ENERVISION
We serve to save
An Empanelled ESCO of B.E.E

2021-2022

Green Audit Report (Environment, Electrical, Energy & Fire Safety) Campus-3

Kalinga Institute of Social Sciences Deemed to be University

Prepared by

ENER VISION
(ISO 9001 CERTIFIED & BEE empaneled ESCO)
Kandivali EAST, MUMBAI

Acknowledgement

M/S. ENER VISION places on record its sincere thanks to the KISS University Management giving us the opportunity for carrying out Green Audit (Environment, Electrical, Energy and Fire Safety Audit) of the KISS University campus-3. We also sincerely thank to Mr. Suvendu Panda (KIIT & KISS Nodal Officer) & maintenance team for their excellent co-ordination and help during the Third Party Inspection of services & Electrical Installation on 9th March to 12th March 2022.

Our engineers under the lead auditors Mr. Chinmoy Dutta – Chartered Electrical, Engineer & BEE Certified Energy Auditor, have carried out the power & facility audit.

Chinmoy Dutta

Place: Mumbai

Date: 15th March 2022

Chinmoy Dutta
(Chartered Elect Engineer & BEE Certified Energy Auditor EA-0985)
ENER VISION
(ISO 9001 Certified & BEE empanel ESCO)

Audit Team:

Mr. Chinmoy Dutta: B.E. Electrical & Certified Energy auditor from Bureau of Energy Efficiency, Ministry of Energy, Govt. of India and Chartered Engineer More than 28 years of experience in designing and Project Management of all types of Electrical, Automation & HVAC system. Handled various projects during his tenure. Also has hands on experience in Facility Management and has handled some of the prestigious facilities. Worked with TISCO, Siemens, Saudi Aramco, IPMSL & Pantaloon retail India. Audited Mall, Hotel and Corporate Buildings, Data Centers etc.

Mr. Pravin Shankar: Certified Energy auditor from Bureau of Energy Efficiency (EA 9892), Ministry of Energy, Govt. of India. Experience in designing and Project Management of all types of Electrical & HVAC system. Hands on experience in Facility Management.

Mr. D T Naik - Diploma in Electrical & Mechanical, PWD certified Electrical Supervisor, ISO 50,000 Certified energy auditor and HVAC auditor with 40 years of experience in design and execution of HVAC system.

Capt. Balasubramanian G S - An ex-Army officer with a certificate on firemanship from Nagpur Fire brigade College. He has also done his diploma in Industrial safety from Labour Institute of Madras. Apart from his career in Army, captain has been working in the field of training on fire safety and auditing of status of firefighting system in various organization for good around 25 years

Pranav Derasari -Electrical Engineer with 15 years of working experience, has varied experience in execution, Electrical Designing & project management.

Rahul Kalamata – Jr. Mechanical Engineer

Abhishek Anand- Jr. Electrical Engineer

About “ENER VISION”:

Established in 2007, ENER VISION is one of the leading providers of building energy management systems and solutions services with a scalable vertically–integrated business model. The Group operates with a footprint in three major cities in India supported by a service personal in Mumbai, Hyderabad, Bangalore and Gurgaon.

ENER VISION offers comprehensive energy-saving solutions for building environments, and BEE empanelled ESCO since 2010.

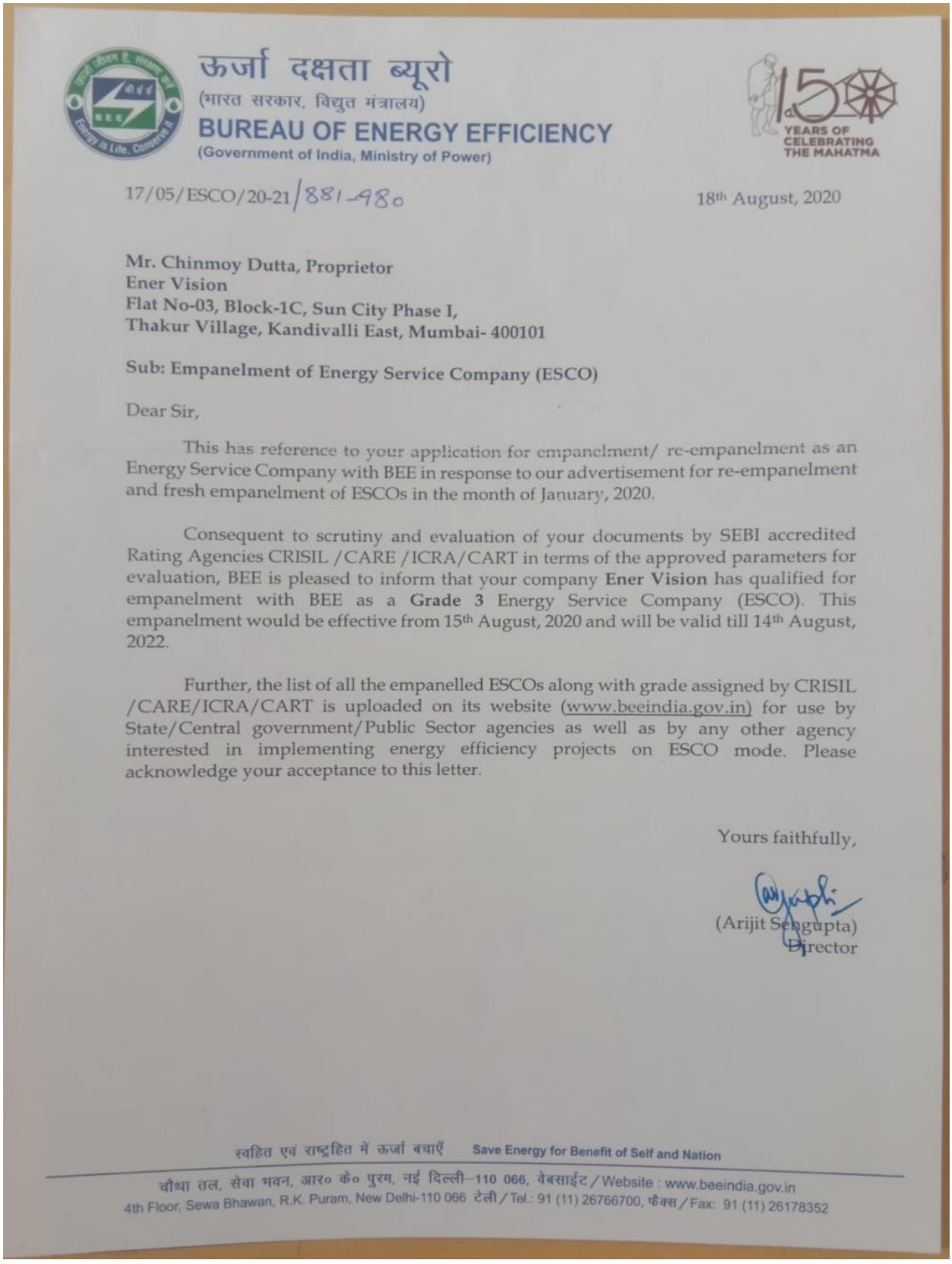
Our Mission:

To provide building owners with energy efficiency measures and products that are more sustainable, efficient and healthy than conventional building throughout all stages of a building's lifecycle

Our Vision:

To be recognized as the leading player in providing energy saving solutions to buildings

Certification of the company



ऊर्जा दक्षता ब्यूरो
(भारत सरकार, विद्युत मंत्रालय)
BUREAU OF ENERGY EFFICIENCY
(Government of India, Ministry of Power)

15 YEARS OF CELEBRATING THE MAHATMA

17/05/ESCO/20-21/881-980

18th August, 2020

Mr. Chinmoy Dutta, Proprietor
Ener Vision
Flat No-03, Block-1C, Sun City Phase I,
Thakur Village, Kandivalli East, Mumbai- 400101

Sub: Empanelment of Energy Service Company (ESCO)

Dear Sir,

This has reference to your application for empanelment/ re-empanelment as an Energy Service Company with BEE in response to our advertisement for re-empanelment and fresh empanelment of ESCOs in the month of January, 2020.

Consequent to scrutiny and evaluation of your documents by SEBI accredited Rating Agencies CRISIL /CARE /ICRA/CART in terms of the approved parameters for evaluation, BEE is pleased to inform that your company **Ener Vision** has qualified for empanelment with BEE as a **Grade 3** Energy Service Company (ESCO). This empanelment would be effective from 15th August, 2020 and will be valid till 14th August, 2022.

Further, the list of all the empanelled ESCOs along with grade assigned by CRISIL /CARE/ICRA/CART is uploaded on its website (www.beeindia.gov.in) for use by State/Central government/Public Sector agencies as well as by any other agency interested in implementing energy efficiency projects on ESCO mode. Please acknowledge your acceptance to this letter.

Yours faithfully,

(Arijit Sengupta)
Director

स्वहित एवं राष्ट्रहित में ऊर्जा बचाएँ Save Energy for Benefit of Self and Nation

चौथा तल, सेवा भवन, आर० के० पुरम, नई दिल्ली–110 066, वेबसाईट / Website : www.beeindia.gov.in
4th Floor, Sewa Bhawan, R.K. Puram, New Delhi-110 066 टेली / Tel.: 91 (11) 26766700, फैक्स / Fax: 91 (11) 26178352

Certification of the company

QRO
QUALITY RESEARCH ORGANIZATION

Certificate of Registration

This is to certify that

ENER VISION

BUILDING NO. 1C, FLAT NO. 03, NG SUNCITY PHASE-1, THAKUR VILLAGE, KANDIVALI (E), MUMBAI-400101 (MAHARASHTRA) INDIA

has been independently assessed by QRO
and is compliant with the requirement of:

ISO 9001:2015

Quality Management System

For the following scope of activities:

ENERGY AUDIT & ENERGY MANAGEMENT, ELECTRICAL & FIRE SAFETY AUDIT, EM CONSULTANCY.

Date of Certification: 28th January 2021
1st Surveillance Audit Due: 27th January 2022
2nd Surveillance Audit Due: 27th January 2023
Certificate Expiry: 27th January 2024

Certificate Number: 305021012817Q

EGAC
CAB # 119005

IAF
MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

Head of Certification

Validity of this certificate is subject to annual surveillance audits to be done successfully on or before 365 days from date of the audit.
(In case if surveillance audit is not allowed to be conducted: this certificate shall be suspended / withdrawn).
The Validity of this certificate can be verified at www.qrocert.org
This certificate of registration remains the property of QRO Certification LLP, and shall be returned immediately upon request.

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Table of Content:

Executive Summary:

Due to the raise in covid-19 cases and nation-wide lockdown, this audit mainly focused on the Electrical & Fire safety audit to maintain the facilities healthier. This audit is not only to maintain but also to help the clients for better enhancement in terms of “IOT based campus” or “Smart campus”. Whereas in the field of green energy audit, this audit aimed to maintain the campuses as like in the year 2019.

Due to the nation-wide lockdown, university hostels and academic buildings were not in operation and as a result wastage from these type facilities is negligible. As the hostels were closed the Bio-gas plants were not in operational as its mainly used for the hostel kitchens. Soil and Water samples were tested in the labs and results were promising as the values are in the range of its prescribed values. Also, due to the less mobility of the petrol & diesel vehicles, the carbon emissions in the air is also very less in the campus. This year university mainly focused to increase the green plants across the campus and the results are very good.

On physical verification of the electrical system, it is noticed the maintenance team has done a good work. Physically the condition of wires, cables, breakers, panels, DB’s, transformers, DG sets, etc are good. Entire university electrical system is thermal scanned and found normal as the temperature is less than 45 Deg C except in few places. These hotspots are also rectified during the time of audit and now it is normal. Earth pits are found good. AC machines were checked and are working with normal efficient range. Except at some places the maintenance has not been done which indeed are serviced properly during the period of audit.

With respect of fire safety, the campus are installed with proper fire fighting systems. Signages are also in-tact.

University has planned to implement all the checklists and Remote monitoring system from the year 2022.

Water Management

The water sources are safe in terms of contamination. The students are taking back the food waste as per the zero-waste management strategy of the college. It helped in reducing the consumption of water for washing.

The wells can be recharged with rainwater from rooftops of new building. Water can be harvested from the roof area of new building.

The rain water from harvesting tank can be used as source water as well as coolant for the distillation unit. The rain water can also be used as source for drinking water.

The BMC club can arrange awareness programs for water conservation. There should be a proper monitoring of water consumption pattern in the campus. BMC can also conduct water quality monitoring during specific intervals. The canteen waste can also be subjected to aerobic composting by setting-up of few composting yards in the

campus. This will provide a chance for the students to learn by seeing and operating such compost yards by them. Also, a good practice of managing their own waste (from lunch box) instead of carrying them back home they can be trained in operating the compost yard, by using their lunch time waste to produce good organic manure.

Energy management

The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner) in the college. The potential of renewable energy sources has to be explored.
All the campuses should be monitored by the IOT based energy monitoring system.
All the electrical DB's/Distribution boxes should be converted to smart DB's.
As the college has a very large roof area for installing solar panels so that it can be effectively used for generating power. The college has started steps in installing the solar panels for office.
It is recommended to install the following solar powered appliances in the campus;
Solar powered water heater and cooker in the college canteen
Solar powered street lights and LED display board
Total build-up area of the campus Vs total energy consumption of the campus is very good and worth.
Install sensors to synchronize the existing lights with day light in the admin building.

Green Campus:

In order to increase the carbon credit and greenery of the campus, it is recommended to plant more indigenous and evergreen / fruit trees inside the campus. Day light using in the campus is very good. Especially in the academic building the day light is very good.

Waste Management :

Try to avoid the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus. Leaf litter from the campus can be effectively used for aerobic/ vermin composting, so that the composted material can also be used as good manure. Recycle the paper waste instead of incinerate or burning.

INTRODUCTION

About college -

Kalinga Institute of Social Sciences – KISS comprises of KISS foundation. KISS foundation is an NGO in India headquartered in Bhubaneshwar Odisha. School, college and university is the educational wing of this initiative located at the intersection of food, education and empowerment.

Our aim is to break the vicious cycle of poverty and social isolation and to restore hope for a better future. We believe that every person has the right to access resources and opportunities in order to live and develop with dignity and to became an active and contributing member of our society.

KISS provides eco-friendly and green campus for the students. University gives higher education value in the fields of engineering, medicine, bio-technology, law and social sciences.

Vision Statement of KISS University-

No indigenous child should be deprived of formal education because of poverty.

ENVIRONMENT POLICY:

- *Establish environmental management systems to minimize harmful effects on environment, human, health and safety.*
- *Preventing pollution through continually monitoring and improving its environmental performance.*
- *Promote use of clean and safe technologies in order to utilize natural resources efficiently.*
- *Encourage transparency and communication of its commitment to sustainable development simultaneously increasing environmental awareness amongst the community at large.*

ENVIRONMENT MANAGEMENT PROGRAMME

♣ Conservation of Water Resources.

a) Judicious Management and conservation of water resource.
b) Ground Water Recharging.
c) Waste water management.

♣ Conservation of Energy.

a) Judicious Management and Conservation of energy.
b) Reduction in use of fossil fuels.
c) Promotion and use of Renewal energy sources.

♣ Solid waste and Garbage Management.

a) Proper disposal of Hospital waste (Biomedical & Clinic waste).
b) Conversion of biodegradable components into biogas and bio-fertilizers.
c) Recycling of waste paper.
d) Proper disposal of non-biodegradable components.

♣ Plantation in open areas.

MAPPING & DETAILS OF CAMPUS:

- Administrative Building
  No. of floors- Ground + Three
  Used for Admin officers and staff's cabins and working space. Conference halls & meeting rooms. KISS research labs.
- Academic Building
  No of floors- Ground + Four
  Consists of student's class rooms, labs, Faculty chambers & cabins, Library.
- Library
  No of floors- Ground + One
- Girls Hostel
  No. of floors- Ground + Four
  1st floor to 4th floor- hostel rooms
  Ground floor- Kitchen & Dining Area
- Information Centre Building.

OBJECTIVES OF GREEN AUDIT -

The main aim objectives of this green audit are to assess the environmental quality and the management strategies being implemented in KIIT University.

The specific objectives are:

1. To assess the quality of the water and soil in each of the KIIT campus.
2. To monitor the energy consumption pattern of the college
3. To quantify the liquid and solid waste generation and management plans in the campus.
4. To assess the carbon foot print of the college
5. To assess whether the measures implemented by each KIIT Campus has helped to reduce the Carbon Footprint.
6. To impart environment management plans to the college
7. Providing a database for corrective actions and future plans.
8. To assess whether extracurricular activities of the Institution support the collection, recovery, reuse and recycling of solid wastes.
9. To identify the gap areas and suggest recommendations to improve the Green Campus status of the KIIT University.

TARGET AREAS OF GREEN AUDITING

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency.

All these indicators are assessed in the process of "Green Auditing of this educational institute". Eco-campus focuses on the reduction of contribution to emissions, procures a cost effective and secure supply of energy, encourages and enhances energy use conservation, promotes personal action, reduce the institute's energy and water consumption, and reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

Auditing for Water Management

Water is a natural resource; all living organisms depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate.
Hence it is essential to examine the quality and usage of water in the college. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

Auditing for Energy Management

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Auditing for Waste Management

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health.
Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol. Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college. Bio-degradable waste can be

effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Auditing for Green Campus Management

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus.
So while you are busy studying and working on earning those good grades, all the trees in campus are also working hard to make the air cleaner for you.

Auditing for Carbon Footprint

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapours, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important.

Electrical & Energy Auditing

To study & understand the health & energy efficiency of the equipment, quality of power used for the electro-mechanical installations and distribution systems of common utility like AC System, measurement of electro-mechanical parameters of the system and comparing the same against design parameter (standards if available) and also reviewing of the operation & maintenance of the buildings. Determine the adequacy, review the Systems & Procedures and recommend implementation strategies for further improvement of energy efficiency of the electrical & electro-mechanical systems at the KIIT university.

Fire Safety Auditing

A walkthrough the concerned premises. Review of the layout and drawings. Review of the existing firefighting systems in the premises. Review of the training and awareness regarding availability and operations of the firefighting systems in and across the organization.

WATER MANAGEMENT

Underground water is used in the KISS campus-3 which is pumping by 6 pumps. Purpose of water – Drinking (RO Plant), Kitchen, Bathrooms, Washrooms, Toilets & Gardening. Campus-3 is not having bore well. Pumps are directly pumping water to the overhead tanks of each building. Tanks on the hostel is having level sensor and is connected with three 6HP pumps operated in AUTO mode. Pumping of water to other buildings is done as per the requirement.

SL NO	PARAMETERS	Response	Remarks
1	Source of water	Underground/well	
2	No of underground tank	one	
4	Pumps & Water Meters	6 HP – 6 nos 1.5 HP – 1 nos Water meters are not installed	
6	Number of water tanks & Capacity	Hostel – 2 tanks (15000 Lit x 2 nos) Kitchen – 4 tanks (1000 lit x 4 nos) Academic & Admin – One tank each (15000 Lit x 1 nos each building) UGT – 1 lac Litre x 1 nos	
8	Quantity of water pumped every day	12000 L (approx.) No data is recorded.	Need to install sensor-based water management system.
9	Any water wastage/why?	Absent	
10	Water usage for gardening	20KL / day	
11	Waste water sources	Rest room, Bathrooms, kitchen	
12	Use of waste water	Gardening	
13	Rain water harvest available?	NO	
15	Any leaky taps	Nil (On inspection)	
16	Amount of water lost per day	No recorded data.	

SL NO	PARAMETERS	Response	Remarks
18	Any water saving techniques followed?	STP	

Level sensor of pump with starter

Ground water pump

RO Plant

SOIL QUALITY ASSESSMENT

Soil samples were collected from the campus and analyzed for the basic parameters. The results are tabulated and presented in the table:

Parameter	Values
pH	7.1 to 7.3
Total Nitrogen (mg/kg)	2.5 to 2.8
Total organic carbon (%)	1.2 to 1.4
Phosphate (mg/kg)	0.21


Soil

SOLAR POWER PLANT

Solar power plant is installed in the campus-3 KISS. It has 75 KW rooftop solar plant. All the plants are fully functioning. Solar plants are well maintained and the generation units were recorded in the register. At present the solar plant generation is meeting 50% of the energy consumption in the campus which is very good practice during the lockdown. It is planned to install more solar panels in the campus to meet 60% of the total energy consumption during the full occupancy of the campus.

	**Solar Power Plant**

WASTE MANAGEMENT

Waste management is important for an ecofriendly campus. In college different types of wastes are generated, its collection and management are very challenging. The following data provide the details of the waste generated and the disposal method adopted by the college. The organic waste generated from this campus is used for livestock feed. In order to recycle the organic waste which is collected almost 225 KG per day. One Bio Gas plant is installed in the campus and is producing almost 18 to 27 cu mtr of gas. Capacity of plant is 500kg.

Different types of waste generated in the college and their disposal

Types of waste	Particulars	Disposal method
E-Waste	Computers, electrical and electronic parts	Direct selling
Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc	Direct selling
Solid wastes	Damaged furniture, paper waste, paper plates, food wastes	Reuse after maintenance energy conversion
Wastewater	Washing, urinals, bathrooms	Soak pits
Glass waste	Broken glass wares from the labs	Direct selling
Sanitary Napkin		Napkin Incinerators

STP

Bio gas plant

GREENERY/PLANTATION

Great work has been initiated in the last year of planting so many trees. The greenery inside the campus is good and fresh air is flowing all over the campus. Use of day light in the building of the campus is very good.

CARBON FOOT PRINT

All the vehicles were parked outside of the campus gate. This helps to reduce the harmful emissions inside the campus. EV are introduced inside the campus to reduce the pollutant emissions.

RENEWABLE ENERGY PRACTICES

- Bio gas plant is installed which uses organic waste to produce bio gas. This bio gas is used in the hostel kitchen for cooking.
- Steam based cooking system is introduced in the hostel kitchen.
- Sewage water and grey water is treated in the STP and treated water is used for watering the plants and trees in the campus.
- Solar plant generation of units is meeting 50% of the total energy consumption of the campus.

Steam based cooking system

KISS's Clean Energy Initiatives Timeline:

- **2010 – KISS installed steam-based cooking system for mass cooking.**
- **2011- KISS has completed 50 KW solar power plant**
- **2012 - KISS has installed 10,000 LPD solar water heating system for cooking purpose.**
- **2012 - KISS has installed 1000 KGPD organic waste-based biogas plant.**
- **2013 –Technical survey and estimate prepared for 500KWp rooftop solar power station.**
- **2013 – KISS has set up 400KLD STP for waste water treatment for recycling and reuse.**
- **2014 – 500 KW rooftop solar power station started functioning successfully.**
- **2015 – Two more steam-based kitchens installed for KISS-2 & KISS-3.**
- **2015 – Solar lantern distribution program started for the State.**
- **2016 – Another 50KWp solar power system added on rooftop of new higher education building of KISS-3.**

2016 – KISS has set up 300 KLD Bio STP for new campus ELECTRICAL &

ENERGY & ELECTRICAL AUDIT:

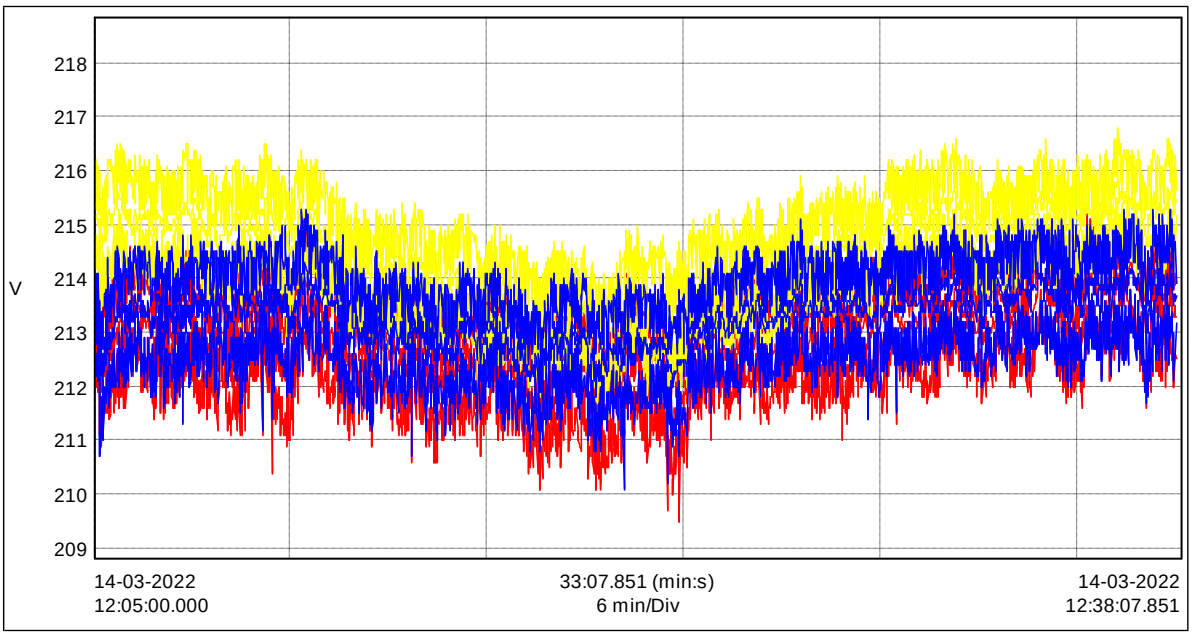
Study of Power Quality:

Campus	Voltage	Distribution of Load	Harmonics	Power factor
Main LT Panel incomer	Normal	Uniformly distributed	Within the limit	Avg is 0.99 which is normal.
Academic Building incomer	Normal	Uniformly distributed	Within the limit	Avg is unity which is normal.
Admin building AC panel incomer	Little Fluctuations recorded	Uniformly distributed	Within the limit	Avg is unity which is normal.
Admin building Lighting panel incomer	Normal	Uniformly distributed	Within the limit	Avg is unity which is normal.
Girls Hostel	Little Fluctuations recorded	Uniformly distributed	Within the limit	Avg is unity which is normal.
Library	Normal	Uniformly distributed	Within the limit	Avg is unity which is normal.

Main LT Panel:

V_{rms} –

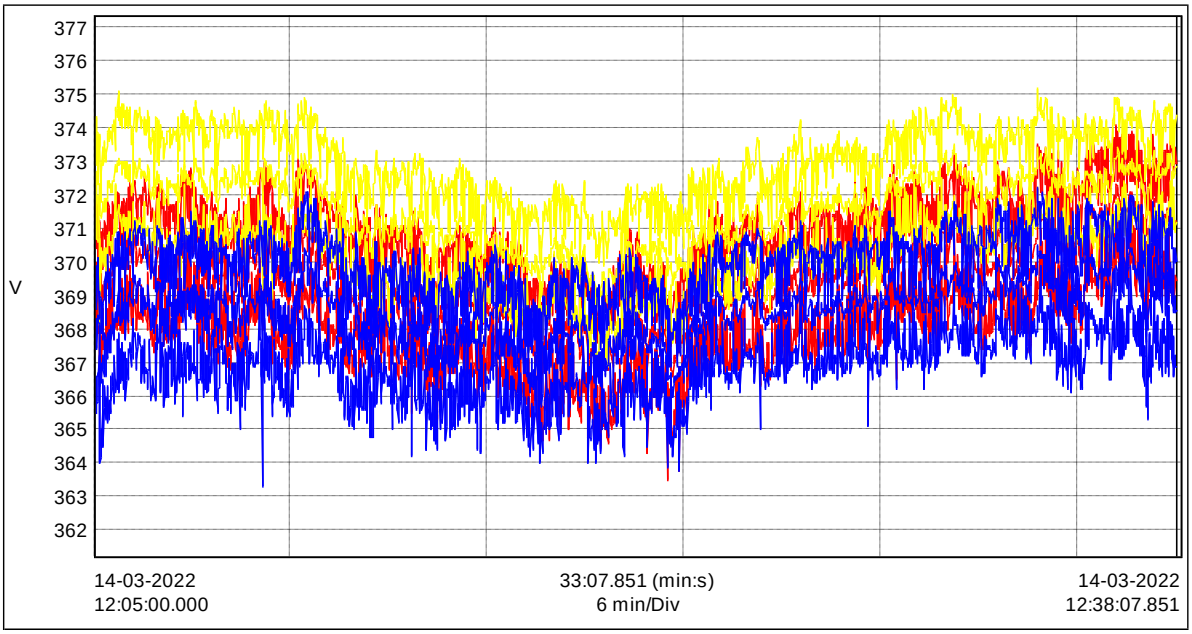
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
V1 rms	14-03-2022	12:05 PM	212.84	209.50	215.20	V	33:03.000	(min:s)
V2 rms	14-03-2022	12:05 PM	214.48	211.40	216.80	V	33:03.000	(min:s)
V3 rms	14-03-2022	12:05 PM	213.26	210.10	215.30	V	33:03.000	(min:s)
VNE rms	14-03-2022	12:05 PM	0.06	0.00	2.70	V	33:03.000	(min:s)



Remarks – Average Voltage is very low.

U_{rms} –

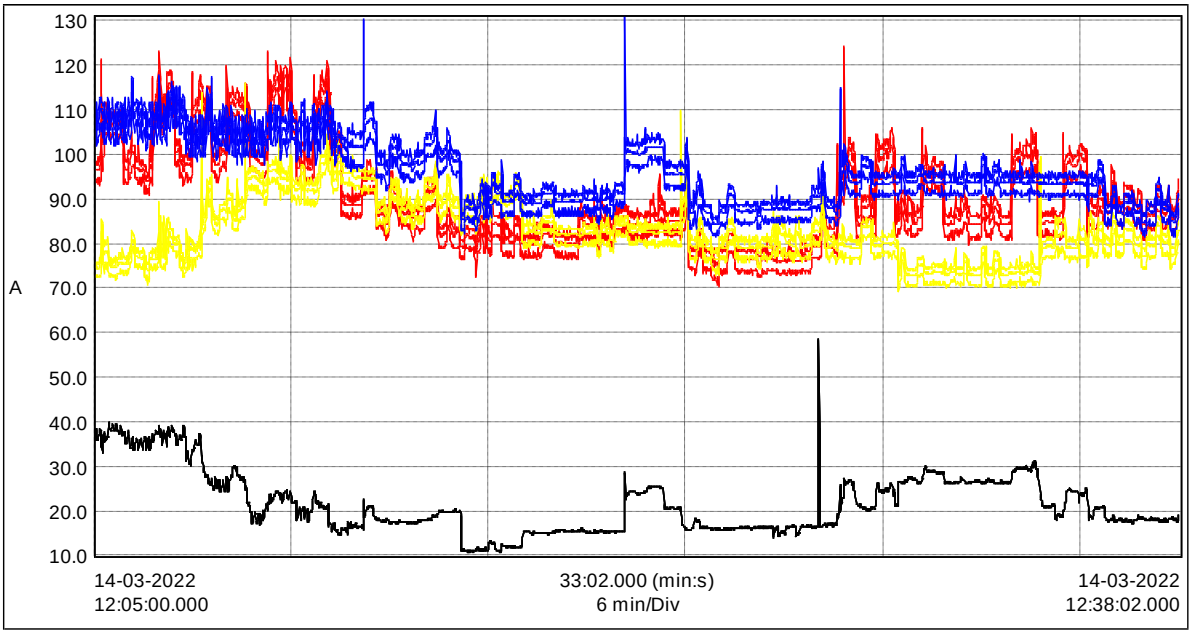
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
U12 rms	14-03-2022	12:05 PM	369.48	363.50	374.10	V	33:03.000	(min:s)
U23 rms	14-03-2022	12:05 PM	371.58	366.90	375.20	V	33:03.000	(min:s)
U31 rms	14-03-2022	12:05 PM	368.44	363.30	372.20	V	33:03.000	(min:s)



Remarks – Voltage value are very low.

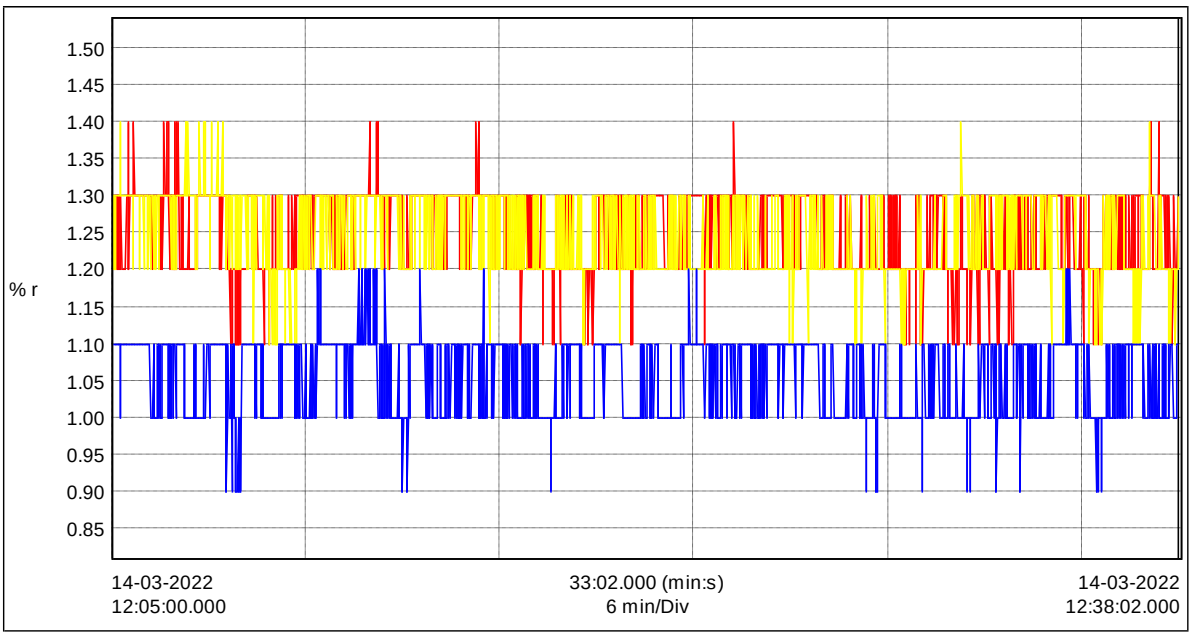
A_{rms} –

Name	Date	Time	Avg	Min	Max	Units	Duration	Units
A1 rms	14-03-2022	12:05 PM	90.92	70.50	124.50	A	33:03.000	(min:s)
A2 rms	14-03-2022	12:05 PM	83.31	69.50	116.00	A	33:03.000	(min:s)
A3 rms	14-03-2022	12:05 PM	96.47	81.50	134.50	A	33:03.000	(min:s)
AN rms	14-03-2022	12:05 PM	22.79	10.90	58.50	A	33:03.000	(min:s)



VThdr:

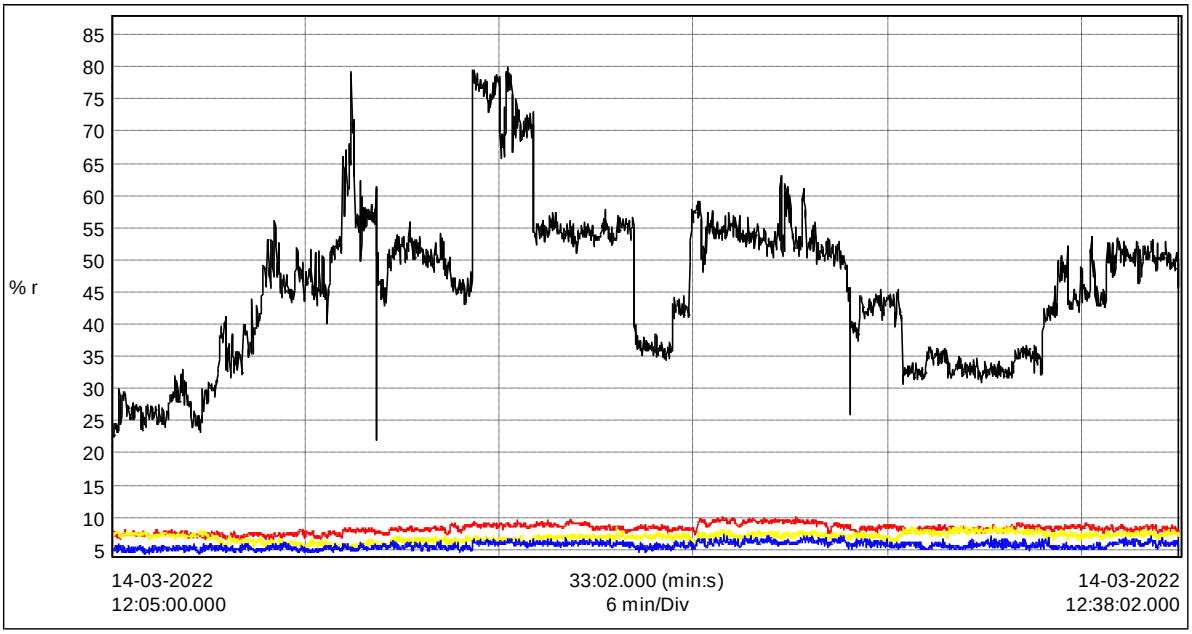
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
V1 THDr	14-03-2022	12:05 PM	1.251	1.1	1.4	% r	33:03.000	(min:s)
V2 THDr	14-03-2022	12:05 PM	1.247	1.1	1.4	% r	33:03.000	(min:s)
V3 THDr	14-03-2022	12:05 PM	1.054	0.9	1.2	% r	33:03.000	(min:s)
VNE THDr	14-03-2022	12:38 PM	---	NA	NA	% r	1.000	(s)



Remarks: Voltage harmonic values are normal and are within the limit.

AThdr:

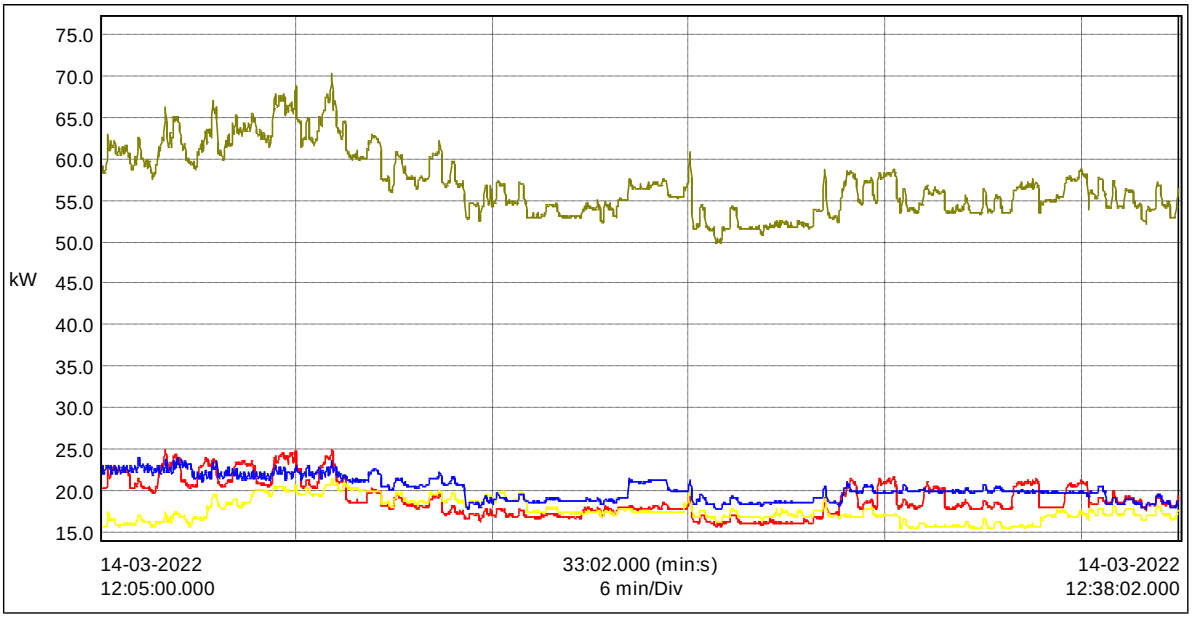
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
A1 THDr	14-03-2022	12:05 PM	8.37	6.6	10.1	% r	33:03.000	(min:s)
A2 THDr	14-03-2022	12:05 PM	7.057	5	8.8	% r	33:03.000	(min:s)
A3 THDr	14-03-2022	12:05 PM	5.759	4.4	7.5	% r	33:03.000	(min:s)
AN THDr	14-03-2022	12:05 PM	46.292	22	80	% r	33:03.000	(min:s)



Remarks: Current harmonic values are low.

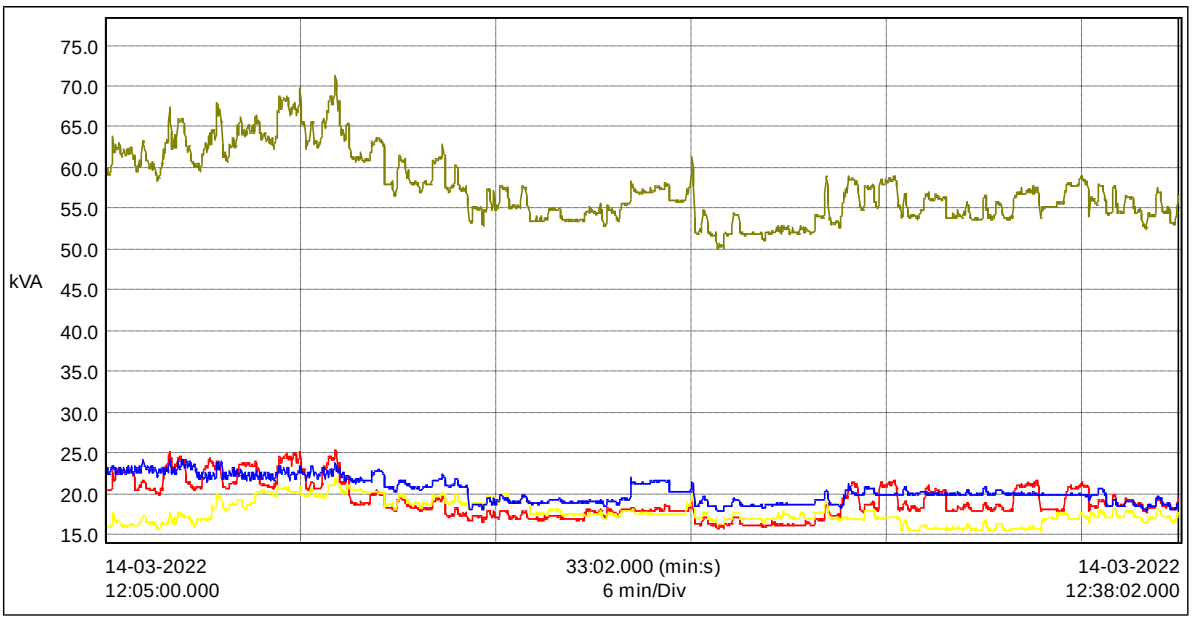
Power (KW):

Name	Date	Time	Avg	Min	Max	Units	Duration	Units
P1 (W)	14-03-2022	12:05 PM	19.081	15.7	25.038	W	33:03.000	(min:s)
P2 (W)	14-03-2022	12:05 PM	17.683	15.593	21.636	W	33:03.000	(min:s)
P3 (W)	14-03-2022	12:05 PM	20.296	17.861	24.029	W	33:03.000	(min:s)
PT (W)	14-03-2022	12:05 PM	57.06	49.937	70.279	W	33:03.000	(min:s)



S (KVA):

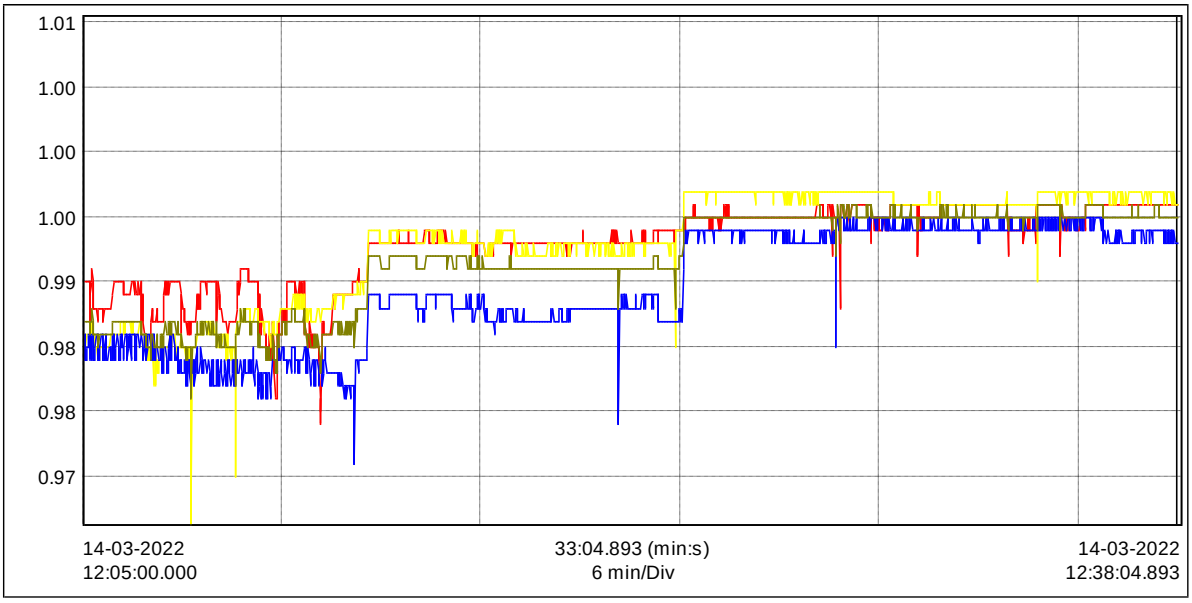
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
S1 (VA)	14-03-2022	12:05 PM	19.224	15.79	25.415	VA	33:03.000	(min:s)
S2 (VA)	14-03-2022	12:05 PM	17.811	15.653	21.906	VA	33:03.000	(min:s)
S3 (VA)	14-03-2022	12:05 PM	20.514	17.972	24.376	VA	33:03.000	(min:s)
ST (VA)	14-03-2022	12:05 PM	57.55	50.199	71.303	VA	33:03.000	(min:s)



Remarks: During this recording session the maximum demand recorded from this panel is 71.3 KVA.

Power Factor:

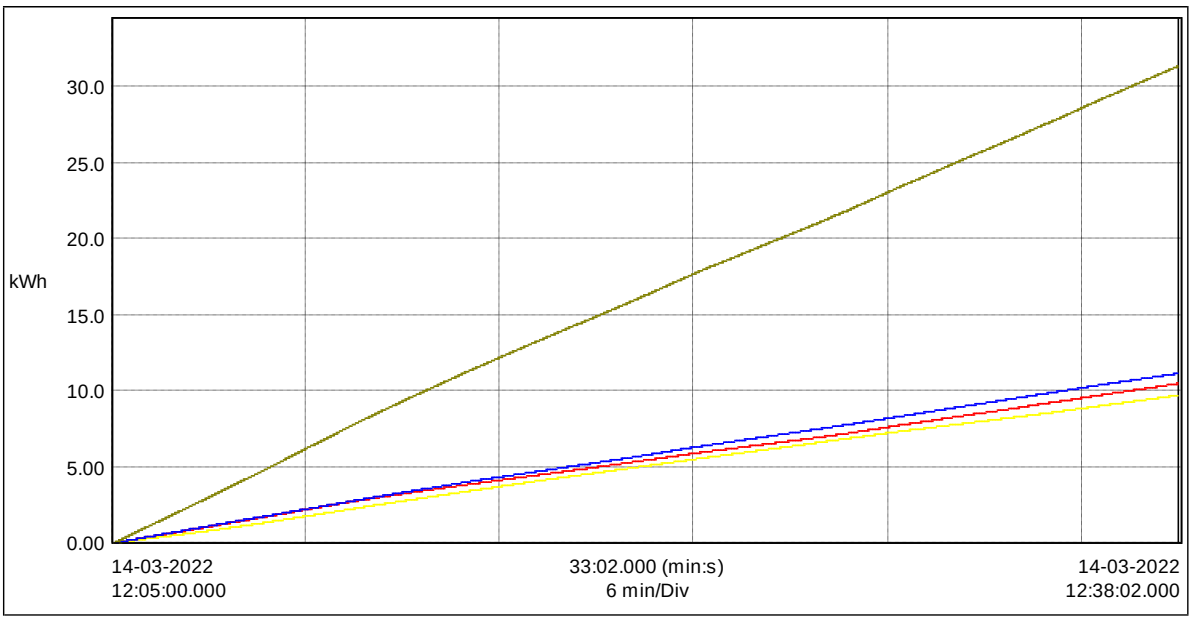
Name	Date	Time	Avg	Min	Max	Duration	Units
PF1	14-03-2022	12:05 PM	0.99	0.98	1.00	33:03.000	(min:s)
PF2	14-03-2022	12:05 PM	0.99	0.97	1.00	33:03.000	(min:s)
PF3	14-03-2022	12:05 PM	0.99	0.98	1.00	33:03.000	(min:s)
PFT	14-03-2022	12:05 PM	0.99	0.98	1.00	33:03.000	(min:s)



Remarks: Power factor values are very good.

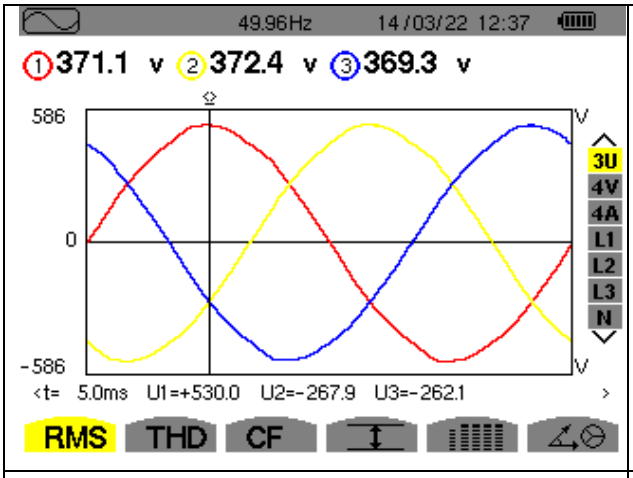
Energy:

Name	Date	Time	Max	Units	Duration	Units
Ep1 (Wh)	14-03-2022	12:05 PM	10.51	Wh	33:03.000	(min:s)
Ep2 (Wh)	14-03-2022	12:05 PM	9.74	Wh	33:03.000	(min:s)
Ep3 (Wh)	14-03-2022	12:05 PM	11.18	Wh	33:03.000	(min:s)
EpT (Wh)	14-03-2022	12:05 PM	31.43	Wh	33:03.000	(min:s)

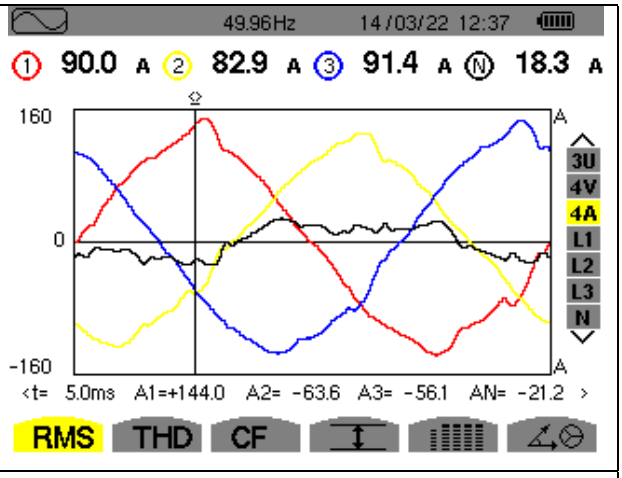


Remarks: Total unit consumption during this recording session is 31.4 units

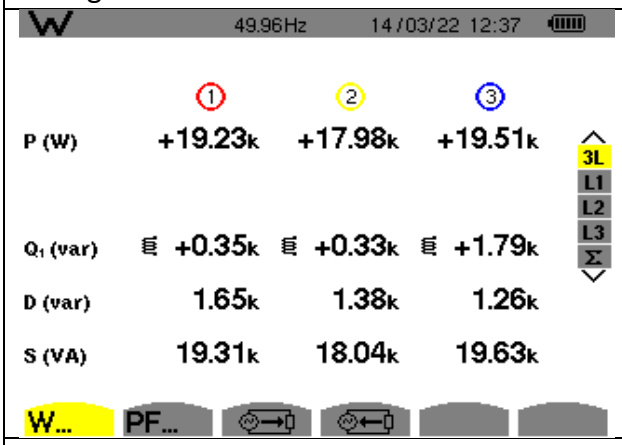
Screenshots during the recording session:



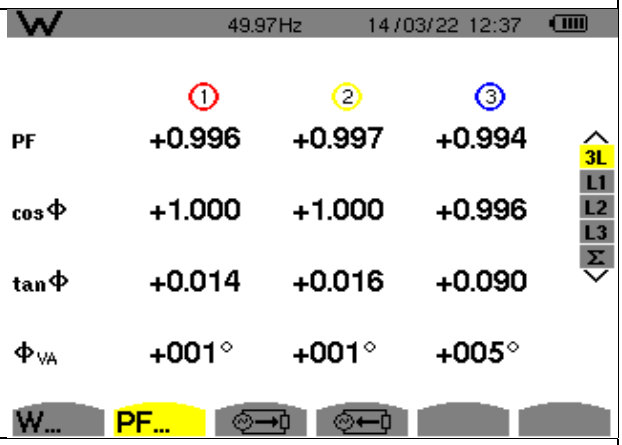
Voltage



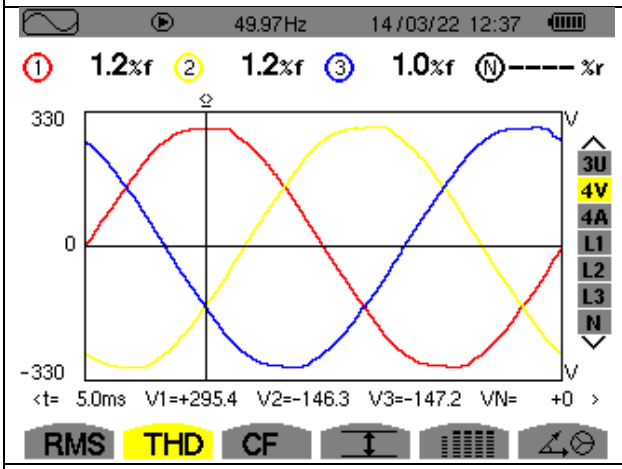
Current



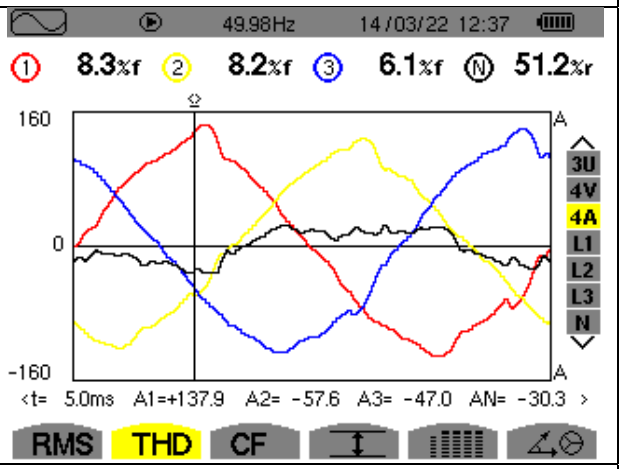
Power



Power factor



Voltage Harmonics

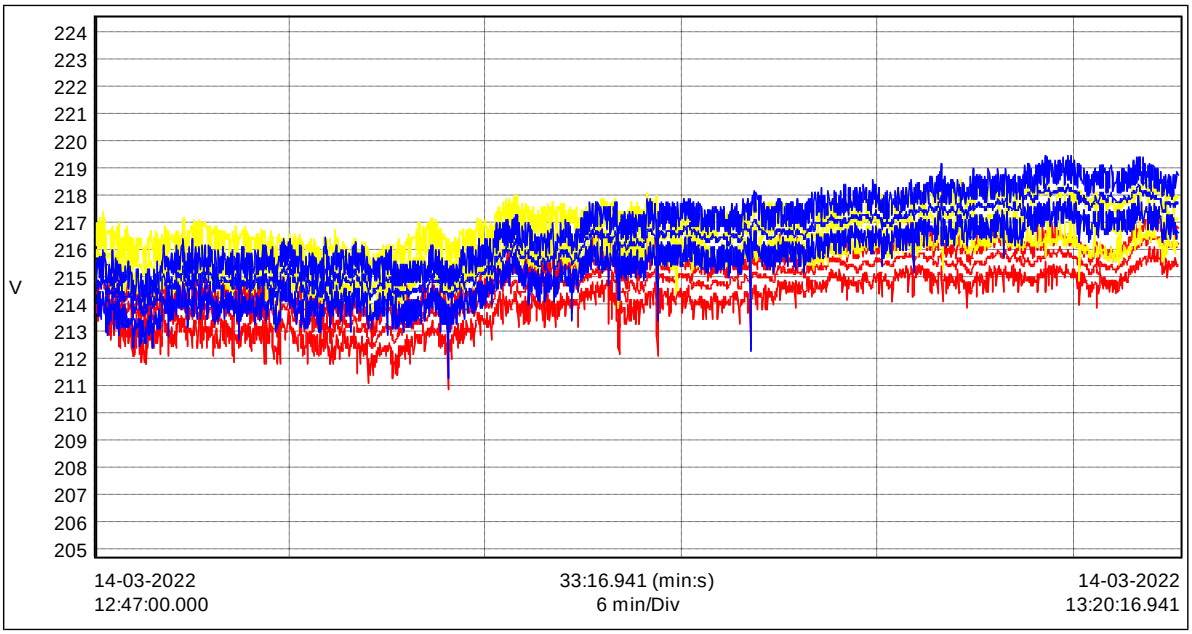


Current Harmonics

AC Panel:

V_{rms} –

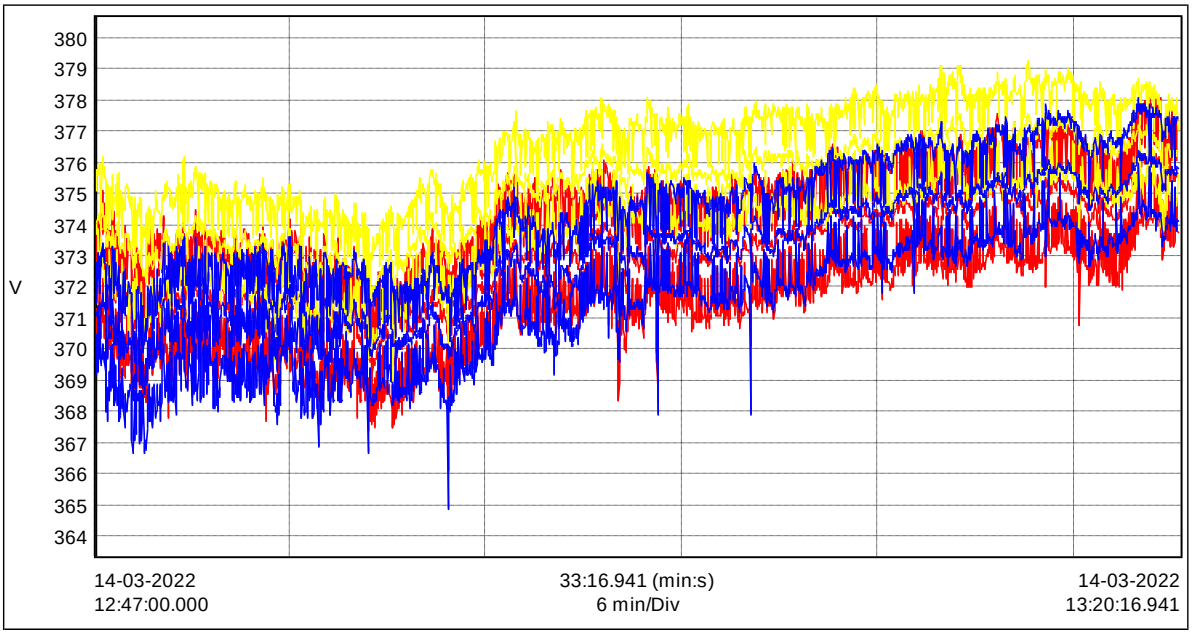
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
V1 rms	14-03-2022	12:47 PM	214.67	210.90	217.60	V	33:15.000	(min:s)
V2 rms	14-03-2022	12:47 PM	216.40	213.20	218.60	V	33:15.000	(min:s)
V3 rms	14-03-2022	12:47 PM	216.18	211.30	219.50	V	33:15.000	(min:s)
VNE rms	14-03-2022	12:47 PM	0.00	0.00	0.00	V	33:15.000	(min:s)



Remarks – Average Voltage is very low.

U_{rms} –

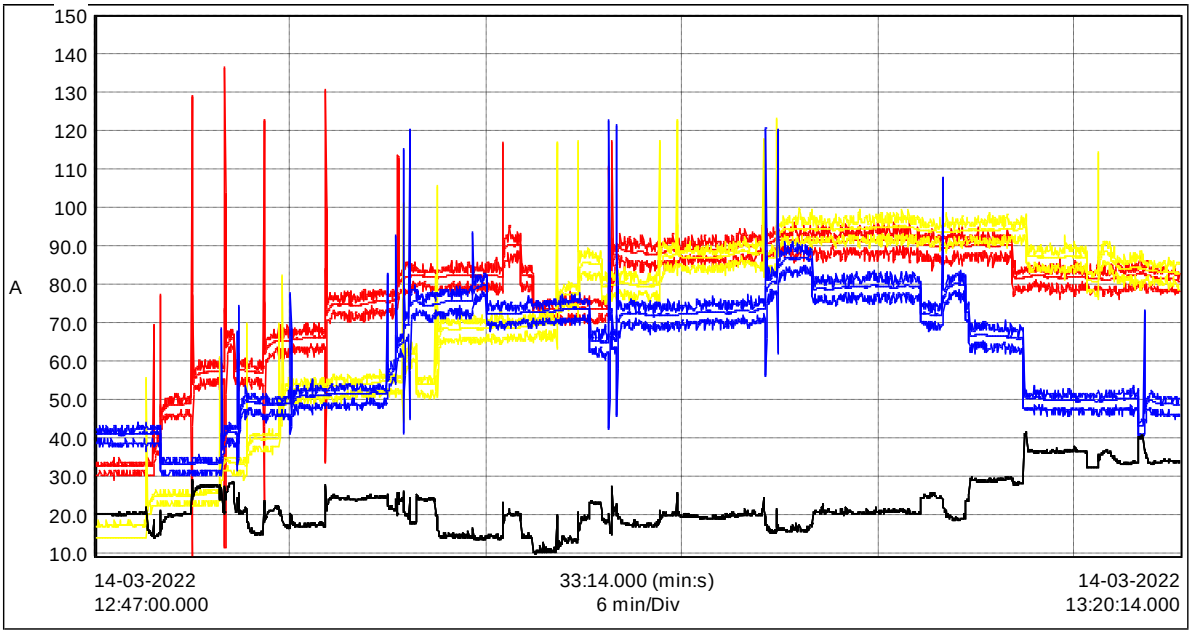
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
U12 rms	14-03-2022	12:47 PM	373.01	366.10	378.20	V	33:15.000	(min:s)
U23 rms	14-03-2022	12:47 PM	375.14	368.90	379.30	V	33:15.000	(min:s)
U31 rms	14-03-2022	12:47 PM	372.90	364.90	378.10	V	33:15.000	(min:s)



Remarks – Voltage is on lower side.

A_{rms} –

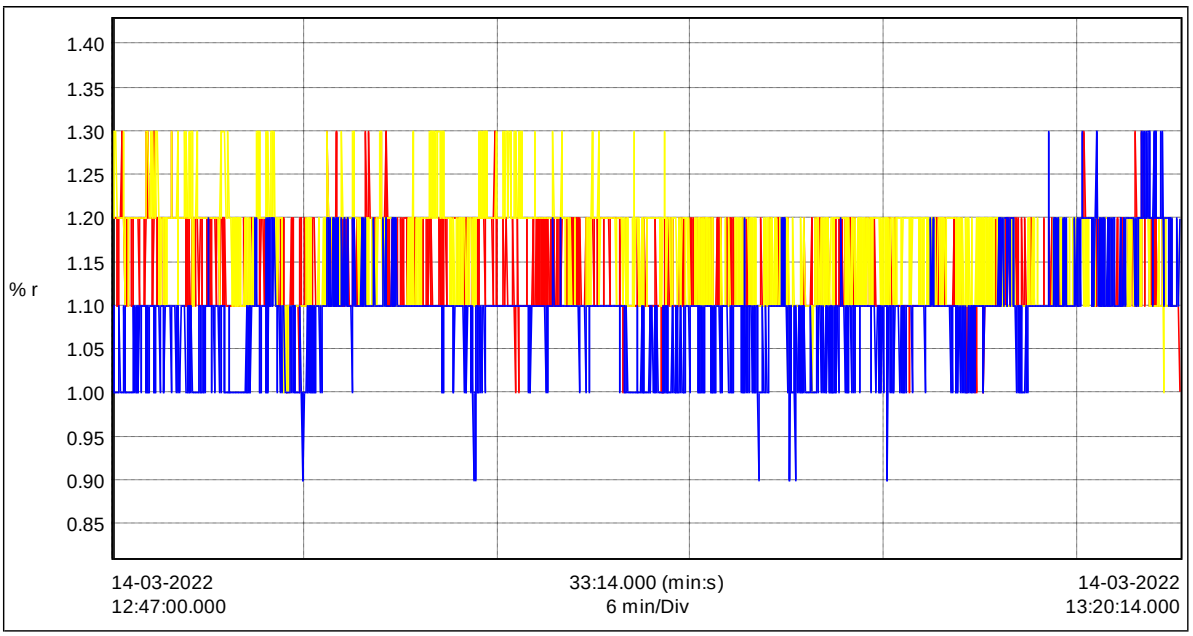
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
A1 rms	14-03-2022	12:47 PM	79.45	0.00	136.50	A	33:15.000	(min:s)
A2 rms	14-03-2022	12:47 PM	75.07	14.50	123.50	A	33:15.000	(min:s)
A3 rms	14-03-2022	12:47 PM	64.61	30.50	123.00	A	33:15.000	(min:s)
AN rms	14-03-2022	12:47 PM	23.54	10.40	42.00	A	33:15.000	(min:s)



Remarks – The up's and down's in the current trend in each phase represents that the AC machines compressor are switching ON & OFF. This is a good sign.

VThdr:

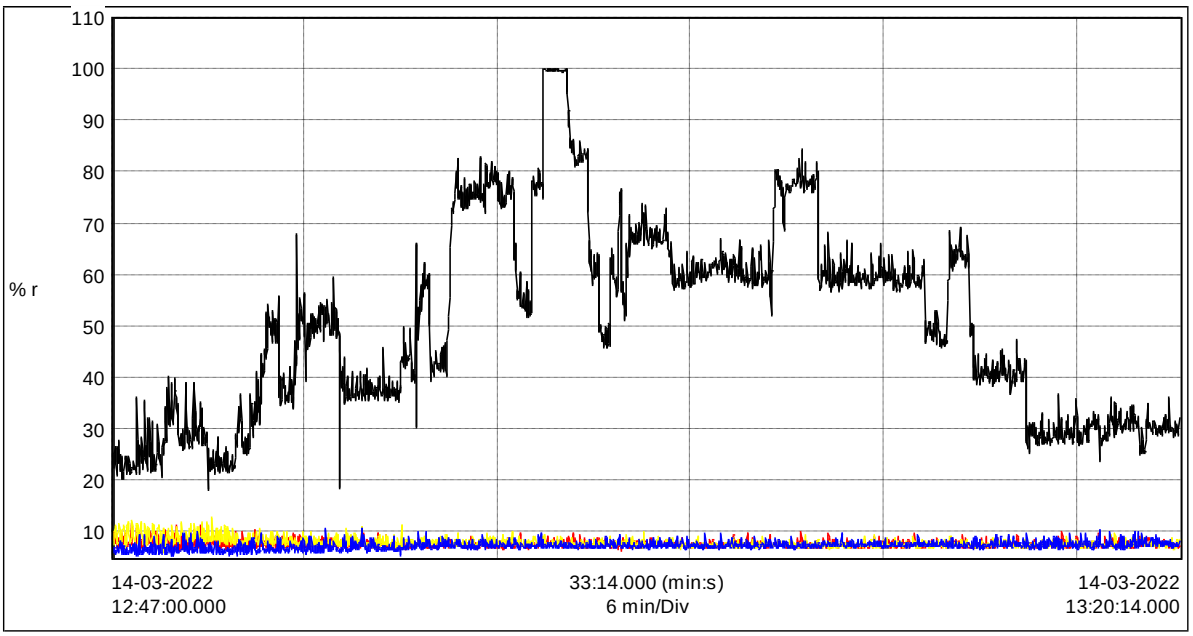
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
V1 THDr	14-03-2022	12:47 PM	1.139	1	1.3	% r	33:15.000	(min:s)
V2 THDr	14-03-2022	12:47 PM	1.166	1	1.3	% r	33:15.000	(min:s)
V3 THDr	14-03-2022	12:47 PM	1.087	0.9	1.3	% r	33:15.000	(min:s)
VNE THDr	14-03-2022	1:20 PM	---	NA	NA	% r	1.000	(s)



Remarks: Voltage harmonic values are normal and are within the limit.

AThdr:

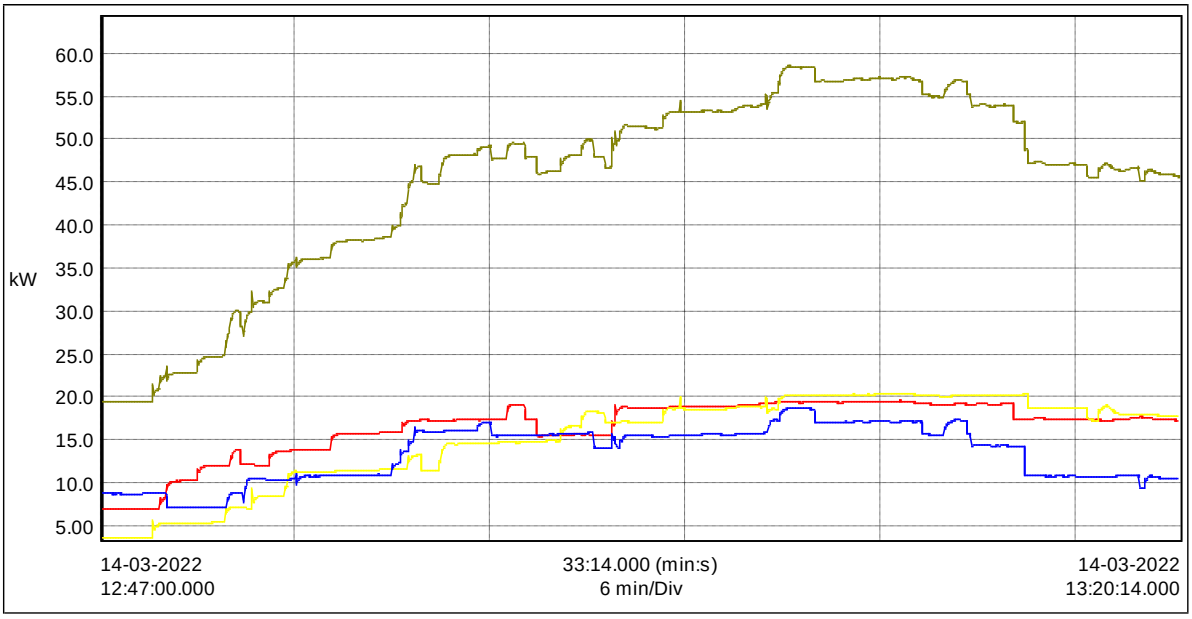
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
A1 THDr	14-03-2022	12:47 PM	7.71	6.4	11.6	% r	33:15.000	(min:s)
A2 THDr	14-03-2022	12:47 PM	7.97	6.1	12.8	% r	33:15.000	(min:s)
A3 THDr	14-03-2022	12:47 PM	7.432	5.4	10.8	% r	33:15.000	(min:s)
AN THDr	14-03-2022	12:47 PM	50.676	18.2	100	% r	33:15.000	(min:s)



Remarks: Current harmonic values are low

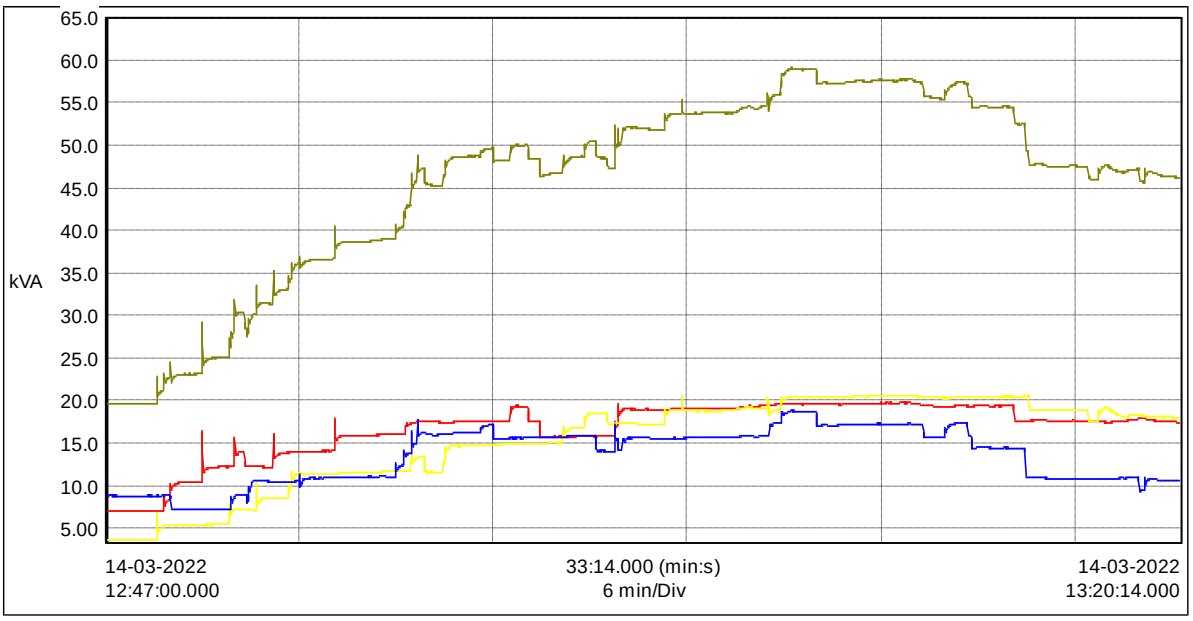
Power (KW):

Name	Date	Time	Avg	Min	Max	Units	Duration	Units
P1 (W)	14-03-2022	12:47 PM	16.527	6.967	19.627	W	33:15.000	(min:s)
P2 (W)	14-03-2022	12:47 PM	15.219	3.691	20.459	W	33:15.000	(min:s)
P3 (W)	14-03-2022	12:47 PM	13.498	7.176	18.791	W	33:15.000	(min:s)
PT (W)	14-03-2022	12:47 PM	45.243	19.458	58.571	W	33:15.000	(min:s)



S (KVA):

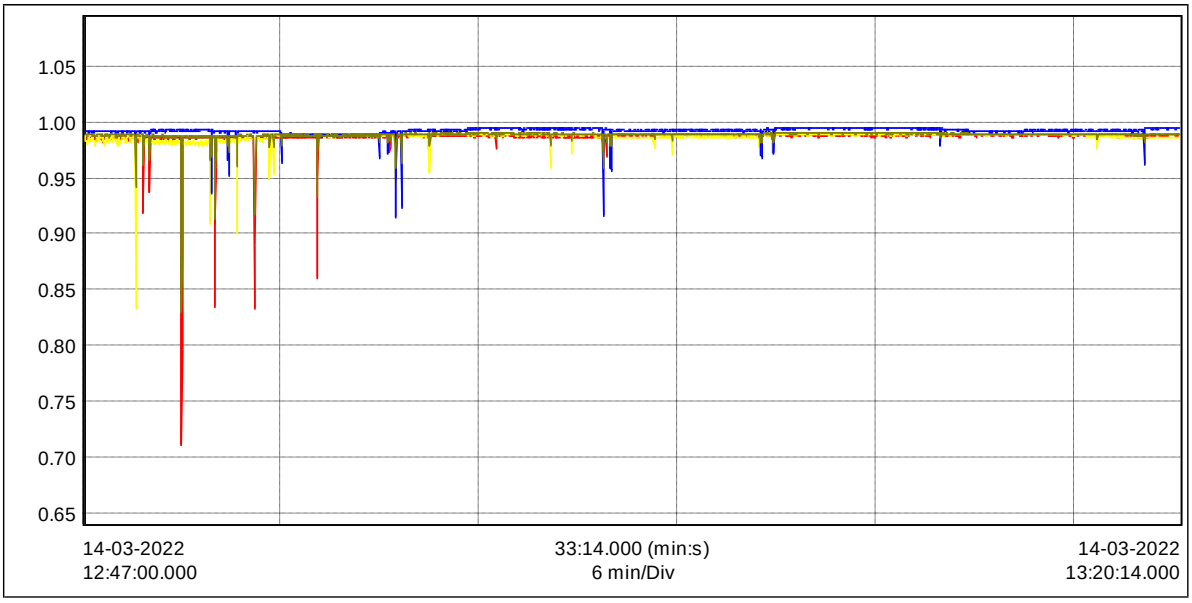
Name	Date	Time	Avg	Min	Max	Units	Duration	Units
S1 (VA)	14-03-2022	12:47 PM	16.735	7.072	19.861	VA	33:15.000	(min:s)
S2 (VA)	14-03-2022	12:47 PM	15.404	3.736	20.716	VA	33:15.000	(min:s)
S3 (VA)	14-03-2022	12:47 PM	13.593	7.222	18.89	VA	33:15.000	(min:s)
ST (VA)	14-03-2022	12:47 PM	45.731	19.667	59.112	VA	33:15.000	(min:s)



Remarks: During this recording session the maximum demand recorded from this panel is 59.1 KVA.

Power Factor:

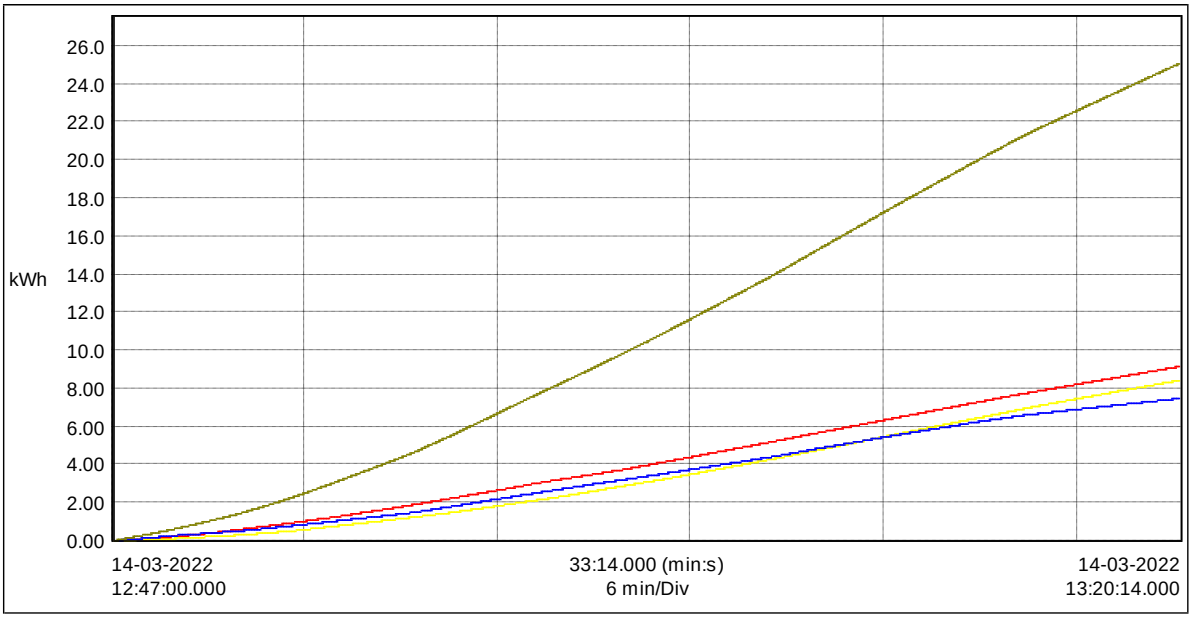
Name	Date	Time	Avg	Min	Max	Duration	Units
PF1	14-03-2022	12:47 PM	0.99	0.71	0.99	33:15.000	(min:s)
PF2	14-03-2022	12:47 PM	0.99	0.83	0.99	33:15.000	(min:s)
PF3	14-03-2022	12:47 PM	0.99	0.92	1.00	33:15.000	(min:s)
PFT	14-03-2022	12:47 PM	0.99	0.83	0.99	33:15.000	(min:s)



Remarks: Power factor values are good.

Energy:

Name	Date	Time	Max	Units	Duration	Units
Ep1 (Wh)	14-03-2022	12:47 PM	9.16	Wh	33:15.000	(min:s)
Ep2 (Wh)	14-03-2022	12:47 PM	8.43	Wh	33:15.000	(min:s)
Ep3 (Wh)	14-03-2022	12:47 PM	7.48	Wh	33:15.000	(min:s)
EpT (Wh)	14-03-2022	12:47 PM	25.07	Wh	33:15.000	(min:s)



Remarks: Total unit consumption during this recording session is 25 units.

Electrical System:

1. 3 / 1 Phase Voltage, any disturbance in supply Voltage.
   Power quality was monitored in all the campuses main transformers LT panels incomer. 11kV line is step down to the 420 volts.
2. Load on each phase & Neutral, any abnormality in Voltage and current.
   Load is uniformly distributed in all the three phases. There are still some ups and downs in the voltage profile.
3. Noise in neutral / Neutral to Ground Voltage
   Noise in neutral is on lower side and is acceptable. last year recorded values.
4. Voltage and current Harmonic & Total harmonic distortions
   Voltage and Current harmonics are little on higher side.
5. Power Factor is good.
6. Thermal Imaging of electrical system
   Entire university is thermal scanned and found high temperatures locations which has been gradually serviced and now the temperature is normal and within the limit of 45 Deg C.
7. Review of Single line Power diagram.
   At control rooms SLD is available and the same is verified and found OK.
8. Review of daily weekly and monthly checks and log sheet.
   Checklist for the maintenance activity is introduced but need to follow the SOP for filling the checklist. Log sheet of daily energy consumption data is maintained. Complaint book is being maintained.
9. Safety review of the installed Electrical system.
   RCCB's are installed but at some places they found bypassed and faulty which has been already replaced. MCB and other relays are installed.

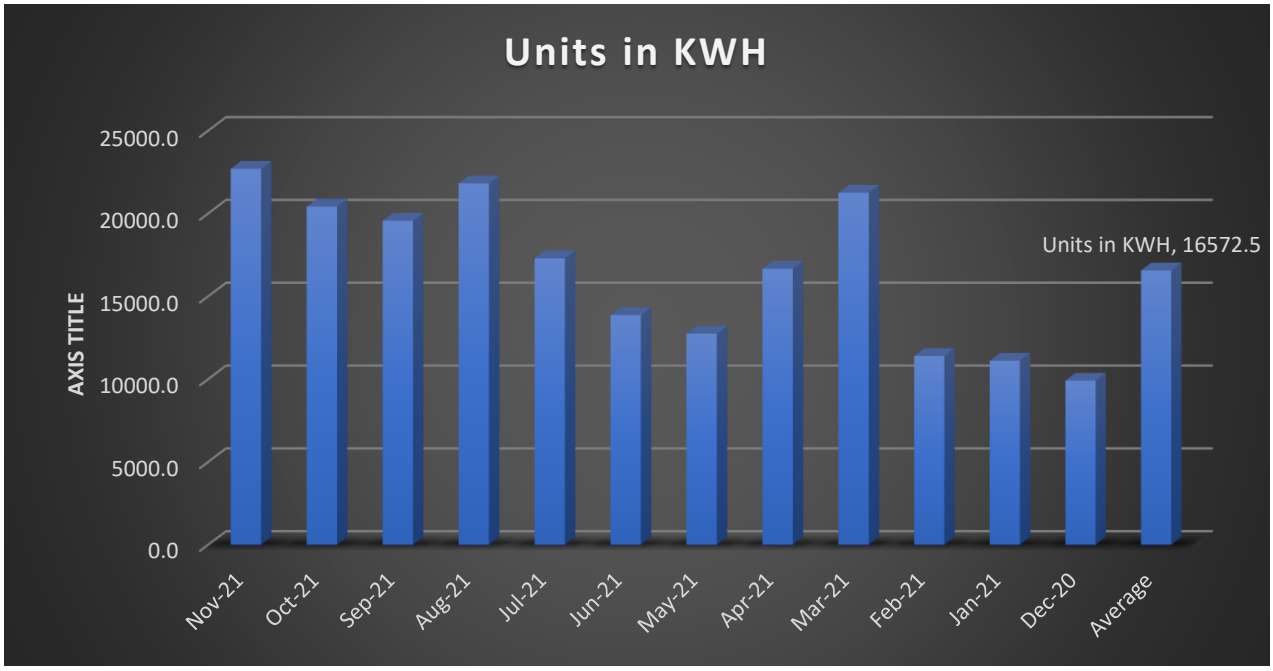
HVAC system:

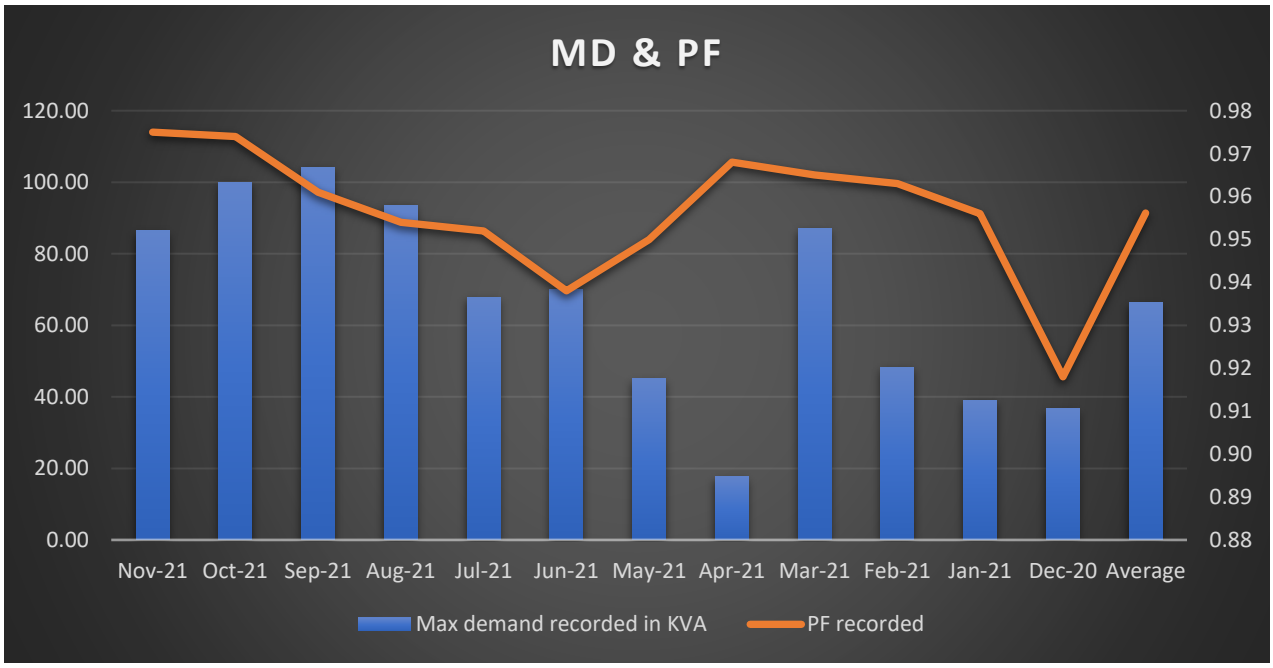
1. Inspect the AC's physical condition and its performances.
   Physical conditions of AC indoor and outdoor is good. For old facilities AC's need to be upgradation.
2. Review of electrical parameters of AC machines.
   All the electrical parameters like current, PF, KW and voltage are well within the limit of the rated parameters of the machine.
3. Review of service reports and analysis of the faults in the AC machines.
   As for any issues in the AC machines inhouse maintenance team is resolving the issues. No record of servicing is recorded. Only the complaint register is maintained.
4. Review the performances of AC machines.
   Performances of AC machines are good. But for some old AC units the efficiency has been reduced upto 10%.

Analysis of the Electrical energy

1. Recording the energy consumption of each Panel incomers.
   Last one year energy consumption data has been recorded and registered were maintained for tracking of consumption.
2. Analysis of the consumption of the units w.r.t to the load and time at incomers.
   All the data has been analysed. There were places where the energy can be optimized.
3. Review of the Present Energy Measurement and Monitoring process exist.
4. Need to fine tune the method and tacking of the present energy consumption data recording method.
5. Total build-up area of the campus Vs Total energy consumption is really good and worth.

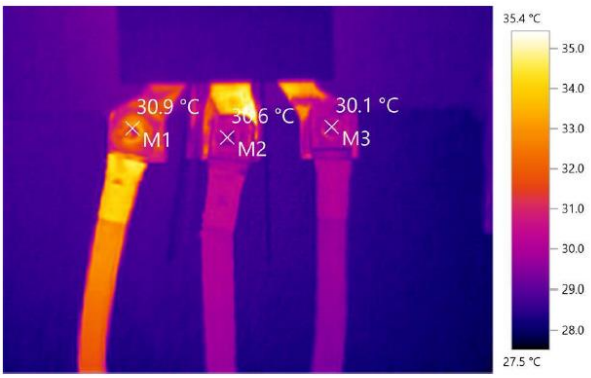
KIIS Campus-03, Bhubaneshwar, Contract Demand-200 KVA, Type of supply-Three Phase 11 KV					
Month	**Units in KWH**	**Max demand recorded in KVA**	**PF recorded**	**Bill Amount**	**Unit Rate**
Nov-21	22710.0	86.40	0.98	187150	8.24
Oct-21	20433.0	99.90	0.97	172877	8.46
Sep-21	19572.0	104.10	0.96	169172	8.64
Aug-21	21828.0	93.60	0.95	184803	8.47
Jul-21	17301.0	67.80	0.95	155275	8.97
Jun-21	13881.0	69.90	0.94	134012	9.65
May-21	12753.0	45.00	0.95	105867	8.30
Apr-21	16677.0	17.70	0.97	137084	8.22
Mar-21	21264.0	87.00	0.97	168252	7.91
Feb-21	11412.0	48.30	0.96	216741	18.99
Jan-21	11121.0	39.00	0.96	106793	9.60
Dec-20	9918.0	36.65	0.92	94457	9.52
Average	16572.5	66.28	0.96	152707	9.58


Units in KWH
25000.0
20000.0
15000.0
10000.0
5000.0
0.0
AXIS TITLE
Units in KWH, 16572.5
Nov-21
Oct-21
Sep-21
Aug-21
Jul-21
Jun-21
May-21
Apr-21
Mar-21
Feb-21
Jan-21
Dec-20
Average


MD & PF
120.00
100.00
80.00
60.00
40.00
20.00
0.00
0.98
0.97
0.96
0.95
0.94
0.93
0.92
0.91
0.90
0.89
0.88
Nov-21 Oct-21 Sep-21 Aug-21 Jul-21 Jun-21 May-21 Apr-21 Mar-21 Feb-21 Jan-21 Dec-20 Average
Max demand recorded in KVA
PF recorded

THERMAL REPORT:

Panel main incomer:

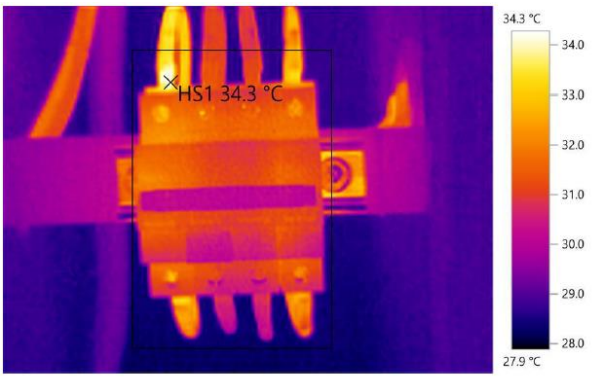


Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	15:48:46	**Refl. temp. [°C]:**	19.0
	File:	IV_16269.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	30.9	0.93	19.0	Temperature recorded at R-phase
Measure point 2	30.6	0.93	19.0	Temperature recorded at Y-phas
Measure point 3	30.1	0.93	19.0	Temperature recorded at B-phase

Outgoing feeders:

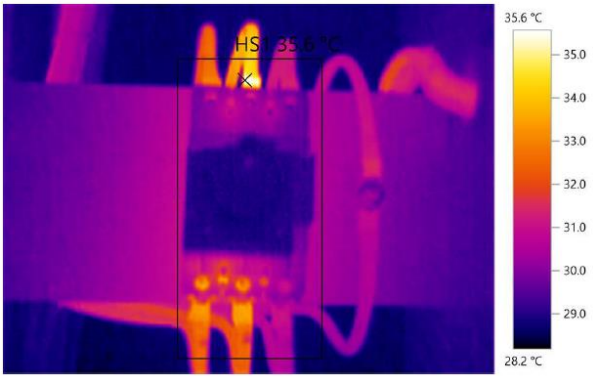


Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	15:50:56	**Refl. temp. [°C]:**	19.0
	File:	IV_16278.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Hot spot 1	34.3	0.93	19.0	Temperature recorded at lugs

AC DB feeder:

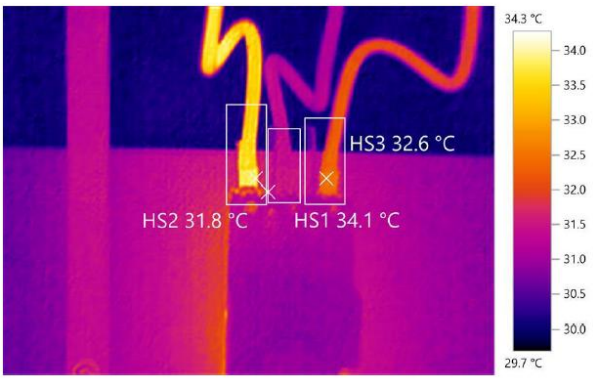


Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	16:04:29	**Refl. temp. [°C]:**	19.0
	File:	IV_16293.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Hot spot 1	35.6	0.93	19.0	Temperature recorded at lugs

AC sub panel incomer:

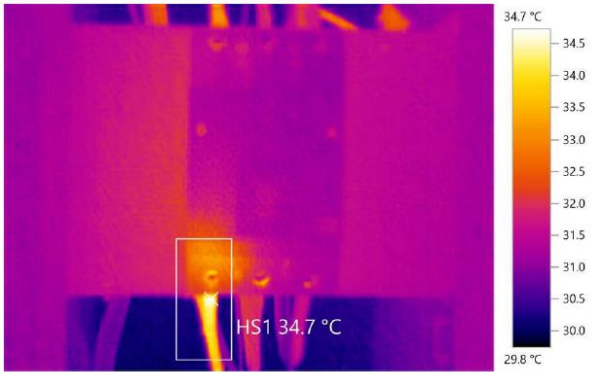


Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	16:36:46	**Refl. temp. [°C]:**	19.0
	File:	IV_16317.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Hot spot 1	34.1	0.93	19.0	Temperature recorded at R-phase
Hot spot 2	31.8	0.93	19.0	Temperature recorded at Y-phas
Hot spot 3	32.6	0.93	19.0	Temperature recorded at B-phase

Lighting sub panel incomer:

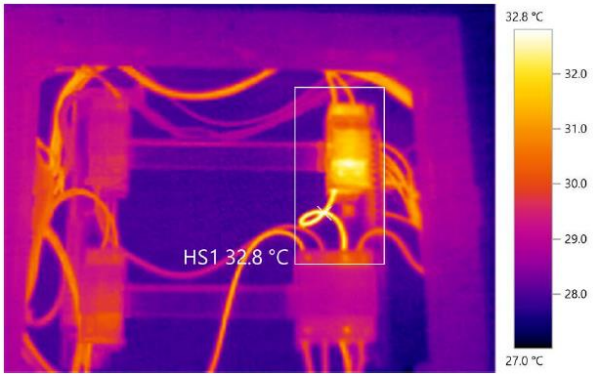


Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	16:38:47	**Refl. temp. [°C]:**	19.0
	File:	IV_16322.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Hot spot 1	34.7	0.93	19.0	Temperature recorded at R-phase

1st floor DB:

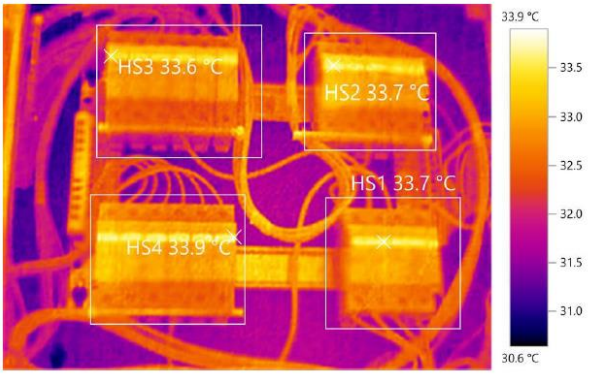


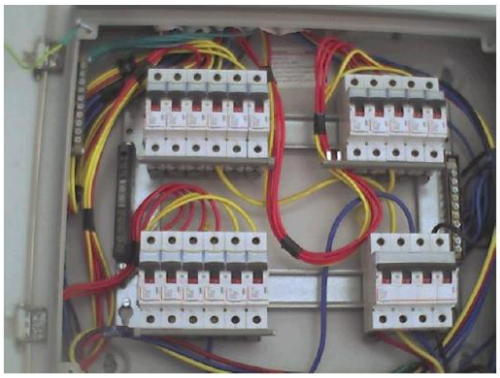
Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	16:43:06	**Refl. temp. [°C]:**	19.0
	File:	IV_16327.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Hot spot 1	32.8	0.93	19.0	Temperature recorded at B-phase wire & MCB

2nd floor DB:





Picture data:	**Date:**	09-03-2022	**Emissivity:**	0.93
	Time:	13:12:40	**Refl. temp. [°C]:**	19.0
	File:	IV_16266.BMT		

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Hot spot 1	33.7	0.93	19.0	Temperature recorded at main incomer MCB
Hot spot 2	33.7	0.93	19.0	Temperature recorded at R-phase
Hot spot 3	33.6	0.93	19.0	Temperature recorded at Y-phas
Hot spot 4	33.9	0.93	19.0	Temperature recorded at B-phase

Remarks- Entire Electrical systems are thermal scanned and Temperature was found < 40 deg C, which is Normal.

FIRE SAFETY:

Overall, the campus found healthy and free from fire threats. Fire extinguishers are installed in each building.

Signages are missing and this needed to be done.

	
Co2 type fire extinguisher	ABC Dry powder type fire extinguisher

Report by,

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ENER VISION
(ISO 9001 Certified & BEE empanel ESCO)