ENERVISION
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2019-2020

# 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 Campus-3 Management giving us the opportunity for carrying out Green Audit (Environment, Electrical, Energy and Fire Safety Audit) of the KISS 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 11th Feb 2020 to 16th Feb 2020

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: 21st Feb 2020

**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.

Vivek Kumar – Electrical Engineer

Rahul Kalamata – Jr. Mechanical 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.

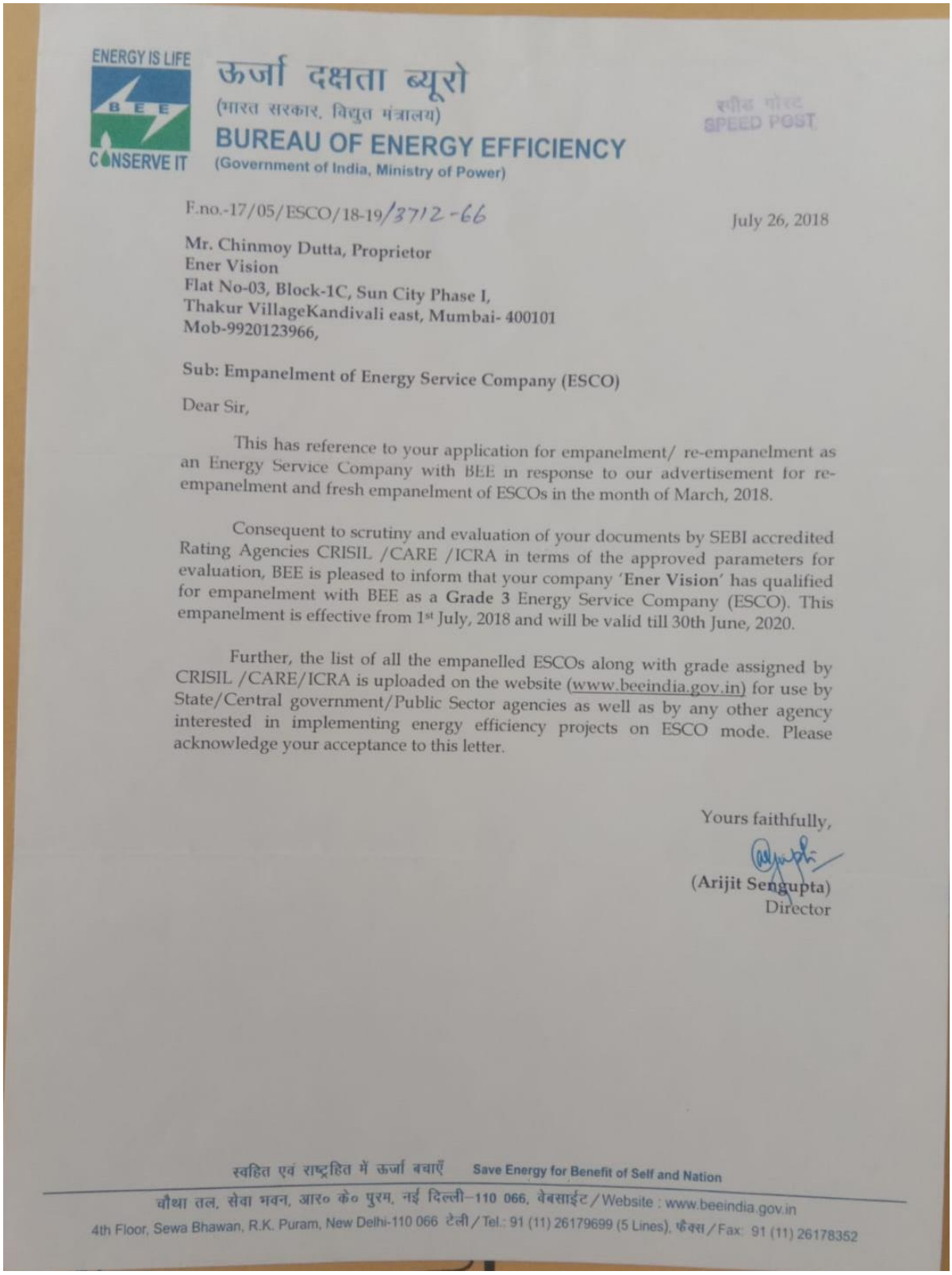
**Our Mission:**

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



ENERGY IS LIFE
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CONSERVE IT

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

स्पीड पोस्ट
SPEED POST

F.no.-17/05/ESCO/18-19/3712-66

July 26, 2018

Mr. Chinmoy Dutta, Proprietor
Ener Vision
Flat No-03, Block-1C, Sun City Phase I,
Thakur VillageKandivali east, Mumbai- 400101
Mob-9920123966,

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 March, 2018.

Consequent to scrutiny and evaluation of your documents by SEBI accredited Rating Agencies CRISIL /CARE /ICRA 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 is effective from 1st July, 2018 and will be valid till 30th June, 2020.

Further, the list of all the empanelled ESCOs along with grade assigned by CRISIL /CARE/ICRA is uploaded on the 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) 26179699 (5 Lines), फैक्स / Fax: 91 (11) 26178352

## Certification of the company

# Table of Content:

# Executive Summary:

**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.

**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.
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

**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.

**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 KISS University.

**The specific objectives are:**

1. To assess the quality of the water and soil in each of the KISS 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 KISS 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 KISS 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<br>1.5 HP – 1 nos<br>Water meters are not installed | |
| 6 | Number of water tanks & Capacity | Hostel – 2 tanks (15000 Lit x 2 nos)<br>Kitchen – 4 tanks (1000 lit x 4 nos)<br>Academic & Admin – One tank each (15000 Lit x 1 nos each building)<br>UGT – 1 lac Litre x 1 nos | |
| 8 | Quantity of water pumped every day | 12000 L (approx.)<br>No data is recorded. | |
| 9 | Any water wastage/why? | NO | |
| 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 | |

**Water Quality assessment**

Water samples from four different locations were collected and analyzed for its quality parameters. The results are comparable with the values of drinking water standards prescribed by different agencies.

| Parameters | Tap water |
|---|---|
| Dissolved Oxygen (mg/l) | 7.41 |
| Acidity (mg/l) | 21 |
| Alkalinity (mg/l) | 17 |
| Chloride (mg/l) | 34.1 |
| Hardness (Total) | Nil |
| Total Dissolved Solids (ppm) | 128 |
| Total coliform | Nil |

## ***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 |

## SOLAR POWER PLANT

Solar power plant is installed in the campus-3 KISS. It has 75 KW rooftop solar plant. At present the damaged roof top solar plants are re-commissioned due to the cyclone in last year.

## 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 |

## 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.

## 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 in side the campus to reduce the pollutant emissions.

**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 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. |

**AC machines analysis:**

In Admin Building Split AC units are installed in all the floors rooms. All the AC's are new and working fine. Compressors of each AC is working good.

It was noticed that there is no maintenance activity process for the AC system but Weekly/Monthly maintenance checklists are good. The maintenance checklist is as follows:

Check and clean condenser coils.

Check and clean drain pan (If installed).

Check and clean condensate drains to prevent water overflow.

Leak test all coils and connections for Freon leaks.

Check capacitors for hazardous leaks.

Clean and sanitize evaporator coil [in place] for mold and mildew prevention. [Removal for cleaning additional charge]

Check and clean filters.*

Check thermostat calibration & battery life.

Check all supply vents for proper air circulation.

Test heating elements for trouble-free operation.

Check safety controls.

Check Lubricate motor and blower bearings.

Note all corrosion spots and apply protective film, on equipment as needed.

Inspect, clean and spray controls and switches.

Check all electrical components for proper operation.

Check all wire connections and replace, as needed.

Check all relays for trouble-free operation.

Inspect and clean contactor points.

Test compressor's running current.

Document motor amperages to compare to future visits.

Check refrigerant flow control device.

Test and monitor refrigerant pressures.

Check operating temperatures and temperature drop across coils.

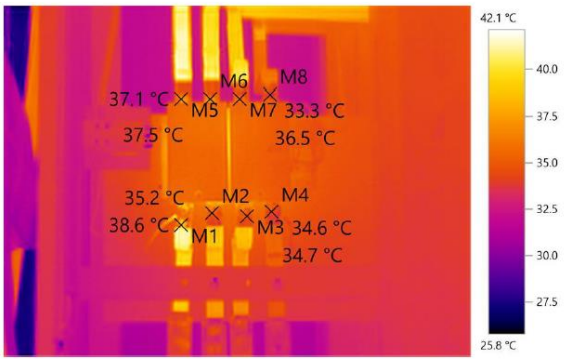
Provide a detailed report upon completion of a maintenance visit

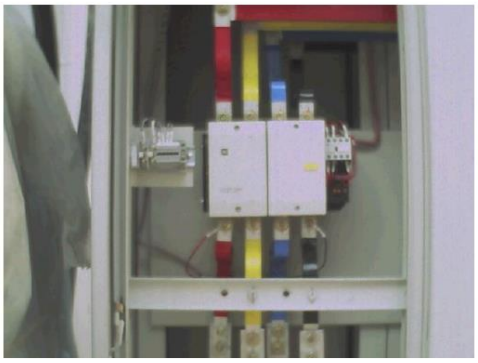
**Conclusion:**

| Sl No | Description | Observation / Recommendations |
|---|---|---|
| 1 | Power Distribution System | Overall Electrical distribution is in good condition. |
| 2 | Protection System | All Panel feeders are checked annually and maintained. MCCB are tested annually. All DB's have RCCB and same are tested once in six month. It is recommended to install IoT base advance fault detection system on all DB's. |
| 3. | IR testing of cables | Major Power Cables IR values are above 200 M Ohms. This is good |
| 4. | HOT Spot test of Power Distribution system | Entire distributions systems are thermal scanned by TESTO German make, calibrated Thermal Imager. Few cable termination the temperature was noticed 50 to 60 Deg C. These are serviced and thermal scanned once again. Temp after service is below 40 Deg C. |
| 5 | Power Quality of Normal Power / DG Power / UPS Power | Power quality of Normal / UPS / DG Powers were monitored and Voltage, Current Waveforms are found normal. Voltage is quite Stable, Both Voltage and Current Harmonics are within limit. There is no Noise noticed between Earth and Neutral. |
| 6 | Energy Monitoring | Energy is monitored on Main and sub meter installed on each Panels Main Incomer on daily basis. |
| 7 | Water Pumping | Water Pump are operating based on the level sensor. All the valves are checked on monthly basis to stop any leakages. |
| 8 | Air Conditioning System | All the AC machines are of split type. The filters of the AC machines are found cleaned. CFM is measured and found ok, KW/ Tr is also good. |
| 9 | Electrical Rooms | Overall the elect room and panels are found neat and cleaned. |
| 10 | Fire Safety | Fire Fighting system are operational. |

# THERMOGRAPHY:

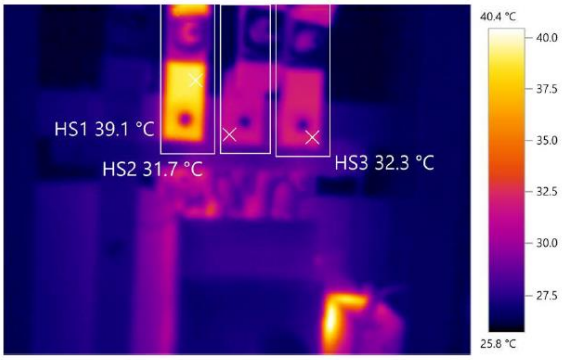
## Changeover:



| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Measure point 1 | 38.6 | 0.93 | 19.0 | Temperature recorded at R-phase input |
| Measure point 2 | 35.2 | 0.93 | 19.0 | Temperature recorded at Y-phase input |
| Measure point 3 | 34.7 | 0.93 | 19.0 | Temperature recorded at B-phase input |
| Measure point 4 | 34.6 | 0.93 | 19.0 | Temperature recorded at Neutral input |
| Measure point 5 | 37.1 | 0.93 | 19.0 | Temperature recorded at R-phase output |
| Measure point 6 | 37.5 | 0.93 | 19.0 | Temperature recorded at Y-phase output |
| Measure point 7 | 36.5 | 0.93 | 19.0 | Temperature recorded at B-phase output |
| Measure point 8 | 33.3 | 0.93 | 19.0 | Temperature recorded at Neutral output |

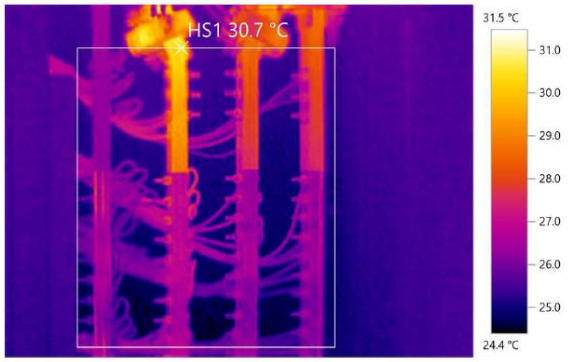
## LT Panel Main incomer:

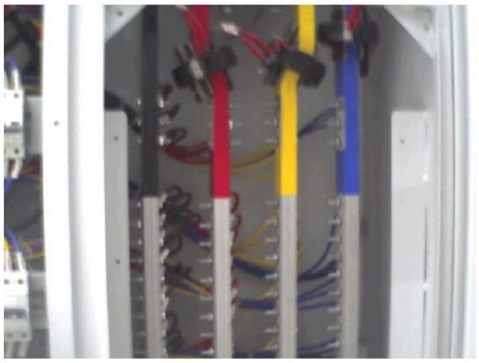



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 39.1 | 0.93 | 19.0 | Temperature recorded at R-phase |
| Hot spot 2 | 31.7 | 0.93 | 19.0 | Temperature recorded at Y-phas |
| Hot spot 3 | 32.3 | 0.93 | 19.0 | Temperature recorded at B-phase |

## Bus-Bar Chamber:

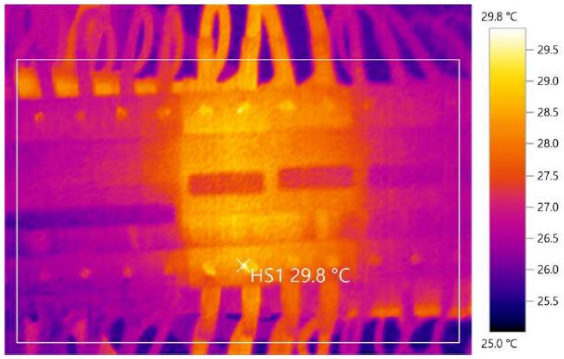


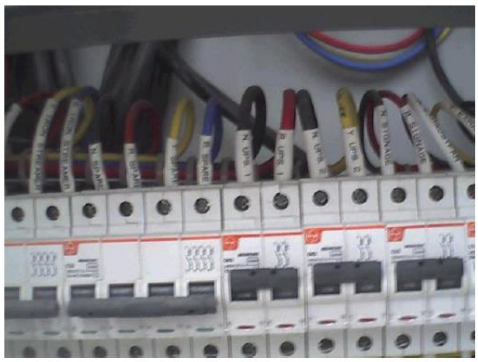



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 30.7 | 0.93 | 19.0 | Maximum Temperature area |

## Outgoing feeders:

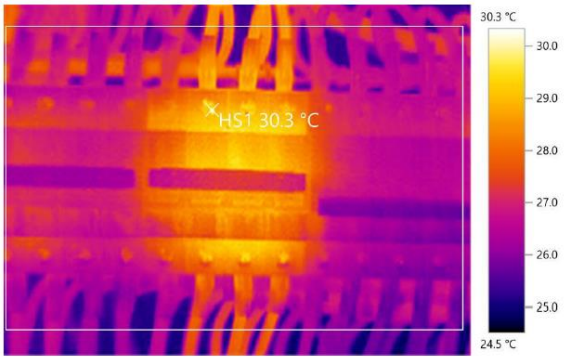


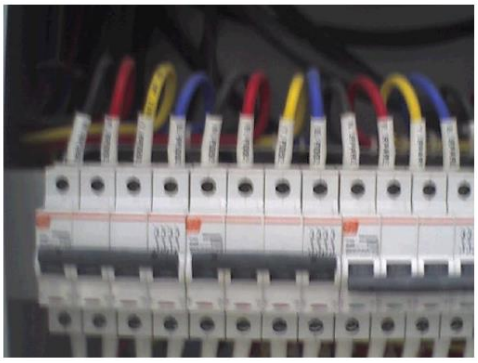



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 29.8 | 0.93 | 19.0 | Temperature recorded at outgoing feeders |

## Outgoing feeders:



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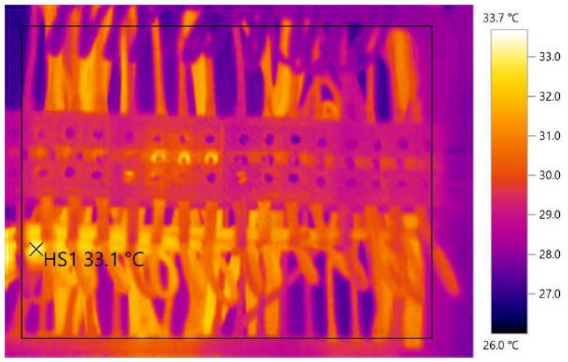
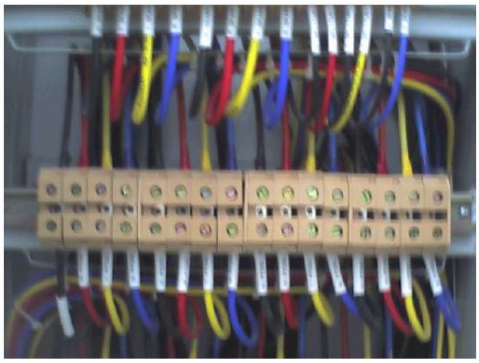
| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 30.3 | 0.93 | 19.0 | Temperature recorded at outgoing feeders |

## Cable chamber:

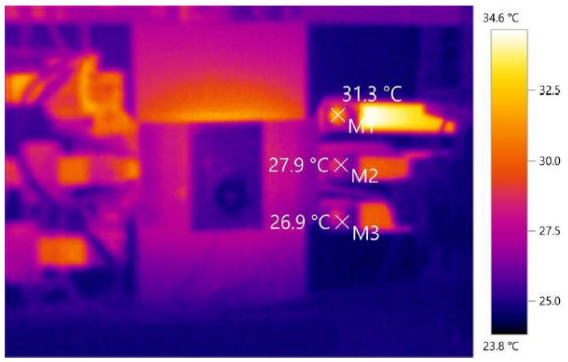


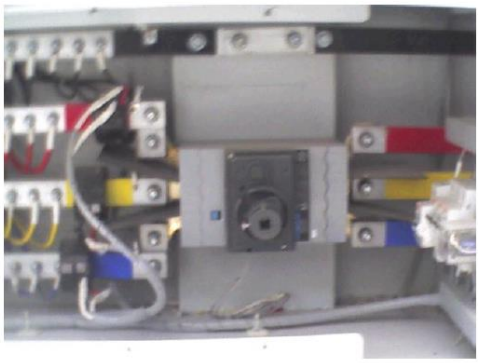



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 33.1 | 0.93 | 19.0 | Temperature recorded cable chamber/outgoing cables |

## AC Sub-incomer:

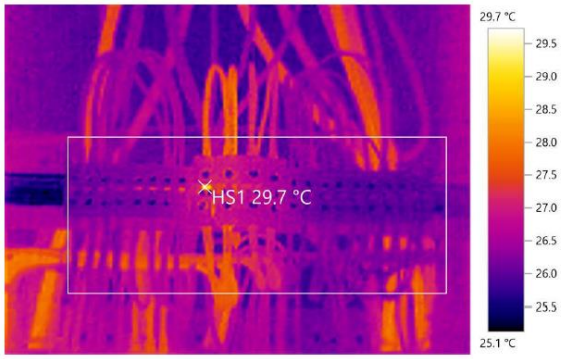


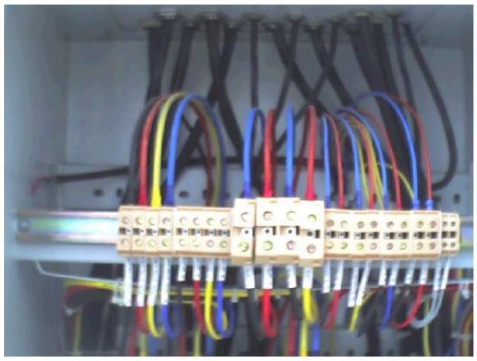



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Measure point 1 | 31.3 | 0.93 | 19.0 | Temperature recorded at R-phase |
| Measure point 2 | 27.9 | 0.93 | 19.0 | Temperature recorded at Y-phas |
| Measure point 3 | 26.9 | 0.93 | 19.0 | Temperature recorded at B-phase |

## Cable chamber:

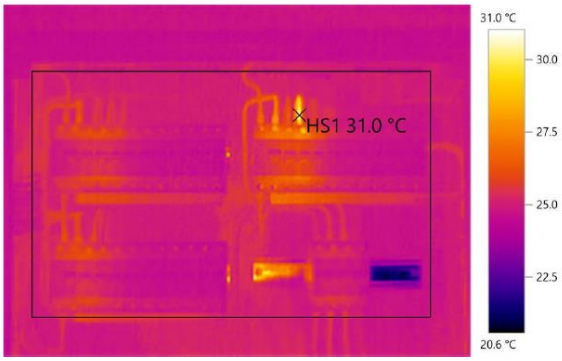


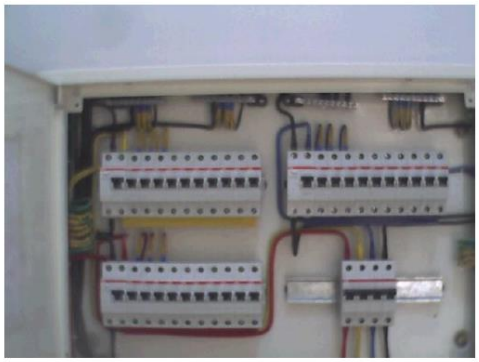



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 29.7 | 0.93 | 19.0 | Temperature recorded at cable chamber |

## Admin building LDB:

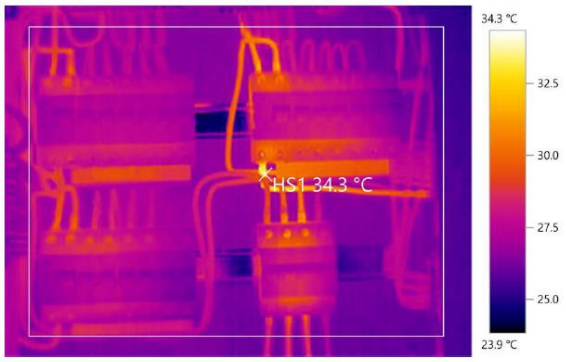


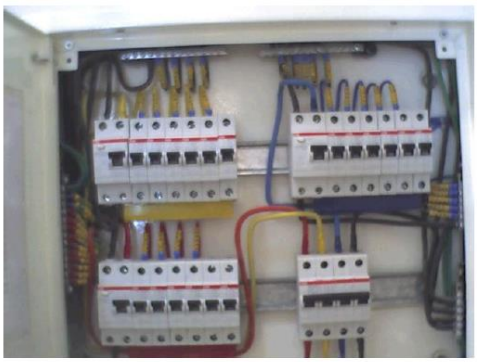



**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 31.0 | 0.93 | 19.0 | Maximum Temperature recorded |

## Admin building PDB-2:

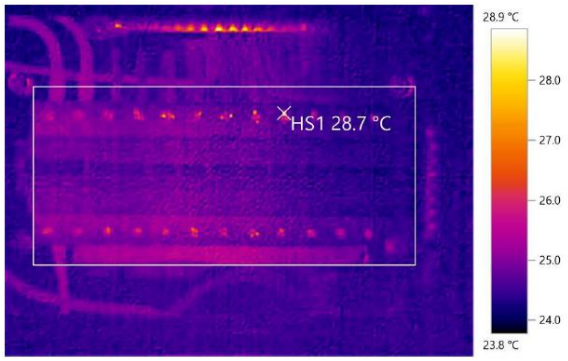


**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 34.3 | 0.93 | 19.0 | Maximum Temperature area |

## UPS DB:




**Picture markings:**

| Measurement Objects | Temp. [°C] | Emiss. | Refl. temp. [°C] | Remarks |
|---|---|---|---|---|
| Hot spot 1 | 28.7 | 0.93 | 19.0 | Temperature recorded at MCB terminations |

**Review of Fire safety:**

Campus is well equipped with huge number fire extinguishers. All the fire exits were free from materials and path holes.

**Report by,**

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