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:04:20 PM	49.87	420.3	419.4	420.3	45.81	29.42	31.73	10.64	6.85	7.50	24.99	0.963
12:04:40 PM	49.86	421.4	420.5	421.2	46.36	29.62	32.35	10.77	6.90	7.66	25.34	0.962
12:05:00 PM	49.86	421.4	421.3	421.9	46.37	29.61	31.78	10.77	6.91	7.54	25.22	0.962
12:05:20 PM	49.87	422.1	421.9	422.7	46.37	29.6	31.78	10.79	6.92	7.55	25.25	0.962
12:05:40 PM	49.87	421.3	421	421.5	46.15	29.58	32.25	10.72	6.90	7.65	25.27	0.962
12:06:00 PM	49.88	421.5	421.3	421.3	45.93	29.56	31.85	10.66	6.90	7.54	25.11	0.962
12:06:20 PM	49.86	421.5	420.7	421.3	45.81	29.49	31.71	10.63	6.88	7.51	25.02	0.962
12:06:40 PM	49.86	420.6	419.7	420.4	45.62	29.41	31.69	10.58	6.85	7.49	24.92	0.962
12:07:00 PM	49.88	421.4	420.2	421.4	45.27	29.51	31.69	10.55	6.87	7.51	24.93	0.963
12:07:20 PM	49.89	421.3	420.6	421.6	45.27	29.55	31.7	10.55	6.89	7.51	24.95	0.963
12:07:40 PM	49.88	421.9	420.6	422.1	45.33	29.54	31.7	10.57	6.89	7.52	24.98	0.963
12:08:00 PM	49.88	421.1	419.6	421.3	45.27	29.53	31.68	10.55	6.87	7.50	24.92	0.963
12:08:20 PM	49.88	420.6	419.1	419.9	45.15	28.97	31.68	10.51	6.77	7.48	24.75	0.965
12:08:40 PM	49.88	421.4	419.9	420.8	45.24	28.9	31.67	10.54	6.76	7.49	24.79	0.965
12:09:00 PM	49.91	422.5	420.6	422.3	45.47	28.86	31.7	10.61	6.76	7.53	24.90	0.965
12:09:20 PM	49.93	422.8	421.8	422.8	45.38	28.93	31.72	10.60	6.79	7.54	24.93	0.964
12:09:40 PM	49.94	422.3	421.2	422.4	45.37	28.87	31.72	10.59	6.77	7.54	24.90	0.965
12:10:00 PM	49.96	420.4	419.2	420.4	45.28	28.76	31.66	10.54	6.72	7.49	24.75	0.966
12:10:20 PM	49.96	422	420.7	421.3	45.34	28.87	31.69	10.57	6.77	7.51	24.85	0.965
12:10:40 PM	49.96	422.1	420.7	421.4	45.26	28.89	31.69	10.56	6.77	7.51	24.84	0.965
12:11:00 PM	49.97	423	421.6	422.7	45.35	28.97	31.69	10.60	6.79	7.54	24.93	0.964
12:11:20 PM	49.98	423.2	421.7	422.8	45.4	28.98	31.7	10.62	6.80	7.54	24.96	0.964
12:11:40 PM	50	422	420.8	421.5	45.33	28.92	31.68	10.59	6.77	7.52	24.87	0.965
12:12:00 PM	49.99	422.9	421.6	422.1	45.84	29.07	31.69	10.71	6.82	7.52	25.05	0.964
12:12:20 PM	49.98	423	421.4	422.4	46.05	29.05	31.69	10.76	6.81	7.52	25.08	0.963
12:12:40 PM	49.97	422.7	421.4	422.4	45.99	29.03	31.7	10.73	6.80	7.53	25.06	0.963

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:13:00 PM	49.98	422.8	421.8	422.3	45.96	29.04	31.7	10.73	6.81	7.53	25.06	0.964
12:13:20 PM	49.99	423.2	421.9	422.9	46.03	29.04	31.71	10.75	6.81	7.54	25.10	0.963
12:13:40 PM	49.98	423.1	422.1	423	45.95	29.05	31.73	10.73	6.81	7.54	25.09	0.963
12:14:00 PM	49.96	423.4	422.5	423.3	45.88	29.07	31.72	10.72	6.82	7.55	25.09	0.963
12:14:20 PM	49.96	422.5	421.5	422.8	45.91	28.97	31.71	10.71	6.78	7.54	25.03	0.964
12:14:40 PM	49.95	422.6	421.5	423	45.5	28.91	31.7	10.64	6.77	7.54	24.94	0.964
12:15:00 PM	49.95	421.1	419.9	421.6	45.38	28.8	31.68	10.59	6.73	7.51	24.83	0.965
12:15:20 PM	49.96	422.6	421.3	423.1	45.48	28.89	31.7	10.64	6.76	7.54	24.94	0.964
12:15:40 PM	49.96	422.5	421.3	422.9	45.41	28.93	31.73	10.62	6.78	7.55	24.94	0.965
12:16:00 PM	49.95	422.2	420.8	422.3	45.31	28.98	31.72	10.59	6.78	7.53	24.91	0.965
12:16:20 PM	49.94	422.2	420.9	422.2	45.31	28.96	31.72	10.58	6.78	7.53	24.89	0.965
12:16:40 PM	49.94	422.3	421.5	422	48.09	29.02	31.8	11.31	6.81	7.54	25.66	0.967
12:17:00 PM	49.95	421.2	420.5	421.2	46.4	28.93	31.71	10.85	6.77	7.51	25.14	0.966
12:17:20 PM	49.95	422.1	421.4	422.3	46.34	28.92	31.71	10.85	6.78	7.54	25.16	0.965
12:17:40 PM	49.95	422.4	421.5	422.3	45.71	28.96	31.71	10.69	6.79	7.54	25.01	0.965
12:18:00 PM	49.95	423	421.8	422.7	45.88	29.38	31.73	10.73	6.90	7.55	25.19	0.965
12:18:20 PM	49.95	422.9	421.7	422.8	45.88	28.98	31.72	10.74	6.80	7.55	25.09	0.965
12:18:40 PM	49.95	422.7	421.9	423.3	45.78	29.01	31.7	10.71	6.80	7.56	25.07	0.965
12:19:00 PM	49.95	422.2	422.4	423.6	46.03	28.96	31.73	10.77	6.80	7.57	25.13	0.965
12:19:20 PM	49.94	420.8	421.2	422.6	45.83	28.88	31.72	10.69	6.76	7.55	25.01	0.966
12:19:40 PM	49.95	421.1	421.4	422.5	46.57	28.95	31.74	10.89	6.78	7.55	25.22	0.966
12:20:00 PM	49.95	421.8	422.2	423	46.87	28.98	31.76	10.95	6.80	7.56	25.32	0.965
12:20:20 PM	49.94	422.1	422.6	423.3	46.81	29.03	31.76	10.92	6.82	7.57	25.31	0.964
12:20:40 PM	49.94	423	423.4	424.4	46.46	29.07	32.48	10.84	6.83	7.77	25.44	0.964
12:21:00 PM	49.94	424.8	424.2	424.7	46.14	29.33	31.81	10.82	6.90	7.59	25.31	0.963
12:21:20 PM	49.95	422.3	423.1	423.6	46.15	29.05	31.78	10.75	6.83	7.58	25.16	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:21:40 PM	49.95	422.4	423.5	423.9	46.46	29	32.58	10.83	6.82	7.79	25.43	0.964
12:22:00 PM	49.95	421.5	422.3	423.1	46.25	28.89	32.4	10.76	6.78	7.73	25.27	0.964
12:22:20 PM	49.94	421.5	422.1	423	45.98	28.87	32.17	10.70	6.77	7.68	25.15	0.964
12:22:40 PM	49.93	421.9	422.6	423.2	45.48	28.89	31.79	10.60	6.79	7.59	24.98	0.965
12:23:00 PM	49.93	422.4	423.3	423.6	45.51	28.95	31.79	10.61	6.81	7.59	25.02	0.964
12:23:20 PM	49.94	422.3	422.9	423.2	45.4	28.93	31.75	10.58	6.80	7.58	24.96	0.965
12:23:40 PM	49.94	422.2	422.8	423.4	45.48	28.93	31.75	10.60	6.80	7.58	24.98	0.965
12:24:00 PM	49.95	422.5	423.1	423.7	45.46	28.91	31.76	10.61	6.80	7.59	25.00	0.965
12:24:20 PM	49.95	422.2	422.7	423.2	45.44	28.91	31.77	10.60	6.80	7.58	24.98	0.965
12:24:40 PM	49.96	422.4	422.5	423.1	45.38	28.9	31.78	10.59	6.79	7.58	24.96	0.965
12:25:00 PM	49.96	422.7	423.1	424.1	45.5	28.93	31.78	10.63	6.80	7.60	25.03	0.965
12:25:20 PM	49.97	422.9	423.2	424.7	45.58	28.93	31.77	10.66	6.80	7.60	25.06	0.965
12:25:40 PM	49.97	421.8	421.7	423.8	45.53	28.87	31.71	10.63	6.76	7.57	24.97	0.965
12:26:00 PM	49.98	422.8	423	425.1	45.64	28.93	31.75	10.68	6.79	7.60	25.07	0.964
12:26:20 PM	49.97	422.4	422.6	424.3	45.55	28.95	31.74	10.65	6.80	7.59	25.03	0.965
12:26:40 PM	49.97	422.7	423	424	45.45	28.97	31.76	10.62	6.81	7.59	25.02	0.964
12:27:00 PM	49.98	422.1	422.2	423.4	45.4	28.94	31.74	10.61	6.79	7.57	24.96	0.965
12:27:20 PM	49.97	422.1	421.9	423.1	45.39	28.93	31.73	10.60	6.79	7.56	24.95	0.965
12:27:40 PM	49.96	422.3	421.9	423.2	45.46	28.94	31.72	10.62	6.79	7.56	24.97	0.965
12:28:00 PM	49.96	423.4	422.9	424.2	45.66	29.02	31.75	10.69	6.82	7.58	25.09	0.964
12:28:20 PM	49.97	423.8	423.8	424.8	46.26	29.07	31.77	10.81	6.84	7.60	25.24	0.963
12:28:40 PM	49.97	422.4	422.2	423	46.07	29.03	32.79	10.74	6.81	7.82	25.37	0.964
12:29:00 PM	49.95	422.1	421.6	422	45.99	29.07	33.54	10.71	6.81	8.00	25.51	0.965
12:29:20 PM	49.94	421.9	421.4	422.1	46.34	29.07	32.02	10.79	6.81	7.62	25.23	0.965
12:29:40 PM	49.95	421.7	421.5	422.5	46.37	29.07	32.32	10.80	6.81	7.70	25.31	0.965
12:30:00 PM	49.96	421.8	421.4	422.7	46.3	29.05	32.02	10.79	6.81	7.63	25.23	0.965

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:30:20 PM	49.96	423.3	422.8	424.2	46.43	29.14	32.05	10.85	6.84	7.66	25.35	0.964
12:30:40 PM	49.95	423.1	422.6	424.1	45.84	29.09	32.03	10.74	6.82	7.65	25.22	0.965
12:31:00 PM	49.94	422.7	421.7	423.6	45.87	29.09	32.01	10.75	6.81	7.64	25.20	0.965
12:31:20 PM	49.94	423.1	422.4	424.1	45.92	29.08	32.04	10.76	6.82	7.65	25.24	0.965
12:31:40 PM	49.95	421.7	421	422.6	45.81	29.04	32.02	10.71	6.79	7.63	25.13	0.966
12:32:00 PM	49.95	422.2	421.6	423.3	45.9	29.08	33.23	10.75	6.81	7.91	25.47	0.965
12:32:20 PM	49.95	422.7	421.4	423	45.99	29.1	35.19	10.78	6.80	8.35	25.93	0.964
12:32:40 PM	49.95	422.3	421.3	422.2	45.89	29.09	35.06	10.74	6.80	8.31	25.85	0.964
12:33:00 PM	49.94	423.6	422.7	423	45.88	29.14	35.1	10.76	6.83	8.33	25.92	0.963
12:33:20 PM	49.94	422.1	421.3	421.8	45.67	29.03	35.09	10.68	6.79	8.31	25.78	0.964
12:33:40 PM	49.95	422.5	421.5	422.4	45.42	29.09	35.09	10.62	6.81	8.32	25.75	0.964
12:34:00 PM	49.96	422.8	421.8	422.5	45.49	29.15	35.08	10.64	6.83	8.32	25.79	0.963
12:34:20 PM	49.97	422.9	421.7	422.3	45.54	29.16	35.1	10.65	6.83	8.33	25.81	0.964
12:34:40 PM	49.96	422.6	421.4	421.8	45.47	29.17	35.08	10.62	6.83	8.32	25.78	0.964
12:35:00 PM	49.96	422.3	421.1	421.4	45.48	29.74	35.08	10.61	6.97	8.31	25.90	0.964
12:35:20 PM	49.96	422.6	421.2	422.1	45.47	29.95	35.11	10.61	7.02	8.33	25.96	0.964
12:35:40 PM	49.96	421.4	420.4	421.5	45.49	30.6	35.13	10.60	7.14	8.32	26.06	0.964
12:36:00 PM	49.97	421.4	420.3	421.4	45.6	30.62	35.11	10.63	7.14	8.31	26.08	0.963
12:36:20 PM	49.98	421.5	420	421	45.6	30.62	35.1	10.63	7.13	8.30	26.07	0.963
12:36:40 PM	49.97	421.9	420.6	421.5	46.34	30.64	35.11	10.78	7.14	8.31	26.24	0.962
12:37:00 PM	49.96	420.8	419.6	420.8	46.17	30.59	35.06	10.72	7.12	8.29	26.13	0.962
12:37:20 PM	49.96	420.4	419.2	420.4	46.16	30.58	35.08	10.71	7.11	8.29	26.11	0.963
12:37:40 PM	49.96	420	418.7	420.5	46.24	30.54	35.09	10.72	7.09	8.29	26.10	0.962
12:38:00 PM	49.95	422.2	419.2	420.4	46.05	30.89	35.09	10.75	7.18	8.26	26.19	0.962
12:38:20 PM	49.95	423.9	420.8	421.6	46.12	31.05	35.11	10.79	7.24	8.28	26.32	0.961
12:38:40 PM	49.95	423.3	419.6	420.8	46.12	30.92	35.06	10.78	7.20	8.26	26.24	0.962

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:39:00 PM	49.95	423.1	419.8	421.1	45.56	30.87	35.07	10.67	7.19	8.27	26.13	0.962
12:39:20 PM	49.95	424	420.8	422	45.49	30.97	35.11	10.68	7.22	8.29	26.20	0.962
12:39:40 PM	49.95	423.2	420.4	421.4	45.49	30.95	35.08	10.67	7.21	8.28	26.16	0.963
12:40:00 PM	49.97	423.1	420.3	421.4	45.43	30.92	35.08	10.65	7.20	8.28	26.13	0.963
12:40:20 PM	49.96	423.1	420.6	421.4	45.42	30.94	35.07	10.65	7.21	8.28	26.14	0.963
12:40:40 PM	49.95	422.3	419.7	420.4	45.42	30.89	35.06	10.63	7.19	8.26	26.08	0.963
12:41:00 PM	49.94	422.3	419.8	419.9	45.21	30.92	35.08	10.58	7.20	8.26	26.04	0.963
12:41:20 PM	49.93	422	419.9	419.9	45.12	30.88	35.09	10.55	7.20	8.26	26.00	0.963
12:41:40 PM	49.93	422	421	420.5	45.19	31.26	35.11	10.55	7.31	8.29	26.15	0.963
12:42:00 PM	49.91	420.8	419.4	418.5	45.11	31.3	35.06	10.50	7.31	8.24	26.05	0.964
12:42:20 PM	49.89	420.3	418.5	418.4	45.12	30.73	35.02	10.50	7.15	8.22	25.87	0.964
12:42:40 PM	49.88	420.3	418.5	418.6	45.18	30.76	35.01	10.52	7.15	8.22	25.90	0.964
12:43:00 PM	49.88	420.4	418.3	418.2	45.15	30.75	35.02	10.51	7.15	8.21	25.88	0.964
12:43:20 PM	49.89	420.3	418.1	418.2	45.17	30.71	35.06	10.52	7.14	8.22	25.88	0.964
12:43:40 PM	49.9	421	419.1	419.1	45.19	30.71	35.05	10.53	7.15	8.24	25.92	0.963
12:44:00 PM	49.9	420.9	419	419.3	45.18	30.71	35.04	10.53	7.15	8.24	25.92	0.964
12:44:20 PM	49.9	420.7	418.7	419	45.15	30.76	35.01	10.52	7.16	8.23	25.91	0.964
12:44:40 PM	49.9	420.5	418.5	418.8	45.25	30.71	35.01	10.54	7.14	8.22	25.91	0.964
12:45:00 PM	49.89	420.6	418.3	418.7	45.75	30.67	34.99	10.64	7.13	8.21	25.98	0.963
12:45:20 PM	49.89	421.8	419.5	419.4	45.88	30.79	35	10.68	7.17	8.23	26.08	0.962
12:45:40 PM	49.89	421.2	419.3	418.9	45.75	30.85	35.02	10.63	7.19	8.23	26.05	0.963
12:46:00 PM	49.9	421.1	418.9	419.2	45.8	30.87	34.99	10.65	7.19	8.22	26.06	0.963
12:46:20 PM	49.9	420.5	417.7	418.5	45.81	30.78	34.97	10.65	7.14	8.20	26.00	0.963
12:46:40 PM	49.92	420.4	417.2	418	45.79	30.68	34.96	10.65	7.11	8.19	25.96	0.963
12:47:00 PM	49.94	420.1	417.1	418.3	45.77	30.68	34.97	10.64	7.11	8.20	25.95	0.963
12:47:20 PM	49.93	419.9	416.9	418.1	45.58	30.62	34.93	10.61	7.11	8.19	25.90	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:47:40 PM	49.92	420.6	417.4	418.7	45.38	30.09	34.94	10.59	7.01	8.20	25.81	0.966
12:48:00 PM	49.92	421.2	417.6	418.9	45.32	30.04	34.95	10.59	7.00	8.20	25.80	0.965
12:48:20 PM	49.92	421.8	418	419.3	45.27	29.99	34.97	10.59	7.00	8.21	25.79	0.965
12:48:40 PM	49.92	422.5	419.1	420.5	45.31	30.07	34.96	10.61	7.03	8.23	25.87	0.964
12:49:00 PM	49.91	422.3	419.1	420.6	45.34	30.05	34.95	10.61	7.02	8.23	25.87	0.965
12:49:20 PM	49.92	421.4	418.7	419.6	45.23	30.04	34.97	10.57	7.01	8.23	25.81	0.965
12:49:40 PM	49.94	421.9	418.9	419.4	45.22	30.08	35.2	10.58	7.03	8.28	25.88	0.965
12:50:00 PM	49.95	423	419.6	420.2	45.32	30.11	35.98	10.62	7.04	8.48	26.14	0.965
12:50:20 PM	49.95	423.5	420.5	421.1	45.35	30.15	35.03	10.64	7.06	8.26	25.97	0.964
12:50:40 PM	49.95	423.1	420.5	420.8	45.29	30.18	34.99	10.62	7.07	8.25	25.94	0.965
12:51:00 PM	49.96	422.9	420.7	420.3	45.23	30.17	35.05	10.60	7.07	8.26	25.93	0.965
12:51:20 PM	49.96	423.2	420.9	420.5	45.21	30.15	35.08	10.60	7.07	8.27	25.94	0.965
12:51:40 PM	49.97	423.7	421.5	421.6	45.32	30.88	35.05	10.63	7.26	8.29	26.18	0.965
12:52:00 PM	49.99	423.5	421.2	421.4	45.29	30.25	35.06	10.63	7.10	8.28	26.01	0.965
12:52:20 PM	49.99	423.2	421.3	421	45.22	30.2	34.94	10.60	7.09	8.25	25.94	0.964
12:52:40 PM	49.99	423.6	421.5	421.2	45.28	30.19	34.99	10.62	7.10	8.26	25.98	0.965
12:53:00 PM	50	423.7	421.2	421.1	45.32	30.23	34.97	10.63	7.11	8.25	25.99	0.965
12:53:20 PM	50.02	424.1	421.4	421.2	45.73	30.19	34.96	10.72	7.10	8.25	26.07	0.964
12:53:40 PM	50.04	423.4	420.5	420.2	45.9	30.01	34.93	10.73	7.04	8.23	26.00	0.964
12:54:00 PM	50.05	423	420.2	420	45.76	29.95	34.92	10.69	7.02	8.22	25.93	0.964
12:54:20 PM	50.06	423.3	420.4	420.4	45.81	29.92	34.94	10.71	7.02	8.23	25.96	0.964
12:54:40 PM	50.07	423.4	421.2	421.3	45.89	29.9	34.93	10.74	7.02	8.24	26.00	0.963
12:55:00 PM	50.08	422.1	421	421.6	45.99	29.71	34.96	10.72	6.97	8.27	25.97	0.964
12:55:20 PM	50.09	422.3	421.5	421.9	45.91	29.76	34.95	10.71	6.99	8.28	25.98	0.964
12:55:40 PM	50.08	422.1	421.3	421.9	45.76	29.76	34.95	10.68	6.98	8.28	25.94	0.964
12:56:00 PM	50.08	422.6	421.4	422	45.36	29.77	34.97	10.61	6.99	8.29	25.89	0.965

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
12:56:20 PM	50.07	423	421.9	422.3	45.45	29.81	34.99	10.64	7.01	8.30	25.95	0.965
12:56:40 PM	50.06	422.8	421.9	422.6	45.56	29.8	35	10.67	7.00	8.30	25.97	0.965
12:57:00 PM	50.04	422.8	421.9	422.7	45.89	29.81	35	10.75	7.00	8.30	26.05	0.965
12:57:20 PM	50.03	422.9	421.4	422.3	45.87	29.81	34.96	10.74	7.00	8.28	26.03	0.965
12:57:40 PM	50.01	422.2	420.8	421.5	45.81	29.74	34.93	10.71	6.98	8.26	25.95	0.965
12:58:00 PM	49.99	420.9	420.6	421.2	45.48	29.56	28.75	10.61	6.95	6.79	24.35	0.966
12:58:20 PM	49.98	420.5	420	420.2	45.32	29.55	26.02	10.55	6.96	6.12	23.64	0.967
12:58:40 PM	49.97	418.9	418.3	418.2	45.26	29.4	25.97	10.51	6.91	6.09	23.50	0.967
12:59:00 PM	49.97	416.7	416.7	416.8	45.16	29.28	25.92	10.44	6.85	6.06	23.36	0.968
12:59:20 PM	49.97	419	419.7	419.7	45.26	29.43	26.05	10.51	6.92	6.13	23.57	0.967
12:59:40 PM	49.95	421.4	422.2	422.2	45.34	29.52	26.16	10.58	6.97	6.19	23.74	0.965
1:00:00 PM	49.94	422.5	423.2	423.1	45.35	29.67	26.21	10.60	7.02	6.21	23.83	0.965
1:00:20 PM	49.93	423	424.3	423.4	48.39	29.89	26.34	11.38	7.10	6.24	24.72	0.966
1:00:40 PM	49.94	423.1	424.1	424	46.23	29.88	26.28	10.83	7.09	6.24	24.16	0.965
1:01:00 PM	49.94	423.5	424.5	423.6	47.04	29.94	26.35	11.05	7.12	6.25	24.41	0.966
1:01:20 PM	49.95	422.9	423.4	422.1	46.7	29.92	26.93	10.94	7.10	6.34	24.39	0.966
1:01:40 PM	49.97	422.7	423.1	422	45.63	29.88	26.69	10.66	7.09	6.29	24.04	0.964
1:02:00 PM	49.98	422.7	423.4	422.1	45.83	29.94	26.64	10.67	7.10	6.28	24.05	0.963
1:02:20 PM	49.98	423.2	423.5	422.3	45.78	29.89	26.61	10.67	7.09	6.27	24.03	0.963
1:02:40 PM	49.97	423.2	423.9	422.5	45.89	29.92	26.63	10.69	7.10	6.28	24.08	0.963
1:03:00 PM	49.96	422.2	422.8	421.3	45.75	29.9	26.6	10.64	7.09	6.25	23.99	0.963
1:03:20 PM	49.96	421.6	422.7	421.2	45.81	29.88	26.6	10.65	7.08	6.26	23.98	0.964
1:03:40 PM	49.94	421.7	422.9	421.6	45.69	29.84	26.6	10.62	7.07	6.26	23.95	0.963
1:04:00 PM	49.93	422.5	423.9	422.7	45.64	29.91	26.65	10.62	7.09	6.29	24.00	0.962
1:04:20 PM	49.92	421.3	423.1	421.7	45.05	29.85	26.62	10.49	7.07	6.27	23.83	0.964
1:04:40 PM	49.92	418.6	420	418.5	44.8	29.96	26.48	10.38	7.06	6.20	23.64	0.966

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
1:05:00 PM	49.93	417.1	417.9	416.5	44.68	29.83	26.42	10.32	7.01	6.16	23.48	0.967
1:05:20 PM	49.93	418.2	419	417.7	44.77	29.83	26.46	10.36	7.02	6.18	23.56	0.966
1:05:40 PM	49.95	419.5	420.4	419.6	44.89	30.02	26.5	10.41	7.09	6.22	23.72	0.965
1:06:00 PM	49.97	419.7	420.7	420.3	44.34	30.34	26.5	10.32	7.18	6.24	23.74	0.968
1:06:20 PM	49.96	420.6	421.2	421	44.38	29.63	26.52	10.36	7.00	6.24	23.60	0.966
1:06:40 PM	49.97	420.8	421.7	421.3	44.38	29.63	26.53	10.36	7.01	6.25	23.62	0.966
1:07:00 PM	49.97	421.2	422.4	421.7	44.35	30.32	26.59	10.36	7.19	6.27	23.82	0.967
1:07:20 PM	49.98	421.8	423.2	422.6	44.39	30.47	26.64	10.38	7.24	6.30	23.92	0.967
1:07:40 PM	49.99	422.2	423.7	422.9	44.44	30.3	26.68	10.40	7.20	6.31	23.91	0.966
1:08:00 PM	49.99	422.2	423.5	422.6	44.49	30.21	26.68	10.42	7.18	6.30	23.90	0.966
1:08:20 PM	49.99	421.1	422.8	422.1	44.43	30.16	26.64	10.39	7.15	6.28	23.83	0.966
1:08:40 PM	50	422.1	423.6	422.9	44.34	30.15	26.67	10.39	7.16	6.30	23.85	0.966
1:09:00 PM	50.01	422.4	424	423.1	44.43	30.09	26.67	10.41	7.15	6.31	23.87	0.966
1:09:20 PM	50	421.6	423.6	422.8	44.35	29.78	26.63	10.38	7.06	6.30	23.74	0.966
1:09:40 PM	50	418.1	419.9	419.3	44.13	29.94	26.48	10.25	7.06	6.22	23.54	0.968
1:10:00 PM	50	417.1	418.1	417.5	44.07	29.56	26.4	10.23	6.95	6.17	23.34	0.968
1:10:20 PM	49.99	418.9	419	417.9	44.6	29.72	26.41	10.37	7.00	6.16	23.53	0.967
1:10:40 PM	49.97	417.7	417.4	416.2	44.52	29.62	26.33	10.32	6.95	6.12	23.40	0.967
1:11:00 PM	49.95	416.4	415.9	414.3	44.38	29.53	26.27	10.26	6.91	6.08	23.25	0.967
1:11:20 PM	49.95	416.4	415.8	414.4	44.4	29.53	26.25	10.26	6.91	6.08	23.25	0.967
1:11:40 PM	49.95	416.8	416.6	415.2	44.4	29.57	26.28	10.27	6.93	6.10	23.30	0.967
1:12:00 PM	49.95	417.3	417.4	416	44.44	29.57	26.34	10.29	6.94	6.13	23.35	0.967
1:12:20 PM	49.95	415.8	416.2	415.4	44.38	29.47	26.32	10.26	6.89	6.11	23.27	0.967
1:12:40 PM	49.94	417.5	418	417	44.11	29.56	26.31	10.25	6.94	6.13	23.31	0.967
1:13:00 PM	49.93	419.5	420.2	419.3	44.08	29.69	26.39	10.29	7.00	6.17	23.46	0.966
1:13:20 PM	49.95	422.3	423.1	422.2	44.17	29.84	26.33	10.36	7.07	6.19	23.62	0.965

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
1:13:40 PM	49.97	422.8	423.6	422.7	44.14	29.84	26.34	10.37	7.08	6.20	23.64	0.965
1:14:00 PM	49.98	423.1	423.6	422.3	44.17	29.85	26.34	10.37	7.08	6.19	23.65	0.965
1:14:20 PM	49.98	423.7	424.2	423.2	44.17	29.91	26.39	10.39	7.11	6.21	23.71	0.964
1:14:40 PM	49.98	424.1	424.2	423.5	44.2	30.65	26.42	10.40	7.27	6.22	23.89	0.964
1:15:00 PM	49.99	424.9	425.1	424	44.24	30.77	26.47	10.42	7.30	6.24	23.97	0.963
1:15:20 PM	49.99	424.9	425.1	423.6	44.23	30.78	26.47	10.42	7.31	6.23	23.96	0.963
1:15:40 PM	50	423.8	423.7	422.4	44.15	30.65	26.39	10.38	7.26	6.20	23.84	0.963
1:16:00 PM	50.01	424	423.4	422.1	44.18	30.66	26.37	10.39	7.26	6.19	23.84	0.964
1:16:20 PM	50.01	423.9	423.2	422.1	44.17	30.61	26.36	10.38	7.25	6.19	23.82	0.964
1:16:40 PM	50	423.5	422.9	422	44.14	30.58	26.36	10.37	7.23	6.19	23.79	0.964
1:17:00 PM	50	423.5	423	422.6	44.19	30.59	26.35	10.39	7.24	6.19	23.82	0.964
1:17:20 PM	49.99	423.1	422.6	422.2	44.17	30.57	26.35	10.38	7.22	6.19	23.79	0.964
1:17:40 PM	49.99	422.8	422	421.5	44.16	30.57	26.33	10.37	7.22	6.17	23.76	0.964
1:18:00 PM	49.99	422.7	422.2	421.6	44.05	30.62	26.22	10.34	7.24	6.14	23.73	0.964
1:18:20 PM	49.99	421.9	421.7	420.8	44.05	30.56	25.66	10.32	7.23	5.99	23.54	0.964
1:18:40 PM	49.99	422.2	422.3	421.3	45.22	30.6	25.31	10.55	7.24	5.92	23.71	0.962
1:19:00 PM	50	422	422.2	421.2	45.45	30.58	25.29	10.58	7.23	5.91	23.72	0.962
1:19:20 PM	50.01	423	423.1	421.9	45.43	30.65	25.33	10.59	7.26	5.93	23.78	0.961
1:19:40 PM	50.02	423.3	423.5	421.8	45.37	30.81	25.36	10.58	7.31	5.94	23.83	0.961
1:20:00 PM	50.03	423.6	423.5	422	45.38	30.82	25.34	10.59	7.31	5.93	23.83	0.961
1:20:20 PM	50.03	422.8	422.7	421.2	45.39	30.75	25.43	10.58	7.29	5.95	23.81	0.962
1:20:40 PM	50.03	423.8	423.8	422.3	45.46	30.85	25.62	10.62	7.32	6.01	23.95	0.961
1:21:00 PM	50.03	423.8	424	422.6	45.32	30.99	25.65	10.59	7.36	6.03	23.97	0.962
1:21:20 PM	50.04	425	424.7	423.5	44.92	30.96	25.69	10.54	7.36	6.04	23.95	0.962
1:21:40 PM	50.04	424	424.6	423.4	44.98	30.76	25.68	10.53	7.31	6.05	23.89	0.962
1:22:00 PM	50.06	424	424.8	423.1	44.9	30.82	25.68	10.51	7.33	6.05	23.89	0.963

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
1:22:20 PM	50.05	424.2	424.8	422.9	44.84	31.52	25.7	10.50	7.51	6.05	24.06	0.963
1:22:40 PM	50.04	424.2	424.6	423	44.82	30.89	25.68	10.50	7.34	6.04	23.88	0.962
1:23:00 PM	50.03	424.2	424.7	423.2	44.85	30.87	25.68	10.51	7.34	6.04	23.89	0.962
1:23:20 PM	50.04	424.2	424.5	423.5	44.88	30.96	25.69	10.52	7.36	6.05	23.92	0.962
1:23:40 PM	50.04	424.3	424.7	423.9	46.69	30.8	25.72	10.98	7.32	6.06	24.36	0.963
1:24:00 PM	50.04	423.5	424	423.1	46.54	30.76	25.67	10.94	7.30	6.04	24.27	0.963
1:24:20 PM	50.06	423.7	424	423.1	46.07	30.76	25.93	10.82	7.30	6.10	24.22	0.964
1:24:40 PM	50.06	422.6	422.6	422	45.59	31.3	26.57	10.67	7.42	6.25	24.34	0.965
1:25:00 PM	50.06	423.8	423.7	423.1	45.92	30.77	25.66	10.77	7.30	6.04	24.11	0.963
1:25:20 PM	50.06	423.6	423.2	423	45.62	30.77	26.37	10.70	7.28	6.21	24.20	0.963
1:25:40 PM	50.05	419.5	419.1	419.1	45.41	30.66	25.77	10.57	7.21	6.02	23.81	0.966
1:26:00 PM	50.03	420	419.3	419.7	43.36	31.09	25.88	10.10	7.32	6.06	23.48	0.966
1:26:20 PM	50.01	419.3	418.3	418.9	42.73	30.78	25.91	9.93	7.23	6.05	23.21	0.966
1:26:40 PM	50	418.2	417.1	417.6	42.65	30.66	25.3	9.88	7.19	5.89	22.96	0.966
1:27:00 PM	49.99	418.5	417	417.3	42.67	30.42	25.93	9.89	7.14	6.04	23.07	0.967
1:27:20 PM	49.98	418.9	417.8	418	43.44	30.1	25.65	10.05	7.08	5.98	23.12	0.965
1:27:40 PM	49.98	418.3	417.6	418.1	43.29	30.03	25.23	10.01	7.06	5.88	22.95	0.966
1:28:00 PM	49.98	417.7	417.3	417.5	43.24	30.07	25.23	9.98	7.07	5.88	22.93	0.966
1:28:20 PM	49.99	415.6	415.6	415.6	43.12	29.99	25.13	9.91	7.02	5.84	22.77	0.967
1:28:40 PM	49.98	413.7	413.4	413.4	43.07	29.89	25.06	9.87	6.98	5.79	22.63	0.967
1:29:00 PM	49.98	412.9	412.8	412.3	42.92	29.91	25.06	9.81	6.98	5.78	22.57	0.968
1:29:20 PM	49.99	413.7	413.6	413.1	42.62	29.93	25.09	9.76	6.99	5.79	22.54	0.968
1:29:40 PM	49.99	413.9	413.7	413.8	42.18	29.85	25.09	9.69	6.97	5.80	22.47	0.968
	Average load in kW/PF										**23.48**	**0.962**

Table No. 2.4 Measurement of Harmonics, Voltage & Current Unbalance at Main Incomer

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:05:00 AM	50.03	9.2	9.3	5.5	1.8	1.8	1.9
11:05:20 AM	50.04	8.8	9	5.6	1.7	1.7	1.8
11:05:40 AM	50.04	9	9.3	5.4	1.8	1.8	1.8
11:06:00 AM	50.03	9	8.9	5.4	1.8	1.9	1.9
11:06:20 AM	50.02	8.8	9.3	5.5	1.9	2	2
11:06:40 AM	50.02	7.9	9.4	5.2	1.8	1.8	1.8
11:07:00 AM	50.01	6.7	9.1	4.8	1.8	1.8	1.8
11:07:20 AM	50.01	6.6	9	4.5	1.8	1.8	1.9
11:07:40 AM	50.03	6.6	8.1	4.3	1.9	2	1.9
11:08:00 AM	50.02	6.3	7.5	4.3	1.9	1.9	1.9
11:08:20 AM	50.01	6.1	7	4.5	1.8	1.8	1.8
11:08:40 AM	50.02	6.2	7.2	4.5	1.8	1.9	1.8
11:09:00 AM	50.02	6.3	7	4.5	1.9	2	1.9
11:09:20 AM	50.03	6	6.7	4.6	1.9	1.9	1.9
11:09:40 AM	50.02	6.1	6.9	4.4	1.9	1.8	1.9
11:10:00 AM	50.02	6.1	6.9	4.5	1.9	1.9	1.8
11:10:20 AM	50.02	6.1	6.9	4.4	1.9	1.9	1.8
11:10:40 AM	50.01	6.2	7.1	4.1	1.9	1.9	1.9
11:11:00 AM	50.01	6.2	6.9	4.1	2	2.1	2
11:11:20 AM	50.02	6.1	6.9	4.1	1.7	1.8	1.7
11:11:40 AM	50.04	6.1	6.9	4	1.7	1.8	1.8
11:12:00 AM	50.04	5.9	6.8	4.1	1.8	1.8	1.8
11:12:20 AM	50.01	6	7.2	3.9	1.9	1.9	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:12:40 AM	50	6.1	7.3	4	2	2	2
11:13:00 AM	49.99	6	6.9	4.1	1.9	1.9	1.9
11:13:20 AM	49.99	5.9	7.2	4.1	1.7	1.8	1.8
11:13:40 AM	49.98	5.8	7	4.2	1.8	1.8	1.8
11:14:00 AM	49.96	6	7.2	4	1.9	1.9	2
11:14:20 AM	49.95	6	7.3	4	2	2	2
11:14:40 AM	49.96	5.8	6.9	4.4	1.8	1.8	1.8
11:15:00 AM	49.97	5.8	7.3	4.3	1.8	1.8	1.8
11:15:20 AM	49.97	6.2	7.3	4.8	1.9	1.9	1.9
11:15:40 AM	49.97	6.5	7.5	5	1.9	1.9	1.9
11:16:00 AM	49.98	6.5	7.2	5	2	1.9	1.8
11:16:20 AM	49.99	6.3	7	4.6	1.7	1.7	1.7
11:16:40 AM	50	6.2	7.1	5.2	1.7	1.8	1.8
11:17:00 AM	50.01	6.4	7.3	5.2	1.9	1.8	1.9
11:17:20 AM	50.02	6.3	7	5.3	1.9	1.9	1.9
11:17:40 AM	50.01	6.1	7.2	5.4	1.9	1.9	1.9
11:18:00 AM	50	5.8	6.7	5.5	1.8	1.9	1.8
11:18:20 AM	49.99	5.6	7	5.5	1.9	1.8	1.8
11:18:40 AM	49.98	5.6	6.9	5.4	1.8	1.8	1.8
11:19:00 AM	49.98	5.6	7.1	5.5	1.9	1.9	1.9
11:19:20 AM	49.98	5.1	7	5.4	1.8	1.8	1.7
11:19:40 AM	49.97	5.1	6.9	5.6	1.8	1.8	1.8
11:20:00 AM	49.96	5.2	7.1	5.6	1.9	1.8	1.8
11:20:20 AM	49.95	5.3	7.1	5.7	1.9	1.8	1.9
11:20:40 AM	49.96	5.2	7.1	5.6	1.9	1.8	1.8

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:21:00 AM	49.96	5.2	6.9	5.6	1.8	1.8	1.8
11:21:20 AM	49.96	5.3	7.3	5.7	1.9	1.9	1.9
11:21:40 AM	49.97	5.1	7.1	5.7	1.8	1.9	1.8
11:22:00 AM	49.97	4.9	6.4	5.8	1.7	1.7	1.7
11:22:20 AM	49.96	4.6	6.7	5.4	1.7	1.7	1.7
11:22:40 AM	49.96	4.6	6.4	5.4	1.8	1.8	1.7
11:23:00 AM	49.97	4.4	6.5	5.3	1.8	1.9	1.8
11:23:20 AM	49.97	4.6	6.3	5.6	1.9	1.9	1.9
11:23:40 AM	49.97	4.4	5.9	5.1	1.7	1.7	1.7
11:24:00 AM	49.97	4.4	5.8	5	1.7	1.7	1.7
11:24:20 AM	49.96	4.6	6	5.2	1.7	1.7	1.7
11:24:40 AM	49.94	4.4	6.6	5.8	1.9	1.9	1.8
11:25:00 AM	49.92	4.4	6.5	5.8	1.9	1.9	1.9
11:25:20 AM	49.91	4.3	6.4	5.5	1.9	1.9	1.8
11:25:40 AM	49.91	4.4	6.4	5.7	1.9	1.8	1.9
11:26:00 AM	49.92	4.2	6.2	5.5	1.9	1.9	1.8
11:26:20 AM	49.93	4.3	6.4	5.6	1.9	2	1.9
11:26:40 AM	49.94	4.1	6.3	5.4	1.9	1.9	1.9
11:27:00 AM	49.93	4.4	6.3	5.8	1.9	1.9	1.9
11:27:20 AM	49.93	4.3	6.2	5.8	1.9	1.9	1.9
11:27:40 AM	49.92	4	6.3	5.2	1.8	1.9	1.8
11:28:00 AM	49.91	4.1	6.2	5.2	1.9	1.9	1.9
11:28:20 AM	49.91	4.2	6	5.8	1.8	1.9	1.8
11:28:40 AM	49.9	4.2	5.7	5.9	1.9	1.8	1.8
11:29:00 AM	49.9	4.3	5.6	6.1	2	1.9	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:29:20 AM	49.9	4	5.4	5.6	1.9	1.9	1.8
11:29:40 AM	49.91	4.1	5.6	5.8	1.8	1.9	1.8
11:30:00 AM	49.91	4.1	5.4	5.6	1.9	1.8	1.8
11:30:20 AM	49.91	4	5.5	5.6	1.9	1.9	1.9
11:30:40 AM	49.91	3.9	5.4	5.7	1.8	1.9	1.8
11:31:00 AM	49.91	4	5.5	5.6	1.9	2	1.9
11:31:20 AM	49.91	4	5.5	5.4	1.9	1.8	1.9
11:31:40 AM	49.91	4.1	5.6	5.7	2	2	2
11:32:00 AM	49.91	3.9	5.4	5.4	1.9	1.8	1.9
11:32:20 AM	49.89	4	5.6	5.5	2	2	1.9
11:32:40 AM	49.88	4.2	5.7	5.7	2	2	1.9
11:33:00 AM	49.88	4.2	5.4	5.2	2	2	2
11:33:20 AM	49.88	4.1	5.4	4.9	1.9	1.9	1.9
11:33:40 AM	49.87	4	5.3	5	1.9	1.8	1.9
11:34:00 AM	49.87	4.1	5.3	4.8	1.9	2	1.9
11:34:20 AM	49.85	4.2	5.3	5.1	1.9	2	1.9
11:34:40 AM	49.85	4.1	5.3	4.8	1.9	1.8	1.9
11:35:00 AM	49.85	4.1	5.3	4.8	1.8	1.8	1.9
11:35:20 AM	49.86	4.1	5.2	5	1.8	1.8	1.9
11:35:40 AM	49.87	4.2	5.4	4.9	1.9	1.9	1.9
11:36:00 AM	49.87	3.9	5.3	4.7	1.9	1.9	1.9
11:36:20 AM	49.87	4.1	5.3	5	1.8	1.8	1.9
11:36:40 AM	49.87	4.2	5.4	5.2	1.9	1.9	2
11:37:00 AM	49.87	4.2	5.3	5	1.9	1.8	1.9
11:37:20 AM	49.87	4.1	5.2	4.9	1.8	1.9	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:37:40 AM	49.88	4.2	5.3	5	1.8	1.8	1.8
11:38:00 AM	49.89	4.1	5.3	5.1	1.8	1.9	1.9
11:38:20 AM	49.88	4	5.3	4.7	1.8	1.8	1.8
11:38:40 AM	49.87	4.1	5.5	5	1.9	2	2
11:39:00 AM	49.87	4	5.3	4.8	1.8	1.9	1.8
11:39:20 AM	49.87	4	5.4	5	1.9	2	2
11:39:40 AM	49.88	4	5.5	4.8	1.7	1.8	1.8
11:40:00 AM	49.9	4	5.4	4.9	1.7	1.8	1.8
11:40:20 AM	49.9	4	5.3	4.9	1.9	1.9	1.9
11:40:40 AM	49.89	4	5.5	5	1.9	1.9	1.9
11:41:00 AM	49.89	4	5.3	4.7	1.8	1.8	1.9
11:41:20 AM	49.88	4.1	5.5	4.9	1.8	1.8	1.8
11:41:40 AM	49.89	4	5.1	4.7	1.8	1.8	1.9
11:42:00 AM	49.89	4	5.3	4.9	1.8	1.9	1.9
11:42:20 AM	49.9	4	5.5	4.9	1.9	2	1.9
11:42:40 AM	49.89	4	5.4	4.9	1.8	1.8	1.8
11:43:00 AM	49.89	4	5.3	4.9	1.8	1.8	1.9
11:43:20 AM	49.9	4	5.5	4.9	1.9	2	1.9
11:43:40 AM	49.89	3.7	5.4	4.8	1.9	2.1	2
11:44:00 AM	49.88	3.8	5.4	4.6	1.9	2	1.9
11:44:20 AM	49.88	3.8	5.4	4.7	1.9	2	2
11:44:40 AM	49.88	3.8	5.4	4.6	1.8	1.9	1.9
11:45:00 AM	49.89	3.9	5.5	4.9	1.8	1.9	1.9
11:45:20 AM	49.9	4	5.3	5.2	1.8	1.9	1.9
11:45:40 AM	49.9	4	5.5	5.1	2	2.1	2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:46:00 AM	49.89	3.8	5.6	4.9	2	2	1.9
11:46:20 AM	49.88	4	5.4	5	1.9	1.9	1.9
11:46:40 AM	49.88	3.8	5.4	4.9	1.9	1.9	1.9
11:47:00 AM	49.88	3.9	5.5	4.9	2	2	1.9
11:47:20 AM	49.9	3.8	5.5	4.7	1.9	2	1.9
11:47:40 AM	49.9	3.7	5.5	4.7	1.9	2	2
11:48:00 AM	49.89	3.8	5.4	4.7	2	2	2
11:48:20 AM	49.88	4	5.7	5	2	2.1	2
11:48:40 AM	49.88	4	5.3	5	2	2	2
11:49:00 AM	49.89	3.9	5.3	4.8	1.8	1.8	1.8
11:49:20 AM	49.91	3.9	5.3	4.8	1.9	2	2
11:49:40 AM	49.9	4	5.5	5	2	2	2
11:50:00 AM	49.9	4.1	5.4	5.1	2	2	2
11:50:20 AM	49.9	4.1	5.4	5	1.9	2	2
11:50:40 AM	49.91	4.1	5.3	4.9	1.9	1.8	1.9
11:51:00 AM	49.92	4.1	5.5	4.8	1.9	1.9	2
11:51:20 AM	49.93	4.2	5.4	5	2	2	2
11:51:40 AM	49.92	4.2	5.4	5	1.8	1.9	1.8
11:52:00 AM	49.92	4.1	5.3	4.9	1.8	1.9	1.8
11:52:20 AM	49.92	4.1	5.3	4.9	1.8	1.9	1.9
11:52:40 AM	49.92	4.1	5.3	4.9	1.8	1.8	1.9
11:53:00 AM	49.92	4.2	5.5	5	2	2	2
11:53:20 AM	49.93	4.2	5.4	5.1	2	2	1.9
11:53:40 AM	49.95	4.1	5.3	5	1.8	1.9	1.8
11:54:00 AM	49.98	4.1	5.2	5	1.9	1.9	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
11:54:20 AM	50.01	4.1	5.3	4.9	1.9	1.8	1.9
11:54:40 AM	50.04	4.1	5.2	5	1.9	1.9	1.9
11:55:00 AM	50.06	4.2	5.4	5	2	2	2
11:55:20 AM	50.07	4.2	5.4	5.2	2	2.1	2.1
11:55:40 AM	50.07	4.2	5.4	5.1	2	2	2.1
11:56:00 AM	50.08	4	5.3	4.9	1.9	1.9	1.8
11:56:20 AM	50.08	4.1	5.2	4.9	2	2	2
11:56:40 AM	50.07	4.1	5.3	5	2	2.1	2.1
11:57:00 AM	50.06	4.1	5.5	4.9	2.1	2.2	2.2
11:57:20 AM	50.03	4.1	5.2	5.3	1.9	2	2
11:57:40 AM	50	4.1	5.2	5.2	1.8	1.9	1.9
11:58:00 AM	50	4	5.3	4.8	2	2	2
11:58:20 AM	50	4.1	5.3	4.8	2	2.1	2
11:58:40 AM	49.99	4.3	5.5	5.2	2.3	2.3	2.3
11:59:00 AM	49.99	4.1	5.4	4.9	2	2	2.1
11:59:20 AM	49.98	4.3	5.3	5.4	2	2.1	2.1
11:59:40 AM	49.97	4.3	5.2	5.2	1.9	2	2
12:00:00 PM	49.96	4	5.2	4.5	1.8	1.8	1.8
12:00:20 PM	49.94	4.1	5.3	4.9	1.9	2	2
12:00:40 PM	49.93	4.3	5.3	5.3	2	2	2.1
12:01:00 PM	49.93	4.4	5.3	5.4	2.1	2	2
12:01:20 PM	49.92	4.3	5.3	5.2	2	2	2
12:01:40 PM	49.92	4.1	5.2	4.9	1.9	1.9	1.9
12:02:00 PM	49.92	3.9	5.1	4.5	1.8	1.9	1.9
12:02:20 PM	49.93	4.1	5.4	4.8	2	2	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:02:40 PM	49.91	4.2	5.3	5.2	1.9	2	1.9
12:03:00 PM	49.89	4.1	5.3	4.9	1.9	2	1.9
12:03:20 PM	49.88	4.4	5.4	5.3	2	2	2
12:03:40 PM	49.88	4.3	5.3	5.2	1.9	2	2
12:04:00 PM	49.88	4.1	5.1	4.9	1.7	1.8	1.8
12:04:20 PM	49.87	4.1	5.2	4.8	1.7	1.8	1.9
12:04:40 PM	49.86	4.1	5.2	5.1	1.9	1.9	2
12:05:00 PM	49.86	4.1	5.4	5	2	2.1	2.1
12:05:20 PM	49.87	4.2	5.5	4.9	2.1	2.1	2.1
12:05:40 PM	49.87	4.1	5.4	4.9	2	2	2
12:06:00 PM	49.88	4.2	5.4	5.1	2	2	2
12:06:20 PM	49.86	4.1	5.3	4.9	1.9	2.1	2
12:06:40 PM	49.86	4.1	5.2	4.9	1.8	1.9	1.9
12:07:00 PM	49.88	4.3	5.4	5	2	2	2
12:07:20 PM	49.89	4.4	5.3	5.3	2	2	2
12:07:40 PM	49.88	4.3	5.3	5	2	2.1	2
12:08:00 PM	49.88	4.2	5.2	4.9	1.9	1.9	1.9
12:08:20 PM	49.88	4.1	5.4	4.9	1.8	1.8	1.8
12:08:40 PM	49.88	4.2	5.4	5	1.9	2	1.9
12:09:00 PM	49.91	4.3	5.5	5.1	2.1	2.1	2
12:09:20 PM	49.93	4.4	5.7	5.3	2.2	2.2	2.2
12:09:40 PM	49.94	4.3	5.6	5.2	2.1	2.2	2.1
12:10:00 PM	49.96	4.1	5.3	5	1.7	1.8	1.8
12:10:20 PM	49.96	4.2	5.5	5.1	1.9	2	1.9
12:10:40 PM	49.96	4.2	5.5	5	1.9	2	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:11:00 PM	49.97	4.3	5.6	5.1	2	2.1	1.9
12:11:20 PM	49.98	4.3	5.6	5.2	2	2.1	2
12:11:40 PM	50	4.2	5.4	5	1.8	1.9	1.9
12:12:00 PM	49.99	4.1	5.6	5	1.9	2	1.9
12:12:20 PM	49.98	4.2	5.6	5.1	1.9	2	1.9
12:12:40 PM	49.97	4.1	5.6	5	1.9	2	1.9
12:13:00 PM	49.98	4.1	5.5	5.1	1.9	2.1	1.9
12:13:20 PM	49.99	4.2	5.6	5	2	2.1	2
12:13:40 PM	49.98	4.2	5.7	5.1	2.1	2.1	2
12:14:00 PM	49.96	4.3	5.6	5.1	2.2	2.2	2.1
12:14:20 PM	49.96	4.3	5.6	5.1	2.1	2.1	2
12:14:40 PM	49.95	4.3	5.7	5.2	2.1	2.1	2.1
12:15:00 PM	49.95	4.2	5.4	5	1.8	1.8	1.8
12:15:20 PM	49.96	4.3	5.5	5.1	2	2.1	2.1
12:15:40 PM	49.96	4.3	5.6	5.2	2	2.1	2
12:16:00 PM	49.95	4.3	5.5	5	1.9	2	1.9
12:16:20 PM	49.94	4.3	5.6	5.2	2	2.1	2.1
12:16:40 PM	49.94	3.9	5.6	4.9	2	2.1	2.2
12:17:00 PM	49.95	4	5.4	4.8	1.8	1.9	1.9
12:17:20 PM	49.95	4.1	5.4	5	1.9	2	2
12:17:40 PM	49.95	4.2	5.4	5	1.9	2	2
12:18:00 PM	49.95	4.3	5.4	5.1	2	2.1	2.1
12:18:20 PM	49.95	4.3	5.3	5	2	2	2.1
12:18:40 PM	49.95	4.4	5.4	5	2	2.1	2.1
12:19:00 PM	49.95	4.3	5.3	4.9	2	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:19:20 PM	49.94	4.1	5.2	4.9	1.8	1.9	1.8
12:19:40 PM	49.95	4	5.3	4.8	1.9	1.9	1.9
12:20:00 PM	49.95	4	5.3	4.8	2	2	2.1
12:20:20 PM	49.94	4.2	5.5	5.1	2	2	2
12:20:40 PM	49.94	4.3	5.6	5.1	2.2	2.1	2.2
12:21:00 PM	49.94	4.3	5.7	5.4	2.1	2.3	2.3
12:21:20 PM	49.95	4.2	5.5	4.9	1.9	2	2
12:21:40 PM	49.95	4.3	5.5	5.1	2	2.1	2
12:22:00 PM	49.95	4.1	5.2	4.9	1.9	1.9	1.9
12:22:20 PM	49.94	4.2	5.3	4.9	1.8	1.9	1.9
12:22:40 PM	49.93	4.3	5.1	5	1.8	1.9	1.9
12:23:00 PM	49.93	4.4	5.5	5	1.9	2	2
12:23:20 PM	49.94	4.4	5.2	5.1	1.9	2	2
12:23:40 PM	49.94	4.4	5.4	5.1	1.9	2	1.9
12:24:00 PM	49.95	4.4	5.3	5	1.9	2	1.9
12:24:20 PM	49.95	4.3	5.2	5.1	1.8	1.9	2
12:24:40 PM	49.96	4.4	5.4	5	1.8	1.9	2
12:25:00 PM	49.96	4.4	5.4	5.2	1.9	2	2
12:25:20 PM	49.97	4.4	5.5	5.2	2	2	2
12:25:40 PM	49.97	4.3	5.2	5.1	1.8	1.8	1.8
12:26:00 PM	49.98	4.4	5.4	5.2	1.9	2	2
12:26:20 PM	49.97	4.5	5.4	5.1	1.9	2	2
12:26:40 PM	49.97	4.4	5.4	5.2	2	2	2
12:27:00 PM	49.98	4.4	5.3	4.9	1.8	1.9	1.9
12:27:20 PM	49.97	4.3	5.2	5.1	1.8	1.9	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:27:40 PM	49.96	4.3	5.4	5	1.8	1.9	1.9
12:28:00 PM	49.96	4.4	5.6	5.2	2	2.1	2.1
12:28:20 PM	49.97	4.4	5.7	5.2	2.1	2.1	2.1
12:28:40 PM	49.97	4.2	5.3	5	1.9	1.9	1.9
12:29:00 PM	49.95	4.2	5.3	4.8	1.8	1.9	1.9
12:29:20 PM	49.94	4.1	5.3	4.9	1.8	1.9	1.9
12:29:40 PM	49.95	4.2	5.4	5	1.8	1.9	1.9
12:30:00 PM	49.96	4.2	5.4	4.9	1.8	1.8	1.9
12:30:20 PM	49.96	4.4	5.6	5.2	1.9	2.1	2.2
12:30:40 PM	49.95	4.3	5.5	5.2	2	2.2	2.1
12:31:00 PM	49.94	4.3	5.4	5.1	1.9	2	2.1
12:31:20 PM	49.94	4.4	5.4	5.2	2	2	2.1
12:31:40 PM	49.95	4.2	5.3	5	1.8	1.9	1.9
12:32:00 PM	49.95	4.3	5.3	4.8	1.9	2	1.9
12:32:20 PM	49.95	4.3	5.4	4.6	2	2.1	2.1
12:32:40 PM	49.95	4.3	5.4	4.6	2	2.1	2.1
12:33:00 PM	49.94	4.4	5.7	4.9	2.2	2.3	2.3
12:33:20 PM	49.94	4.3	5.5	4.7	2	2.1	2.1
12:33:40 PM	49.95	4.4	5.5	4.7	1.9	2.1	2.1
12:34:00 PM	49.96	4.5	5.5	4.6	1.9	2	2
12:34:20 PM	49.97	4.5	5.4	4.6	2	2	2
12:34:40 PM	49.96	4.5	5.4	4.5	1.9	2	2
12:35:00 PM	49.96	4.5	5.1	4.5	1.9	2	2
12:35:20 PM	49.96	4.5	5.2	4.6	2	2	2
12:35:40 PM	49.96	4.5	5	4.5	1.8	1.9	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:36:00 PM	49.97	4.4	4.9	4.6	1.9	1.9	2
12:36:20 PM	49.98	4.4	5	4.5	1.9	1.9	1.9
12:36:40 PM	49.97	4.4	5.1	4.6	2	2	2.1
12:37:00 PM	49.96	4.3	4.9	4.5	1.8	1.8	1.9
12:37:20 PM	49.96	4.2	4.8	4.3	1.7	1.8	1.8
12:37:40 PM	49.96	4.2	4.8	4.3	1.7	1.8	1.8
12:38:00 PM	49.95	4.1	5	4.4	1.8	1.8	1.9
12:38:20 PM	49.95	4.2	5.2	4.5	2	2	2.1
12:38:40 PM	49.95	4.2	5.1	4.5	1.9	2	2
12:39:00 PM	49.95	4.2	5	4.4	1.9	1.9	2
12:39:20 PM	49.95	4.4	5.1	4.5	1.9	2	2
12:39:40 PM	49.95	4.3	5	4.4	1.9	1.9	2
12:40:00 PM	49.97	4.3	5.1	4.4	1.9	2	2
12:40:20 PM	49.96	4.4	5.2	4.6	2	2.1	2.1
12:40:40 PM	49.95	4.2	5	4.4	1.8	1.9	2
12:41:00 PM	49.94	4.3	5.1	4.4	1.9	2	2
12:41:20 PM	49.93	4.3	5	4.4	1.9	1.9	2
12:41:40 PM	49.93	4.3	5.1	4.6	2	2.1	2.1
12:42:00 PM	49.91	4.2	4.8	4.3	1.8	1.9	1.9
12:42:20 PM	49.89	4.2	5	4.4	1.9	1.9	2
12:42:40 PM	49.88	4.3	5	4.3	1.9	1.9	2
12:43:00 PM	49.88	4.3	5.1	4.5	2	2	2.1
12:43:20 PM	49.89	4.2	5	4.4	1.9	2.1	2
12:43:40 PM	49.9	4.2	5.1	4.4	2	2.1	2.1
12:44:00 PM	49.9	4.3	5.1	4.5	1.9	2	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:44:20 PM	49.9	4.3	4.9	4.5	1.9	2	2
12:44:40 PM	49.9	4.2	5	4.3	1.9	2	2
12:45:00 PM	49.89	4.2	5	4.4	1.9	2	2
12:45:20 PM	49.89	4.2	5.1	4.4	2	2.1	2.1
12:45:40 PM	49.89	4.2	5.1	4.5	1.9	2	2
12:46:00 PM	49.9	4.2	5.1	4.3	1.9	2	2
12:46:20 PM	49.9	4.2	5	4.4	1.9	2	2
12:46:40 PM	49.92	4.1	5.1	4.4	1.9	2	2
12:47:00 PM	49.94	4.2	5.1	4.5	2.1	2.1	2.2
12:47:20 PM	49.93	4.2	5	4.4	2	2	2.1
12:47:40 PM	49.92	4.3	5.1	4.3	1.9	2	2
12:48:00 PM	49.92	4.2	5.2	4.5	1.9	2	1.9
12:48:20 PM	49.92	4.2	5.1	4.5	1.9	2.1	2
12:48:40 PM	49.92	4.3	5.2	4.6	1.9	2.1	2.1
12:49:00 PM	49.91	4.3	5.3	4.5	1.9	2	2
12:49:20 PM	49.92	4.2	5	4.4	1.8	1.8	1.8
12:49:40 PM	49.94	4.2	5	4.4	1.8	1.9	1.9
12:50:00 PM	49.95	4.3	5.2	4.5	1.9	2	2
12:50:20 PM	49.95	4.3	5.3	4.6	2	2.1	2.1
12:50:40 PM	49.95	4.3	5.3	4.5	2	2	2
12:51:00 PM	49.96	4.3	5.2	4.5	1.9	2	2
12:51:20 PM	49.96	4.2	5.2	4.5	1.9	2.1	2
12:51:40 PM	49.97	4.3	5.2	4.6	2	2.1	2.1
12:52:00 PM	49.99	4.2	5.2	4.5	1.9	2	2
12:52:20 PM	49.99	4.2	5.2	4.5	1.9	2	1.9

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
12:52:40 PM	49.99	4.2	5.2	4.5	1.9	2	1.9
12:53:00 PM	50	4.3	5.2	4.5	1.9	2	1.9
12:53:20 PM	50.02	4.2	5.3	4.5	2	2.1	2
12:53:40 PM	50.04	4.1	5.4	4.4	1.9	2	1.9
12:54:00 PM	50.05	4.1	5.4	4.4	1.9	2	1.9
12:54:20 PM	50.06	4.1	5.4	4.4	1.9	2	1.9
12:54:40 PM	50.07	4.2	5.4	4.7	2	2.1	2
12:55:00 PM	50.08	4.3	5.3	4.6	1.9	2	2
12:55:20 PM	50.09	4.3	5.3	4.6	1.9	2	2
12:55:40 PM	50.08	4.3	5.3	4.5	1.9	2	1.9
12:56:00 PM	50.08	4.4	5.3	4.6	1.9	2	1.9
12:56:20 PM	50.07	4.3	5.3	4.4	2	2	2
12:56:40 PM	50.06	4.3	5.3	4.6	1.8	1.9	1.9
12:57:00 PM	50.04	4.4	5.3	4.7	1.9	2	2
12:57:20 PM	50.03	4.4	5.4	4.7	2	2	2.1
12:57:40 PM	50.01	4.3	5.3	4.5	1.9	2	2
12:58:00 PM	49.99	4.2	5.3	3.4	1.9	2.1	2.1
12:58:20 PM	49.98	4.1	5.2	2.8	1.9	2.1	2.1
12:58:40 PM	49.97	4	5.2	2.8	2	2	2.1
12:59:00 PM	49.97	4	5	2.8	1.9	2	2
12:59:20 PM	49.97	4	5.1	2.8	1.9	2.1	2.1
12:59:40 PM	49.95	4.1	5.2	2.8	1.9	2.1	2.1
1:00:00 PM	49.94	4.1	5.2	2.9	1.9	2	2.1
1:00:20 PM	49.93	3.8	5.3	2.7	2	2.2	2.3
1:00:40 PM	49.94	3.9	5.1	2.8	2	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:01:00 PM	49.94	3.8	5.2	2.7	2	2.1	2.2
1:01:20 PM	49.95	3.7	5	2.7	1.8	2	2.1
1:01:40 PM	49.97	3.9	5	2.7	1.8	2	2
1:02:00 PM	49.98	3.9	5.1	2.7	1.9	2	2.1
1:02:20 PM	49.98	4	5.1	2.7	1.9	2.1	2.1
1:02:40 PM	49.97	3.9	5.1	2.8	2	2.1	2.1
1:03:00 PM	49.96	3.9	5	2.7	1.9	2.1	2.1
1:03:20 PM	49.96	3.9	5.1	2.7	1.9	2.1	2.1
1:03:40 PM	49.94	4	5.1	2.7	1.9	2	2.1
1:04:00 PM	49.93	4.1	5.1	2.8	2	2.1	2.1
1:04:20 PM	49.92	4.2	5.1	3	2.1	2.1	2.2
1:04:40 PM	49.92	4	4.8	2.8	1.8	1.9	2
1:05:00 PM	49.93	4	4.8	2.8	1.8	2	2.1
1:05:20 PM	49.93	4	4.9	2.8	1.9	1.9	2
1:05:40 PM	49.95	4.1	4.9	2.8	1.9	2	2
1:06:00 PM	49.97	4.2	4.8	3	1.9	2.1	2.1
1:06:20 PM	49.96	4.2	5	2.8	1.9	2	2.1
1:06:40 PM	49.97	4.3	5.1	2.8	2	2	2.1
1:07:00 PM	49.97	4.2	4.8	2.7	1.9	2	2.1
1:07:20 PM	49.98	4.2	4.8	2.8	1.9	2.1	2.1
1:07:40 PM	49.99	4.2	5	2.8	1.9	2.1	2.1
1:08:00 PM	49.99	4.2	5	2.8	2	2.1	2.1
1:08:20 PM	49.99	4.2	4.9	2.7	1.8	1.9	2
1:08:40 PM	50	4.3	4.9	2.8	2	2	2.1
1:09:00 PM	50.01	4.3	5	2.7	2	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:09:20 PM	50	4.3	5.1	2.8	2	2.1	2.2
1:09:40 PM	50	4.2	4.9	2.9	1.9	2	2.1
1:10:00 PM	50	4.2	4.9	2.7	1.9	1.9	2
1:10:20 PM	49.99	4.1	5.1	2.7	2	2.1	2.2
1:10:40 PM	49.97	4.1	5	2.8	2	2.2	2.2
1:11:00 PM	49.95	4	4.9	2.8	1.9	2	2
1:11:20 PM	49.95	4	4.8	2.8	1.9	2	2.1
1:11:40 PM	49.95	4.1	4.9	2.7	2	2.1	2.1
1:12:00 PM	49.95	4.1	5	2.7	2	2.1	2.1
1:12:20 PM	49.95	4	4.8	2.7	1.9	2	2
1:12:40 PM	49.94	4	4.8	2.7	1.9	2	2
1:13:00 PM	49.93	4.1	4.9	2.6	1.9	2	2
1:13:20 PM	49.95	4.2	5.2	2.6	2.2	2.1	2.3
1:13:40 PM	49.97	4.1	4.9	2.6	1.9	1.9	1.9
1:14:00 PM	49.98	4	5	2.5	1.8	1.9	1.9
1:14:20 PM	49.98	4.1	5.1	2.5	1.8	1.9	1.9
1:14:40 PM	49.98	4.1	5	2.7	1.9	2	2.1
1:15:00 PM	49.99	4.2	5.1	2.6	1.9	2.1	2.1
1:15:20 PM	49.99	4.2	5.2	2.7	2	2.2	2.1
1:15:40 PM	50	4.1	5	2.6	1.9	1.9	2
1:16:00 PM	50.01	4	5	2.7	1.9	2	2
1:16:20 PM	50.01	4.1	5.1	2.7	1.9	2	2.1
1:16:40 PM	50	4.2	5.1	2.7	2.1	2.1	2.1
1:17:00 PM	50	4.2	5.1	2.7	2	2.1	2.1
1:17:20 PM	49.99	4.1	5.1	2.7	2	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:17:40 PM	49.99	4.1	5.1	2.7	2	2.1	2.1
1:18:00 PM	49.99	4.1	5.2	2.7	2.1	2.2	2.2
1:18:20 PM	49.99	4.1	5	2.9	2	2.1	2.1
1:18:40 PM	49.99	4	5.1	3	1.9	2.1	2.1
1:19:00 PM	50	4	5.1	3	2	2.1	2.1
1:19:20 PM	50.01	4	5.1	3	2	2.1	2.1
1:19:40 PM	50.02	4	5	2.9	2	2.1	2.1
1:20:00 PM	50.03	4	5.1	3	2	2.2	2.1
1:20:20 PM	50.03	3.9	4.9	3.1	1.9	1.9	2
1:20:40 PM	50.03	4	5	3	1.9	2.1	2.1
1:21:00 PM	50.03	4.1	5	3	1.9	2.1	2.1
1:21:20 PM	50.04	4.2	5.1	3.1	2.1	2.2	2.1
1:21:40 PM	50.04	4.1	5.1	3.1	2	2.1	2.1
1:22:00 PM	50.06	4.1	5.1	3.1	2	2.1	2.1
1:22:20 PM	50.05	4.1	5	3	2	2.1	2.1
1:22:40 PM	50.04	4.1	4.9	3	2	2	2
1:23:00 PM	50.03	4.1	5	3.1	2	2.1	2.1
1:23:20 PM	50.04	4.1	5	3.1	2	2.1	2.1
1:23:40 PM	50.04	4	5.1	3.1	2	2.2	2.1
1:24:00 PM	50.04	3.7	5	3.1	1.9	2.1	2.1
1:24:20 PM	50.06	3.9	5	3.1	2	2.2	2.2
1:24:40 PM	50.06	3.9	4.7	3	1.9	2	2
1:25:00 PM	50.06	3.9	5	3.1	2	2.1	2.1
1:25:20 PM	50.06	4	5	3.1	1.9	2.2	2.1
1:25:40 PM	50.05	3.9	4.9	3.1	2	2.2	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:26:00 PM	50.03	4.1	4.8	3.1	2	2.1	2.1
1:26:20 PM	50.01	4.2	4.8	3.1	2	2.1	2.1
1:26:40 PM	50	4.1	4.8	3.1	2	2.1	2.2
1:27:00 PM	49.99	4.2	4.9	3.1	2	2.2	2.2
1:27:20 PM	49.98	4.1	4.9	3.1	2	2	2.1
1:27:40 PM	49.98	4.1	4.9	3.1	2	2.1	2.1
1:28:00 PM	49.98	4.2	4.9	3	2.1	2.2	2.2
1:28:20 PM	49.99	4.1	4.8	3	2.2	2.2	2.2
1:28:40 PM	49.98	4	4.7	3	2	2.1	2.2
1:29:00 PM	49.98	3.9	4.6	3.1	1.9	2	2
1:29:20 PM	49.99	4	4.7	3	2	2.1	2.1
1:29:40 PM	49.99	4.1	4.7	3	2	2.1	2.1

❖ **Observation & Recommendation:-**

- Voltage unbalance is within limit.
- Current unbalance is considerable.
- Total Voltage harmonics distortion is there.
- Total Current Harmonics distortion is there and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.
- Average measured power factor is 0.962

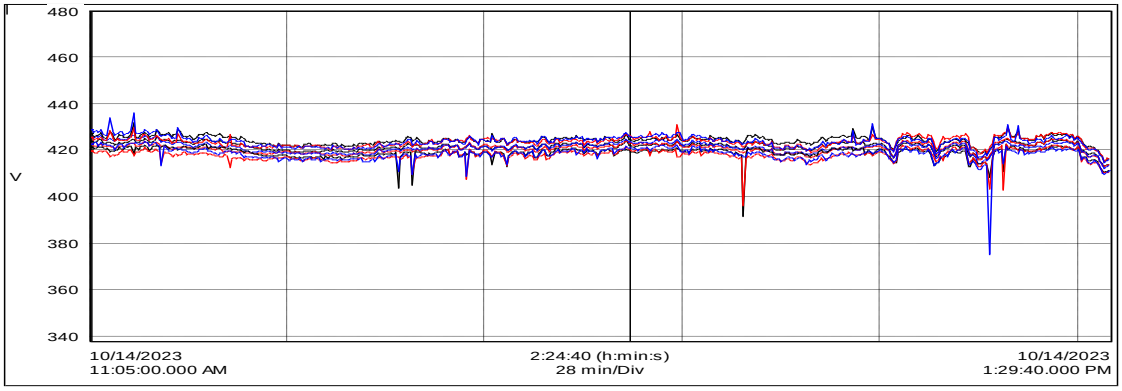
❒ Study of electrical parameters at Main Incomer

1. Line Voltage

Table No. 2.5: Line Voltage

Name	Time	Avg	Min	Max	Units	Duration	Units
U1 RMS	11:05:00 AM	422.298	412.9	426.1	V	2:25:00	(h:min:s)
U2 RMS	11:05:00 AM	421.284	412.8	425.1	V	2:25:00	(h:min:s)
U3 RMS	11:05:00 AM	421.778	412.3	426.6	V	2:25:00	(h:min:s)

Graph No. 2.1: Line Voltage Variation for the Recorded Time



RMS, Max RMS & Min. RMS
Phase voltage variation

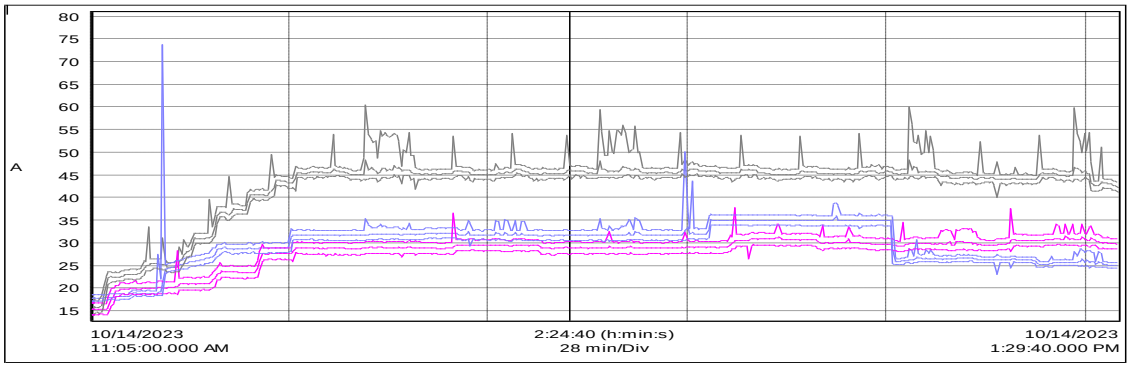
- Voltage unbalance is within limit.

2. Current

Table No.2.6: Current

Name	Time	Avg	Min	Max	Units	Duration	Units
A1 RMS	11:05:00 AM	43.058	15.42	48.43	A	2:25:00	(h:min:s)
A2 RMS	11:05:00 AM	28.342	15.43	31.52	A	2:25:00	(h:min:s)
A3 RMS	11:05:00 AM	30.035	17.9	35.98	A	2:25:00	(h:min:s)

Graph No. 2.2: Line Current Variation for recorded time



RMS, Max RMS & Min. RMS
Current variation

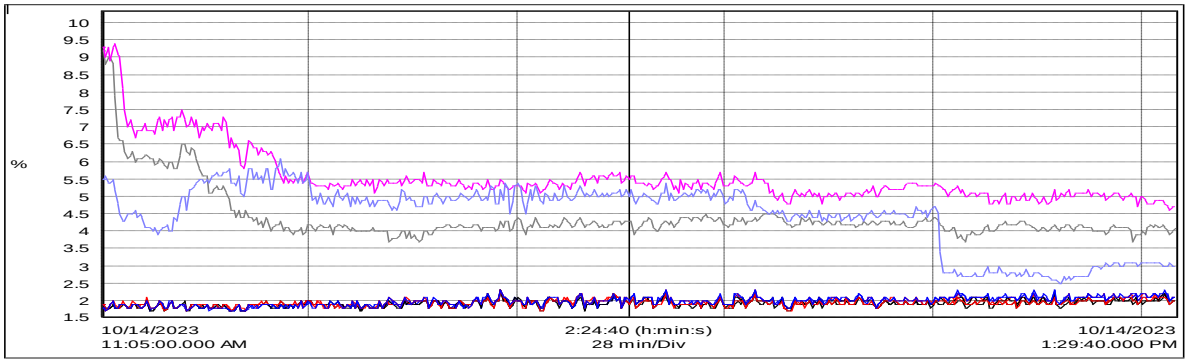
- Current unbalance is considerable.

3. Total harmonic Distortion (THD).

Table No.2.7: THD

Name	Time	Avg	Min	Max	Units	Duration	Units
A1 THD	11:05:00 AM	4.412	3.7	9.2	%	2:25:00	(h:min:s)
A2 THD	11:05:00 AM	5.543	4.6	9.4	%	2:25:00	(h:min:s)
A3 THD	11:05:00 AM	4.457	2.5	6.1	%	2:25:00	(h:min:s)
U1 THD	11:05:00 AM	1.913	1.7	2.3	%	2:25:00	(h:min:s)
U2 THD	11:05:00 AM	1.976	1.7	2.3	%	2:25:00	(h:min:s)
U3 THD	11:05:00 AM	1.974	1.7	2.3	%	2:25:00	(h:min:s)

Graph No. 2.3: THD

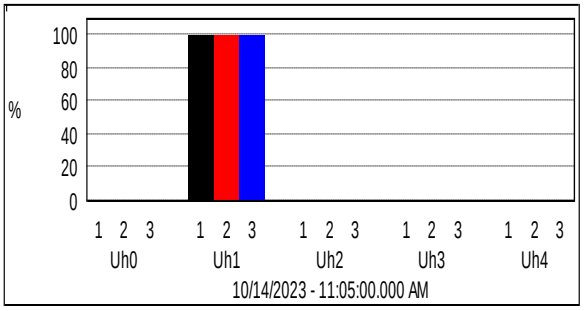


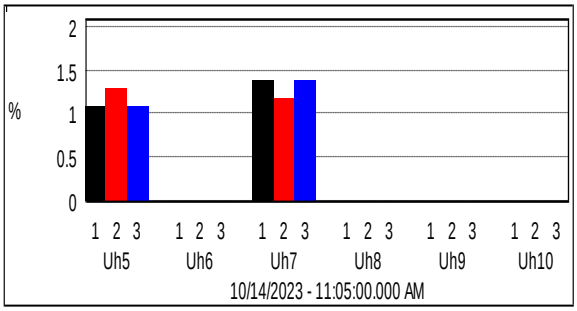
Variation of current, Phase Voltage, Line Voltage
Total Harmonic Distortion

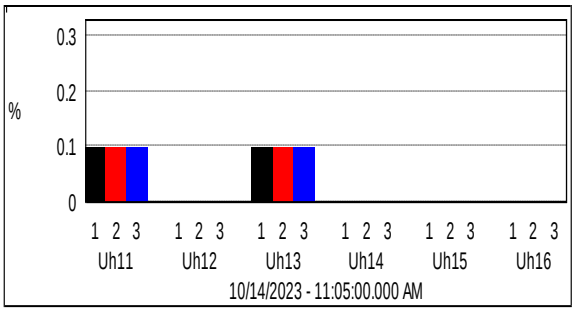
- Voltage harmonics distortion is there.
- Current harmonics distortion is there. and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.

- **Individual Voltage Harmonics**

Name	Avg	Min	Max	Units
U1h0	0	0	0	%
U1h1	100	100	100	%
U1h10	0	0	0	%
U1h11	0.084	0	0.3	%
U1h12	0	0	0	%
U1h13	0.162	0.1	0.3	%
U1h14	0	0	0	%
U1h15	0	0	0	%
U1h16	0	0	0	%
U1h2	0.001	0	0.1	%
U1h3	0.011	0	0.1	%
U1h4	0	0	0	%
U1h5	1.15	1	1.3	%
U1h6	0	0	0	%
U1h7	1.483	1.3	1.9	%
U1h8	0	0	0	%
U1h9	0	0	0	%
U2h0	0.1	0	0.1	%
U2h1	100	100	100	%
U2h10	0	0	0	%
U2h11	0.084	0	0.3	%
U2h12	0	0	0	%
U2h13	0.145	0	0.3	%
U2h14	0	0	0	%
U2h15	0	0	0	%
U2h16	0	0	0	%
U2h2	0.001	0	0.1	%
U2h3	0.04	0	0.1	%
U2h4	0	0	0	%
U2h5	1.386	1.2	1.6	%
U2h6	0	0	0	%
U2h7	1.358	1.1	1.7	%
U2h8	0	0	0	%
U2h9	0.001	0	0.1	%
U3h0	0	0	0	%
U3h1	100	100	100	%
U3h10	0	0	0	%
U3h11	0.07	0	0.2	%
U3h12	0	0	0	%
U3h13	0.137	0.1	0.2	%
U3h14	0	0	0	%
U3h15	0	0	0	%
U3h16	0	0	0	%
U3h2	0	0	0.1	%
U3h3	0.045	0	0.2	%
U3h4	0	0	0	%
U3h5	1.255	1.1	1.5	%
U3h6	0	0	0	%
U3h7	1.482	1.2	1.8	%
U3h8	0	0	0	%
U3h9	0.004	0	0.1	%

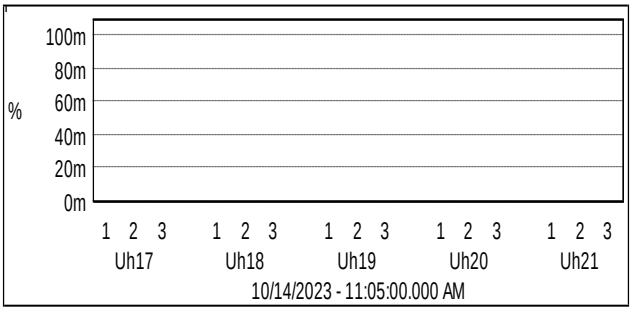


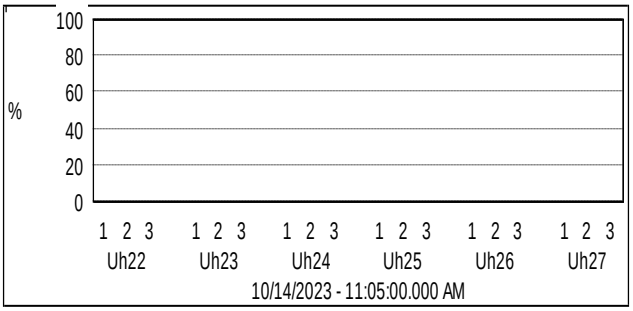


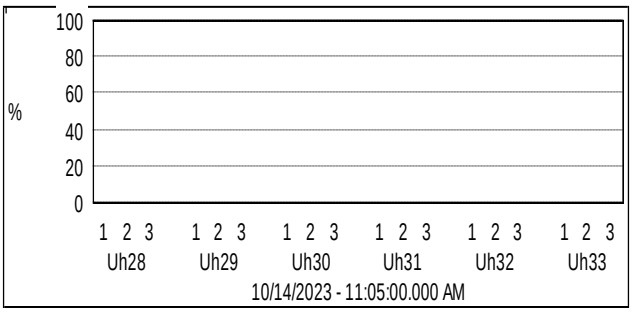


5th & 7th order individual voltage harmonics have noticeable presence.

Name	Avg	Min	Max	Units
U1h17	0.001	0	0.1	%
U1h18	0	0	0	%
U1h19	0.023	0	0.1	%
U1h20	0	0	0	%
U1h21	0	0	0	%
U1h22	0	0	0	%
U1h23	0	0	0	%
U1h24	0	0	0	%
U1h25	0	0	0	%
U1h26	0	0	0	%
U1h27	0	0	0	%
U1h28	0	0	0	%
U1h29	0	0	0	%
U1h30	0	0	0	%
U1h31	0	0	0	%
U1h32	0	0	0	%
U1h33	0	0	0	%
U2h17	0	0	0	%
U2h18	0	0	0	%
U2h19	0.006	0	0.1	%
U2h20	0	0	0	%
U2h21	0	0	0	%
U2h22	0	0	0	%
U2h23	0	0	0	%
U2h24	0	0	0	%
U2h25	0	0	0	%
U2h26	0	0	0	%
U2h27	0	0	0	%
U2h28	0	0	0	%
U2h29	0	0	0	%
U2h30	0	0	0	%
U2h31	0	0	0	%
U2h32	0	0	0	%
U2h33	0	0	0	%
U3h17	0	0	0	%
U3h18	0	0	0	%
U3h19	0	0	0.1	%
U3h20	0	0	0	%
U3h21	0	0	0	%
U3h22	0	0	0	%
U3h23	0	0	0	%
U3h24	0	0	0	%
U3h25	0	0	0	%
U3h26	0	0	0	%
U3h27	0	0	0	%
U3h28	0	0	0	%
U3h29	0	0	0	%
U3h30	0	0	0	%
U3h31	0	0	0	%
U3h32	0	0	0	%
U3h33	0	0	0	%

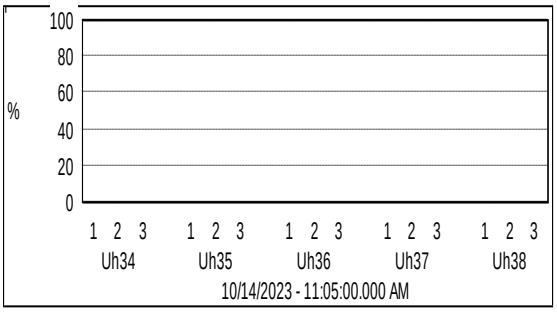


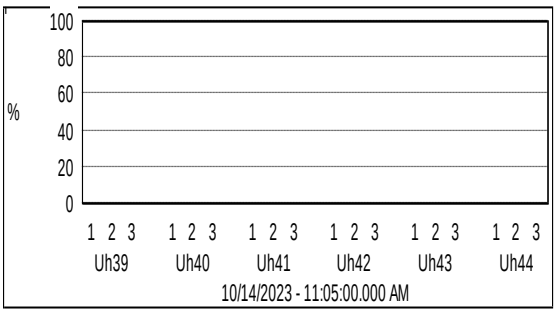


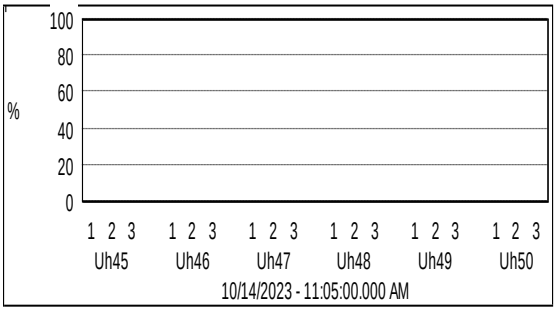


- Above individual voltage harmonics are not considerable.

Name	Avg	Min	Max	Units
U1h34	0	0	0	%
U1h35	0	0	0	%
U1h36	0	0	0	%
U1h37	0	0	0	%
U1h38	0	0	0	%
U1h39	0	0	0	%
U1h40	0	0	0	%
U1h41	0	0	0	%
U1h42	0	0	0	%
U1h43	0	0	0	%
U1h44	0	0	0	%
U1h45	0	0	0	%
U1h46	0	0	0	%
U1h47	0	0	0	%
U1h48	0	0	0	%
U1h49	0	0	0	%
U1h50	0	0	0	%
U2h34	0	0	0	%
U2h35	0	0	0	%
U2h36	0	0	0	%
U2h37	0	0	0	%
U2h38	0	0	0	%
U2h39	0	0	0	%
U2h40	0	0	0	%
U2h41	0	0	0	%
U2h42	0	0	0	%
U2h43	0	0	0	%
U2h44	0	0	0	%
U2h45	0	0	0	%
U2h46	0	0	0	%
U2h47	0	0	0	%
U2h48	0	0	0	%
U2h49	0	0	0	%
U2h50	0	0	0	%
U3h34	0	0	0	%
U3h35	0	0	0	%
U3h36	0	0	0	%
U3h37	0	0	0	%
U3h38	0	0	0	%
U3h39	0	0	0	%
U3h40	0	0	0	%
U3h41	0	0	0	%
U3h42	0	0	0	%
U3h43	0	0	0	%
U3h44	0	0	0	%
U3h45	0	0	0	%
U3h46	0	0	0	%
U3h47	0	0	0	%
U3h48	0	0	0	%
U3h49	0	0	0	%
U3h50	0	0	0	%



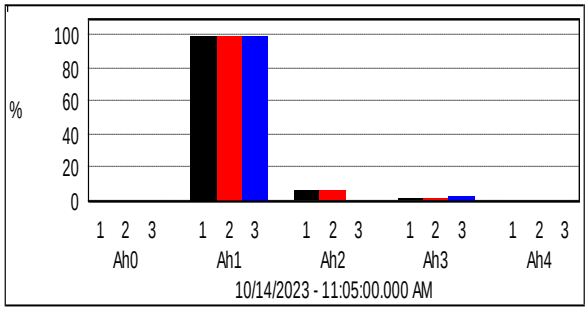


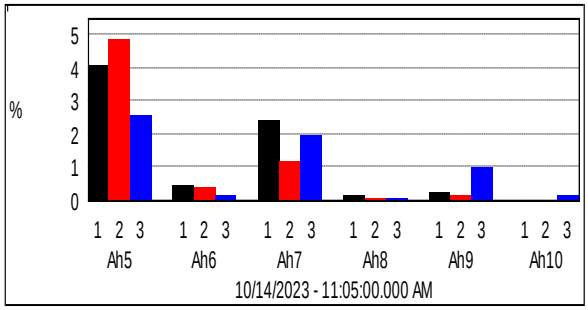


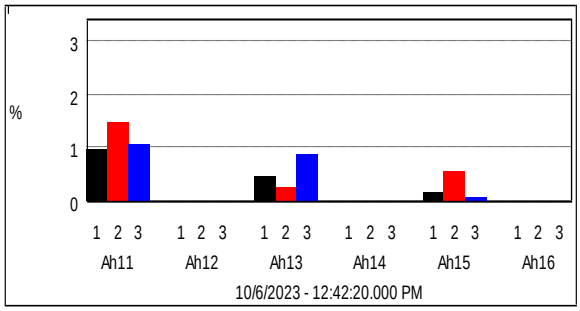
- Above individual voltage harmonics are not considerable.

➢ Individual Current Harmonics

Name	Avg	Min	Max	Units
A1h0	0	0	0	%
A1h1	100	100	100	%
A1h10	0	0	0	%
A1h11	0.011	0	0.3	%
A1h12	0	0	0	%
A1h13	0.086	0	0.3	%
A1h14	0	0	0	%
A1h15	0	0	0	%
A1h16	0	0	0	%
A1h2	2.358	1.7	7.3	%
A1h3	2.475	1.9	3.6	%
A1h4	0.092	0	0.6	%
A1h5	2.469	2.1	4.2	%
A1h6	0.022	0	0.6	%
A1h7	0.909	0.5	2.6	%
A1h8	0.013	0	0.2	%
A1h9	0.146	0	0.4	%
A2h0	0	0	0	%
A2h1	100	100	100	%
A2h10	0.001	0	0.1	%
A2h11	0.162	0	0.5	%
A2h12	0	0	0	%
A2h13	0.126	0	0.4	%
A2h14	0	0	0	%
A2h15	0.065	0	0.2	%
A2h16	0	0	0	%
A2h2	3.962	3.3	7.4	%
A2h3	1.644	1	3	%
A2h4	0.205	0	0.6	%
A2h5	3.212	2.6	5	%
A2h6	0.155	0	0.5	%
A2h7	0.985	0.6	1.6	%
A2h8	0.073	0	0.2	%
A2h9	0.049	0	0.3	%
A3h0	0	0	0	%
A3h1	100	100	100	%
A3h10	0.092	0	0.3	%
A3h11	0.203	0	0.5	%
A3h12	0.045	0	0.2	%
A3h13	0.18	0	0.4	%
A3h14	0.014	0	0.2	%
A3h15	0.197	0.1	0.4	%
A3h16	0.007	0	0.1	%
A3h2	2.411	0.9	3.9	%
A3h3	2.368	1.6	3.7	%
A3h4	0.35	0.1	0.7	%
A3h5	2.211	0.2	3.2	%
A3h6	0.174	0.1	0.5	%
A3h7	1.126	0.6	2	%
A3h8	0.167	0.1	0.4	%
A3h9	0.169	0	1	%

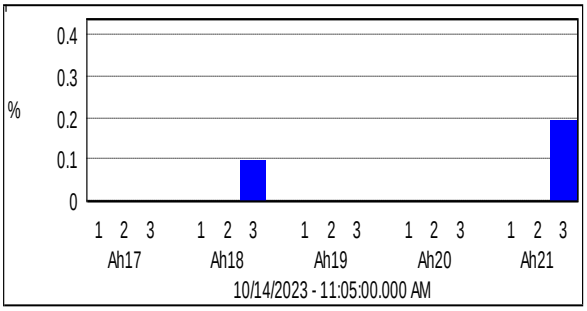


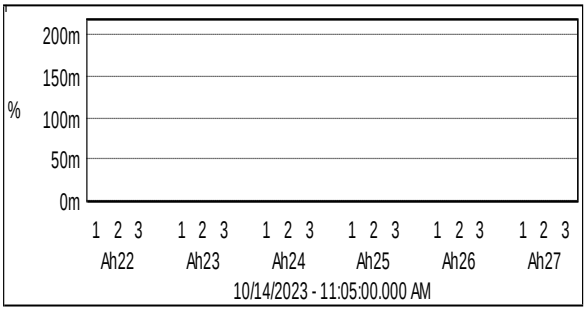


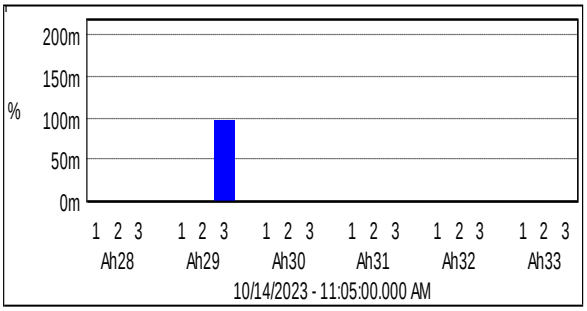


➢ 2nd, 3rd & 5th, order individual current harmonics have noticeable presence.

Name	Avg	Min	Max	Units
A1h17	0	0	0	%
A1h18	0	0	0	%
A1h19	0	0	0	%
A1h20	0	0	0	%
A1h21	0	0	0	%
A1h22	0	0	0	%
A1h23	0	0	0	%
A1h24	0	0	0	%
A1h25	0	0	0	%
A1h26	0	0	0	%
A1h27	0	0	0	%
A1h28	0	0	0	%
A1h29	0	0	0	%
A1h30	0	0	0	%
A1h31	0	0	0	%
A1h32	0	0	0	%
A1h33	0	0	0	%
A2h17	0.015	0	0.1	%
A2h18	0	0	0	%
A2h19	0.006	0	0.1	%
A2h20	0	0	0	%
A2h21	0	0	0	%
A2h22	0	0	0	%
A2h23	0	0	0.1	%
A2h24	0	0	0	%
A2h25	0	0	0	%
A2h26	0	0	0	%
A2h27	0	0	0	%
A2h28	0	0	0	%
A2h29	0	0	0	%
A2h30	0	0	0	%
A2h31	0	0	0	%
A2h32	0	0	0	%
A2h33	0	0	0	%
A3h17	0.145	0	0.4	%
A3h18	0.006	0	0.1	%
A3h19	0.003	0	0.1	%
A3h20	0	0	0.1	%
A3h21	0.096	0	0.3	%
A3h22	0	0	0	%
A3h23	0.018	0	0.1	%
A3h24	0	0	0	%
A3h25	0.1	0	0.2	%
A3h26	0	0	0	%
A3h27	0	0	0	%
A3h28	0	0	0	%
A3h29	0.066	0	0.2	%
A3h30	0	0	0	%
A3h31	0	0	0	%
A3h32	0	0	0	%
A3h33	0	0	0	%

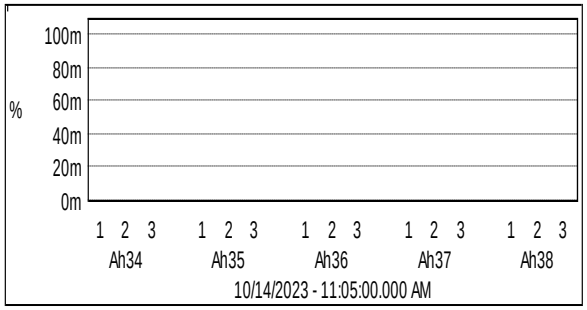


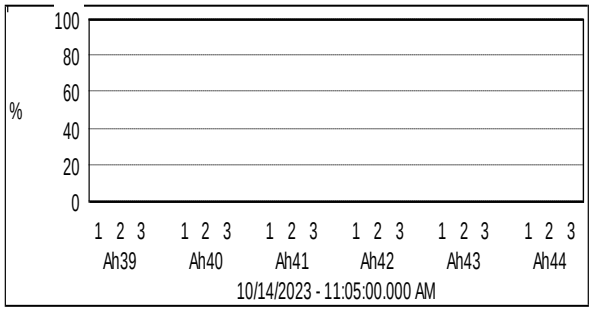


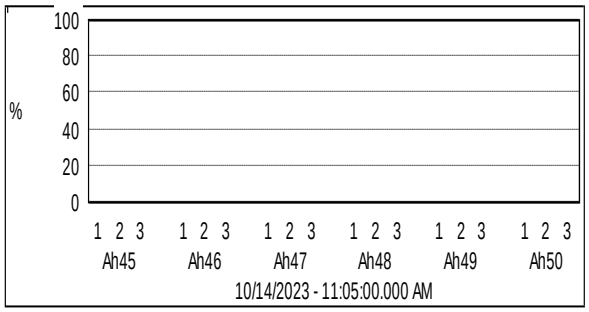


- Above individual current harmonics are not considerable.

Name	Avg	Min	Max	Units
A1h34	0	0	0	%
A1h35	0	0	0	%
A1h36	0	0	0	%
A1h37	0	0	0	%
A1h38	0	0	0	%
A1h39	0	0	0	%
A1h40	0	0	0	%
A1h41	0	0	0	%
A1h42	0	0	0	%
A1h43	0	0	0	%
A1h44	0	0	0	%
A1h45	0	0	0	%
A1h46	0	0	0	%
A1h47	0	0	0	%
A1h48	0	0	0	%
A1h49	0	0	0	%
A1h50	0	0	0	%
A2h34	0	0	0	%
A2h35	0	0	0	%
A2h36	0	0	0	%
A2h37	0	0	0	%
A2h38	0	0	0	%
A2h39	0	0	0	%
A2h40	0	0	0	%
A2h41	0	0	0	%
A2h42	0	0	0	%
A2h43	0	0	0	%
A2h44	0	0	0	%
A2h45	0	0	0	%
A2h46	0	0	0	%
A2h47	0	0	0	%
A2h48	0	0	0	%
A2h49	0	0	0	%
A2h50	0	0	0	%
A3h34	0	0	0	%
A3h35	0	0	0	%
A3h36	0	0	0	%
A3h37	0.002	0	0.1	%
A3h38	0	0	0	%
A3h39	0	0	0	%
A3h40	0	0	0	%
A3h41	0	0	0	%
A3h42	0	0	0	%
A3h43	0	0	0	%
A3h44	0	0	0	%
A3h45	0	0	0	%
A3h46	0	0	0	%
A3h47	0	0	0	%
A3h48	0	0	0	%
A3h49	0	0	0	%
A3h50	0	0	0	%







- Above individual current harmonics are not considerable.

Average measured values for Total Current & Voltage Harmonics Distortion is as under:-

Location	First Measurement Main Incomer of Pharmacy College			
THD Voltage (%)	**Name**	**Avg**	**Min**	**Max**
	U1 THD (%)	1.913	1.7	2.3
	U2 THD (%)	1.976	1.7	2.3
	U3 THD (%)	1.974	1.7	2.3
	Total Voltage Harmonic Distortion is there.			
	5th & 7th order individual voltage harmonics have noticeable presence.			
THD current (%)	**Name**	**Avg**	**Min**	**Max**
	A1 THD (%)	4.412	3.7	9.2
	A2 THD (%)	5.543	4.6	9.4
	A3 THD (%)	4.457	2.5	6.1
	Total current harmonics distortion is there and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.			
	2nd, 3rd & 5th order individual current harmonics have noticeable presence.			

❒ **Study of power parameters for Main Incomer is as follows:**

Table No. 2.3 Second Measurement of Power Parameters for Main Incomer

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
1:41:00 PM	50.01	411.9	413.2	413.5	42.18	28.89	25.02	9.64	6.71	5.80	22.14	0.968
1:41:20 PM	50	412.4	414	414.1	42.17	28.96	25.07	9.64	6.73	5.82	22.20	0.967
1:41:40 PM	50	414.8	416.4	416.7	42.32	29.05	25.15	9.72	6.78	5.87	22.38	0.966
1:42:00 PM	49.99	416.1	417.6	418.1	42.38	29.08	25.18	9.76	6.80	5.89	22.46	0.965
1:42:20 PM	49.99	416.3	418	418.1	42.34	29.11	25.19	9.75	6.82	5.90	22.46	0.965
1:42:40 PM	50	416.9	418.5	418.5	42.36	29.17	25.22	9.77	6.84	5.91	22.52	0.965
1:43:00 PM	50	418.5	420	420.4	42.41	29.26	25.31	9.81	6.88	5.95	22.64	0.965
1:43:20 PM	50.01	419.9	421.1	421.7	42.49	29.34	25.34	9.86	6.91	5.97	22.74	0.964
1:43:40 PM	50.01	420.4	421.4	421.9	42.5	29.39	25.36	9.87	6.93	5.97	22.77	0.964
1:44:00 PM	50	420.5	421.7	421.9	42.8	29.43	25.38	9.93	6.95	5.98	22.85	0.963
1:44:20 PM	50	420.4	421.7	422.3	43.14	29.41	25.36	9.99	6.94	5.98	22.90	0.962
1:44:40 PM	50	419.4	420.6	421.1	43.09	29.33	25.25	9.96	6.90	5.94	22.80	0.963
1:45:00 PM	49.98	419.7	421.1	421.6	43.1	29.36	25.22	9.96	6.92	5.94	22.81	0.963
1:45:20 PM	49.98	419.7	421.5	421.6	43.12	29.39	25.24	9.97	6.93	5.94	22.84	0.963
1:45:40 PM	49.98	420.4	422.2	421.9	43.13	29.45	25.26	9.98	6.95	5.95	22.88	0.962
1:46:00 PM	49.98	421.4	423.2	422.9	43.21	29.51	25.3	10.02	6.98	5.97	22.96	0.962
1:46:20 PM	49.98	420	421.7	421.7	42.97	29.41	25.24	9.95	6.94	5.94	22.82	0.963
1:46:40 PM	49.98	420.4	421.3	421.9	42.56	29.41	25.23	9.88	6.94	5.94	22.76	0.963
1:47:00 PM	49.97	420	421.4	421.7	42.49	29.42	25.22	9.86	6.94	5.94	22.73	0.963
1:47:20 PM	49.97	419.9	421.2	421.7	42.44	29.43	25.22	9.85	6.94	5.94	22.72	0.964
1:47:40 PM	49.98	421.2	422.3	422.7	42.55	29.5	25.24	9.89	6.97	5.96	22.82	0.963

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
1:48:00 PM	49.98	421.2	422	422.4	42.52	29.5	25.24	9.88	6.97	5.95	22.80	0.963
1:48:20 PM	49.99	420.5	421	421.9	42.47	29.38	25.18	9.86	6.93	5.93	22.72	0.964
1:48:40 PM	49.99	420.3	421.3	422.1	42.48	29.36	25.19	9.86	6.92	5.94	22.72	0.964
1:49:00 PM	49.99	420.1	421.6	422.3	42.51	29.36	25.22	9.86	6.92	5.95	22.74	0.964
1:49:20 PM	49.98	421.1	422.6	422.5	42.58	29.44	25.26	9.89	6.96	5.96	22.81	0.963
1:49:40 PM	49.98	420.6	422.1	421.9	42.54	28.67	25.22	9.88	6.76	5.94	22.58	0.963
1:50:00 PM	49.97	421.6	423	422.1	42.54	21.34	25.09	9.93	4.99	5.91	20.83	0.96
1:50:20 PM	49.97	421.8	423.3	422.4	42.51	21.33	25.1	9.93	4.99	5.92	20.83	0.96
1:50:40 PM	49.98	422.1	423.5	422.6	42.54	21.35	25.1	9.95	4.99	5.92	20.86	0.96
1:51:00 PM	50	422.2	423.3	422.8	42.56	21.33	25.1	9.95	4.99	5.92	20.86	0.96
1:51:20 PM	50.01	421.5	422.5	421.9	42.53	21.46	25.07	9.93	5.00	5.90	20.84	0.96
1:51:40 PM	50.02	421.3	421.7	420.7	42.47	21.44	25.04	9.91	5.00	5.88	20.78	0.96
1:52:00 PM	50.02	422	422.4	421.9	42.56	21.47	25.05	9.95	5.01	5.89	20.85	0.96
1:52:20 PM	50.03	422.5	423	422.7	42.97	21.5	25.07	10.07	5.02	5.91	20.99	0.96
1:52:40 PM	50.04	422.3	422.9	422.5	43.71	22.06	25.1	10.21	5.13	5.91	21.25	0.958
1:53:00 PM	50.05	419.6	420.7	421.9	43.73	29.4	25.17	10.11	6.92	5.93	22.96	0.963
1:53:20 PM	50.06	420.5	421.5	422.2	43.77	29.36	25.18	10.13	6.91	5.94	22.99	0.962
1:53:40 PM	50.06	420.2	421.4	421.3	43.68	29.43	25.17	10.10	6.94	5.93	22.97	0.963
1:54:00 PM	50.05	419.8	420.8	421.2	43.67	29.49	25.15	10.09	6.94	5.92	22.96	0.963
1:54:20 PM	50.06	419.7	420.6	421.5	43.74	29.45	25.16	10.11	6.93	5.93	22.97	0.963
1:54:40 PM	50.07	419.7	420.6	421.8	43.71	29.97	25.18	10.10	7.04	5.94	23.08	0.962
1:55:00 PM	50.08	417.8	418.5	419.4	43.11	30.06	25.11	9.96	7.03	5.89	22.87	0.964
1:55:20 PM	50.06	416.3	417.1	417.7	42.96	29.98	25.06	9.89	6.99	5.86	22.75	0.965
1:55:40 PM	50.05	416.9	417.7	418.3	42.98	30.05	26.03	9.91	7.01	6.10	23.03	0.965
1:56:00 PM	50.05	417.6	418.2	418.9	42.95	30.04	25.21	9.92	7.02	5.91	22.84	0.964

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
1:56:20 PM	50.05	419.2	419.9	420.4	43	30.15	25.16	9.96	7.07	5.91	22.94	0.963
1:56:40 PM	50.06	420.2	421	421.6	42.72	30.19	25.21	9.91	7.09	5.94	22.94	0.963
1:57:00 PM	50.06	420.5	421.7	422	42.63	30.21	25.25	9.89	7.10	5.95	22.94	0.962
1:57:20 PM	50.05	420.4	421.5	422	42.68	30.24	25.25	9.90	7.11	5.95	22.96	0.963
1:57:40 PM	50.04	420.5	421.6	422.4	42.65	30.25	25.26	9.90	7.11	5.96	22.97	0.962
1:58:00 PM	50.03	421	422	422.6	42.67	30.3	25.27	9.91	7.13	5.96	23.00	0.962
1:58:20 PM	50.02	421.6	421.3	422.2	42.77	30.38	31.62	9.96	7.11	7.42	24.48	0.96
1:58:40 PM	50.01	421.6	420.9	422.1	42.56	29.98	31.88	9.93	7.03	7.54	24.49	0.964
1:59:00 PM	49.99	421.4	420.9	422	42.53	29.66	31.97	9.92	6.97	7.56	24.44	0.964
1:59:20 PM	49.97	421.8	421.5	422.5	42.36	29.45	32.18	9.90	6.93	7.62	24.45	0.965
1:59:40 PM	49.97	421.7	421.4	422.3	41.76	29.45	32.37	9.78	6.92	7.67	24.37	0.966
2:00:00 PM	49.96	420.7	420.4	421.5	39.79	29.35	32.39	9.39	6.89	7.67	23.95	0.97
2:00:20 PM	49.94	420.7	420.5	421.4	39.82	29.32	32.47	9.39	6.89	7.69	23.97	0.97
2:00:40 PM	49.93	421.1	420.7	421.6	39.84	29.37	32.55	9.40	6.89	7.71	24.01	0.97
2:01:00 PM	49.92	421.9	421.5	422.6	40.11	29.38	32.68	9.48	6.91	7.75	24.14	0.969
2:01:20 PM	49.92	421.4	420.8	422	40.48	29.4	32.76	9.53	6.90	7.76	24.20	0.968
2:01:40 PM	49.92	421.2	420.8	421.6	40.47	29.39	32.82	9.52	6.90	7.78	24.20	0.969
2:02:00 PM	49.91	420.9	420.5	421.6	40.41	29.38	32.87	9.51	6.89	7.78	24.19	0.969
2:02:20 PM	49.9	420.7	420.2	421.2	40.41	29.37	32.92	9.50	6.89	7.79	24.18	0.969
2:02:40 PM	49.9	421.3	420.7	421.7	40.46	29.39	32.99	9.53	6.90	7.81	24.24	0.968
2:03:00 PM	49.92	421.3	420.5	421.8	40.44	29.41	33.02	9.52	6.90	7.82	24.24	0.968
2:03:20 PM	49.93	421.3	420.4	422	40.35	29.43	33.07	9.51	6.91	7.84	24.25	0.969
2:03:40 PM	49.94	421.3	420.3	421.8	40	29.41	33.02	9.45	6.90	7.82	24.18	0.97
2:04:00 PM	49.93	421.6	420.6	422.2	39.83	29.42	32.99	9.41	6.91	7.82	24.14	0.97
2:04:20 PM	49.92	421.6	420.4	422	39.74	29.37	32.99	9.39	6.90	7.82	24.10	0.969

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:04:40 PM	49.92	421.4	420	422	39.73	29.35	33.01	9.39	6.89	7.82	24.09	0.97
2:05:00 PM	49.91	420.4	419.9	421.9	39.55	29.21	28.23	9.32	6.87	6.67	22.87	0.97
2:05:20 PM	49.91	419.9	420	421.7	39.54	29.13	24.68	9.31	6.87	5.83	22.01	0.971
2:05:40 PM	49.91	420.3	420.4	422	39.55	29.17	24.69	9.32	6.89	5.83	22.05	0.971
2:06:00 PM	49.92	420.6	420.7	422	39.52	29.18	24.7	9.31	6.90	5.84	22.05	0.971
2:06:20 PM	49.92	420.1	420.3	421.7	39.56	29.18	24.69	9.31	6.89	5.83	22.04	0.971
2:06:40 PM	49.92	419.9	420.3	421.5	39.59	29.21	24.7	9.32	6.90	5.83	22.05	0.971
2:07:00 PM	49.91	419.6	419.8	421	39.55	28.84	24.64	9.31	6.82	5.81	21.94	0.971
2:07:20 PM	49.91	419.7	419.7	420.9	39.55	28.53	24.62	9.31	6.75	5.80	21.87	0.972
2:07:40 PM	49.91	419.1	419.2	420.4	39.53	28.48	24.61	9.29	6.73	5.79	21.82	0.972
2:08:00 PM	49.9	419.1	419.5	420.6	39.49	28.49	24.63	9.29	6.74	5.80	21.83	0.972
2:08:20 PM	49.91	420.3	420.8	421.9	39.53	28.54	24.7	9.32	6.77	5.83	21.92	0.972
2:08:40 PM	49.92	419.1	419.7	420.4	39.45	28.5	24.66	9.28	6.75	5.81	21.83	0.972
2:09:00 PM	49.93	419.2	420	420.7	39.48	28.54	24.68	9.29	6.76	5.82	21.86	0.972
2:09:20 PM	49.93	419.3	420.2	420.7	39.94	28.54	24.68	9.38	6.76	5.82	21.95	0.972
2:09:40 PM	49.93	419.4	420.2	420.6	40.1	28.55	24.65	9.41	6.76	5.81	21.98	0.971
2:10:00 PM	49.93	420	420.6	421.2	40.06	28.57	24.2	9.40	6.78	5.71	21.89	0.971
2:10:20 PM	49.93	418.3	419.1	419.9	40.04	28.47	23.88	9.37	6.73	5.62	21.73	0.972
2:10:40 PM	49.92	418.4	419.2	420	40.03	28.45	23.83	9.37	6.73	5.61	21.71	0.972
2:11:00 PM	49.9	418.4	419	420	39.98	28.46	23.83	9.36	6.73	5.61	21.70	0.972
2:11:20 PM	49.89	418.8	419.3	420.1	39.88	28.56	23.83	9.34	6.76	5.61	21.70	0.971
2:11:40 PM	49.89	419.4	420	420.9	39.38	28.58	23.85	9.22	6.77	5.62	21.62	0.971
2:12:00 PM	49.88	419.4	420	420.8	38.5	28.55	23.84	9.02	6.76	5.62	21.40	0.971
2:12:20 PM	49.88	419.3	419.8	420.3	37.93	28.6	23.81	8.87	6.77	5.61	21.25	0.971
2:12:40 PM	49.88	419.8	420.1	420.8	37.94	28.6	23.83	8.88	6.78	5.62	21.28	0.97

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:13:00 PM	49.88	418.4	418.6	419.3	37.8	28.49	23.78	8.82	6.73	5.59	21.14	0.971
2:13:20 PM	49.88	418.8	419	419.7	37.8	28.5	23.84	8.83	6.74	5.61	21.17	0.971
2:13:40 PM	49.86	418.2	418.2	419.1	37.78	28.48	23.87	8.81	6.73	5.61	21.15	0.971
2:14:00 PM	49.84	418.5	418.1	419.2	37.91	28.57	23.84	8.85	6.75	5.60	21.20	0.971
2:14:20 PM	49.83	418.5	418.6	419.5	37.88	28.59	23.87	8.85	6.75	5.61	21.21	0.971
2:14:40 PM	49.83	418.6	419	419.7	37.91	28.59	23.87	8.85	6.76	5.62	21.22	0.97
2:15:00 PM	49.85	417.9	418.4	418.8	37.87	28.53	23.81	8.83	6.73	5.59	21.15	0.971
2:15:20 PM	49.86	418.8	419.2	419.8	37.91	28.59	23.86	8.86	6.76	5.62	21.23	0.97
2:15:40 PM	49.88	419.1	419.7	420.1	37.92	28.59	23.88	8.86	6.77	5.62	21.25	0.97
2:16:00 PM	49.9	419.7	419.9	420.6	37.89	28.6	23.88	8.87	6.77	5.63	21.27	0.97
2:16:20 PM	49.91	418.5	418.3	418.9	37.78	28.51	23.79	8.82	6.73	5.59	21.14	0.971
2:16:40 PM	49.91	418.6	418.4	418.8	37.83	28.55	23.8	8.83	6.75	5.59	21.17	0.971
2:17:00 PM	49.9	418.4	418.4	418.8	37.76	28.52	23.83	8.81	6.74	5.59	21.15	0.971
2:17:20 PM	49.9	419.1	418.9	419.6	37.81	28.52	23.84	8.84	6.74	5.61	21.19	0.971
2:17:40 PM	49.91	419.5	419.5	420.2	38.13	28.55	23.84	8.91	6.76	5.61	21.28	0.97
2:18:00 PM	49.92	419.2	419.5	420	38.47	28.56	23.83	8.97	6.75	5.61	21.33	0.969
2:18:20 PM	49.93	418.9	419.7	419.7	38.32	28.58	23.87	8.93	6.76	5.61	21.31	0.97
2:18:40 PM	49.93	419.1	419.8	420	38.32	28.58	23.83	8.93	6.76	5.61	21.31	0.969
2:19:00 PM	49.94	419.5	420.6	420.6	38.41	28.61	23.87	8.96	6.78	5.63	21.37	0.969
2:19:20 PM	49.94	417.7	418.9	418.9	38.41	28.54	23.8	8.93	6.74	5.60	21.27	0.97
2:19:40 PM	49.94	418.7	419.6	419.7	38.44	28.57	23.84	8.96	6.75	5.61	21.32	0.97
2:20:00 PM	49.95	419	419.6	419.5	38.49	28.6	23.81	8.97	6.77	5.60	21.34	0.97
2:20:20 PM	49.95	419.2	419.4	419.6	37.89	28.58	23.85	8.86	6.77	5.61	21.24	0.971
2:20:40 PM	49.94	419.4	419.8	419.8	38.33	28.64	23.86	8.97	6.79	5.62	21.37	0.971
2:21:00 PM	49.95	419.8	420.1	420.1	38.4	28.64	23.85	8.99	6.79	5.62	21.40	0.971

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:21:20 PM	49.95	418.2	418.5	418.9	38.29	28.59	23.81	8.94	6.76	5.59	21.29	0.971
2:21:40 PM	49.94	418	418.8	419	38.3	28.44	23.86	8.94	6.72	5.61	21.27	0.971
2:22:00 PM	49.95	418.3	419.4	419.5	38.26	28.43	23.89	8.94	6.72	5.62	21.28	0.971
2:22:20 PM	49.96	419	419.6	419.7	38.26	28.47	23.87	8.94	6.74	5.62	21.31	0.971
2:22:40 PM	49.97	418.9	419.8	419.8	38.29	28.58	23.91	8.95	6.77	5.63	21.35	0.971
2:23:00 PM	49.97	418.5	419.5	419.1	38.2	28.62	23.92	8.92	6.78	5.62	21.33	0.971
2:23:20 PM	49.98	418.7	419	419.3	38.2	28.63	23.89	8.93	6.78	5.61	21.32	0.972
2:23:40 PM	49.98	418.6	418.8	419	38.23	28.62	23.87	8.93	6.78	5.61	21.31	0.972
2:24:00 PM	49.98	418.6	418.6	418.8	38.27	28.63	23.88	8.94	6.78	5.60	21.32	0.972
2:24:20 PM	49.98	419.4	419.6	419.2	38.26	28.13	23.88	8.95	6.67	5.61	21.23	0.971
2:24:40 PM	49.99	419.8	419.6	418.4	38.16	20.39	23.66	8.97	4.79	5.55	19.31	0.969
2:25:00 PM	50	419.4	419.4	418.4	38.04	20.35	23.65	8.94	4.78	5.55	19.26	0.97
2:25:20 PM	50.01	419.5	419.4	418.3	37.8	20.34	23.65	8.88	4.78	5.54	19.20	0.969
2:25:40 PM	50.01	420.6	419.9	419.9	32.19	20.19	23.47	7.53	4.74	5.54	17.81	0.968
2:26:00 PM	50.02	421.3	420.4	421	29.78	20.06	23.44	6.96	4.71	5.56	17.23	0.967
2:26:20 PM	50.02	421.1	420.4	420.9	30.49	20.12	23.57	7.09	4.73	5.59	17.40	0.966
2:26:40 PM	50.02	421	420.4	420.9	30.38	19.97	23.69	7.06	4.68	5.62	17.37	0.966
2:27:00 PM	50	421.1	420.2	420.6	30.36	19.89	23.67	7.06	4.67	5.61	17.33	0.966
2:27:20 PM	50.01	421.5	420.4	421	30.39	19.92	23.67	7.07	4.67	5.61	17.36	0.965
2:27:40 PM	50.01	420.9	419.5	420.5	30.4	19.88	23.63	7.07	4.66	5.60	17.32	0.966
2:28:00 PM	50.02	420.5	418.9	420.4	30.44	19.87	23.63	7.08	4.65	5.59	17.32	0.966
2:28:20 PM	50.03	420.2	418.4	419.9	30.41	19.85	23.6	7.06	4.64	5.58	17.28	0.966
2:28:40 PM	50.02	420.9	419.1	420.4	29.98	19.87	23.61	7.00	4.65	5.59	17.24	0.967
2:29:00 PM	50.01	420.8	419	420	29.89	19.86	23.6	6.98	4.65	5.58	17.21	0.967
2:29:20 PM	50	420.5	418.7	419.6	29.82	19.85	23.59	6.96	4.64	5.58	17.18	0.967

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:29:40 PM	49.98	419.9	418.1	418.9	29.7	19.84	23.59	6.92	4.64	5.56	17.12	0.968
2:30:00 PM	49.97	420.4	418.6	419.3	29.72	19.85	23.6	6.93	4.65	5.57	17.15	0.968
2:30:20 PM	49.99	419.8	417.9	418.6	29.67	19.84	23.59	6.91	4.64	5.56	17.11	0.968
2:30:40 PM	49.98	420.5	418.7	419.3	29.74	19.88	23.6	6.94	4.65	5.57	17.16	0.968
2:31:00 PM	49.98	420.3	418.4	418.8	29.76	19.87	23.59	6.94	4.65	5.56	17.15	0.968
2:31:20 PM	49.99	420.8	418.6	419.1	29.77	19.9	23.6	6.95	4.66	5.57	17.18	0.968
2:31:40 PM	49.98	419.5	417.4	417.9	29.74	19.83	23.55	6.92	4.63	5.54	17.10	0.968
2:32:00 PM	49.97	419.6	417.2	417.7	29.7	19.83	23.56	6.91	4.63	5.54	17.09	0.968
2:32:20 PM	49.96	419.5	417.2	417.9	29.66	19.81	23.57	6.90	4.63	5.54	17.07	0.968
2:32:40 PM	49.96	420	418	418.8	29.61	19.84	23.6	6.90	4.64	5.56	17.10	0.968
2:33:00 PM	49.96	419	417	418	29.65	19.8	23.55	6.90	4.62	5.54	17.06	0.968
2:33:20 PM	49.97	419.4	417.5	418.5	29.68	19.81	23.55	6.91	4.63	5.55	17.09	0.968
2:33:40 PM	49.99	419.4	417.4	418.6	29.67	19.81	24.66	6.91	4.63	5.76	17.30	0.966
2:34:00 PM	49.99	419.4	416.1	417.9	29.81	19.8	31.22	6.94	4.61	7.34	18.89	0.968
2:34:20 PM	50	420	416.5	418.3	29.87	19.82	31.26	6.97	4.61	7.36	18.94	0.968
2:34:40 PM	50	419.8	416.2	418.1	30.26	20.54	31.43	7.04	4.76	7.40	19.19	0.966
2:35:00 PM	50.01	420.2	416.7	417.9	30.45	20.63	31.61	7.07	4.78	7.43	19.28	0.964
2:35:20 PM	50	420.4	417	417.8	30.4	20.63	31.66	7.06	4.78	7.45	19.29	0.964
2:35:40 PM	49.99	419.1	415.7	416.8	30.4	20.57	31.72	7.04	4.75	7.44	19.24	0.964
2:36:00 PM	49.99	419.4	415.9	417.3	30.38	20.57	31.82	7.04	4.75	7.47	19.27	0.964
2:36:20 PM	49.99	419.8	416.7	417.7	30.45	20.58	31.9	7.06	4.77	7.50	19.33	0.964
2:36:40 PM	49.98	420.1	417.4	418.1	30.43	20.6	31.99	7.06	4.78	7.53	19.37	0.964
2:37:00 PM	49.98	420	417.7	418.2	30.22	20.6	32.07	7.02	4.78	7.56	19.35	0.964
2:37:20 PM	49.96	419.2	417	417.5	29.77	20.58	32.11	6.92	4.76	7.56	19.25	0.966
2:37:40 PM	49.96	418.1	416.1	416.5	29.67	20.55	32.12	6.89	4.75	7.55	19.18	0.966

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:38:00 PM	49.95	418.5	416.5	416.9	29.67	20.56	32.18	6.89	4.75	7.57	19.21	0.966
2:38:20 PM	49.95	419.4	417.4	417.8	29.71	20.6	32.22	6.91	4.77	7.59	19.27	0.966
2:38:40 PM	49.96	419.3	417	417.8	29.75	20.57	32.22	6.92	4.77	7.59	19.28	0.966
2:39:00 PM	49.98	419.5	417.2	418	29.83	20.59	32.23	6.94	4.77	7.59	19.31	0.966
2:39:20 PM	49.99	420.2	417.9	418.6	29.82	20.62	32.23	6.95	4.78	7.60	19.34	0.966
2:39:40 PM	49.98	419.2	417.1	417.7	29.88	20.58	32.22	6.96	4.77	7.59	19.31	0.966
2:40:00 PM	49.99	419.2	417.1	417.6	30.09	20.56	32.25	7.01	4.77	7.59	19.37	0.967
2:40:20 PM	50	419.7	417.3	417.9	30.13	20.58	32.28	7.03	4.77	7.60	19.40	0.966
2:40:40 PM	50.02	419.3	416.8	417.5	30.08	20.56	32.27	7.01	4.76	7.60	19.37	0.967
2:41:00 PM	50.03	419.5	416.8	417.7	30.14	20.55	32.25	7.03	4.76	7.60	19.38	0.967
2:41:20 PM	50.04	419.5	416.8	417.5	30.18	20.56	32.28	7.04	4.76	7.60	19.40	0.967
2:41:40 PM	50.04	417.7	414.9	415.9	30.06	20.46	32.25	6.98	4.72	7.57	19.27	0.967
2:42:00 PM	50.03	418.6	415.8	416.9	30.12	20.48	32.27	7.01	4.73	7.59	19.33	0.967
2:42:20 PM	50.01	419.3	416.1	417.4	30.17	20.5	32.26	7.03	4.74	7.59	19.36	0.967
2:42:40 PM	50	419.1	415.7	417.2	30.1	20.49	32.16	7.01	4.73	7.56	19.31	0.967
2:43:00 PM	49.99	419	415.7	417	30.12	20.47	32.2	7.02	4.73	7.57	19.31	0.967
2:43:20 PM	49.98	418.6	415.6	416.6	30.8	20.48	32.22	7.13	4.73	7.56	19.43	0.965
2:43:40 PM	49.96	417.6	414.8	415.7	30.65	20.44	32.21	7.08	4.71	7.55	19.35	0.965
2:44:00 PM	49.97	417.5	415.2	415.8	30.59	20.44	32.24	7.07	4.71	7.56	19.34	0.965
2:44:20 PM	49.98	417.4	415.2	415.7	30.56	20.46	32.26	7.06	4.72	7.57	19.34	0.966
2:44:40 PM	49.97	417.4	415.3	416.1	30.58	20.45	32.28	7.06	4.72	7.58	19.36	0.965
2:45:00 PM	49.98	418	415.9	416.7	30.6	20.47	32.29	7.08	4.73	7.59	19.39	0.965
2:45:20 PM	49.99	418	415.8	416.6	30.58	20.48	32.27	7.08	4.73	7.58	19.38	0.965
2:45:40 PM	49.98	417.7	414.9	416.2	30.11	20.42	32.24	6.99	4.71	7.56	19.26	0.966
2:46:00 PM	49.97	417.1	413.9	415.6	29.98	20.38	32.25	6.96	4.69	7.55	19.20	0.967

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:46:20 PM	49.97	417.7	414.1	416.2	30.04	20.38	32.26	6.98	4.69	7.56	19.24	0.967
2:46:40 PM	49.97	418.2	414.4	417.1	30.13	20.38	32.27	7.02	4.69	7.58	19.28	0.966
2:47:00 PM	49.98	418.4	414.8	417.5	30.15	19.76	32.28	7.03	4.58	7.59	19.19	0.969
2:47:20 PM	49.97	417.4	414.2	416.8	30.09	19.67	32.26	7.00	4.55	7.58	19.13	0.969
2:47:40 PM	49.97	417.1	414.3	416.7	30.09	19.66	32.28	6.99	4.55	7.58	19.13	0.969
2:48:00 PM	49.96	417.2	414.5	416.9	30.12	19.67	32.3	7.00	4.55	7.59	19.15	0.969
2:48:20 PM	49.95	417.1	414.3	416.7	30.16	19.67	32.28	7.01	4.55	7.58	19.14	0.969
2:48:40 PM	49.94	417.6	414.5	416.9	30.09	19.69	32.26	7.00	4.56	7.58	19.14	0.969
2:49:00 PM	49.94	416.7	413.7	416.1	30.14	19.66	32.28	7.00	4.54	7.57	19.11	0.969
2:49:20 PM	49.94	417.5	414.7	417.2	30.6	19.71	32.28	7.12	4.56	7.59	19.28	0.969
2:49:40 PM	49.95	417.7	414.9	417.3	30.65	19.7	32.28	7.14	4.56	7.60	19.29	0.969
2:50:00 PM	49.95	418.2	415.2	417.5	30.66	19.72	32.86	7.15	4.57	7.74	19.45	0.969
2:50:20 PM	49.95	416.7	413.7	416	30.51	19.65	32.93	7.09	4.54	7.73	19.36	0.97
2:50:40 PM	49.96	417	414.3	416.5	30.57	19.68	32.31	7.11	4.55	7.59	19.25	0.97
2:51:00 PM	49.98	417.8	415.1	417.2	30.53	19.7	32.31	7.11	4.56	7.61	19.28	0.969
2:51:20 PM	49.99	418.4	415.8	417.9	30.62	19.73	32.34	7.14	4.58	7.62	19.34	0.969
2:51:40 PM	50	418.1	415.5	417.4	31.2	19.72	32.35	7.24	4.57	7.62	19.43	0.968
2:52:00 PM	49.99	418.1	415.2	417.2	31.26	19.74	32.35	7.25	4.57	7.61	19.44	0.967
2:52:20 PM	49.99	417.6	415.1	417.1	31.26	19.71	32.31	7.24	4.56	7.60	19.41	0.967
2:52:40 PM	50.01	417.1	414.5	416.4	31.18	19.68	32.16	7.21	4.55	7.55	19.32	0.968
2:53:00 PM	50.01	417.4	415.5	417.2	31.05	19.69	28.19	7.19	4.57	6.63	18.38	0.967
2:53:20 PM	50.02	417.2	416.3	418	30.71	19.64	22.8	7.10	4.57	5.37	17.04	0.967
2:53:40 PM	50.04	418	417.3	419	30.29	19.69	21.29	7.01	4.59	5.05	16.65	0.968
2:54:00 PM	50.04	418.3	417.8	419	29.83	19.7	20.2	6.92	4.60	4.81	16.33	0.97
2:54:20 PM	50.07	419.2	418.7	420.2	29.56	19.74	19.81	6.88	4.62	4.74	16.24	0.972

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
2:54:40 PM	50.07	418.4	418.1	419.5	29.53	19.72	19.81	6.87	4.61	4.73	16.21	0.972
2:55:00 PM	50.06	419	418.7	420	29.57	19.75	19.81	6.89	4.62	4.74	16.25	0.971
2:55:20 PM	50.05	419.2	418.8	420.1	28.97	19.74	19.79	6.76	4.62	4.73	16.11	0.972
2:55:40 PM	50.05	419.9	419.7	420.8	28.63	19.78	19.8	6.70	4.64	4.74	16.08	0.972
2:56:00 PM	50.05	419.3	419.3	420.1	28.58	19.77	19.8	6.67	4.63	4.74	16.04	0.972
2:56:20 PM	50.02	418.7	418.9	419.7	28.54	19.74	20.29	6.65	4.62	4.84	16.11	0.971
2:56:40 PM	50.02	419.1	419	419.8	28.61	19.76	22.13	6.67	4.62	5.27	16.56	0.97
2:57:00 PM	50	418.5	418.4	419.2	28.58	19.73	22.07	6.66	4.60	5.25	16.51	0.97
2:57:20 PM	49.98	419.3	419.3	419.8	28.6	19.73	22.08	6.67	4.61	5.26	16.54	0.97
2:57:40 PM	49.98	418.8	418.8	419.1	28.52	19.67	22.06	6.64	4.59	5.25	16.48	0.97
2:58:00 PM	49.97	418.4	418.5	418.8	28.56	19.66	22.05	6.65	4.59	5.24	16.48	0.97
2:58:20 PM	49.97	419	418.9	419.4	28.59	19.69	22.05	6.66	4.60	5.25	16.51	0.97
2:58:40 PM	49.98	419.6	419.2	419.9	28.61	19.71	22.05	6.68	4.61	5.25	16.54	0.97
2:59:00 PM	49.98	419	418.7	419.4	28.61	19.69	22.04	6.67	4.60	5.24	16.51	0.97
2:59:20 PM	49.96	418.9	418.7	419.5	28.63	19.68	22.04	6.67	4.59	5.24	16.51	0.97
2:59:40 PM	49.96	418.7	418.4	419.4	28.63	19.67	22.03	6.67	4.59	5.24	16.50	0.97
3:00:00 PM	49.95	418.8	418.5	419.8	29.24	19.67	22.04	6.79	4.59	5.25	16.62	0.968
3:00:20 PM	49.95	418.2	418	419.2	29.23	19.66	22.02	6.77	4.58	5.23	16.59	0.968
3:00:40 PM	49.96	417.9	417.5	419	29.19	19.65	22	6.76	4.57	5.23	16.56	0.968
3:01:00 PM	49.97	417.7	417.2	418.9	29.13	19.63	22	6.75	4.56	5.22	16.53	0.969
3:01:20 PM	49.95	417.4	417	418.8	29.1	19.63	21.99	6.74	4.56	5.22	16.52	0.968
3:01:40 PM	49.92	417.2	416.9	418.4	29.08	19.62	21.99	6.72	4.56	5.22	16.50	0.969
3:02:00 PM	49.91	416.4	415.9	417.4	29	19.59	21.96	6.69	4.54	5.20	16.43	0.969
3:02:20 PM	49.9	416.3	415.6	417.3	28.66	19.56	21.96	6.63	4.53	5.20	16.36	0.97
3:02:40 PM	49.91	417	416.1	417.8	28.44	19.58	22	6.61	4.54	5.21	16.36	0.97

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:03:00 PM	49.91	417.1	415.7	417.5	28.41	19.62	21.85	6.60	4.55	5.17	16.32	0.97
3:03:20 PM	49.91	416.7	415.8	417.1	28.34	19.61	21.85	6.58	4.55	5.16	16.29	0.97
3:03:40 PM	49.91	416	415.2	416.4	28.37	19.59	21.84	6.58	4.54	5.15	16.27	0.971
3:04:00 PM	49.91	416.5	415.6	416.9	28.38	19.59	22.65	6.59	4.54	5.33	16.46	0.969
3:04:20 PM	49.9	416.3	415.6	417	28.37	19.59	22.31	6.58	4.54	5.25	16.37	0.969
3:04:40 PM	49.89	416.6	416	417.3	28.39	19.61	22.28	6.59	4.55	5.25	16.39	0.969
3:05:00 PM	49.89	416.8	416.3	417.3	28.39	19.61	22.3	6.59	4.55	5.26	16.40	0.969
3:05:20 PM	49.89	417.5	417.1	418.1	28.47	19.63	22.33	6.62	4.57	5.27	16.46	0.969
3:05:40 PM	49.89	417.2	416.7	418	28.46	19.62	22.33	6.61	4.56	5.27	16.44	0.969
3:06:00 PM	49.88	417.5	416.6	417.8	28.45	19.63	22.32	6.61	4.56	5.27	16.44	0.969
3:06:20 PM	49.88	417.6	416.8	417.9	28.45	19.63	22.32	6.61	4.56	5.27	16.44	0.969
3:06:40 PM	49.9	417.7	416.8	417.8	28.42	19.64	22.32	6.61	4.57	5.27	16.44	0.969
3:07:00 PM	49.9	417.2	416.5	417.4	28.41	19.63	22.31	6.60	4.56	5.26	16.42	0.969
3:07:20 PM	49.91	417	416.2	417.1	28.41	19.63	22.31	6.60	4.56	5.26	16.41	0.969
3:07:40 PM	49.9	416.9	416.2	416.7	28.34	19.62	22.33	6.57	4.56	5.26	16.39	0.969
3:08:00 PM	49.9	417.6	416.5	417.5	28.41	19.64	22.37	6.60	4.57	5.27	16.44	0.969
3:08:20 PM	49.9	417.5	416.6	417.7	28.59	19.64	22.59	6.64	4.57	5.33	16.53	0.968
3:08:40 PM	49.89	416.9	416.1	417.7	29.08	19.61	22.57	6.72	4.55	5.33	16.59	0.967
3:09:00 PM	49.88	416.7	415.6	417.3	29.06	19.6	22.34	6.71	4.54	5.26	16.52	0.967
3:09:20 PM	49.88	414.5	413.4	415.2	28.98	19.51	22.2	6.67	4.50	5.20	16.37	0.968
3:09:40 PM	49.88	413.4	412.6	414.3	28.9	19.47	21.45	6.63	4.48	5.01	16.13	0.967
3:10:00 PM	49.88	413.4	412.8	414.7	28.82	19.46	19.83	6.61	4.49	4.61	15.71	0.966
3:10:20 PM	49.88	412.7	412.1	414.2	28.88	19.42	19.77	6.62	4.47	4.59	15.68	0.966
3:10:40 PM	49.88	413.1	412.3	414.3	28.85	19.46	19.77	6.62	4.48	4.59	15.69	0.966
3:11:00 PM	49.88	412.6	411.9	413.8	28.27	19.42	19.78	6.51	4.47	4.59	15.57	0.968

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:11:20 PM	49.88	412.6	411.8	414.1	28.27	19.42	19.75	6.51	4.47	4.59	15.57	0.968
3:11:40 PM	49.87	412.5	411.9	413.5	28.24	19.4	19.77	6.50	4.47	4.59	15.55	0.968
3:12:00 PM	49.84	412	411.7	412.6	28.13	19.4	19.79	6.46	4.47	4.58	15.51	0.968
3:12:20 PM	49.83	412.1	411.8	412.9	28.17	19.43	19.78	6.47	4.47	4.58	15.53	0.968
3:12:40 PM	49.83	412.3	412	413	28.14	19.45	19.78	6.47	4.48	4.58	15.53	0.968
3:13:00 PM	49.83	412.4	411.6	412.6	28.1	19.44	19.77	6.46	4.48	4.58	15.51	0.968
3:13:20 PM	49.83	412.4	411.8	413.1	28.16	19.43	19.77	6.48	4.47	4.58	15.53	0.968
3:13:40 PM	49.85	412.6	412	413.4	28.23	19.44	19.78	6.50	4.48	4.59	15.56	0.968
3:14:00 PM	49.85	412.4	411.9	413.2	28.21	19.46	19.77	6.49	4.48	4.58	15.55	0.968
3:14:20 PM	49.84	412.6	411.9	413.2	28.17	20.13	19.8	6.48	4.62	4.59	15.69	0.967
3:14:40 PM	49.85	412.6	412.1	413.4	28.14	20.23	19.8	6.48	4.63	4.59	15.70	0.965
3:15:00 PM	49.87	413.2	412.6	414.2	28.19	20.18	19.81	6.49	4.62	4.60	15.72	0.966
3:15:20 PM	49.88	413.1	412.2	413.6	28.22	20.18	19.79	6.49	4.62	4.59	15.71	0.966
3:15:40 PM	49.88	412.8	412.3	413.8	29.61	20.19	19.78	6.75	4.62	4.59	15.96	0.962
3:16:00 PM	49.88	412.7	412	413.7	30.05	20.23	19.75	6.84	4.63	4.58	16.04	0.962
3:16:20 PM	49.88	413.1	412.4	414.1	30.02	20.22	19.77	6.83	4.63	4.59	16.05	0.961
3:16:40 PM	49.87	412.5	411.6	413.4	29.84	20.29	19.71	6.79	4.63	4.56	15.98	0.961
3:17:00 PM	49.87	412.8	411.9	413.5	30.26	20.28	19.75	6.86	4.64	4.57	16.07	0.96
3:17:20 PM	49.86	412.7	411.9	413.8	30.3	20.29	19.75	6.86	4.64	4.57	16.07	0.959
3:17:40 PM	49.85	412.7	412.4	414.2	30.34	20.27	19.76	6.86	4.63	4.59	16.08	0.959
3:18:00 PM	49.85	413.1	412.9	414.7	30.77	20.28	19.81	6.98	4.64	4.60	16.22	0.96
3:18:20 PM	49.86	413	412.7	414.5	30.8	20.28	19.8	6.98	4.64	4.59	16.22	0.96
3:18:40 PM	49.87	413.4	412.8	414.6	30.77	20.3	19.8	6.98	4.65	4.59	16.22	0.959
3:19:00 PM	49.86	413.4	413	414.8	30.78	20.27	19.81	6.98	4.64	4.60	16.22	0.959
3:19:20 PM	49.86	412.4	411.9	413.6	30.41	20.25	19.77	6.90	4.63	4.58	16.10	0.96

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:19:40 PM	49.86	412.4	411.9	413.5	30.08	20.32	19.76	6.85	4.64	4.57	16.06	0.961
3:20:00 PM	49.85	412.6	411.8	413.5	30.04	20.31	19.76	6.84	4.64	4.57	16.05	0.961
3:20:20 PM	49.85	412.5	411.8	413.7	30.05	20.3	19.76	6.84	4.64	4.58	16.05	0.961
3:20:40 PM	49.87	413.1	412.4	414.2	30.15	20.25	19.79	6.87	4.63	4.59	16.09	0.961
3:21:00 PM	49.87	412.6	412.1	413.7	30.19	20.17	19.8	6.86	4.62	4.59	16.07	0.962
3:21:20 PM	49.87	413	412.8	414.1	30.18	20.23	19.82	6.86	4.64	4.60	16.10	0.962
3:21:40 PM	49.88	412.4	412	413.4	30.19	20.16	19.81	6.86	4.61	4.59	16.07	0.962
3:22:00 PM	49.88	412.6	412.2	413.8	30.2	20.19	19.79	6.87	4.62	4.59	16.08	0.962
3:22:20 PM	49.87	412.9	412.4	414.1	29.86	20.19	19.81	6.79	4.62	4.60	16.00	0.961
3:22:40 PM	49.88	413.3	412.8	414.4	29.87	20.21	19.94	6.79	4.63	4.63	16.05	0.961
3:23:00 PM	49.9	412.4	411.8	413.7	29.75	20.16	19.91	6.76	4.61	4.61	15.98	0.961
3:23:20 PM	49.91	412.4	411.9	414	29.73	20.16	19.92	6.76	4.60	4.62	15.98	0.961
3:23:40 PM	49.91	412.4	412.1	414.1	29.72	20.2	19.91	6.76	4.61	4.62	15.99	0.96
3:24:00 PM	49.92	412.9	412.8	414.6	29.75	20.29	19.92	6.77	4.64	4.62	16.03	0.961
3:24:20 PM	49.92	413.7	413.5	415.5	29.77	20.3	19.93	6.79	4.65	4.63	16.07	0.96
3:24:40 PM	49.91	414.6	413.9	416.1	29.86	20.26	19.97	6.82	4.65	4.65	16.11	0.96
3:25:00 PM	49.89	415.1	414.1	416.1	29.97	20.31	19.97	6.84	4.66	4.64	16.15	0.959
3:25:20 PM	49.89	414.8	413.6	415.7	30.19	20.3	19.95	6.88	4.65	4.64	16.17	0.959
3:25:40 PM	49.89	413.1	412.5	414.8	30.69	20.12	19.97	6.94	4.61	4.63	16.18	0.959
3:26:00 PM	49.88	413.2	412.7	415	30.63	20.12	19.97	6.93	4.61	4.64	16.17	0.959
3:26:20 PM	49.87	414	413.4	415.5	30.62	20.18	19.98	6.94	4.63	4.64	16.21	0.958
3:26:40 PM	49.86	412.9	412.4	414.2	30.54	20.15	19.97	6.90	4.61	4.63	16.14	0.959
3:27:00 PM	49.85	413.4	413	414.7	30.59	20.14	19.99	6.92	4.62	4.64	16.17	0.958
3:27:20 PM	49.83	413.2	412.7	414.3	30.59	19.47	19.95	6.92	4.49	4.63	16.03	0.961
3:27:40 PM	49.82	414.1	413.5	415.1	30.65	19.45	19.99	6.94	4.49	4.64	16.08	0.96

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:28:00 PM	49.82	415	414.2	416.1	30.07	19.49	19.99	6.85	4.51	4.65	16.02	0.962
3:28:20 PM	49.81	414.5	413.4	415.7	30.04	19.5	19.93	6.85	4.50	4.64	15.98	0.962
3:28:40 PM	49.81	414.4	413.3	415.6	30.07	19.5	19.92	6.86	4.50	4.63	15.98	0.962
3:29:00 PM	49.81	413.8	412.8	415.1	30.02	19.47	19.91	6.84	4.49	4.62	15.95	0.962
3:29:20 PM	49.8	414.1	412.8	415.3	30.02	19.49	19.91	6.84	4.49	4.62	15.96	0.962
3:29:40 PM	49.79	414.5	413.1	415.3	29.98	19.5	19.91	6.84	4.49	4.62	15.96	0.962
3:30:00 PM	49.79	413.9	412.6	414.8	29.93	19.48	19.89	6.82	4.49	4.62	15.92	0.962
3:30:20 PM	49.8	413.8	412.7	414.8	29.93	19.48	19.9	6.82	4.48	4.62	15.92	0.962
3:30:40 PM	49.81	414	412.7	414.7	29.91	19.5	19.9	6.82	4.49	4.62	15.92	0.962
3:31:00 PM	49.81	412.9	411.3	413.5	29.84	19.47	19.86	6.79	4.47	4.59	15.85	0.963
3:31:20 PM	49.81	413.3	411.8	413.7	29.85	19.49	19.86	6.79	4.48	4.60	15.87	0.963
3:31:40 PM	49.81	412.2	410.6	412.5	29.83	19.45	19.81	6.77	4.46	4.57	15.81	0.963
3:32:00 PM	49.81	413	411.6	413	29.83	19.51	19.84	6.78	4.49	4.59	15.85	0.963
3:32:20 PM	49.81	413.1	411.6	412.9	29.79	19.53	19.84	6.77	4.49	4.59	15.85	0.963
3:32:40 PM	49.81	413.1	411.5	412.5	29.77	19.51	19.83	6.76	4.49	4.58	15.83	0.963
3:33:00 PM	49.83	413.3	411.6	412.8	29.78	19.47	19.86	6.77	4.48	4.59	15.84	0.963
3:33:20 PM	49.85	413.4	412.2	413.4	29.81	19.5	19.87	6.78	4.49	4.60	15.87	0.963
3:33:40 PM	49.85	412.1	410.8	412.1	29.78	19.45	19.82	6.76	4.46	4.58	15.80	0.963
3:34:00 PM	49.83	411.7	410.6	411.8	30.48	19.43	19.84	6.88	4.46	4.58	15.91	0.962
3:34:20 PM	49.8	412	410.8	412	30.4	19.47	19.83	6.86	4.47	4.58	15.91	0.961
3:34:40 PM	49.8	411.6	410.5	411.8	30.36	19.42	19.84	6.84	4.46	4.58	15.87	0.962
3:35:00 PM	49.81	411.4	410.2	411.5	30.29	19.43	19.83	6.82	4.46	4.57	15.85	0.962
3:35:20 PM	49.81	411.8	410.5	411.7	30.37	19.46	19.82	6.85	4.46	4.57	15.88	0.961
3:35:40 PM	49.81	412.1	410.7	411.5	30.37	19.48	19.83	6.85	4.47	4.57	15.89	0.962
3:36:00 PM	49.8	412.2	410.6	411.7	30.39	19.48	19.82	6.86	4.47	4.57	15.90	0.961

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:36:20 PM	49.8	412.4	410.5	411.8	30	19.47	19.8	6.79	4.47	4.57	15.83	0.963
3:36:40 PM	49.81	411.3	409.6	410.8	29.69	19.43	19.77	6.72	4.45	4.55	15.72	0.963
3:37:00 PM	49.81	411.9	410.3	411.4	29.76	19.46	19.8	6.75	4.46	4.56	15.77	0.963
3:37:20 PM	49.8	411.6	410	411.2	29.8	19.43	19.79	6.75	4.45	4.56	15.77	0.963
3:37:40 PM	49.81	411.6	409.9	411.5	29.78	19.42	19.79	6.75	4.45	4.56	15.76	0.963
3:38:00 PM	49.83	411.8	410.2	411.8	29.77	19.42	19.81	6.75	4.45	4.57	15.77	0.963
3:38:20 PM	49.84	412	410.8	412.4	29.83	19.41	19.83	6.76	4.45	4.58	15.80	0.963
3:38:40 PM	49.84	411.3	410.1	411.6	29.78	19.4	19.81	6.74	4.45	4.57	15.76	0.964
3:39:00 PM	49.85	411.1	410.1	411.6	29.75	19.38	19.8	6.73	4.44	4.57	15.75	0.964
3:39:20 PM	49.86	411	410	411.4	29.75	19.37	19.81	6.73	4.44	4.57	15.74	0.963
3:39:40 PM	49.87	411.8	410.7	412	29.81	19.41	19.85	6.75	4.46	4.59	15.80	0.963
3:40:00 PM	49.88	413.5	411.8	413.5	29.88	19.48	19.87	6.80	4.48	4.60	15.88	0.963
3:40:20 PM	49.88	412.8	411.2	412.9	29.86	19.44	19.85	6.78	4.47	4.59	15.84	0.963
3:40:40 PM	49.88	412.2	411.2	412.7	29.83	19.42	19.85	6.77	4.46	4.59	15.82	0.963
3:41:00 PM	49.87	412.6	411.2	412.8	29.84	19.43	19.86	6.77	4.46	4.59	15.83	0.963
3:41:20 PM	49.89	412.8	411.5	413.2	29.84	19.43	19.86	6.78	4.47	4.60	15.84	0.963
3:41:40 PM	49.89	413.2	411.6	413.4	29.82	19.46	19.86	6.78	4.47	4.60	15.85	0.963
3:42:00 PM	49.89	413.3	411.6	413.4	29.86	19.44	19.88	6.79	4.47	4.60	15.86	0.963
3:42:20 PM	49.9	413.5	411.8	413.7	30.07	19.48	19.87	6.83	4.48	4.60	15.92	0.963
3:42:40 PM	49.9	413.8	411.9	413.9	30.52	19.52	19.88	6.92	4.49	4.60	16.01	0.961
3:43:00 PM	49.89	413.9	411.7	413.9	30.48	19.54	19.87	6.91	4.50	4.60	16.01	0.961
3:43:20 PM	49.89	413.7	411.9	414.1	30.48	19.54	19.87	6.91	4.49	4.60	16.00	0.961
3:43:40 PM	49.89	413.7	412.1	414.3	30.43	19.53	19.89	6.90	4.50	4.61	16.00	0.961
3:44:00 PM	49.89	413.3	412.1	414	30.42	19.52	19.89	6.89	4.49	4.61	15.99	0.961
3:44:20 PM	49.89	413.5	412.5	414.1	30.38	19.54	19.89	6.88	4.50	4.61	15.99	0.961

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:44:40 PM	49.9	413.8	412.4	414.3	30.4	19.53	19.88	6.89	4.50	4.61	16.00	0.961
3:45:00 PM	49.91	414.2	412.4	414.4	29.91	19.58	19.85	6.82	4.51	4.60	15.93	0.963
3:45:20 PM	49.91	414.3	412.6	414.5	29.84	19.55	19.86	6.80	4.50	4.61	15.92	0.963
3:45:40 PM	49.91	414.2	412.6	414.3	29.82	19.56	19.86	6.80	4.51	4.61	15.91	0.963
3:46:00 PM	49.91	414.4	412.2	413.9	29.78	19.56	19.87	6.79	4.51	4.60	15.90	0.963
3:46:20 PM	49.9	414.2	412.1	413.9	30.07	19.55	19.88	6.86	4.51	4.60	15.97	0.963
3:46:40 PM	49.89	414.2	412.1	413.8	30.14	19.56	19.87	6.87	4.51	4.60	15.98	0.963
3:47:00 PM	49.87	414.1	412.2	413.8	30.12	19.57	19.88	6.87	4.51	4.60	15.98	0.963
3:47:20 PM	49.87	414.2	412.2	413.7	30.07	19.6	19.86	6.86	4.51	4.59	15.97	0.963
3:47:40 PM	49.87	414.2	412.2	413.8	30.14	19.57	19.88	6.87	4.51	4.60	15.98	0.963
3:48:00 PM	49.87	414.2	412.1	413.8	30.19	19.58	19.85	6.89	4.51	4.59	15.99	0.963
3:48:20 PM	49.88	414.1	412.2	413.9	30.22	19.58	19.86	6.89	4.51	4.60	16.00	0.963
3:48:40 PM	49.88	413.7	412.2	413.8	30.19	19.6	19.86	6.88	4.51	4.60	15.99	0.963
3:49:00 PM	49.88	413.5	412.4	413.7	30.16	19.64	19.85	6.88	4.52	4.59	15.99	0.963
3:49:20 PM	49.88	413.5	412.8	413.9	30.16	19.59	19.89	6.87	4.51	4.61	15.99	0.963
3:49:40 PM	49.88	413.9	412.9	414.2	30.19	19.57	19.89	6.88	4.51	4.61	16.00	0.963
3:50:00 PM	49.88	413.9	412.8	413.8	30.21	19.55	19.88	6.88	4.51	4.61	15.99	0.963
3:50:20 PM	49.89	413.3	412.4	413.5	30.16	19.51	19.87	6.87	4.49	4.60	15.96	0.963
3:50:40 PM	49.91	413.7	412.7	413.9	29.95	19.48	19.86	6.82	4.49	4.61	15.91	0.963
3:51:00 PM	49.93	413.9	412.6	414.2	30.59	19.52	19.87	6.93	4.50	4.61	16.04	0.961
3:51:20 PM	49.93	414.2	413.1	414.3	30.5	19.56	19.87	6.92	4.51	4.61	16.04	0.961
3:51:40 PM	49.92	413.5	412.2	413.4	30.41	19.53	19.85	6.89	4.50	4.60	15.98	0.961
3:52:00 PM	49.92	413.8	412.1	413.6	30.46	19.5	19.86	6.90	4.49	4.60	15.99	0.961
3:52:20 PM	49.94	414.1	412.5	414	30.47	19.51	19.88	6.90	4.50	4.61	16.01	0.961
3:52:40 PM	49.96	414.5	412.9	414.4	30.48	19.53	19.89	6.91	4.51	4.61	16.04	0.961

Time	Frequency	Line Voltage Measurement			Current Measurement			kW/ Phase			Total kW	PF
		U1 RMS	U2 RMS	U3 RMS	A1 RMS	A2 RMS	A3 RMS					
	Hz	V	V	V	A	A	A	kW	kW	kW	kW	
3:53:00 PM	49.98	414.6	413.1	414.3	30.48	19.54	19.89	6.91	4.51	4.61	16.04	0.961
3:53:20 PM	49.99	414.2	413.1	414.3	30.14	19.52	19.9	6.86	4.50	4.62	15.98	0.962
3:53:40 PM	50.02	414.3	413.1	414.5	29.98	19.5	19.89	6.83	4.50	4.62	15.95	0.963
3:54:00 PM	50.03	414.4	413	414.5	29.98	19.54	19.87	6.84	4.51	4.61	15.96	0.963
3:54:20 PM	50.07	414.5	413.3	414	29.86	19.7	19.83	6.82	4.54	4.59	15.96	0.963
3:54:40 PM	50.09	414.8	413.5	414.1	29.94	19.55	19.9	6.83	4.52	4.62	15.97	0.963
3:55:00 PM	50.1	415.6	414.3	415.1	29.94	20.57	19.91	6.85	4.73	4.62	16.21	0.961
3:55:20 PM	50.11	415.6	414.2	415.2	29.9	20.45	19.9	6.85	4.70	4.62	16.17	0.96
3:55:40 PM	50.1	414.8	413.2	414.4	29.85	20.4	19.88	6.82	4.68	4.60	16.11	0.961
3:56:00 PM	50.11	414.9	413.2	414.6	29.86	20.42	19.88	6.83	4.69	4.61	16.12	0.961
3:56:20 PM	50.12	415.1	413.3	414.6	29.88	20.43	19.88	6.84	4.69	4.61	16.13	0.961
3:56:40 PM	50.1	414.8	413	414.4	29.8	20.42	19.87	6.81	4.68	4.60	16.10	0.961
3:57:00 PM	50.09	415.1	413.1	414.4	29.87	20.44	19.88	6.83	4.69	4.60	16.12	0.961
3:57:20 PM	50.08	415.5	413.2	414.4	29.81	20.45	19.89	6.82	4.70	4.60	16.12	0.961
3:57:40 PM	50.06	415.2	413.4	414.5	29.8	20.43	19.9	6.82	4.69	4.61	16.12	0.961
3:58:00 PM	50.04	415.2	413.3	414.8	29.87	20.43	19.91	6.84	4.69	4.61	16.13	0.96
3:58:20 PM	50.03	415.2	413.3	414.9	29.76	20.42	19.9	6.81	4.69	4.61	16.10	0.96
3:58:40 PM	50.01	414.4	413.2	414.7	29.72	20.37	19.9	6.79	4.67	4.61	16.07	0.96
3:59:00 PM	49.99	414	413	414.5	29.7	20.36	19.89	6.78	4.66	4.61	16.05	0.96
3:59:20 PM	50	414.6	413.4	414.7	30.2	20.31	19.94	6.88	4.66	4.62	16.16	0.959
3:59:40 PM	49.99	415.3	414.1	415.1	30.45	19.71	19.97	6.92	4.52	4.63	16.07	0.958
	Average load in kW/PF										**18.56**	**0.966**

Table No. 2.4 Measurement of Harmonics, Voltage & Current Unbalance at Transformer Main Incomer

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:41:00 PM	50.01	4.2	5	3.1	2.1	2.1	2.2
1:41:20 PM	50	4.2	5.1	3	2.1	2.1	2.2
1:41:40 PM	50	4.4	5.1	3.1	2.1	2.1	2.1
1:42:00 PM	49.99	4.5	5.3	3.2	2.1	2.1	2.1
1:42:20 PM	49.99	4.4	5.2	3.2	2.1	2.1	2.1
1:42:40 PM	50	4.5	5.2	3.3	2.1	2.1	2.1
1:43:00 PM	50	4.4	5.3	3.2	2	2.1	2.1
1:43:20 PM	50.01	4.4	5.3	3.3	2	2.1	2.1
1:43:40 PM	50.01	4.4	5.3	3.3	2	2	2.1
1:44:00 PM	50	4.4	5.3	3.2	2.1	2.1	2.1
1:44:20 PM	50	4.4	5.4	3.3	2.1	2.1	2.2
1:44:40 PM	50	4.2	5.1	3.2	1.8	1.9	1.9
1:45:00 PM	49.98	4.2	5.2	3.2	1.8	1.9	1.9
1:45:20 PM	49.98	4.3	5.2	3.2	1.9	1.9	2
1:45:40 PM	49.98	4.3	5.3	3.2	2	2	2.1
1:46:00 PM	49.98	4.5	5.4	3.3	2.2	2.2	2.2
1:46:20 PM	49.98	4.3	5.2	3.2	1.9	2	1.9
1:46:40 PM	49.98	4.3	5.2	3.1	1.9	1.9	2
1:47:00 PM	49.97	4.3	5.2	3.1	1.8	2	2
1:47:20 PM	49.97	4.4	5.1	3.1	1.9	2	1.9
1:47:40 PM	49.98	4.5	5.3	3.1	2	2.1	2.1
1:48:00 PM	49.98	4.5	5.3	3.3	2	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:48:20 PM	49.99	4.4	5.2	3.1	1.9	2	2
1:48:40 PM	49.99	4.5	5.1	3.2	1.9	2	2
1:49:00 PM	49.99	4.5	5.1	3.1	2	2	2.1
1:49:20 PM	49.98	4.5	5.3	3.2	2.1	2.2	2.2
1:49:40 PM	49.98	4.4	5	3.1	2	2	2.1
1:50:00 PM	49.97	4.3	3.1	2.7	2	2.1	2
1:50:20 PM	49.97	4.3	3.2	2.7	2.1	2.1	2.1
1:50:40 PM	49.98	4.3	3.2	2.7	2	2.1	2.1
1:51:00 PM	50	4.3	3.2	2.7	2.1	2.1	2.1
1:51:20 PM	50.01	4.2	3.4	2.7	2	2	2
1:51:40 PM	50.02	4.3	3.3	2.7	2	2.1	2
1:52:00 PM	50.02	4.3	3.3	2.7	2	2.2	2
1:52:20 PM	50.03	4.3	3.4	2.7	2.1	2.2	2.1
1:52:40 PM	50.04	4.2	3.5	2.7	2.1	2.2	2.1
1:53:00 PM	50.05	4.3	4.9	3.4	1.9	2	2
1:53:20 PM	50.06	4.4	5.3	3.2	2	2.1	2.1
1:53:40 PM	50.06	4.4	5.3	3.2	2	2.1	2.1
1:54:00 PM	50.05	4.4	5.3	3.3	2.1	2.1	2.2
1:54:20 PM	50.06	4.4	5.3	3.2	2.1	2.1	2.1
1:54:40 PM	50.07	4.4	5.2	3.3	2.2	2.2	2.2
1:55:00 PM	50.08	4.3	5	3.2	1.9	2	2
1:55:20 PM	50.06	4.3	4.9	3.1	1.9	2	2
1:55:40 PM	50.05	4.3	5	3.2	2	2	2.1
1:56:00 PM	50.05	4.3	5	3.2	1.9	1.9	2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
1:56:20 PM	50.05	4.4	5.2	3.2	2.1	2.1	2.1
1:56:40 PM	50.06	4.5	5.1	3.3	2.1	2.1	2.1
1:57:00 PM	50.06	4.5	5.2	3.2	2.1	2.1	2.2
1:57:20 PM	50.05	4.5	5.2	3.1	2.1	2.1	2.2
1:57:40 PM	50.04	4.5	5.1	3.1	2.1	2.1	2.1
1:58:00 PM	50.03	4.5	5.3	3.1	2.2	2.2	2.2
1:58:20 PM	50.02	4.7	5.4	4.2	2.2	2.2	2.1
1:58:40 PM	50.01	4.7	5.4	4.5	2.1	2.1	2.1
1:59:00 PM	49.99	4.7	5.4	4.6	2.1	2.1	2
1:59:20 PM	49.97	4.7	5.4	4.8	2.1	2.1	2.1
1:59:40 PM	49.97	4.7	5.6	4.7	2.1	2.1	2
2:00:00 PM	49.96	4.5	5.5	4.6	2	2	1.9
2:00:20 PM	49.94	4.1	5.1	4.9	1.9	1.9	1.9
2:00:40 PM	49.93	4.5	5.6	4.7	1.9	2	2
2:01:00 PM	49.92	4.4	5.4	5.1	2.2	2.1	2.1
2:01:20 PM	49.92	4.3	5.4	4.9	2.1	2	2
2:01:40 PM	49.92	4.3	5.4	4.8	2	2.1	2.1
2:02:00 PM	49.91	4.4	5.4	4.8	2	2	2
2:02:20 PM	49.9	4.3	5.4	4.8	2	1.9	2
2:02:40 PM	49.9	4.4	5.5	5	2.1	2	2.1
2:03:00 PM	49.92	4.5	5.6	4.9	2	2.1	2.1
2:03:20 PM	49.93	4.4	5.5	5	2.1	2.1	2.1
2:03:40 PM	49.94	4.6	5.8	4.8	2.1	2.1	2.1
2:04:00 PM	49.93	4.7	5.8	4.9	2.1	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:04:20 PM	49.92	4.6	5.7	4.9	2.1	2.1	2.1
2:04:40 PM	49.92	4.5	5.6	5	2	2.1	2.1
2:05:00 PM	49.91	4.2	5.2	4	1.9	2	2
2:05:20 PM	49.91	4.2	5.2	3.5	1.9	2.1	2.1
2:05:40 PM	49.91	4.3	5.2	3.5	2	2.1	2.1
2:06:00 PM	49.92	4.2	5.1	3.6	2.1	2.1	2.2
2:06:20 PM	49.92	4.4	5.3	3.5	2	2.2	2.2
2:06:40 PM	49.92	4.3	5.3	3.5	2.1	2.2	2.2
2:07:00 PM	49.91	4.2	5.3	3.5	2	2.1	2.2
2:07:20 PM	49.91	4.3	5.3	3.4	2	2.1	2.2
2:07:40 PM	49.91	4.2	5.2	3.3	1.9	2	2.1
2:08:00 PM	49.9	4.2	5.2	3.4	2	2	2.1
2:08:20 PM	49.91	4.3	5.4	3.5	2.2	2.2	2.3
2:08:40 PM	49.92	4.2	5.2	3.4	1.9	2	2.1
2:09:00 PM	49.93	4.2	5.3	3.5	2	2.1	2.1
2:09:20 PM	49.93	4.2	5.3	3.4	2.1	2.1	2.2
2:09:40 PM	49.93	4.3	5.3	3.5	2.1	2.1	2.2
2:10:00 PM	49.93	4.4	5.4	3.5	2.1	2.2	2.3
2:10:20 PM	49.93	4.2	5.2	3.3	1.9	2	2.1
2:10:40 PM	49.92	4.2	5.1	3.3	1.9	2	2.1
2:11:00 PM	49.9	4.1	5.1	3.3	1.9	2	2
2:11:20 PM	49.89	4.3	5.3	3.3	2	2	2.1
2:11:40 PM	49.89	4.3	5.3	3.4	2	2.1	2.2
2:12:00 PM	49.88	4.3	5.2	3.3	2.1	2.1	2.3

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:12:20 PM	49.88	4.4	5.2	3.4	2.1	2.1	2.2
2:12:40 PM	49.88	4.5	5.3	3.4	2.2	2.2	2.3
2:13:00 PM	49.88	4.2	5	3.4	1.9	2	2.1
2:13:20 PM	49.88	4.4	5.1	3.4	2	2.1	2.2
2:13:40 PM	49.86	4.4	5.1	3.3	1.9	2	2.1
2:14:00 PM	49.84	4.3	5.2	3.5	2	2	2.1
2:14:20 PM	49.83	4.4	5.2	3.5	2.1	2.1	2.2
2:14:40 PM	49.83	4.5	5.3	3.5	2.1	2.2	2.2
2:15:00 PM	49.85	4.3	5.1	3.4	2	2	2
2:15:20 PM	49.86	4.4	5.1	3.5	2	2	2.1
2:15:40 PM	49.88	4.5	5.3	3.5	2.1	2.2	2.2
2:16:00 PM	49.9	4.5	5.3	3.6	2.2	2.3	2.3
2:16:20 PM	49.91	4.4	5.2	3.3	1.9	2	2.1
2:16:40 PM	49.91	4.3	5.1	3.5	1.9	2	2.1
2:17:00 PM	49.9	4.3	5.1	3.4	1.9	2.1	2.1
2:17:20 PM	49.9	4.4	5.2	3.4	2	2.1	2.1
2:17:40 PM	49.91	4.4	5.3	3.4	2	2.1	2.2
2:18:00 PM	49.92	4.3	5.3	3.5	2	2.1	2.2
2:18:20 PM	49.93	4.3	5.3	3.4	2.1	2.1	2.2
2:18:40 PM	49.93	4.4	5.3	3.4	2.1	2.1	2.2
2:19:00 PM	49.94	4.5	5.5	3.5	2.3	2.2	2.3
2:19:20 PM	49.94	4.2	5.2	3.5	2	2	2
2:19:40 PM	49.94	4.3	5.3	3.5	2.1	2.1	2.2
2:20:00 PM	49.95	4.3	5.3	3.5	2.1	2.1	2.2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:20:20 PM	49.95	4.4	5.3	3.5	2.1	2.1	2.2
2:20:40 PM	49.94	4.4	5.3	3.4	2.2	2.2	2.2
2:21:00 PM	49.95	4.4	5.3	3.6	2.2	2.2	2.3
2:21:20 PM	49.95	4.3	5.1	3.5	1.9	2	2.1
2:21:40 PM	49.94	4.2	5.1	3.3	2	2	2.1
2:22:00 PM	49.95	4.3	5.2	3.4	2	2.1	2.1
2:22:20 PM	49.96	4.3	5.2	3.5	2.1	2.2	2.2
2:22:40 PM	49.97	4.4	5.3	3.5	2.1	2.1	2.2
2:23:00 PM	49.97	4.3	5.2	3.5	2.1	2.1	2.2
2:23:20 PM	49.98	4.3	5.3	3.5	2.1	2.1	2.3
2:23:40 PM	49.98	4.3	5.1	3.4	2	2.1	2.2
2:24:00 PM	49.98	4.2	5.1	3.4	2.1	2.1	2.2
2:24:20 PM	49.98	4.3	5.1	3.5	2.2	2.3	2.3
2:24:40 PM	49.99	4.1	2.7	2.8	2	2.1	2.1
2:25:00 PM	50	4.1	2.7	2.8	2	2.1	2.1
2:25:20 PM	50.01	4.2	2.7	2.8	2	2.1	2.1
2:25:40 PM	50.01	3.7	2.3	3	2	2.1	2.2
2:26:00 PM	50.02	3.5	1.8	3	2.1	2.3	2.3
2:26:20 PM	50.02	3.4	1.8	3.1	2.1	2.2	2.3
2:26:40 PM	50.02	3.5	1.8	3.2	2.1	2.2	2.2
2:27:00 PM	50	3.4	1.8	3.2	2.2	2.3	2.3
2:27:20 PM	50.01	3.5	1.8	3.2	2.3	2.4	2.4
2:27:40 PM	50.01	3.4	1.8	3.3	2.1	2.2	2.2
2:28:00 PM	50.02	3.4	1.8	3.3	2.1	2.1	2.2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:28:20 PM	50.03	3.4	1.8	3.2	2.1	2.1	2.2
2:28:40 PM	50.02	3.5	1.8	3.1	2.2	2.3	2.4
2:29:00 PM	50.01	3.5	1.8	3.2	2.1	2.2	2.3
2:29:20 PM	50	3.5	1.8	3.2	2.1	2.2	2.3
2:29:40 PM	49.98	3.5	1.8	3.2	2.1	2.1	2.1
2:30:00 PM	49.97	3.6	1.8	3.2	2.2	2.2	2.2
2:30:20 PM	49.99	3.5	1.8	3.3	2.1	2.1	2.1
2:30:40 PM	49.98	3.5	1.8	3.2	2.1	2.2	2.3
2:31:00 PM	49.98	3.5	1.8	3.2	2.1	2.1	2.3
2:31:20 PM	49.99	3.5	1.8	3.2	2.2	2.2	2.4
2:31:40 PM	49.98	3.5	1.7	3.2	2.1	2.1	2.1
2:32:00 PM	49.97	3.5	1.7	3.2	2.1	2.1	2.2
2:32:20 PM	49.96	3.5	1.7	3.2	2	2.1	2.2
2:32:40 PM	49.96	3.5	1.8	3.2	2.1	2.2	2.3
2:33:00 PM	49.96	3.5	1.7	3.2	2.1	2.1	2.1
2:33:20 PM	49.97	3.5	1.7	3.2	2.1	2.2	2.2
2:33:40 PM	49.99	3.5	1.7	3.2	2.1	2.2	2.2
2:34:00 PM	49.99	3.6	1.8	4.4	2.1	2.1	2.1
2:34:20 PM	50	3.7	1.8	4.5	2.2	2.1	2.1
2:34:40 PM	50	3.5	1.9	4.4	2.2	2.1	2.1
2:35:00 PM	50.01	3.4	1.8	4.5	2.2	2.2	2.1
2:35:20 PM	50	3.4	1.8	4.5	2.2	2.3	2.2
2:35:40 PM	49.99	3.4	1.7	4.4	1.9	2.1	2
2:36:00 PM	49.99	3.4	1.8	4.4	2	2.1	2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:36:20 PM	49.99	3.4	1.7	4.7	2.1	2.1	2.1
2:36:40 PM	49.98	3.5	1.8	4.6	2.2	2.2	2.2
2:37:00 PM	49.98	3.5	1.8	4.8	2.2	2.2	2.3
2:37:20 PM	49.96	3.6	1.8	4.5	2	2.2	2.2
2:37:40 PM	49.96	3.6	1.7	4.5	2	2	2
2:38:00 PM	49.95	3.6	1.7	4.6	2	2.1	2.1
2:38:20 PM	49.95	3.6	1.8	4.7	2.2	2.2	2.2
2:38:40 PM	49.96	3.6	1.8	4.6	2.1	2.2	2.2
2:39:00 PM	49.98	3.6	1.8	4.6	2.1	2.1	2.2
2:39:20 PM	49.99	3.6	1.8	4.6	2.1	2.2	2.3
2:39:40 PM	49.98	3.6	1.7	4.6	2	2.1	2.1
2:40:00 PM	49.99	3.6	1.7	4.6	2.1	2.2	2.1
2:40:20 PM	50	3.5	1.8	4.6	2.1	2.2	2.2
2:40:40 PM	50.02	3.5	1.8	4.6	2.2	2.2	2.2
2:41:00 PM	50.03	3.6	1.8	4.6	2.2	2.2	2.2
2:41:20 PM	50.04	3.5	1.8	4.6	2.2	2.2	2.2
2:41:40 PM	50.04	3.5	1.7	4.5	2	2.1	2.1
2:42:00 PM	50.03	3.5	1.8	4.6	2.1	2.1	2.2
2:42:20 PM	50.01	3.6	1.8	4.6	2.2	2.1	2.3
2:42:40 PM	50	3.6	1.8	4.6	2.1	2.2	2.2
2:43:00 PM	49.99	3.6	1.8	4.6	2.1	2.2	2.1
2:43:20 PM	49.98	3.4	1.8	4.6	2.2	2.3	2.2
2:43:40 PM	49.96	3.4	1.8	4.5	2.1	2.1	2.1
2:44:00 PM	49.97	3.4	1.8	4.6	2.1	2.1	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:44:20 PM	49.98	3.4	1.8	4.5	2.2	2.1	2.1
2:44:40 PM	49.97	3.4	1.7	4.5	2.1	2.1	2.1
2:45:00 PM	49.98	3.4	1.8	4.6	2.2	2.2	2.2
2:45:20 PM	49.99	3.4	1.8	4.6	2.2	2.2	2.2
2:45:40 PM	49.98	3.5	1.8	4.5	2.1	2.2	2.1
2:46:00 PM	49.97	3.6	1.7	4.5	2.1	2.1	2.1
2:46:20 PM	49.97	3.5	1.8	4.5	2	2.1	2.1
2:46:40 PM	49.97	3.6	1.8	4.6	2.2	2.2	2.2
2:47:00 PM	49.98	3.6	1.9	4.6	2.2	2.1	2.2
2:47:20 PM	49.97	3.7	1.8	4.5	2.1	2.1	2.1
2:47:40 PM	49.97	3.6	1.8	4.5	2	2.1	2
2:48:00 PM	49.96	3.6	1.8	4.6	2.1	2.1	2.1
2:48:20 PM	49.95	3.6	1.8	4.5	2	2	2.1
2:48:40 PM	49.94	3.6	1.9	4.6	2.1	2.1	2.2
2:49:00 PM	49.94	3.6	1.8	4.5	2.1	2	2.1
2:49:20 PM	49.94	3.5	1.8	4.6	2.1	2.1	2.2
2:49:40 PM	49.95	3.5	1.9	4.6	2.1	2.2	2.1
2:50:00 PM	49.95	3.5	1.9	4.6	2.2	2.2	2.2
2:50:20 PM	49.95	3.5	1.8	4.4	2	2	2
2:50:40 PM	49.96	3.5	1.9	4.5	2	2	2
2:51:00 PM	49.98	3.5	1.9	4.6	2.1	2.1	2.1
2:51:20 PM	49.99	3.5	1.9	4.7	2.2	2.2	2.2
2:51:40 PM	50	3.4	2	4.6	2.2	2.1	2.2
2:52:00 PM	49.99	3.3	1.9	4.6	2.2	2.1	2.2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
2:52:20 PM	49.99	3.3	1.9	4.6	2.1	2.1	2.1
2:52:40 PM	50.01	3.3	1.9	4.6	2	2	2.1
2:53:00 PM	50.01	3.3	1.8	4.1	2.1	2.1	2.2
2:53:20 PM	50.02	3.3	1.7	3.1	2.1	2.1	2.1
2:53:40 PM	50.04	3.4	1.8	3.1	2.2	2.1	2.3
2:54:00 PM	50.04	3.5	1.8	3.2	2.1	2.1	2.2
2:54:20 PM	50.07	3.6	1.9	3.3	2.1	2.2	2.3
2:54:40 PM	50.07	3.5	1.8	3.2	2	2.1	2.2
2:55:00 PM	50.06	3.6	1.8	3.2	2.1	2.2	2.3
2:55:20 PM	50.05	3.5	1.8	3.2	2.2	2.3	2.3
2:55:40 PM	50.05	3.6	1.8	3.2	2.2	2.3	2.3
2:56:00 PM	50.05	3.5	1.8	3.2	2.1	2.3	2.3
2:56:20 PM	50.02	3.5	1.8	3.1	2	2.2	2.3
2:56:40 PM	50.02	3.4	1.8	3	2.1	2.2	2.3
2:57:00 PM	50	3.4	1.8	3	2.1	2.2	2.2
2:57:20 PM	49.98	3.5	1.8	3	2.2	2.3	2.4
2:57:40 PM	49.98	3.5	1.7	3	2	2.1	2.2
2:58:00 PM	49.97	3.5	1.7	2.9	2	2.1	2.1
2:58:20 PM	49.97	3.5	1.7	3	2.1	2.1	2.2
2:58:40 PM	49.98	3.5	1.8	3	2.1	2.2	2.3
2:59:00 PM	49.98	3.5	1.7	3	2.1	2.2	2.2
2:59:20 PM	49.96	3.5	1.8	3	2.1	2.2	2.2
2:59:40 PM	49.96	3.4	1.8	2.9	2.1	2.2	2.3
3:00:00 PM	49.95	3.3	1.8	3.1	2.2	2.3	2.3

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:00:20 PM	49.95	3.3	1.7	3.1	2	2.1	2.1
3:00:40 PM	49.96	3.3	1.7	3.1	1.9	2.1	2.1
3:01:00 PM	49.97	3.2	1.7	3	1.9	2.1	2
3:01:20 PM	49.95	3.3	1.8	3	2	2.1	2.1
3:01:40 PM	49.92	3.3	1.8	3	2.1	2.1	2.2
3:02:00 PM	49.91	3.3	1.7	3	2	2	2.1
3:02:20 PM	49.9	3.3	1.7	3	1.9	2	2.1
3:02:40 PM	49.91	3.4	1.7	3	2	2.1	2.1
3:03:00 PM	49.91	3.4	1.7	2.9	2	2	2.1
3:03:20 PM	49.91	3.4	1.7	2.9	1.9	2	2.1
3:03:40 PM	49.91	3.4	1.7	2.9	1.9	2	2
3:04:00 PM	49.91	3.4	1.7	2.8	2	2	2.1
3:04:20 PM	49.9	3.4	1.7	2.8	2	2	2.1
3:04:40 PM	49.89	3.4	1.7	2.9	2	2	2.1
3:05:00 PM	49.89	3.4	1.7	2.9	2	2	2.1
3:05:20 PM	49.89	3.4	1.7	2.9	2.1	2.1	2.1
3:05:40 PM	49.89	3.4	1.7	2.9	1.9	2.1	2.1
3:06:00 PM	49.88	3.4	1.7	2.9	2	2.1	2.1
3:06:20 PM	49.88	3.4	1.7	2.9	2	2	2.1
3:06:40 PM	49.9	3.4	1.7	2.9	2.1	2.1	2.2
3:07:00 PM	49.9	3.4	1.7	2.8	1.9	2	2.1
3:07:20 PM	49.91	3.3	1.7	2.8	2	2	2.1
3:07:40 PM	49.9	3.3	1.8	2.8	2	2	2.1
3:08:00 PM	49.9	3.4	1.8	2.8	2	2	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:08:20 PM	49.9	3.3	1.7	3	2.1	2.1	2.1
3:08:40 PM	49.89	3.2	1.7	3.1	2.1	2.1	2.1
3:09:00 PM	49.88	3.2	1.7	2.9	2.1	2.1	2.1
3:09:20 PM	49.88	3.2	1.7	2.9	2	2.1	2.1
3:09:40 PM	49.88	3.2	1.7	2.8	2	2	2.1
3:10:00 PM	49.88	3.2	1.7	2.8	2.1	2.1	2.2
3:10:20 PM	49.88	3.2	1.7	2.7	2	2.1	2.1
3:10:40 PM	49.88	3.2	1.7	2.8	2.1	2.1	2.2
3:11:00 PM	49.88	3.3	1.8	2.8	2.1	2.1	2.1
3:11:20 PM	49.88	3.4	1.7	2.8	2.1	2.1	2.1
3:11:40 PM	49.87	3.4	1.6	2.8	2.1	2.1	2.1
3:12:00 PM	49.84	3.3	1.7	2.8	2.1	2.1	2.1
3:12:20 PM	49.83	3.3	1.6	2.7	2.1	2.1	2.2
3:12:40 PM	49.83	3.3	1.7	2.7	2.1	2.1	2.1
3:13:00 PM	49.83	3.3	1.7	2.8	2.1	2	2.1
3:13:20 PM	49.83	3.3	1.7	2.7	2.1	2.1	2.1
3:13:40 PM	49.85	3.3	1.7	2.6	2.1	2.1	2.1
3:14:00 PM	49.85	3.3	1.7	2.6	2	2	2.1
3:14:20 PM	49.84	3.3	1.6	2.5	2.1	2	2.1
3:14:40 PM	49.85	3.3	1.6	2.4	2	2	2.1
3:15:00 PM	49.87	3.4	1.6	2.6	2.1	2.1	2.2
3:15:20 PM	49.88	3.3	1.6	2.6	2	2	2.1
3:15:40 PM	49.88	3	1.5	2.7	1.9	2	2.1
3:16:00 PM	49.88	2.9	1.6	2.6	1.9	2	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:16:20 PM	49.88	3	1.6	2.6	2.1	2.1	2.2
3:16:40 PM	49.87	3	1.6	2.4	2	2	2.1
3:17:00 PM	49.87	3	1.6	2.6	1.9	2	2.1
3:17:20 PM	49.86	2.9	1.7	2.6	2	2.1	2.1
3:17:40 PM	49.85	3	1.7	2.5	2.1	2.1	2.1
3:18:00 PM	49.85	2.9	1.6	2.5	2	2	2
3:18:20 PM	49.86	2.8	1.6	2.5	1.9	2	2
3:18:40 PM	49.87	2.9	1.6	2.5	2	1.9	2
3:19:00 PM	49.86	2.9	1.6	2.5	2	2	2.1
3:19:20 PM	49.86	2.9	1.6	2.4	2	2	2.1
3:19:40 PM	49.86	2.9	1.6	2.3	2	2	2.1
3:20:00 PM	49.85	3	1.7	2.3	2	2	2.1
3:20:20 PM	49.85	2.9	1.7	2.3	2	2	2.1
3:20:40 PM	49.87	3	1.6	2.4	2.1	2	2.2
3:21:00 PM	49.87	3	1.6	2.5	2.1	2	2.1
3:21:20 PM	49.87	3	1.6	2.5	2.1	2.1	2.1
3:21:40 PM	49.88	2.9	1.6	2.5	2	2.1	2
3:22:00 PM	49.88	3	1.6	2.5	2	2	2.1
3:22:20 PM	49.87	3	1.6	2.5	2.1	2	2.1
3:22:40 PM	49.88	3	1.6	2.5	2.2	2.1	2.1
3:23:00 PM	49.9	3	1.5	2.6	2	2	2
3:23:20 PM	49.91	3	1.5	2.5	2	2	2.1
3:23:40 PM	49.91	3	1.6	2.4	1.9	2	2.1
3:24:00 PM	49.92	3	1.6	2.3	2.1	2	2.1

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:24:20 PM	49.92	3	1.7	2.3	2.2	2.1	2.2
3:24:40 PM	49.91	3	1.7	2.4	2.2	2.1	2.2
3:25:00 PM	49.89	3	1.7	2.4	2.1	2.1	2.2
3:25:20 PM	49.89	3	1.7	2.4	2.1	2	2.1
3:25:40 PM	49.89	2.9	1.5	2.8	2	1.9	2
3:26:00 PM	49.88	2.9	1.5	2.9	2	2	2
3:26:20 PM	49.87	3	1.6	2.9	2.1	2.1	2.2
3:26:40 PM	49.86	2.9	1.6	2.8	2	2	2.1
3:27:00 PM	49.85	3	1.6	2.8	2.2	2.1	2.2
3:27:20 PM	49.83	2.9	1.6	2.9	2	1.9	2
3:27:40 PM	49.82	2.9	1.6	3	2.1	2	2.1
3:28:00 PM	49.82	3.1	1.6	2.9	2.2	2.1	2.2
3:28:20 PM	49.81	3.1	1.7	3	2.2	2.1	2.2
3:28:40 PM	49.81	3	1.7	3	2.2	2.2	2.2
3:29:00 PM	49.81	3	1.7	3	2.1	2	2.1
3:29:20 PM	49.8	3	1.7	3	2.2	2.1	2.2
3:29:40 PM	49.79	3	1.7	3	2.2	2.2	2.3
3:30:00 PM	49.79	3	1.7	2.9	2.2	2.1	2.2
3:30:20 PM	49.8	3	1.7	2.9	2.2	2.1	2.2
3:30:40 PM	49.81	3.1	1.7	2.9	2.2	2.2	2.2
3:31:00 PM	49.81	3	1.6	2.9	2	2	2
3:31:20 PM	49.81	3	1.6	2.9	2.1	2.1	2.2
3:31:40 PM	49.81	3	1.6	2.9	2.1	2	2.2
3:32:00 PM	49.81	3	1.6	2.9	2.2	2.2	2.3

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:32:20 PM	49.81	3	1.7	2.8	2.3	2.2	2.3
3:32:40 PM	49.81	3	1.7	2.8	2.1	2.2	2.2
3:33:00 PM	49.83	3	1.6	2.9	2.1	2.2	2.2
3:33:20 PM	49.85	3	1.7	2.9	2.2	2.2	2.2
3:33:40 PM	49.85	2.9	1.6	2.9	2.1	2	2.1
3:34:00 PM	49.83	2.7	1.6	3	2.1	2.2	2.2
3:34:20 PM	49.8	2.8	1.6	3	2.1	2.2	2.2
3:34:40 PM	49.8	2.8	1.6	3	2.1	2.1	2.2
3:35:00 PM	49.81	2.9	1.6	3	2.1	2.1	2.1
3:35:20 PM	49.81	2.8	1.6	2.9	2.1	2.1	2.1
3:35:40 PM	49.81	2.9	1.6	3	2.1	2.2	2.1
3:36:00 PM	49.8	2.8	1.6	3	2.1	2.1	2.2
3:36:20 PM	49.8	2.8	1.7	3	2.1	2.1	2.2
3:36:40 PM	49.81	2.8	1.6	2.9	2	2	2
3:37:00 PM	49.81	2.9	1.7	2.8	2.1	2.1	2.1
3:37:20 PM	49.8	2.9	1.7	2.9	2	2	2
3:37:40 PM	49.81	2.9	1.6	2.9	1.9	2	2
3:38:00 PM	49.83	2.9	1.7	2.9	2	1.9	2
3:38:20 PM	49.84	2.9	1.7	2.9	2.1	2	2.1
3:38:40 PM	49.84	2.9	1.6	2.9	1.9	1.9	2
3:39:00 PM	49.85	2.8	1.6	2.9	1.9	2	2
3:39:20 PM	49.86	2.8	1.6	2.9	1.8	1.9	2
3:39:40 PM	49.87	2.9	1.6	3	1.9	2	2.1
3:40:00 PM	49.88	2.9	1.7	3	2.1	2.1	2.2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:40:20 PM	49.88	2.9	1.6	2.9	1.9	1.9	2
3:40:40 PM	49.88	2.9	1.6	2.9	1.9	2	2
3:41:00 PM	49.87	2.9	1.7	2.9	1.9	2	2
3:41:20 PM	49.89	2.9	1.7	2.9	1.9	1.9	2
3:41:40 PM	49.89	2.9	1.7	2.9	2	2	2
3:42:00 PM	49.89	2.9	1.7	3	1.9	2	2
3:42:20 PM	49.9	2.8	1.7	3	2	2	2
3:42:40 PM	49.9	2.8	1.7	3	1.9	1.9	2
3:43:00 PM	49.89	2.8	1.6	3	1.9	1.9	2
3:43:20 PM	49.89	2.8	1.6	2.9	2	1.9	2
3:43:40 PM	49.89	2.8	1.6	3	2	1.9	2
3:44:00 PM	49.89	2.8	1.6	3	1.8	1.9	2
3:44:20 PM	49.89	2.8	1.7	3	1.9	1.9	2
3:44:40 PM	49.9	2.8	1.7	3	1.9	1.9	2
3:45:00 PM	49.91	2.9	1.7	2.6	1.9	2	2
3:45:20 PM	49.91	2.9	1.7	2.7	1.9	2	2
3:45:40 PM	49.91	2.9	1.7	2.7	1.9	2	2
3:46:00 PM	49.91	3	1.6	2.7	1.9	1.9	2
3:46:20 PM	49.9	2.9	1.6	2.7	1.9	1.9	2
3:46:40 PM	49.89	2.9	1.6	2.7	1.9	2	1.9
3:47:00 PM	49.87	2.8	1.7	2.7	1.9	2	2
3:47:20 PM	49.87	2.8	1.7	2.6	1.9	1.9	2
3:47:40 PM	49.87	2.9	1.7	2.7	1.9	2	2
3:48:00 PM	49.87	2.9	1.7	2.7	1.9	2	2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:48:20 PM	49.88	2.9	1.7	2.7	1.9	1.9	1.9
3:48:40 PM	49.88	2.9	1.6	2.7	1.8	1.9	2
3:49:00 PM	49.88	2.9	1.7	2.5	1.9	1.9	2
3:49:20 PM	49.88	2.9	1.6	2.6	2	1.9	2
3:49:40 PM	49.88	2.9	1.6	2.8	1.9	1.9	2
3:50:00 PM	49.88	2.9	1.7	2.9	1.9	1.9	1.9
3:50:20 PM	49.89	2.9	1.7	2.9	1.8	1.9	2
3:50:40 PM	49.91	2.9	1.7	2.9	1.9	1.9	2
3:51:00 PM	49.93	2.8	1.6	3	1.9	2	2
3:51:20 PM	49.93	2.9	1.6	3	2	2	2.1
3:51:40 PM	49.92	2.9	1.6	3	1.8	1.9	2
3:52:00 PM	49.92	2.8	1.6	3	1.9	1.9	1.9
3:52:20 PM	49.94	2.8	1.7	3	1.9	2	2
3:52:40 PM	49.96	2.8	1.6	2.9	2	2	2
3:53:00 PM	49.98	2.8	1.6	2.9	1.9	1.9	2
3:53:20 PM	49.99	2.8	1.6	2.9	1.9	2	2
3:53:40 PM	50.02	2.9	1.6	2.9	1.9	2	2
3:54:00 PM	50.03	2.8	1.6	2.9	1.9	1.9	2
3:54:20 PM	50.07	2.8	1.7	2.5	1.9	1.9	2
3:54:40 PM	50.09	2.8	1.6	2.9	1.9	1.9	2
3:55:00 PM	50.1	2.9	1.7	2.4	2.1	2.1	2.2
3:55:20 PM	50.11	2.8	1.7	2.3	2	2.1	2.2
3:55:40 PM	50.1	2.8	1.7	2.3	1.9	1.9	2
3:56:00 PM	50.11	2.8	1.7	2.3	1.9	1.9	2

Time	Frequency	Current Harmonics			Line Voltage Harmonics		
		A1 THD	A2 THD	A3 THD	U1 THD	U2 THD	U3 THD
	Hz	%	%	%	%	%	%
3:56:20 PM	50.12	2.8	1.6	2.4	1.9	1.9	2
3:56:40 PM	50.1	2.8	1.6	2.4	1.8	1.9	1.9
3:57:00 PM	50.09	2.8	1.6	2.4	1.9	2	2
3:57:20 PM	50.08	2.8	1.7	2.3	2	2	2.1
3:57:40 PM	50.06	2.8	1.6	2.3	1.9	2	2
3:58:00 PM	50.04	2.8	1.6	2.4	1.9	2	2
3:58:20 PM	50.03	2.8	1.6	2.4	1.9	2	2
3:58:40 PM	50.01	2.8	1.7	2.4	1.9	2	2
3:59:00 PM	49.99	2.9	1.7	2.4	1.9	1.9	2
3:59:20 PM	50	2.8	1.6	2.6	2	2	2.1
3:59:40 PM	49.99	2.8	1.6	3	2.1	2.2	2.2

❖ **Observation & Recommendation:-**

- Voltage unbalance is within limit.
- Current unbalance is considerable.
- Total Voltage harmonics distortion is there.
- Total Current Harmonics distortion is there and hence related electrical equipment's, switch gear and cables should not be loaded to their rated capacity. Proper derating factor should be applied.
- Average measured power factor is 0.96

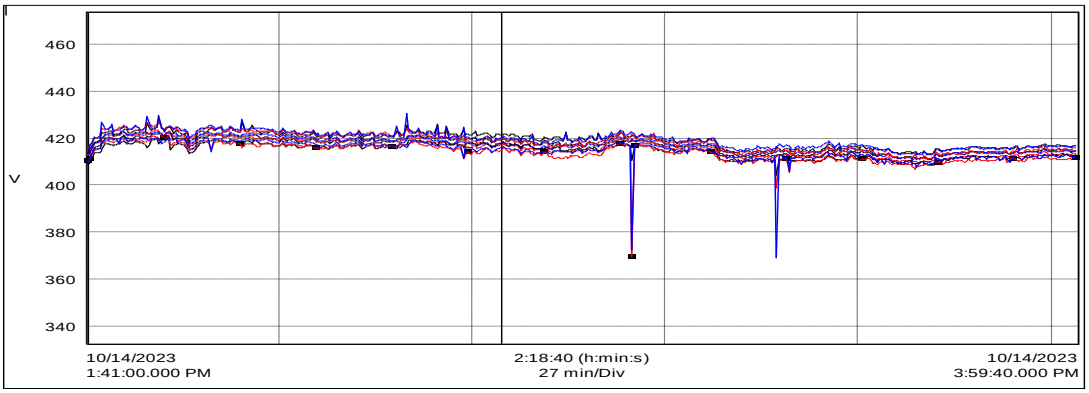
❒ **Study of electrical parameters at Main Incomer**

3. Line Voltage

Table No. 2.5: Line Voltage

Name	Time	Avg	Min	Max	Units	Duration	Units
U1 RMS	1:41:00 PM	417.51	411	422.5	V	2:19:00	(h:min:s)
U2 RMS	1:41:00 PM	416.73	409.6	423.5	V	2:19:00	(h:min:s)
U3 RMS	1:41:00 PM	417.85	410.8	422.9	V	2:19:00	(h:min:s)

Graph No. 2.1: Line Voltage Variation for the Recorded Time



RMS, Max RMS & Min. RMS
Phase voltage variation

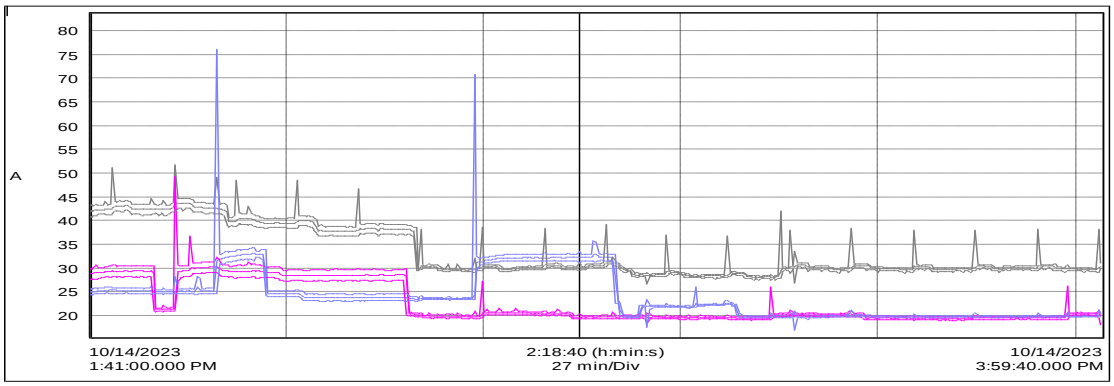
- Voltage unbalance is within limit.

4. Current

Table No.2.6: Current

Name	Time	Avg	Min	Max	Units	Duration	Units
A1 RMS	1:41:00 PM	33.72	28.1	43.77	A	2:19:00	(h:min:s)
A2 RMS	1:41:00 PM	23.02	19.37	30.38	A	2:19:00	(h:min:s)
A3 RMS	1:41:00 PM	24.37	19.71	33.07	A	2:19:00	(h:min:s)

Graph No. 2.2: Line Current Variation for recorded time



RMS, Max RMS & Min. RMS
Current variation

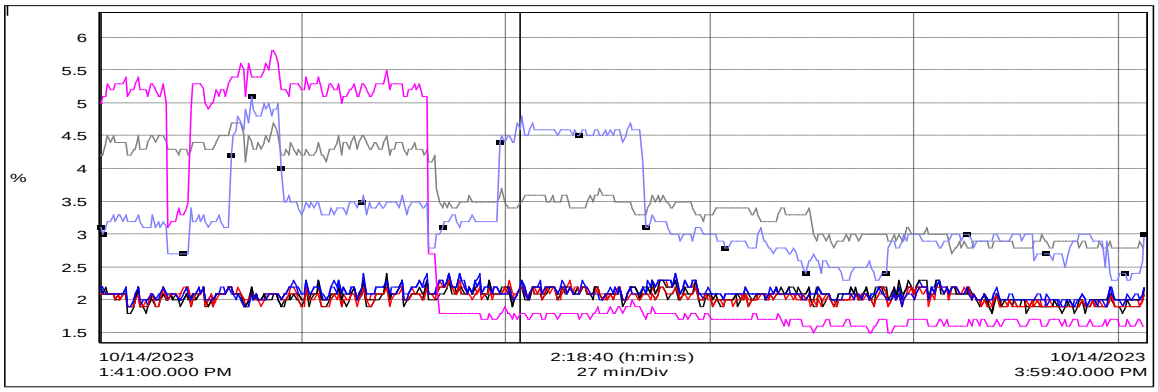
- Current unbalance is considerable.

4. Total harmonic Distortion (THD).

Table No.2.7: THD

Name	Time	Avg	Min	Max	Units	Duration	Units
A1 THD	1:41:00 PM	3.565	2.7	4.7	%	2:19:00	(h:min:s)
A2 THD	1:41:00 PM	2.786	1.5	5.8	%	2:19:00	(h:min:s)
A3 THD	1:41:00 PM	3.291	2.3	5.1	%	2:19:00	(h:min:s)
U1 THD	1:41:00 PM	2.041	1.8	2.3	%	2:19:00	(h:min:s)
U2 THD	1:41:00 PM	2.074	1.9	2.4	%	2:19:00	(h:min:s)
U3 THD	1:41:00 PM	2.118	1.9	2.4	%	2:19:00	(h:min:s)

Graph No. 2.3: THD

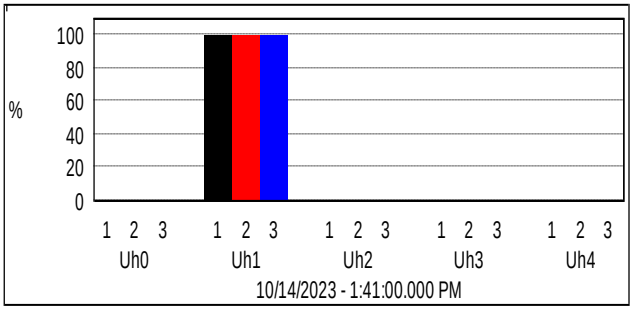


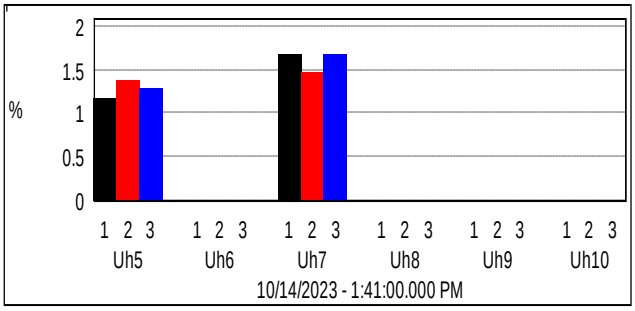
Variation of current, Phase Voltage, Line Voltage Total Harmonic Distortion

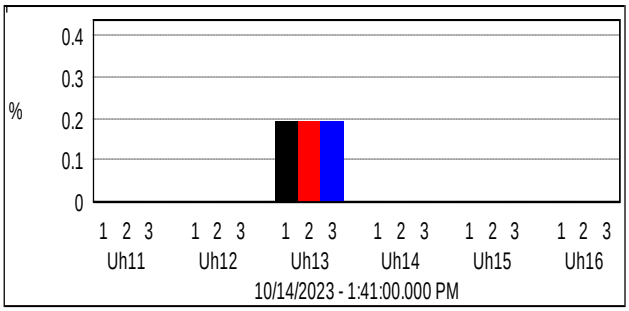
- Voltage harmonics distortion is there.
- Current harmonics distortion is not considerable.

- **Individual Voltage Harmonics**

Name	Avg	Min	Max	Units
U1h0	0	0	0	%
U1h1	100	100	100	%
U1h10	0	0	0	%
U1h11	0.084	0	0.3	%
U1h12	0	0	0	%
U1h13	0.184	0.1	0.4	%
U1h14	0	0	0	%
U1h15	0	0	0	%
U1h16	0	0	0	%
U1h2	0.001	0	0.1	%
U1h3	0.023	0	0.1	%
U1h4	0	0	0	%
U1h5	1.219	0.9	1.5	%
U1h6	0	0	0	%
U1h7	1.588	1.3	1.9	%
U1h8	0	0	0	%
U1h9	0	0	0	%
U2h0	0.1	0.1	0.1	%
U2h1	100	100	100	%
U2h10	0	0	0	%
U2h11	0.051	0	0.2	%
U2h12	0	0	0	%
U2h13	0.178	0.1	0.4	%
U2h14	0	0	0	%
U2h15	0	0	0	%
U2h16	0	0	0	%
U2h2	0	0	0	%
U2h3	0.002	0	0.1	%
U2h4	0	0	0	%
U2h5	1.443	1.2	1.7	%
U2h6	0	0	0	%
U2h7	1.446	1.2	1.7	%
U2h8	0	0	0	%
U2h9	0	0	0	%
U3h0	0	0	0	%
U3h1	100	100	100	%
U3h10	0	0	0	%
U3h11	0.036	0	0.3	%
U3h12	0	0	0	%
U3h13	0.153	0.1	0.3	%
U3h14	0	0	0	%
U3h15	0	0	0	%
U3h16	0	0	0	%
U3h2	0	0	0	%
U3h3	0.019	0	0.1	%
U3h4	0	0	0	%
U3h5	1.359	1.1	1.6	%
U3h6	0	0	0	%
U3h7	1.58	1.3	1.9	%
U3h8	0	0	0	%
U3h9	0.004	0	0.1	%

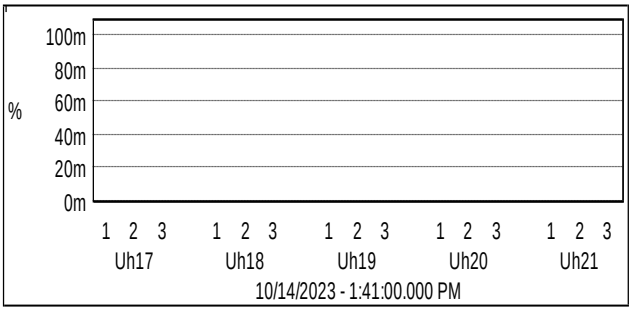


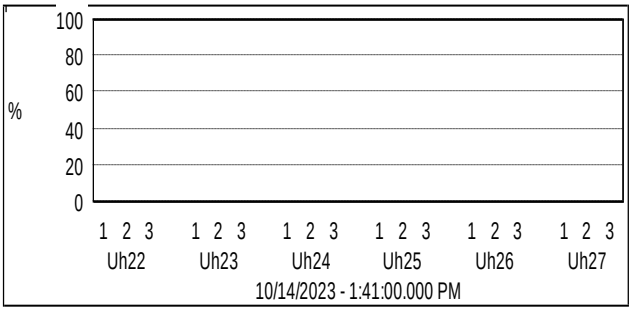


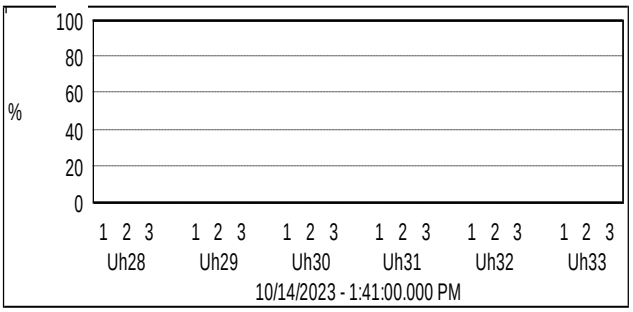


5th & 7th order individual voltage harmonics have noticeable presence.

Name	Avg	Min	Max	Units
U1h17	0.003	0	0.1	%
U1h18	0	0	0	%
U1h19	0.053	0	0.1	%
U1h20	0	0	0	%
U1h21	0	0	0	%
U1h22	0	0	0	%
U1h23	0	0	0	%
U1h24	0	0	0	%
U1h25	0	0	0	%
U1h26	0	0	0	%
U1h27	0	0	0	%
U1h28	0	0	0	%
U1h29	0	0	0	%
U1h30	0	0	0	%
U1h31	0	0	0	%
U1h32	0	0	0	%
U1h33	0	0	0	%
U2h17	0	0	0.1	%
U2h18	0	0	0	%
U2h19	0.037	0	0.1	%
U2h20	0	0	0	%
U2h21	0	0	0	%
U2h22	0	0	0	%
U2h23	0	0	0	%
U2h24	0	0	0	%
U2h25	0	0	0	%
U2h26	0	0	0	%
U2h27	0	0	0	%
U2h28	0	0	0	%
U2h29	0	0	0	%
U2h30	0	0	0	%
U2h31	0	0	0	%
U2h32	0	0	0	%
U2h33	0	0	0	%
U3h17	0.006	0	0.1	%
U3h18	0	0	0	%
U3h19	0.007	0	0.1	%
U3h20	0	0	0	%
U3h21	0	0	0	%
U3h22	0	0	0	%
U3h23	0	0	0	%
U3h24	0	0	0	%
U3h25	0	0	0	%
U3h26	0	0	0	%
U3h27	0	0	0	%
U3h28	0	0	0	%
U3h29	0	0	0	%
U3h30	0	0	0	%
U3h31	0	0	0	%
U3h32	0	0	0	%
U3h33	0	0	0	%

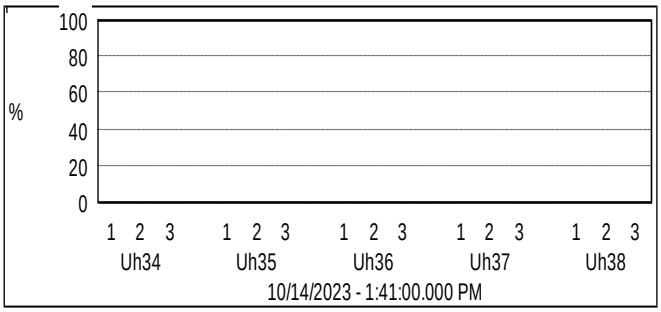


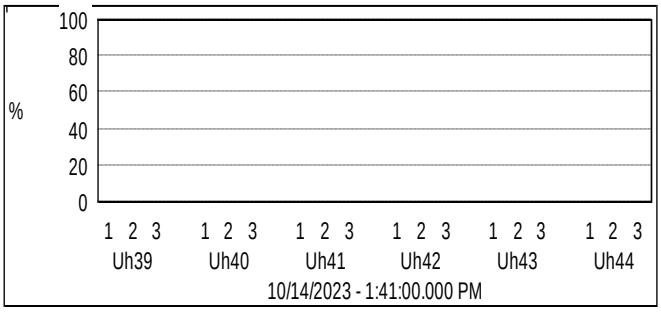


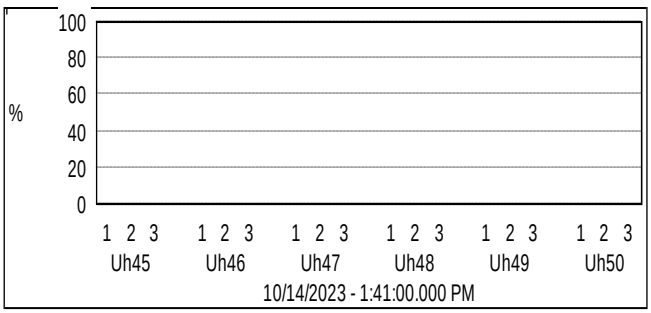


- Above individual voltage harmonics are not considerable.

Name	Avg	Min	Max	Units
U1h34	0	0	0	%
U1h35	0	0	0	%
U1h36	0	0	0	%
U1h37	0	0	0	%
U1h38	0	0	0	%
U1h39	0	0	0	%
U1h40	0	0	0	%
U1h41	0	0	0	%
U1h42	0	0	0	%
U1h43	0	0	0	%
U1h44	0	0	0	%
U1h45	0	0	0	%
U1h46	0	0	0	%
U1h47	0	0	0	%
U1h48	0	0	0	%
U1h49	0	0	0	%
U1h50	0	0	0	%
U2h34	0	0	0	%
U2h35	0	0	0	%
U2h36	0	0	0	%
U2h37	0	0	0	%
U2h38	0	0	0	%
U2h39	0	0	0	%
U2h40	0	0	0	%
U2h41	0	0	0	%
U2h42	0	0	0	%
U2h43	0	0	0	%
U2h44	0	0	0	%
U2h45	0	0	0	%
U2h46	0	0	0	%
U2h47	0	0	0	%
U2h48	0	0	0	%
U2h49	0	0	0	%
U2h50	0	0	0	%
U3h34	0	0	0	%
U3h35	0	0	0	%
U3h36	0	0	0	%
U3h37	0	0	0	%
U3h38	0	0	0	%
U3h39	0	0	0	%
U3h40	0	0	0	%
U3h41	0	0	0	%
U3h42	0	0	0	%
U3h43	0	0	0	%
U3h44	0	0	0	%
U3h45	0	0	0	%
U3h46	0	0	0	%
U3h47	0	0	0	%
U3h48	0	0	0	%
U3h49	0	0	0	%
U3h50	0	0	0	%



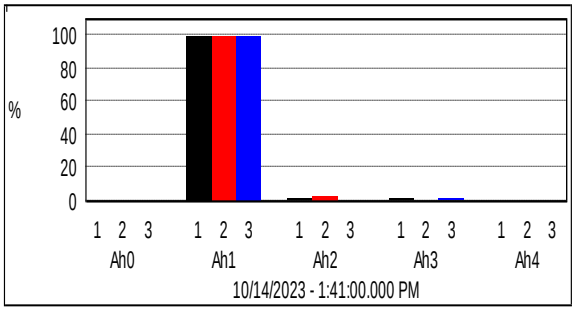


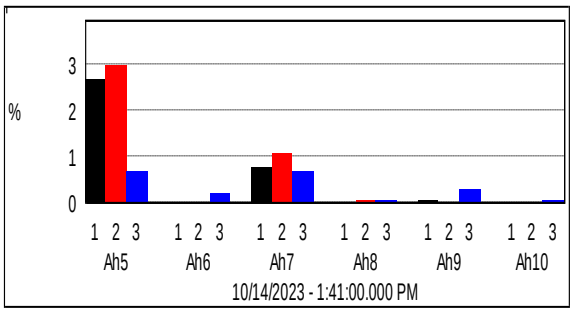


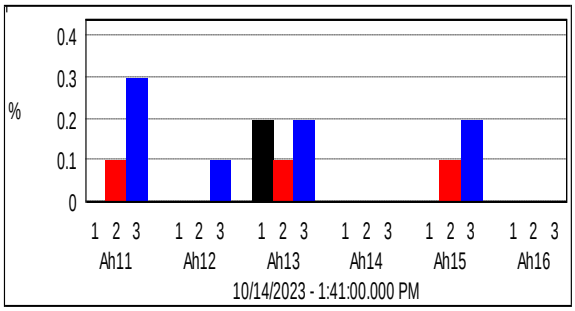
- Above individual voltage harmonics are not considerable.

➢ Individual Current Harmonics

Name	Avg	Min	Max	Units
A1h0	0	0	0	%
A1h1	100	100	100	%
A1h10	0	0	0	%
A1h11	0.064	0	0.2	%
A1h12	0	0	0	%
A1h13	0.12	0.1	0.2	%
A1h14	0	0	0	%
A1h15	0	0	0	%
A1h16	0	0	0	%
A1h2	0.863	0	3	%
A1h3	2.139	1.2	2.7	%
A1h4	0.024	0	0.1	%
A1h5	2.367	1.8	3.3	%
A1h6	0.003	0	0.1	%
A1h7	0.492	0.1	1.2	%
A1h8	0	0	0.1	%
A1h9	0.329	0.1	0.5	%
A2h0	0	0	0	%
A2h1	100	100	100	%
A2h10	0	0	0	%
A2h11	0.165	0	0.4	%
A2h12	0	0	0	%
A2h13	0.194	0.1	0.3	%
A2h14	0	0	0	%
A2h15	0.036	0	0.1	%
A2h16	0	0	0	%
A2h2	1.162	0	4.2	%
A2h3	1.314	0.9	2.9	%
A2h4	0.043	0	0.2	%
A2h5	1.718	0.8	3.6	%
A2h6	0.027	0	0.2	%
A2h7	0.396	0	1.3	%
A2h8	0.024	0	0.1	%
A2h9	0.145	0	0.3	%
A3h0	0	0	0	%
A3h1	100	100	100	%
A3h10	0.097	0	0.2	%
A3h11	0.215	0.1	0.4	%
A3h12	0.079	0	0.1	%
A3h13	0.119	0	0.3	%
A3h14	0.056	0	0.1	%
A3h15	0.248	0.1	0.3	%
A3h16	0.05	0	0.1	%
A3h2	1.008	0.2	3	%
A3h3	2.281	1.6	2.9	%
A3h4	0.232	0	0.6	%
A3h5	1.168	0.2	3.3	%
A3h6	0.139	0	0.4	%
A3h7	1.087	0.6	1.5	%
A3h8	0.115	0	0.2	%
A3h9	0.111	0	0.4	%

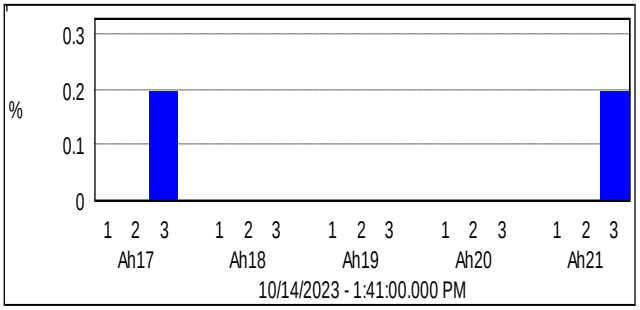


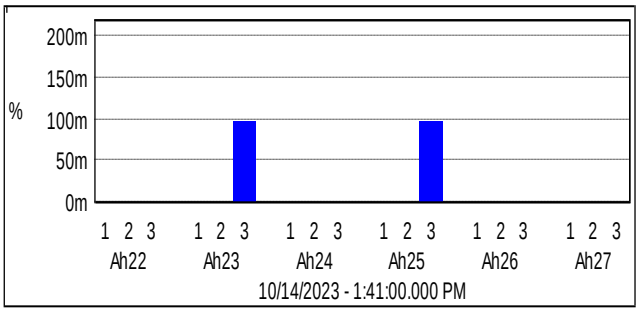


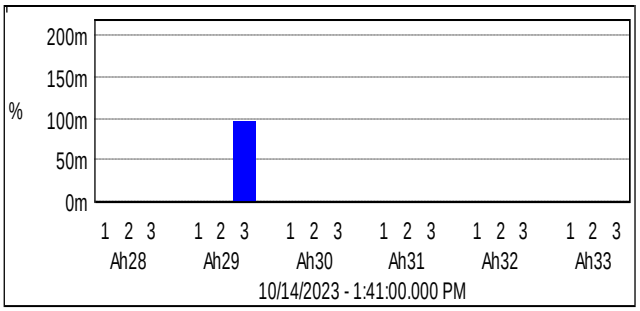


➢ 3rd & 5th order individual current harmonics have noticeable presence.

Name	Avg	Min	Max	Units
A1h17	0	0	0.1	%
A1h18	0	0	0	%
A1h19	0	0	0	%
A1h20	0	0	0	%
A1h21	0	0	0	%
A1h22	0	0	0	%
A1h23	0	0	0	%
A1h24	0	0	0	%
A1h25	0	0	0	%
A1h26	0	0	0	%
A1h27	0	0	0	%
A1h28	0	0	0	%
A1h29	0	0	0	%
A1h30	0	0	0	%
A1h31	0	0	0	%
A1h32	0	0	0	%
A1h33	0	0	0	%
A2h17	0.038	0	0.1	%
A2h18	0	0	0	%
A2h19	0.06	0	0.1	%
A2h20	0	0	0	%
A2h21	0.001	0	0.1	%
A2h22	0	0	0	%
A2h23	0.007	0	0.1	%
A2h24	0	0	0	%
A2h25	0	0	0	%
A2h26	0	0	0	%
A2h27	0	0	0	%
A2h28	0	0	0	%
A2h29	0.045	0	0.1	%
A2h30	0	0	0	%
A2h31	0	0	0	%
A2h32	0	0	0	%
A2h33	0	0	0	%
A3h17	0.162	0	0.3	%
A3h18	0.018	0	0.1	%
A3h19	0.024	0	0.1	%
A3h20	0.003	0	0.1	%
A3h21	0.116	0	0.3	%
A3h22	0	0	0.1	%
A3h23	0.065	0	0.1	%
A3h24	0	0	0	%
A3h25	0.118	0	0.2	%
A3h26	0	0	0	%
A3h27	0	0	0.1	%
A3h28	0	0	0	%
A3h29	0.109	0	0.2	%
A3h30	0	0	0	%
A3h31	0.03	0	0.1	%
A3h32	0	0	0	%
A3h33	0.002	0	0.1	%

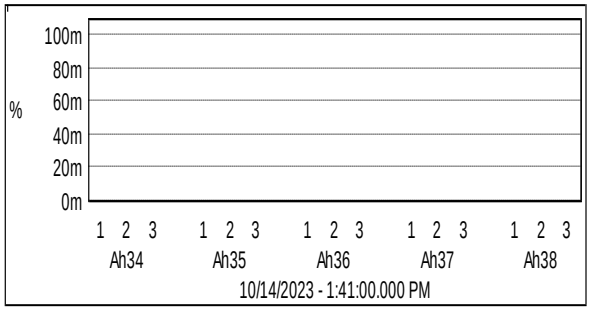


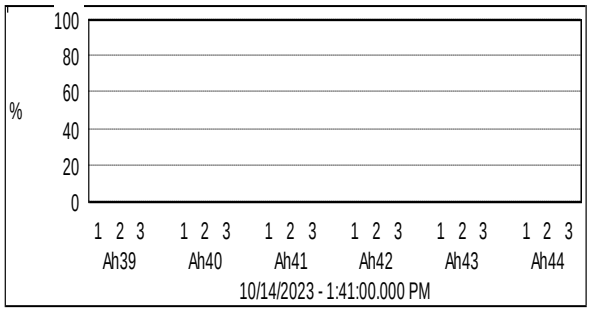


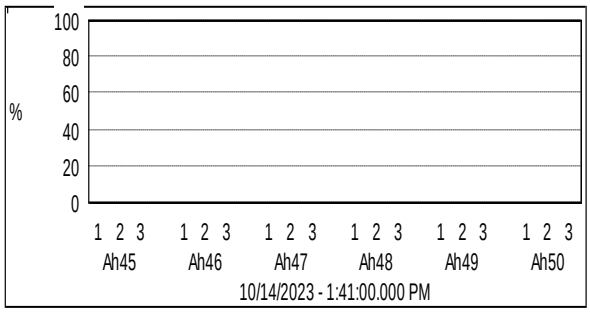


- Above individual current harmonics are not considerable.

Name	Avg	Min	Max	Units
A1h34	0	0	0	%
A1h35	0	0	0	%
A1h36	0	0	0	%
A1h37	0	0	0	%
A1h38	0	0	0	%
A1h39	0	0	0	%
A1h40	0	0	0	%
A1h41	0	0	0	%
A1h42	0	0	0	%
A1h43	0	0	0	%
A1h44	0	0	0	%
A1h45	0	0	0	%
A1h46	0	0	0	%
A1h47	0	0	0	%
A1h48	0	0	0	%
A1h49	0	0	0	%
A1h50	0	0	0	%
A2h34	0	0	0	%
A2h35	0	0	0	%
A2h36	0	0	0	%
A2h37	0	0	0	%
A2h38	0	0	0	%
A2h39	0	0	0	%
A2h40	0	0	0	%
A2h41	0	0	0	%
A2h42	0	0	0	%
A2h43	0	0	0	%
A2h44	0	0	0	%
A2h45	0	0	0	%
A2h46	0	0	0	%
A2h47	0	0	0	%
A2h48	0	0	0	%
A2h49	0	0	0	%
A2h50	0	0	0	%
A3h34	0	0	0	%
A3h35	0	0	0	%
A3h36	0	0	0	%
A3h37	0.006	0	0.1	%
A3h38	0	0	0	%
A3h39	0	0	0	%
A3h40	0	0	0	%
A3h41	0	0	0	%
A3h42	0	0	0	%
A3h43	0	0	0	%
A3h44	0	0	0	%
A3h45	0	0	0	%
A3h46	0	0	0	%
A3h47	0	0	0	%
A3h48	0	0	0	%
A3h49	0	0	0	%
A3h50	0	0	0	%







- Above individual current harmonics are not considerable.

Average measured values for Total Current & Voltage Harmonics Distortion without capacitors is as under:-

Location	2nd measurement of Main Incomer of Pharmacy College			
THD Voltage (%)	**Name**	**Avg**	**Min**	**Max**
	U1 THD (%)	2.04	1.8	2.3
	U2 THD (%)	2.07	1.9	2.4
	U3 THD (%)	2.12	1.9	2.4
	Total Voltage Harmonic Distortion is there.			
	5th & 7th order individual voltage harmonics have noticeable presence.			
THD current (%)	**Name**	**Avg**	**Min**	**Max**
	A1 THD (%)	3.57	2.7	4.7
	A2 THD (%)	2.79	1.5	5.8
	A3 THD (%)	3.29	2.3	5.1
	Total current harmonics distortion is not considerable			
	3rd & 5th order individual current harmonics have noticeable presence.			

3. Electricity Bill Analysis and Power Factor

3.1 Electricity Billing

Understanding different components of electrical bill is very important to control the bill. The electricity billing by utilities for medium in Industrial category, is done on two-part tariff structure, i.e. one part for capacity (or demand) drawn and the second part for actual energy drawn during the billing cycle. Capacity or demand is in KVA (apparent power) or KW terms. The reactive energy (i.e.) KVARH drawn by the service is also recorded and billed for in some utilities, because this would affect the load on the utility. Accordingly, utility charges for maximum demand, active energy and reactive power drawn (as reflected by the power factor) in its billing structure. In addition, other fixed and variable expenses are also levied.

Electricity Bill & Its Analysis

Monthly Electricity Consumption:

Applicable Tariff: HT- VIII(B)
Contract Demand (CD) with MSEDCL =200 KVA
Average PF = 0.96

Details of tariff applicable to Agnihotri College of Pharmacy Wardha as under:-
Tariff w.e.f. 1 April, 2022 to 31 March, 2023

Table No. 3.2: Tariff Category: - HT-VIII B

Consumer Category	Wheeling Charges (Rs. / KVAH)	Demand Charges (Rs./ KVA)	Energy Charges (Rs./ KVAH)
All Unit	0.55	454.00	8.96
TOD tariff (in addition to above base tariffs) (Rs/kVAh)			
22 to 06	-1.50		
06 to 09 & 12 to 18	0.00		
09 to 12	0.80		
18 to 22	1.10		

Monthly Billing Demand will be the higher of the following:

a. Actual Maximum Demand recorded in the month during 0600 hours to 2200 hours;

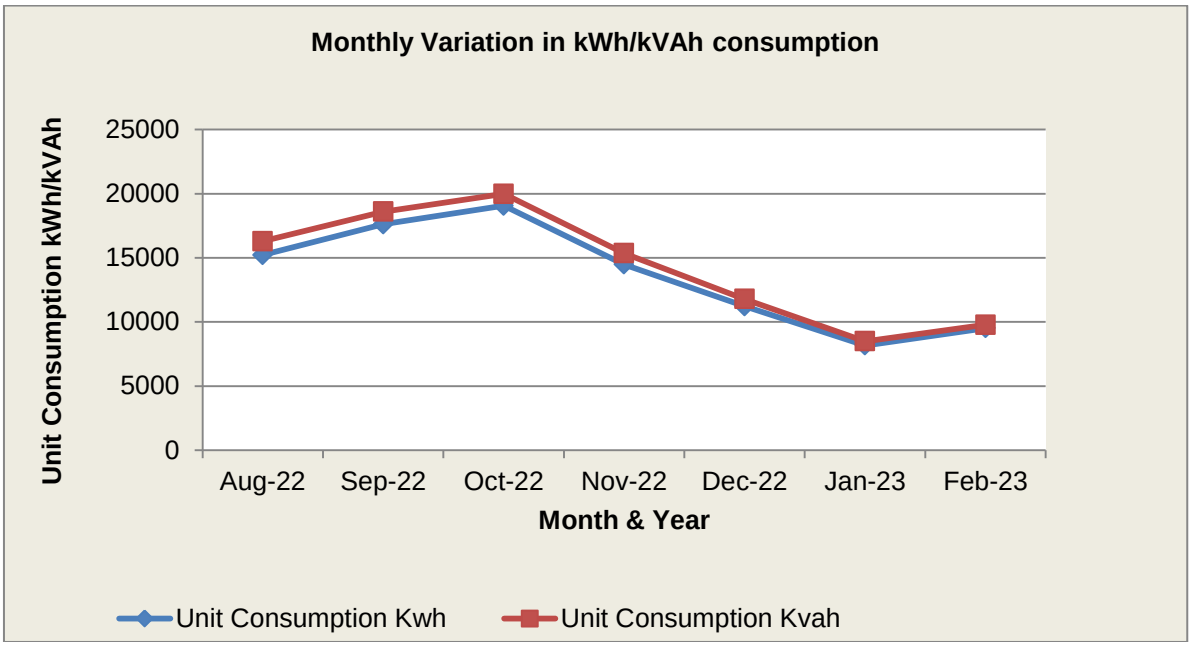
b. 75% of the highest Billing Demand recorded during the preceding eleven months, subject to the limit of Contract Demand;

c. 65% of the Contract Demand. (From aug-22 to march-23)

Table No. 3.3: Electricity Bill Summary of Agnihotri College of Pharmacy

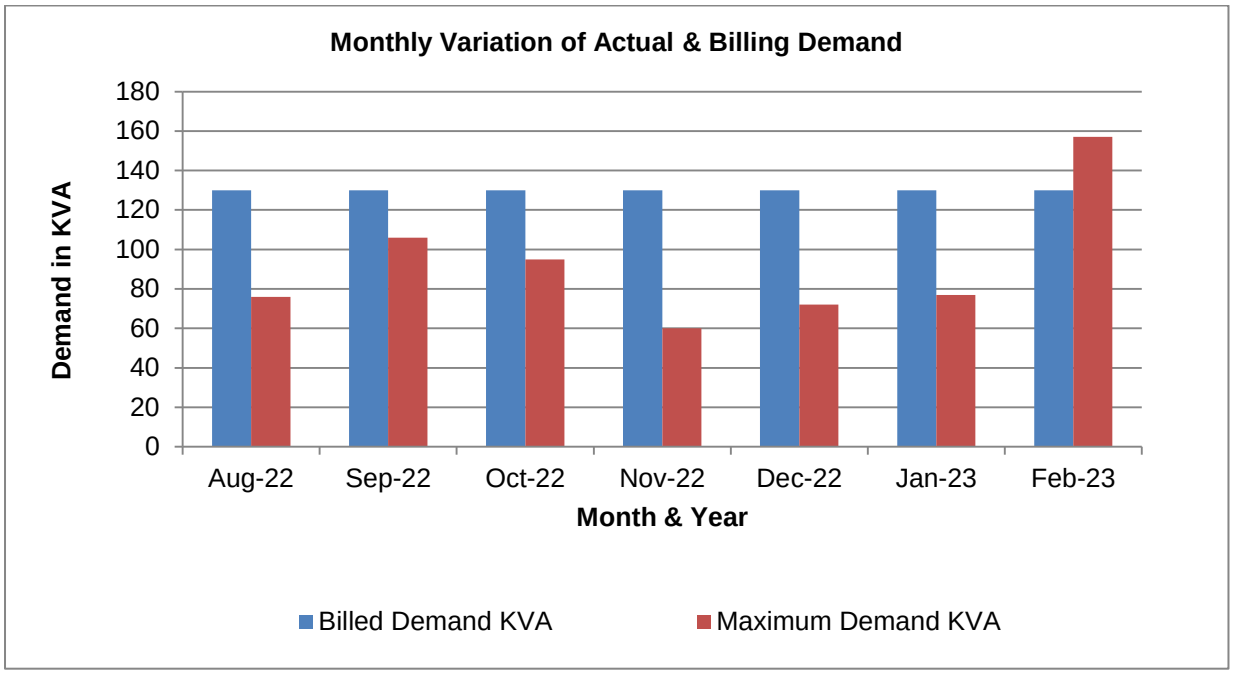
Energy Audit For Agnihotri College of Pharamcy,Bapunagar																
Energy Consumption sheet for Agnihotri College of Pharamcy,Bapunagar,Consumer No.510019006400																
Month	Unit Consumption Kwh	Unit Consumption Kvah	Contract Demand KVA	Billed Demand KVA	Maximum Demand KVA	PF	Demand Charges in Rs.	Energy Charges in Rs.	Wheeling Charges in Rs.	F.A.C	Electricity Duty	Tax On Sale	TOD Tariff EC	Consumption Rebates	Total Amount	Unit Charge Excluding Demand Charge
Aug-22	15221	16297	200	130	76	0.934	59020	146021.12	8963.35	28519	49720	2898.08	-5761.1	0	289380	14.14
Sep-22	17610	18596	200	130	106	0.947	59020	166620.16	10227.8	32543	55203.41	3352.94	-5537.6	0	321430	14.11
Oct-22	19066	19985	200	130	95	0.954	59020	179065	10991.8	34974	58829	3630	-3914	0	342595	14.19
Nov-22	14483	15358	200	130	60	0.943	59020	137607.0	8446.90	26876.5	47853.07	2757.56	-4079.3	0	278482	14.29
Dec-22	11225	11791	200	130	72	0.952	59020	105647.36	6485.05	20634	39654.98	2137.24	-2953.40	0	230625	14.55
Jan-23	8172	8486	200	130	77	0.963	59020	76034.56	4667.30	14850.50	32258.47	1555.95	-960.60	0	187426	15.13
Feb-23	9509	9773	200	130	157	0.973	71278	87566.08	5375.15	17102.75	37910	1810.51	-797.80	0	220245	15.24
Total	**95286**	**100286**					**425398**	**898561**	**55157**	**175500**	**321429**	**18142**	**-24004**		**1870183**	
Average	**12491**	**13079**				**0.952**									**251875**	**14.52**
Estimated Annual	**163347**	**171919**													**3206028**	

Graph No. 3.1: Monthly Variation in kWh & kVAh Consumption

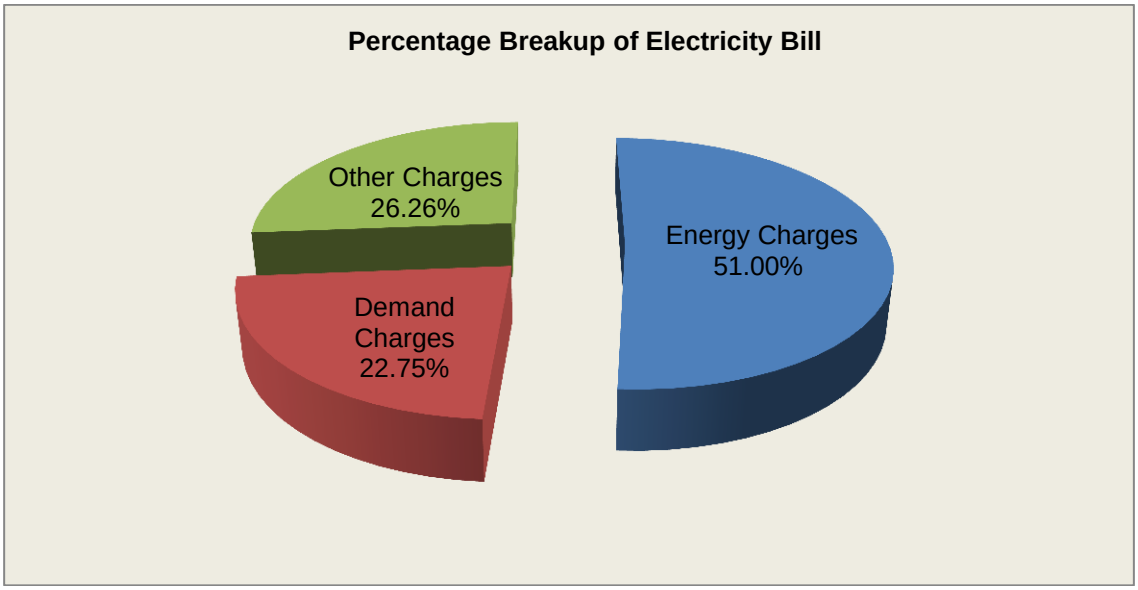


From the above graph it is clear that energy consumption is more in the month of Oct-2022

Graph No. 3.2: Monthly Variation in Actual & Billing Demand (KVA)



From the above graph it is clear that, billing demand is more than to actual maximum demand.



Observation:-

- Contract demand is 200 KVA and & highest maximum demand is 157 KVA.
- Average cost of electricity units is Rs. 14.10 per KVAH. Excluding demand charge
- Energy charges is Rs. 8.96 per KVAH.
- Average billing power factor is 0.96.

3.2 TOD ANALYSIS:-

Unit consumption summary in different slots of TOD tariff at Agnihotri college of Pharmacy is tabulated as under

Table No. 3.5: TOD Summary

TOD Summary of Agnihotri College of Pharmacy Bapunagar Warda									
Month	No of Days in Month	Monthly Consumption (A) Zone	Average Power Cons/Hrs.	Monthly Consumption (B) Zone	Average Power Cons/Hrs.	Monthly Consumption (C) Zone	Average Power Cons/Hrs.	Monthly Consumption (D) Zone	Average Power Cons/Hrs.
		22 TO 6		6 TO 9 & 12 TO 18		9 TO 12		18 TO 22	
Aug-22	31	7276	29.34	4200	15.05	498	5.35	4323	34.86
Sep-22	30	7570	31.54	5467	20.25	988	10.98	4570	38.08
Oct-22	31	6570	26.49	7530	26.99	1776	19.10	4109	33.14
Nov-22	30	5611	23.38	5650	20.93	565	6.28	3532	29.43
Dec-22	31	4947	19.95	2783	9.97	0	0.00	4061	32.75
Jan-23	31	3903	15.74	134	0.48	0	0.00	4449	35.88
Feb-23	28	4420	19.73	50	0.20	0	0.00	5302	47.34
Total	**212**	**40297**		**25814**		**3827**		**30346**	
Average		**5757**	**23.76**	**3688**	**13.53**	**547**	**6.02**	**4335**	**35.79**

Details of Utilization of TOD					
Name of Zone	Time	Average unit consumption /hr	Applicable additional Tariff (Rs./unit)	Desired Priority	Actual priority
A	2200 hr to 0600 hr	23.76	-1.5	I	II
B	0600 hr to 0900 & 1200 hr to 1800 hr	13.53	0	II	III
C	0900 hr to 1200 hr	6.02	0.8	III	IV
D	1800 hr to 2200 hr	35.79	1.1	IV	I

Possibility should be explored to follow unit consumption in desired priority order as far as possible by rearrangement of operation

3.5. Power Factor Improvement

At present capacitors are not installed at College. Capacitor requirement for improvement of power factor from existing pf to desired pf i.e. unity pf, for a given Load is given by Formula as under:-

kVAr Required = KW X (Tan θ1 -Tan θ2)

Where Tan θ1 is the trigonometric ratio for the present power factor, and Tan θ2 is the trigonometric ratio for desired power factor

θ_1 = Existing ($Cos^{-1}PF_1$)

θ_2 = Improved ($Cos^{-1}PF_2$)

The calculations to arrive at the approx. KVAr rating of the capacitor and approx. sizing of APFC are given as under:

Additional Capacitor (KVAR) required for Improving Power Factor						
Locations	Actual P.F.		Target P.F.	Maximum Demand in KVA	Maximum Demand in kW	KVAR Required
	Cos ϕ1	Tan ϕ1	Cos ϕ2			
IOCL Jamnagar AFS	0.9	0.48	0.995	157	153	58

*Considering power factor without capacitors as 0.90.

Hence it is suggested to install APFC panel of 65 kVAr rating, considering 10% additional capacity.

Capacitors should be made on according to load. Excess capacitor may lead to leading power factors and over voltage which is not desirable.

3.4 KVAH Saving By Improvement in Power Factor

Estimated Saving in KVAH consumption due to maintaining power factor near unity is tabulated as under.

Table No. 3.9: KVAH Saving Due to Improvement in PF

Potential Saving due to Unity Power Factor by Reduction in kVAh Consumption											
	Existing Condition									Proposed Condition	
Month	Unit Consumption KVAH	Unit Consumption KWH	Contract Demand KVA	Maximum Demand KVA	Bill Demand KVA	Average Billing Power Factor	Energy Charges in Rs.	Wheeling Charges in Rs.	Electricity Duty in Rs.	Proposed Unit Consumption KVAH if PF is unity	Potential Saving in Energy Charges if PF is unity
Aug-22	16297	15221	200	76	130	0.934	146021.12	8963.35	49720	15375.1	13030
Sep-22	18596	17610	200	106	130	0.947	166620.16	10227.8	55203.41	17788.3	11398
Oct-22	19985	19066	200	95	130	0.954	179065	10991.8	58829	19258.3	10312
Nov-22	15358	14483	200	60	130	0.943	137607.0	8446.90	47853.07	14628.9	10419
Dec-22	11791	11225	200	72	130	0.952	105647.36	6485.05	39654.98	11338.4	6587
Jan-23	8486	8172	200	77	130	0.963	76034.56	4667.30	32258.47	8254.6	3502
Feb-23	9773	9509	200	157	130	0.973	87566.08	5375.15	37910	9605.2	2558
Total	**100286**	**95286**				**0.952**	**898561**	**55157**	**321429**	**96249**	**57806**
Estimated Annual Saving Potential due to unity Power Factor by reduction in kVAh Conumption in Rs.											**99095**

As per details in above table, billing power factor varies between 0.934 to 0.974 and the average billing power factor observed for the college is 0.96. Hence there is scope to further improvement in power factor to 0.99 and there is potential saving of **Rs. 99095/- per annum** by reduction in kVAh consumption.

4 Lighting, Fan & Air Conditioning

4.1 Introduction

Lighting is an essential service in all the building, industries & utilities. Innovation and continuous improvement in the field of lighting has given rise to energy saving opportunities in this area.

At Agnihotri College of Pharmacy, Bapunagar wardha, Lighting system consists of mainly following type of luminaries.

Inventory for lighting & other load is studied & tabulated as under

Table No. 4.1 List of lighting load

Location	Wattage	7	12	16	18	22	36	5	35	12	18
	Type of Lamp	LED	LED	CFL	LED Tube Light	LED Tube light	Tube Light	LED	CFL	LED Bulb	LED Bulb
	No. of Lamp per Fixture	1	1	2	1	1	1	1	1	1	1
Conference Room		18	6								
Examination Control Room				6							
Principle Room					1	4	1				
Smart class Room-1							4				
Principle Passage						1		14			
Pharmacy Museum			13					43			
Registration Room/ Administrative Office						2	2				
Computer Room				9							
Pharmacology Lab						9	14				
Practical Chemistry Room					1		4				
Ictehabled Class Room					2		12				
Smart class Room-3					1	3	8				
Store Room					5		1				
Library									16	36	6
Smart class Room-2							4				

Location	Wattage	7	12	16	18	22	36	5	35	12	18
	Type of Lamp	LED	LED	CFL	LED Tube Light	LED Tube light	Tube Light	LED	CFL	LED Bulb	LED Bulb
	No. of Lamp per Fixture	1	1	2	1	1	1	1	1	1	1
Library Passage							2				
3rd Floor							5				
Class Room No.1							3				
Pharmaceutics R. Lab					2		12				
3rd Floor Passage							2				
TOTAL		18	19	15	12	19	74	57	16	36	6
TOTAL KW		**0.126**	**0.228**	**0.48**	**0.216**	**0.418**	**2.664**	**0.285**	**0.56**	**0.432**	**0.108**
TOTAL Load in KW		**5.52**									

4.1.2 Potential Energy Saving in Lighting Energy Consumption

During field study it is found that, plant is already using energy efficient LED lights at most of the places. Further Energy saving can be achieved in energy consumption of Lighting by following measures.

1. Replacement of Tube Light Fitting 36 W with LED Tube Light 18 W.

Table No. 4.2: Potential saving by replacement of Existing Lighting Fixture by Energy Efficient LED Light

Potential for Energy Savings by various Energy Efficient Lighting Measures								
Description	Existing		Description	Proposed		Saving in Kwh/ annum	Unit Rate	Approximate investment Rs.
	Qty.	Actual power consumption Considering 80% Utilization		Qty.	Actual power consumption Considering 80% Utilization			
Tube light Fitting 1x36 W with Ordinary Fluorescent Lamp with Copper Choke	74	3431	Providing 1 x 18 W LED Tubelight	74	1287	2145	500	37000
		3431			**1287**	**2145**		**37000**
Annual Estimated saving potential for Energy saving in Kwh						**2145**		
Energy Cost (Rs)						**13.87**		
Annual potential for Energy saving in Rs.						**29744**		
Pay Back Period in months						**15**		

By implementing above suggested measures, there is potential of energy saving of about **2145 kWh/annum** costing **Rs. 29744/- per annum** with payback period of **15 months.**

Considered:-

- 80% utilization/working of lamps.
- 7 hours working per day.
- 230 working day per annum

4.1.3. Study of Illumination Systems

The whole lighting system mainly consists of LED. The Luminance levels of different locations as well as different tasks are most important. At Agnihotri college of pharmacy Wardha, lux level is measured with the help of lux meter and tabulated as under:-

Table No. 4.3: Measurement of Lux Level

Location	Lux Level						Average
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	
Conference Room	272	274	290	245	262	253	266
Examination Control Room	212	223	193	183	237	218	211
Principle Room	143	132	128	115	143	136	133
Smart class Room-1	115	110	117	98	91	88	103
Administrative Office	67.4	82.1	95.1	68	73.2	110	83
Principle Passage	119	108	120	98	90	138	112
Pharmacy Museum	112	115	120	134	108	116	118
Computer Room	95	80	113	134	128	149	117
Pharmacology Lab	200	198	172	154	133	124	164
Practical Chemistry Room	142	126	147	144	134	133	138
Smart class Room-3	199	209	162	131	56	63	137
Library	101	157	315	209	238	288	218
Smart class Room-2	271	213	183	187	156	160	195
Class Room No.1	170	172	183	112	113	159	152
Library Passage	161	173	110	123	154	167	148
Pharmaceutics R. Lab	136	127	125	113	133	133	128
3rd Floor	110	105	120	103	109	112	110
3rd Floor Passage	70	78	30	83	90	14	61

Depending on the nature of job activities to be carried out the suggested minimum illumination levels for various areas are as per OISD RP-244 is as under:-

Table No. 4.4: Standard Illumination Level

Sr. No.	Areas	Std. Lux Level
1	Easy office work classes	250
2	Training Room	500
3	Battery room , Charger/UPS rooms	150
4	Control Room bldg./ laboratory	400
5	Admin Building	300
6	Auditoria	150 to 200
7	Stairs Training Room	50

- Lux level is found low at following location:-
  - Principle Room
  - Smart class Room-1
  - Administrative Office
  - Computer Room
  - Pharmacology Lab
  - Practical Chemistry Room
  - Smart class Room-3
  - Library
  - Pharmaceutics R. Lab.

Proper Lighting arrangement should be done for sufficient illumination.

4.2. Energy Saving in Fan

The existing fans installed at Agnihotri College of Pharmacy, Bapunagar wardha premises are of conventional type, having a power consumption of 70 W. Location wise installed number of fans is tabulated as under:-

Table No. 4.2: List of Fan Load

Location	No.s	Type of Fan Ceiling / wall / Exhaust	Make	Wattage of Fan	Total Load in Watt
Conference Room	6	Ceiling Fan	Havells	70	420
Examination Control Room	1	Table Fan	--	60	60
Principle Room	5	Ceiling Fan	Bajaj	70	350
Smart class Room-1	6	Ceiling Fan	Bajaj	70	420
Administrative Office	5	Ceiling Fan	Bajaj	70	350
Computer Room	6	Ceiling Fan	Bajaj	70	420
Pharmacology Lab	17	Ceiling Fan	Bajaj	70	1190
Practical Chemistry Room	6	Ceiling Fan	Bajaj	70	420
ICT EHABLED CLASS Room	9	Ceiling Fan	Bajaj	70	630
ICT EHABLED CLASS Room	3	Exhaust Fan	--	80	240
Smart class Room-3	7	Ceiling Fan	--	70	490
Store Room	3	Ceiling Fan	--	70	210
Store Room	1	Wall Fan	--	60	60
Library	24	Ceiling Fan	Havells	60	1440
Smart class Room-2	6	Ceiling Fan	--	70	420
3rd Floor	24	Ceiling Fan	Anchor	70	1680
TOTAL Load in KW					**8.80**

BEE Star Rated BLDC Fans

BLDC fan has a Brushless DC electronic motor that is super-efficient. The fan does not need a regulator and works with remote control. Power consumption for 1200 mm sweep ceiling fan, at different speed is given as under

Table No.: 4.3 Comparisons of Ordinary Fan and BLDC Fan

Speed	1	2	3	4	5
Wattage	3 Watts	7 Watts	12 Watts	18 Watts	28 Watts

Energy saving potential by replacement of Existing Fans by Energy Efficient BLDC Fan is tabulated as under.

Energy Saving in Ceiling Fan

Table No.:4.4:- Potential saving by replacement of Conventional Ceiling Fan by Energy Efficient BLDC Fan

Potential Saving By Replacement of Existing Fan with Energy Efficient BLDC Fan											
Location	**Existing Ceiling Fans Wattage with no of Fans** **70**	**Wattage of New Fan**	**Average Working Hours Per Day**	**Annual operating day**	**Existing Consumption in kWh**	**Proposed Consumption in kWh**	**Annual kWh Saving**	**Annual Saving Rs.**	**Unit Rate in Rs.**	**Fan Qty.**	**Approximate investment Rs.**
Agnihotri College of Pharmacy	124	28	7	230	8384.9	3354.0	5031	69779	2500	124	310000
Total					**8385**	**3354**	**5031**	**69779**		**124**	**310000**
Considering 20% Saving by use of Remote Regulator							**1006**	**13956**			
Total Saving							**6037**	**83735**			
Total Potential Saving due to Replacement of Existing Fan with Energy Efficient BLDC Fan (kWh)							**6037**				
Total Potential Saving due to Replacement of Existing Fan with Energy Efficient BLDC Fan (Rs.)							**83735**				
Investment in Rs.							**310000**				
Pay Back Period in Month							**44**				

Considered:-

- 60% utilization/working of fans.
- 7 hours working per day.
- 230 working day per annum.

4.3. Air-Conditioning

4.3.1. Introduction

India, being a warm tropical country, most of the Refrigeration and HVAC applications involves cooling of air, water, other fluids or products.

Refrigeration and Air-conditioning accounts for a significant portion of the energy consumption many Commercial building.

Refrigeration and air conditioning systems cover a wide variety of cooling applications, using both standard and custom-made equipment's.

Comfort air-conditioning generally implies cooling of room air to about 24°C and relative humidity of 50% to 60%.Industrial process air conditioning and precision air conditioning may require temperatures ranging from 18°C to 24°C with relative humidity values ranging from 10% to 60%.

Agnihotri College of Pharmacy, Bapunagar wardha Offices has Split & Window Air Conditioners; Numbers of Split A/C units have been installed as per the requirement. The advantage of these units is only the lesser initial cost and less lead period. Secondly, these units are very easy to install. But operating & Maintenance cost of these units is very high.

Table No. 4.11: Details of AC

Location	Type of AC Split / Window / Ductable	Make	Nos	Rated TR	Total TR	EER	Cooling Capacity (Wattage or BTU) of AC	Input Power (Wattage)	Star Rating	Total Load in KW
Conference Room	Split	LLOYD	2	2	4	3.18	6350	2000	3	4000
Examination Centre Room	Split	Videocon	1	1.5	1.5	-	5130	1550	--	1550
Principle Room	Split	--	1	1.5	1.5	--	5130	1550	--	1550
			4		**7**					**7.10**
Specific Energy Consumption KW										**1.01**

4.2.2 Observations on Air Conditioning System

Table No. 4.12: Observations on AC

Location	Air Conditioned Room Area (Mtr)		
	Length (Mtr)	Width (Mtr)	Height (Mtr)
Conference Room	8.38	7.52	3.02
Principal Room	5.2	4.3	3.02
Examination Centre Room	3.38	3.27	3.02

Location	Is there leakage of conditioned air	Is there any external heat gaining?	Is there heat insulation film provided on window?	Weather false sealing is provided for air conditioned area/room	Weather fan is used for air conditioned room
Conference Room	No	No	NA	No	Yes
Principal Room	No	No	NA	No	Yes
Examination Centre Room	No	No	NA	No	Yes

❒ **Tips For Power Saving in Air Conditioner**

- **Use Fans along with AC's:**

As provision of ceiling fan / wall fan will enables distribution & circulation of conditioned air more efficiently in a room. And it will also provide apparent comfort to occupant in room. This comfort can be used to reduce AC room temperature setting to somewhat higher side than present setting of 24-25 ^{o}C. This in turn, will help to reduce Air Conditioned power consumption as for each degree set above 22^{o}C the AC uses 3 to 4 percent less power. Consumption of Energy efficient ceiling fan is very less i.e., 50W compared to the consumption of Air Conditioner.

- **Maintenance of AC filter:**

Dust and dirt collected in the filter will hamper the free flow of air, possibly even damage the unit. Clean or replace filters regularly. This will not only help the unit to cool down faster but also reduce energy consumption. A sliding filter is easier to clean. The instruction manual accompanying the AC will provide recommendations and guidance on filter maintenance and cleanliness.

- **Maintenance of outdoor coils:**

Outdoor coils are constantly exposed to dust. Coils coated with layers of dust and mud will reduce the efficiency of the AC. Keep them clean.

- **Preventing outside air:**

Always take extra care to keep the doors and windows of an AC room closed as much as possible. Carefully avoid moist and warmer outside air from entering the air conditioned room since this would result in an increase in electricity consumed by your AC. Remember that the natural air coming through normal leakages in the windows and doors will sufficiently ensure comfort conditions and minimize any unwanted odor in the air conditioned room. Take care to see that the unit is well sealed from the outdoors during installation and routine maintenance.

- **Maintain an ideal AC thermostat setting:**

For each degree set above 22 degrees c the AC uses 3 to 4 percent less power. The thermostat set at a temperature of 25-26 degrees c during summer should be comfortable. Lesser the difference between outdoor and indoor temperature lower would be the energy consumed by the AC. When you turn on your AC avoid setting the thermostat at a lower temperature than required. This will result in unnecessary extra power consumption as it will only cool your room to an undesirable lower temperature but not any faster!

- **Ensure free flow of air:** Any objects between the AC and its air passage will only hinder its efficiency. Remove any such objects.

4.3 Energy Saving in Computers

Due to increasing population of PC is the commercial building, manufacturing and operation of computer hardware may be a significant contributor to global warming.

Considerable energy can be saved by practicing following measures for computer.

1. Monitor should be combined turn off or enter power-saving mode after 20 minutes (or less) of inactivity, and hard drive to turn off after 30 minutes of inactivity. This can be done from the Power Options icon located in Windows Control Panel.
2. The brightness should be Adjust on monitor. The brighter a monitor, the more energy it uses. A monitor's brightness can be reduced dramatically if used in a dark room, for example.
3. Shut down computer when leave the office for more than two hours. An alternative would be to place it in hibernation or standby mode. Despite popular belief, powering computer on and off daily is a good habit for proper PC maintenance.
4. Consider enabling a monitor's power-saving mode that places the monitor in a "sleep" state until activity from the mouse or keyboard is detected.
5. Screensavers are not energy savers; they continually use the monitor at full power and were originally designed to prevent "burn in."
6. If available laptop computer. Laptop should be used. Laptops use less energy than desktops and are equally suitable for most users.
7. Turn off the laptop's Bluetooth or wireless capabilities when not in use to get some extra minutes, or even hours, out of the device before the battery dies.
8. Configure of monitor to turn off after 20 minutes of inactivity, hard drive to turn off after 30 minutes of inactivity, and desktop computer or laptop to go into a standby or sleep mode after 90 minutes of inactivity.
9. Do not turn on computer, monitor, or printer in the morning until actually need is there.

5. Energy Monitoring and Awareness

5.1 Energy Monitoring

Introduction

Energy monitoring and targeting is primarily a management technique that uses energy information as a basis to eliminate waste, reduce and control current level of energy use and improve the existing operating procedures. It builds on the principle "you can't manage what you don't measure and what you do not understand".
Energy Monitoring essentially combines the principles of energy use and statistics.

Elements of Monitoring & Targeting System

The essential elements of M&T system are:

- Recording-Measuring and recording different energy parameters like Maximum Demand, Power Factor, KWh Etc on Hourly/shift wise/daily etc. Installation of power analyzer which can be interface with Computer will help to do this job.
- Analyzing-Correlating energy consumption to a measured output, such as production quantity machine and equipment wise specific consumption.
- Comparing- Comparing energy consumption to an appropriate standard or benchmark past consumption
- Setting Targets - Setting targets to reduce or control energy consumption
- Monitoring- Comparing energy consumption to the set target on a regular basis
- Reporting -Reporting the results including any variances from the targets which have been set
- Controlling- Implementing management measures to correct any variances, which may have occurred
- Checking the accuracy of energy invoices
- Allocating energy costs to specific departments (Energy Accounting Centers)
- Determining energy performance/efficiency
- Recording energy use, so that projects intended to improve energy efficiency can be checked
- Highlighting performance problems in equipment or systems

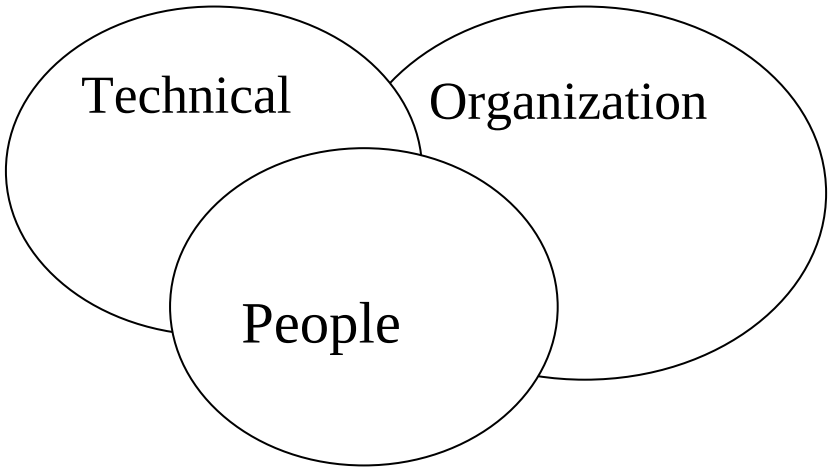
5.2 Awareness and Involvement of Management and operating staff.

Energy Management has technical issues because energy is consumed by technical systems. But technical systems are operated by people, and people can dramatically influence the level of energy consumption. Energy management in industrial, Commercial and institutional organizations can be regarded as having three key elements, as figure below illustrates:

- **Technical** — the energy consuming device and systems that energy efficiency, or inefficiently
- **Organization** — the structure and management system that can support or hinder the achievement of energy efficiency goals
- **People** — the personal values, attitude and practices of individuals in the organization that impact on energy use

The experience of organization that successfully manage their energy use suggests that technological solution alone do not achieve maximum energy saving, and are less likely to be sustained in the long term. There are instances that illustrate that a focus on people alone—their awareness of energy efficiency as an issue, their values and attitude towards energy use, and their skills and knowledge related to energy system –can achieve significant and sustainable saving of source, the combination of these two approaches—technological and human resources—will likely yield the optimum result.

Awareness trainings and participation of end users who are in directing controlling major energy consuming machines/equipments, will definitely improve the energy efficiency.



5.3 Energy Management System

It has, hence, become imperative for Industries and Commercial Establishments and to establish systems to measure monitor, implement and verify efficient use of energy & its conservation and EMS is the first right step in this direction.

Introduction

Electrical energy is one of the major consumables, which Form a large cost component for Industries and Commercial Establishments Particularly in Industries and Commercial Establishments, the rate at which power is made available can make all the difference in cost. The Electricity Bill has a fixed component (proportional to the sanctioned Maximum Demand) and a variable one (proportional to the units consumed). We need to look at both when trying to cut costs. Before one attempts optimization of machinery and processes it is essential to have consumption data and trends on which improvement techniques can be applied.

Only then, can one have, a continuous Energy improvement programmer based on real-time & on-line, plant data collection, data analysis, data interpretation, decision-making and energy saving implementation, in a closed loop.
The problem starts here. Industries and Commercial Establishments today, have lagged behind in basic techniques of measurement and centralized data collection and need to quickly correct this situation.

Some of the problem areas are:

- Use of analog meters, which are inherently not as accurate as digital metering
- A few standalone KWH meters are provided while many other essential parameters like PF, V, I, VAR are not measured / monitored
- There is no provision / system for on-line measurements; readings are taken by manual logging. The off-line monitoring of energy parameters is not synchronized real-time with the production other data. This leads to errors in energy readings. Also, there can be human errors in reading or writing of energy readings
- Greater emphasis on process efficiency than on energy efficiency. Energy loop. optimization is not a p art of the control
- Many of the equipment capacities are overrated by a factor of 3 or higher, to ensure continuous production with little concern for energy consumption

What needs to be done in order to take action for optimization and savings, is to install an on-line Energy Management system.

5.4 Components of an Energy Management Network

The main components of a modern EMS include:

a) Energy Management Software (EMSTM).
b) A computer system with the desired Energy data generators
c) Remote meters, which constitute the main electrical
d) Network components like data cables, data converters, data repeaters and data concentrators (SCMTM) as the physical media.

Today, electric meters are microprocessor-based and available in a variety of configurations, which give information of multiple parameters, which were earlier unimaginable with conventional meters. A typical industry standard meter like the Quasar of L & T reads voltage, current, active / reactive /apparent energy and power, power factor, phase angles, frequency, power demand (max), voltage & local monitoring. Current fundamental and distortion etc. with display for

The meters will be located at remote locations like load centers, power control centers, main receiving station and motor control centers. They read the desired electrical data pertaining to that feeder and send the data to the centralized computer software via the network cables. These meters support industry standard open protocol like Modbus, which allows the EMSTM software to read and configure the meters. The computer receives the data and delivers it to the Energy Management Software, which processes the data and gives the required reports for decision making. EMSTM is based on a Windows Operating System, user-friendly & easy to learn graphic user interface and menu-based configuration. It uses a back-end database for storage and has a robust communication engine for data acquisition with real time capabilities.

The salient features of EMSTM are:

a. Historic trend chart
b. On-line trend charts
c. Performance reports
d. Energy reports
e. Cost reports
f. Budget reports
g. Alarm reports
h. Specific energy consumption reports
i. Run hour reports

EMS indicates the areas of energy saving and helps in identification of specific nodes (locations/users/processes) on which improvements are required. Data collected by the EMS can be suitably used for Energy Management, and hence provides an effective indicator of the industry's energy efficiency.