

ENERGY AUDIT REPORT

FOR THE YEAR 2022-23



LAXMI VENKATESH DESAI COLLEGE RAICHUR

Principal Lead Auditor:

Mallikarjun A Kambalyal.

Regd India: CEA, EA-3485, ISO 50001, 14001 Lead Auditor.

Germany Energieberater: Anbieter-Nr 1041388

Mauritius : REA-57

Audited by:

SUNBSHUBH TECHNOVATIONS PVT LTD.,

120-2, LGF, 'A' wing, IT Park,


Hubli – 580029. Karnataka. India.

Germany off: Neuer Weg 166, 47803 Krefeld, Dusseldorf. Germany



SUNSHUBH TECHNOVATIONS PVT LTD

#120-122,131-2, 'A' Block, IT Park, Opp. Glass House, HUBLI-580 029, Karnataka, INDIA
Germany off: NeuerWeg 166, 47803 Krefeld, Dusseldorf.

WATER	ENERGY	POLLUTION	ORGANIC	
Harvesting	Efficiency	Minimize	Farming	
Conservation	Conservation	Eliminate	Worm compost	
Management	Generation	Manage	Benefits	
Regd. Certified Energy Auditors, GOI (EA 3485), Germany, Anbieter-Nr 1041388				

www.sunshubhrenewables.com, Email: ceo@sunshubhrenewables.com, Ph: 94492 83505, 94490 33505
CIN : U74999KA2020PTC136321, PAN:ABECS02500Q, TAN:BLR577362F GST No: 29ABECS0250Q1ZX

ENERGY AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 15th June 2023 under the instructions of Dr. Venkatesh B Devaru Principal.

This report is generated based on the site visits and evidence collected from the site and this completion certificate is issued in compliance with *Criteria 7.1.6*.

All attempts have been made to evaluate the scope for development and inculcate green practices in the campus and extended throughout the campus. The focus is also laid to make positive impact on the society for a better living.

This report is tabled in two parts. The first forms the core discussions which are subject specific under the statutory requirements of the NAAC accreditation norms. The second section is general in nature.

Any modifications, changes, omissions after the site visit shall be exclusive.

Authorised Auditor.



Mallikarjun A. Kambalyal B.E (E&C)

Certified Energy Auditors EA-3485.

ISO 50001:2011 & ISO14001:2015 Lead Auditor.

Date: 19th June 2023



Credentials attached 7.1.6

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EXECUTIVE SUMMARY

Sr No	Observation*	Observation*	Issues*	Remedial measures *	Capital*	Projected savings*	Category 7
1	Energy use.	Multiple LT connections.		Merge into one or two	NIL	Reduced fixed charges	
2	Solar Power	Solar power for energy needs		Need to opt for Hybrid system.	Approximately ₹6.00 Lacs.	Net zero energy import.	7.1.
3	Battery placement	Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house resources	25% of the cost of the batteries.	7.1.2 & 7.1.6
4	Battery regeneration.	Short life span.	300% of the cost of the battery.	Subject all batteries to regeneration made.	₹ 3,000/- per battery after every 3 to 4 years.	300 %	7.1.2 & 7.1.6
5	Electrical	Old tube lights	High energy consumers	LED lights of appropriate ratings.	Rs.80/- to Rs.250/- per unit	Rs.175/- per tube per annum. ROI of 1 years.	7.1.6
6	Natural Lighting	Uncleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the window-panes and allow maximum natural light penetration.	Nil, part of routine, In house manpower.	Substantial cost of energy bills on lighting.	7.1.2 7.1.6
	Natural Ventilation	Permanently closed ventilators.	Creation of hot air pockets below the ceiling.	Open the Ventilators for easy exit of hot/warm air from the rooms.	Nil, In house manpower.	Eliminates use of Electrical Fans and Substantial cost of energy bills	7.1.2 7.1.6

* For details, please follow the discussions in the report.

ACKNOWLEDGEMENT

SUNSHUBH TECHNOVATIONS PVT LTD is pleased to express its sincere gratitude to the management of TARANATH SHIKSHANA SAMSTHE, LAXMI VENKATESH DESAI COLLEGE, RAICHUR for entrusting Sunshubh Technovations Pvt Ltd with the assignment on Green Earth practices based on Educate, Practice, Advocate & Manage the resources in their educational organization.

We acknowledge the assignment with order reference number Green Audit 2022-23. We also wish to thank Dr Venkatesh B Devaru Principal, Taranath Shikshana Samsthe, Laxmi Venkatesh Desai College, Raichur, and Dr Jayateertha N S IQAC Coordinator and Smt Roopa Kulakarni Criteria VII, who have been constantly following with the Carbon Handprint initiatives and developments in the college. It was on their instance that we got to evaluate the initiatives undertaken. The officials and the maintenance staff for the help rendered during the energy flow study.

We would fail if we neglect to appreciate the sincere efforts put in by the Faculty Members lead by

- Dr Jayateertha N S, IQAC Coordinator
- Ms. Swathi Dixit, Criteria I
- Dr. Chakradhar, Criteria II
- Dr Manjunath, Criteria III
- Dr. Padma, Criteria IV
- Sri Hussainappa, Criteria V
- Sri Hanumanth Nayak, Criteria VI
- Ms. Roopa Kulakarni, Criteria VII

And the Students who against all odds have kept the college premises clean to the possible limits.

Without the crucial and significant support from the fellow teaching team the potential energy saving options and carbon footprint reduction would not be a reality.

With the motivational support of the management, ground realistic support from teaching team and sincere efforts of the students in incorporating the change (habits) and instructions, the college could effectively declare the reduction in Carbon footprint and optimize the waste reductions.

ENERGY AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 15th June 2023 under the instructions of Dr. Venkatesh B Devaru Principal.

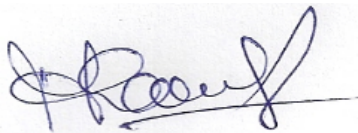
This report is generated based on the site visits and evidence collected from the site and this completion certificate is issued in compliance with *Criteria* 7.1.6.

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Date: 19th June 2023

Credentials attached 7.1.6



BUREAU OF ENERGY EFFICIENCY



Examination Registration No. : **EA-3485** Serial Number **2838**

Certificate Registration No. : **2838**

Certificate For Certified Energy Manager

This is to certify that Mr./Mrs./Ms. **Mallikarjun A Kambalyal**
Son/Daughter of Mr./Mrs. **Andanappa V Kambalyal** who has passed the National Examination for certification of energy manager held in the month of **April 2006** is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010.

This certificate shall be valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years.

His /Her name has been entered in the Register of certified energy manager at Serial Number **2838** being maintained by the Bureau of Energy Efficiency under the aforesaid regulations.

Mr./Mrs./Ms. **Mallikarjun A Kambalyal** is deemed to have qualified for appointment or designation as energy manager under clause (1) of Section 14 of the Energy Conservation Act, 2001 (Act No.52 of 2001).

Given under the seal of the Bureau of Energy Efficiency, this **7th** day of **February, 2013**

Secretary
Bureau of Energy Efficiency
New Delhi

Dates of attending the refresher course	Secretary's Signature	Dates of attending the refresher course	Secretary's Signature
28.01.2020			

Bureau of energy Efficiency Regd No: EA3485

Certificate of Successful Completion

Intertek

This is to Certify that

MALLIKARJUN A KAMBALYAL

has successfully completed the

Intertek

***CQI & IRCA Certified ISO 14001:2015
Auditor Conversion Training Course***

The Course includes the assessment and evaluation of Environmental Management Systems to conform to the requirements of ISO 14001:2015 and ISO 19011:2011

*This course is certified by the Chartered Quality Institute (CQI) and the International Register of Certificated Auditors (IRCA)
– IRCA REFERENCE 18093 –*

The course meets the training requirements for individuals seeking certification under the IRCA Auditor Certification Schemes



Authorising Signature: Vystra Asunova

Course Dates: 14th – 16th July 2017

Certificate Number: 47730

Membership Application To Be Made Within 3 Years From Last Day of Course

121807

ISO Certified Lead Auditor. Certificate No: 47730

bsi.

BSI Training Academy

This is to certify that

Mallikarjun A. Kambalyal

has attended and passed

**Energy Management Systems (ENMS) Auditor/Lead Auditor Training Course
(ISO 50001:2011)**



Premanand Ramakrishnan, Director of Training

Date: 14/04/2016 - 18/04/2016

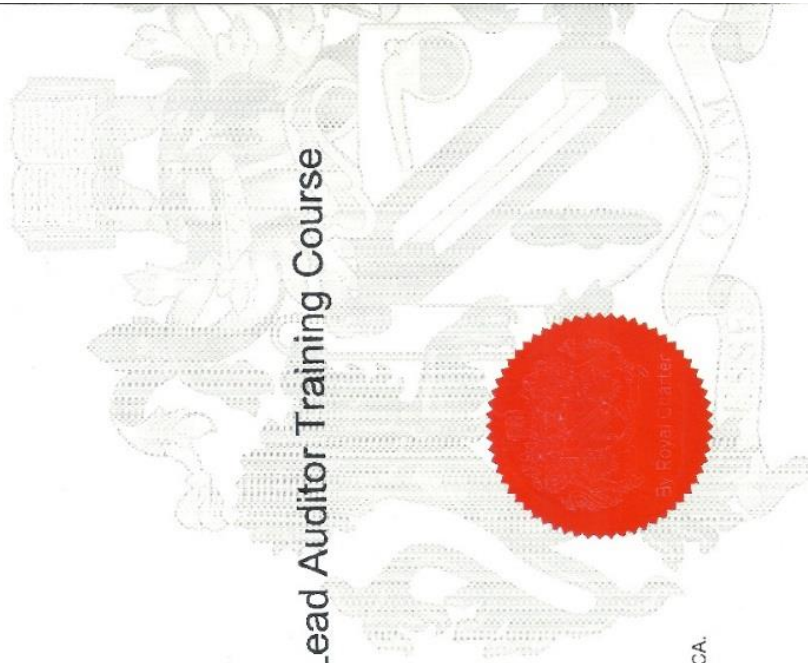
Certificate Number: ENR-00253448

This certificate is valid for 3 years from the date above for the purpose of registering as an auditor with IRCA.



Course number A17583 certified by IRCA

The British Standards Institution is incorporated by Royal Charter.
BSI India, The Mira Corporate Suites (A-2), Plot 1 & 2, Ishwar Nagar, Mathura Road, New Delhi 110065, India Tel: +91 11 2652 9000



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50

ISO Certified Lead Auditor. Certificate No: ENR-00253448

OVERVIEW OF ENERGY AUDIT

The main objective of the energy audit of educational institutions is to set an informative work schedule. Although Electrical Energy is considered to be clean, it is not so, at the point of generation. The impact assessment of electrical power used out in day today activities are highlighted and Pros and Cons are discussed 'off the class room session'.

Self-contribution to the one's well-being is what is intended to be discussed. Judicious use of Electrical energy, reduces power demand and energy consumption. Optimising electrical use is key aspects of the Energy Audit.

On reducing the electrical energy, the power demand reduces. Reduced power demand enables reduced power generation at the point of generation which in India is mainly by Coal firing. This means lower fuel consumption which again leads to lower smoke i.e., CO₂. If sourced from Solar, reduced power demand will call for reduced Solar power plant thus reducing CAPEX and smaller battery bank. At the end of it, both lead to lower emissions i.e., lower 'CARBON FOOTPRINT'.

The benefits would then be transacted into stabilised rainfall pattern.

CARBON FOOTPRINT AUDIT OBJECTIVES

Know Why? Where? What? When? How? about the Audit and its objectives.

Carbon Footprint Audit was initiated in the beginning of 1970's, with the motive of inspecting the work executed within an organization, whose exercises could cause risk to the health of inhabitants and the environment. It exposes the genuineness of the proclamation made by the organisation with the concern on health issues. As a consequence of their operations with respect to environmental pollution, it is the duty of the organisation to carry out the Carbon Footprint audit of the ongoing processes for various reasons, such as

- To make sure whether one is performing in accordance with the relevant rules and regulations,
- To improve the procedures and aptness of material in use,
- To analyse the potential duties and to determine a way which can lower the cost and to the revenue outflow.

Through Carbon Footprint Audit one gets adoration as to how to improve the condition of the environment. There are various factors that were forced upon and determine the growth of/or conduct of Carbon Footprint audit. Incidents like, decades old Bhopal gas tragedy, that has left its residual effect which still haunts us; Our buildings catching fire due to various reasons; Industries blowing off taking valuable human lives etc.; People going sick, feeling tired, after long hours of operations in the organization; Increased demand of generators due to inconsistent power supply, which has resulted or lead into recent floods and droughts; are some of the situations to ponder about?

To address various issues in context with human health, ENVIRONMENT audit is assigned to "Criteria 7" of NAAC (National assessment and accreditation council) accreditation. NAAC is a self-governing organization in India that declares the institutions as Grade "A", Grade "A+", or Grade "A++" ..., according to the scores assigned at the time of accreditation.

The other intention of organising Carbon Footprint audit is to update the environment conditions in and around the institutions i.e., within the compound and outside the compound. It is carried out with the aid of performing certain tasks like waste management, energy consumed, diesel burnt it performing the objective of the organization. Lastly to self-assess the net carbon footprint of the conduct of process in the organization.

The goals of Carbon Footprint audit

- The purpose of carrying out Carbon Footprint audit is securing the environment and cut down the threat posed to human health.

- To Make sure that rules and regulations are complied with.
- To avoid the environmental interruptions that are more difficult to handle and their corrections call for high cost.
- To suggest the best protocol for adding to sustainable development.
- To execute the process of the organisations utilising minimum natural resources and efficient use of those resources contributing to minimum waste generation.

How is the Carbon Footprint audit conducted?

- Pre-audit
- Planning
- selecting the team of auditors both internal and external
- schedule the audit facility
- acquire the background information
- visit areas under audit

On site conditions:

- Understand the scope of audit
- Analyse the strengths and weaknesses of the internal controls
- Conduct audit with end user comfort focused and making it easy to perform.
- Collect necessary evidence so that the stakeholders stand to understand how and where they are going wrong in the process of their conduct.
- Post audit draw the report based on the data collected.
- On confirmation of the preliminary report, draw a final report of the observations and inference with accuracy more near to implementable way.
- Discuss various remedial measures for alternatives if required.
- Prepare an action plan to overcome the shortcomings with continual observation on the action plan initiated.

STEPS UNDER CARBON FOOTPRINT AUDIT

Energy audit: It deals with use of energy in carrying out the task. In the Audit process conservation prevails over efficiency. Conservation awareness and implementation plays a significant role. Awareness in conservation brings in Efficiency by itself. Hence, energy audit will always consider not to use the energy if necessary. At best it can be used judiciously. The final objective is to assess the extent of impact on the environment either Direct or Indirect. One such key tool is CARBON FOOTPRINT.

Carbon Footprint also considers various other components as discussed below.

Water audit: Water is one of the cheapest commodities next to the Air we breathe. Although we Indians, use less water in comparison to western countries. However, the extent of pollutants that we leave behind has polluted all the resources including the deep well.

Rainwater harvesting is one of the best techniques that can be adopted by harvesting the rainwater and using it at the time of scarcity. the audit team to observe and investigate the relevant methods that can be adopted and implemented and draw the balance of use of water.

Waste management audit: The point of generation of waste, the type of waste generated, i.e., hazardous, recyclable and organically compostable wastes and segregating method at the point of generation for easy and best way to handle the same. Evaluating such methods to minimise the use of resources in the process of their management.

Environmental quality audit: It analyses air quality, noise level and the programs undertaken by the institution for plantation creating awareness of trees around us and how nature provides us with remedial measures within its framework.

Health audit: In the process of use of resources and conduct of the activities, they can develop impact on human health, that might be off minutely harmful, cause permanent disorder or may even cause death. Occupational health hazards are discussed in detail and the stakeholders are informed of the same and required necessary remedial measures indicated.

Renewable energy: To make in organisation net zero net zero carbon emission use of renewable resources including energy such as solar wind biogas geothermal energies are put into ooh utilisation.

Carbon handprint: The net impact All the above components of Carbon Footprint Audits are to make an organisation contribute zero emissions which are called bye bhai use of water generation of waste use of energy e environmental damage health damage and finally to explore if the campus or direction can go in in contributing to third-party emissions minimising

Benefits of Carbon Footprint audit: To draw home the benefits, the system has been separated out into various audits as listed above. In doing so, and if audit findings are effectively implemented there are many advantages that can be practiced in the process

- Recognise the cost saving methods through waste minimising and managing technologies.
- Point out the prevailing and forth coming complications.
- Authenticate conformity with the legal requirements.
- Empower the organisation to frame a better environmental performance.
- Portray a good image of the institution which helps build better relationships with the group's organisations, stakeholders in and around its operations

Enhance the alertness for environmental guidelines duties and conduct of preparedness for any eventualities due to environmental disasters.

DAY'S CARBON HANDPRINT PLEDGE

DAY'S CARBON HANDPRINT PLEDGE (proposed)

(indicative templet for display at all prominent areas, classrooms, waiting rooms, canteen, library, relaxing areas in the campus.)

We, The Principal, staff and students, adopt responsible practices in our daily activities with due regard to the environment. We set and continually review objectives and targets for achieving our goal to protect our entire college premises from all pollutions primarily.

We seek to compile with safety and environmental regulations to implement inhouse standards to improve our environmental performance.

We commit ourselves to the safe operation of all our working habits, be it in classrooms, library, canteen, on road, off road, in-campus out-campus as well as at our place of stay.

We adhere to reduce environmental load by efficiently using resources, saving energy, reducing waste, encouraging material recycle, with special emphasize to minimising emissions of greenhouse gases, ozone depleting substance and particle matter. we endure to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources.

We endure to attend educational programs and promulgate our close friends and colleagues to follow suite

We endure to ensure that we recognize the essence of this Energy policy by actively and aggressively conducting workshops and training to all in environmental concepts.

We make wide ranging social contribution to close association with the students, teaching staff, administrative staff, housekeeping staff by disclosing environmental information and supporting environmental consumption.

Principal

DAY'S ENERGY USE PLEDGE

DAY'S ENERGY USE PLEDGE

(Indicative templet for display at all prominent areas, classrooms, waiting rooms, canteen, library, relaxing areas in the campus.)

We, The Principal, staff and students, adopt responsible practices in our day's energy use with due regard to the environment. We pledge to avoid using electrical power where not needed. We also pledge to use judiciously the electrical power by using Energy efficient products. We shall practice to switch off all appliances when not in use.

We will educate one person a day on use of electrical energy.

PURPOSE:

To realistically and comprehensively reduce energy consumption, assure acceptable indoor air quality, and improve energy efficiency on campus through methods that are consistent with a safe, secure, and inviting campus community. As outlined in this policy, energy conservation will be accomplished by developing a proactive and progressive approach to providing energy efficient, responsible, and cost-effective operations on campus. This policy will be reviewed and updated periodically as public awareness, management techniques, and technologies change.

APPLIES TO: Faculty, staff, students, and visitors.

CAMPUS: Taranath Shikshana Samsthe, Laxmi Venkatesh Desai College, Raichur

Principal

Chairperson

ABOUT THE COLLEGE

LAXMI VENKATESH DESAI COLLEGE, RAICHUR KARNATAKA is located in a small town educating the rural children of nearby villages.

The college has Arts Commerce and Science stream.

The upkeep of the campus speaks for their concern to the environment. With few corrective measures the college can consider to move towards being CARBON NEUTRAL.

VISION STATEMENT OF THE INSTITUTE

Core Values of the Institution

<https://lvdcollege.com/>

Vision

Our vision, drawing inspiration from the philosophy of our founder Pandit Taranath is to transform the College into a truly great educational institution that can play a pivotal role in effecting changes in tune with the fast-changing educational scenario. Our vision is to transform ourselves into a truly great educational institution, that can play a pivotal role in effecting changes in tune with fast changing scenario.

Mission

Our mission is to ensure and enhance the quality of education in this educationally backward area that even rivals the educational standards in other parts. To empower the rural men and women to contribute in the nation building process.

Objectives

The five core human values are:

- (1) Right conduct,
- (2) Peace,
- (3) Truth,
- (4) Love, and
- (5) Nonviolence.

1. Values related to RIGHT CONDUCT are:

(a) SELF-HELP SKILLS: Care of possessions, diet, hygiene, modesty, posture, self-reliance, and tidy appearance.

(b) SOCIAL SKILLS: Good behaviour, good manners, good relationships, helpfulness, No wastage, and good environment, and

(c) ETHICAL SKILLS: Code of conduct, courage, dependability, duty, efficiency,

(d) A Textbook on Professional Ethics and Human Values ingenuity, initiative, perseverance, punctuality, resourcefulness, respect for all, and responsibility

2. Values related to PEACE are: Attention, calmness, concentration, contentment, dignity, discipline, equality, equanimity, faithfulness, focus, gratitude, happiness, harmony, humility, inner silence, optimism, patience, reflection, satisfaction, self-acceptance, self-confidence, self-control, self-discipline, self-esteem, self-respect, sense control, tolerance, and understanding

3. Values related to TRUTH are: Accuracy, curiosity, discernment, fairness, fearlessness, honesty, integrity (unity of thought, word, and deed), intuition, justice, optimism, purity, quest for knowledge, reason, self-analysis, sincerity, spirit of enquiry, synthesis, trust, truthfulness, and determination.

4. Values related to LOVE are: Acceptance, affection, care, compassion, consideration, dedication, devotion, empathy, forbearance, forgiveness, friendship, generosity, gentleness, humanness, interdependence, kindness, patience, patriotism, reverence, sacrifice, selflessness, service, sharing, sympathy, thoughtfulness, tolerance and trust

5. Values related to NON-VIOLENCE are: (a) PSYCHOLOGICAL: Benevolence, compassion, concern for others, consideration, forbearance, forgiveness, manners, happiness, loyalty, morality, and universal love (b) SOCIAL: Appreciation of other cultures and religions, brotherhood, care of environment, citizenship, equality, harmlessness, national awareness, perseverance, respect for property, and social justice.

AIMS AND OBJECTIVES

- To impart quality education to young men and women from the Rural and Socio economically marginalised sections of the society.
- To provide education to develop an analytical mind with a compassionate heart and right conscience.
- To contribute towards a society of equality, fraternity and liberty.
- We encourage our students to excel in all their activities.
- We emphasis on all-round and integral development of the student.
- We inculcate in our students, rational mind, secular sprit and strong social values with a commitment to cultural and human values.

Affiliation

Affiliated to Affiliated to [Gulbarga University](#), Kalaburagi & Raichur University,

ABOUT ENERGY AUDIT

Taranath Shikshana Samsthe, Laxmi Venkatesh Desai College, Raichur, Karnataka has asked SUNSHUBH TECHNOVATIONS PVT LTD, Hubli, to conduct the Energy Audit for their Institution.

In this context, the management of the Institute represented by Dr. Venkatesh Devaru, Principal, entrusted us the task of conducting the feasibility study to reduce energy consumption and adopt green habits.

SUNSHUBH TECHNOVATIONS PVT LTD, Hubli, represented by Mr. Mallikarjun A Kambalyal made a detailed study and readings of various appliances were taken and carried out the Energy audit along with the safety parameters.

We hope the points presented will be self-explanatory, if there is need for any clarification, we are open for discussions.

LIMITATIONS:

Our recommendations are in the interest of conservation of Electrical Energy and Green Culture i.e., the reduction in CARBON FOOTPRINT. The compliance to the recommendations will be subjected to meeting the safety and Environmental rules and guidelines.

ONGOING STATUS:

It's an optimistic & highly dedicated team effort lead by the Principal & the senior staff who have dedicated all their wits & free time to initiate Green Carpet the entire college premises. It is also a fact that there do exist, few short comings which however is unintentional & on being trained & educated the campus should look for continued minimized waste generation. With all due appreciation to the management, staff involved & cooperation by the students, we have made few suggestions which on implementation, will reduce, demand for water & electrical power. It will also reduce the existing level of pollution to bear minimum.

There is high potential among the students to be educated and spread the knowledge of going ZERO waste generation in their respective colonies and society they dwell in, contributing positively to the cause of

NO WASTE – NO POLLUTION – NO HEALTH HAZARD.

DISCUSSIONS ON EXECUTIVE SUMMARY

ENERGY AUDIT.



Aerial View of the College Campus

The campus is spread over scenic, elevated terrain. The Rocky structure makes things great for beatification with local flora and fauna. The campus has good opportunity to nurture the knowledge among the students from Biology, Physics and Geology.

Energy use

ELECTRICITY CONSUMPTION DETAILS FROM MAY-2022 TO APRIL-2023

R.R.NO.4826876780

Sl. No.	Month	Total No. of Units Consumed	L.V.D (2/3rd Share)	SRPS (1/3rd Share)
1	Apr-22	0	3800	1896
2	May-22	4907	3273	1634
3	Jun-22	5662	3777	1885
4	Jul-22	5505	3672	1833
5	Aug-22	5758	3841	1917
6	Sep-22	5608	3741	1867
7	Oct-22	4062	2709	1353
8	Nov-22	4194	2797	1397
9	Dec-22	4654	3104	1550
10	Jan-23	4194	2797	1397
11	Feb-23	4014	2677	1337
12	Mar-23	4728	3154	1574
	TOTAL	53286	35542	17744

Maximum energy consumed is recorded as 5758 KWh (Units) which amounts to 240 Units per day Looking at the net zero import from grid a 60 KWp Solar system with 6*10KVA hybrid inverter can be considered for solar system.

It is seen that the Actual energy consumed by the college is 3841 (Maximum). Hence the solar Power system requirement is down sized to 40KWp.

50-53



Gulbarga Electricity Supply Company Limited

GESCOM GSTN No: 29AABCG8895R1ZD

Office of the Asst. Executive Engineer (E), C,O&M Sub-division - Raichur Urban Sub-Division-1

RR No.	Account Number	Bill No.	Billing Period	Bill date	Due Date	Disconnection Date
4826876780	5758025255	575807110078	01-05-2022 - 01-06-2022	01-06-2022	15-06-2022	01-07-2022

Name & Address:	Type	Educational Institutions - HT2C	Whedding Energy
PRINCIPAL : LAXMI VENKATESH DESAI COLLEGE 6-2-68MANIK NAGAR SRRNO HTR-145 JS T1 P1 , KAR -584103	Tan ^{ff}	4HT2C1	High Cost Energy
	Contract Demand(KVA)	75	Special Energy
	85% of CD (KVA)	64	Basic Consumption
	Recorded Demand (KVA)	46	Power Cut
	Billing Demand (KVA)	64	Energy Entitlement Demand Entitlement

Meter Readings for Meter Id 383327315					
Description	Date	KWH Meter	KVAH Meter	MD Meter	PF
Present Reading	01-06-2022	2270.87	0	4948	0.87
Previous Reading	01-05-2022	2221.8	0		
Difference		48.07	0	4948	
Meter Constant		100	100	100	
Consumption		4907	0	4648	
Less/Add Consumption		0	0		
Net Consumption		4907	0	4648	0.87

Forwarded to Principal			
TOTAL BILL AMOUNT FOR THE MONTH	May-2022	Rs.	55592
L.V.D.COLLEGE SHARE(2/3 rd)	55592 x 0.667	Rs.	37061
S.R.P.S.PUCOLLEGE SHARE(1/3 rd)	55592 x 0.333	Rs.	18531
TOTAL			55592

electricity bill CH no 585269
for may-2022 DTG-6/6/2022

TOD meter readings for meter ID 383327315

Time Zone	Name of the Zone	Present Readings	Previous Readings	Consumption	MD Reading
06:00 Hrs to 10:00 Hrs	Morning Peak	0	0	0	0
10:00 Hrs to 18:00 Hrs	Normal	0	0	0	0
18:00 Hrs to 22:00 Hrs	On Peak	0	0	0	0
22:00 Hrs to 06:00 Hrs	Off Peak	0	0	0	0

MDR 16/6/22

Your Detailed Bill		Amount (Rs.)
Description		
Demand Charges: 64.00 KVA at Rs260.00 per kVA		16,640.00
Energy Charges: First 4,907.00 kWh at Rs7.20 per kWh		35,330.40
PF Surcharge: 4907.00 KWH * Rs: 0.09		441.63
Interest on Revenue		0.00
Interest on Tax		0.00
Tax		3179.74
Current Bill Amount		55591.77
Arrears		0.00
Bill Correction		0.00
Bill rounding adjustment		0.23
Net Payable Amount		55592.00
Rupces Fifty-Five Thousand Five Hundred Ninety-Two Only		



Gulbarga Electricity Supply Company Limited

Office of the Asst. Executive Engineer (E), C,O&M Sub-division - Raichur Urban Sub-Division-1

RR No.	Billing Period	Due Date	Disconnection Date	Bill No.	Account Number	Amount payable
4826876780	01-05-2022 - 01-06-2022	15-06-2022	01-07-2022	575807110078	5758025255	Rs.55592.00

Name of the Bank	Branch	Cheque/DD No.	Cheque/DD Date	Amount (Rs.)	Amount In Rupees
5758025255					

Receipt No.	Date	Cashier Signature

Considering the energy data extracted from the bills available

Month	Units	Rec Demand	Power Factor	Penalty Amount	Total bill	% of Penalty
May	4907	46	0.87	442	55592	0.80%
June	5662	31	0.86	670	63227	1.06%
July	5505	34	0.52	6276	67550	9.29%
August	5758	36	0.9	0	63326	0.00%
September	5608	34	0.81	1514	65587	2.31%
October	4062	29	0.74	1950	52946	3.68%
November	4194	23	0.71	2391	54503	4.39%
December	4654	-	0.9	0	55724	0.00%
January	4194	25	0.84	755	12612	5.99%
February	4014	26	0.81	3251	53601	6.07%
March	4728	31	0.62	3972	60317	6.59%
April	6130	27	0.74	2942	66421	4.43%
				Average Penalty		3.72%

The institute has paid a penalty amount of ₹24163.00

With an investment of ₹10000.00 The institute can avoid the PF penalty.

Risk factor in corrective measure is to identify the location where the device should be placed as majority of the loads are single phase. However, a skilled technician can identify and execute the task.

Month	Units	Rec Demand	Power Factor	Rec KW	LVD Share	PU Col-lege share
May	4907	46	0.87	40.02	26.4132	13.6068
June	5662	31	0.86	26.66	17.5956	9.0644
July	5505	34	0.52	17.68	11.6688	6.0112
August	5758	36	0.9	32.4	21.384	11.016
September	5608	34	0.81	27.54	18.1764	9.3636
October	4062	29	0.74	21.46	14.1636	7.2964
November	4194	23	0.71	16.33	10.7778	5.5522
December	4654	-	0.9	-	-	-
January	4194	25	0.84	21	13.86	7.14
February	4014	26	0.81	21.06	13.8996	7.1604
March	4728	31	0.62	19.22	12.6852	6.5348
April	6130	27	0.74	19.98	13.1868	6.7932
				Average rKW:	16KW	

From the Power consumption data, The institute has availed a contract demand of 75KVA against the combined demand of 30 KVA (25KW actual). Hence the institute is paying an extra charge without using the facility. It is

advised to reduce the Contract demand to 35KVA and use the facility optimally.

The financial impact is a net saving of ₹9360/- per month. This amounts to ₹ 1.12 Lac a year. Under the present tariff the revised savings will be ₹ 11988/- per month resulting into annual saving of ₹1,43,850/-.

On initiating corrective measure, the institute can consider to apply for reduction in contract demand.

<u>Green Power on Grid</u>	<u>Category 7.1.2</u>
The institute has the space to install Grid tied Hybrid Solar power on/off net metering basis.	Need to install and establish a basic demo to educate and train the students.

The institute in addition should consider to install 60KWp Solar power with 6nos. of 10KW or 3 nos of 20KW hybrid inverter to meet the energy consumption of the college. Out of which two can be dedicated to LVD college and the CAPEX is appropriately allocated.

In case of isolated loads which are sparingly used may be isolated to avoid excess investment. The institute will meet the CAPEX out of the savings achieved by avoided energy bills to the extent of ₹5.00 Lacs per Annum.

The installation of

To impress upon the judicious technology to use Solar systems in the campus, the following description impresses on why Hybrid systems make sense in semiurban areas where power required is primarily for tasks and illuminating the area is secondary.

A brief note on Why Hybrid solar and not Online/Offline solar system.

ALTERNATE SOLUTION

What is a hybrid solar system? How does it work?

Going solar doesn't just mean installing solar panels – hybrid solar systems include battery storage so you can save the power your panels generate during the day and use it later, when the sun isn't shining.

A hybrid solar system is a renewable energy system that is grid-tied and includes battery storage. The system uses solar panels to produce energy during the day, while the batteries store excess energy for use later at night when there is no sunlight.

Hybrid solar systems are efficient, reliable, and a great investment for homeowners looking to go solar.

What is a hybrid solar system?

A hybrid solar system is a solar power system that uses solar panels, a hybrid inverter and a battery bank. The solar panels convert sunlight into electricity, while the batteries store energy for later use.

Hybrid solar systems have both on-grid and off-grid capabilities, allowing you to continue running on solar power even if the grid goes dark.



How does a hybrid solar system work?

A solar hybrid system is a renewable energy system that uses solar photovoltaic (PV) panels to generate clean energy to power your home. A hybrid solar system intelligently switches between using solar power, battery storage and grid power. It allows you to avoid using grid power at peak prices leading to bill savings.

The system stores renewable energy produced by its rooftop solar panels. During a storm or power outage, the system seamlessly kicks in and powers all of your home's essential loads. Keeping your lights on, refrigerator running, and phones and tablets charged.

The benefits of a hybrid solar system

A hybrid solar system is a great option if your priority is to keep your home running on backup solar power during an outage or whose utility company has time of use rates, demand charges, or does not offer a net metering policy, where they compensate you for the excess energy sent back to the grid.

The hybrid solar system has the flexibility to manage the time of use electricity rates for maximum solar savings on monthly electric bills.

1. Cost-Effectiveness

A hybrid solar system allows you to lock in low energy rates for years to come and shields you from future rate hikes. It also allows you to manage the time of use electricity rates for maximum solar savings on electric bills.

2. Flexibility and Scalability

A hybrid system can be designed to meet the specific needs and is scalable for future energy needs.

For example, a customer may want to have a backup power source for essential loads, such as medical equipment, lights, tv, refrigerator, and computers. In this case, the battery bank would be sized to meet the critical load requirements and would be used as needed. A hybrid PV system can offer flexibility and scalability that are not possible with other types of PV systems.

3. Environmental Sustainability

Solar panels are increasingly popular as people look for ways to reduce their carbon footprint. A hybrid solar system is a great option for those who want to do their part for the environment.

4. Reduce the Risk of Outages

A hybrid solar system is designed to provide power during grid outages. The main benefit of a hybrid solar system is that when the grid goes down due to technical errors or harsh weather conditions, the system ensures you have electricity at your property even when the grid cannot provide power.

Conclusion

In conclusion, a hybrid solar system is a great option for end consumers who are not only looking to go solar to lower their electricity bill, but to ensure your property is powered during a power outage. If you are interested in installing a hybrid solar system, be sure to do your research and find a reputable solar panel installer.

Financial implication.

Having suggested on installation of Grid power. Few considerations need to be accounted.

- Use of UPS systems for emergency power requirements.
- Frequency of power interruptions.

Hunagund is small town and is more likely to see power interruptions. In order to avoid duplication, we suggest that the Hybrid solar system be considered.

Hybrid system works in both online mode and offline mode. While online mode works when supply is live, offline performs with the backing from battery, it converts DC power into AC power and meets

While Hybrid inverter demands the need for battery backup, they can be added at a later date.

The installation of Hybrid system will need a CAPEX of ₹28.00 Lacs.

For details, The institute can contact Mr. Muralidhara(sushanthenterprises@gmail.com). The institute can also contact local vendors if they are capable of supplying the required services based on detailed energy monitoring.

PLACING OF BATTERIES

BATTERY PLACEMENT:

Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5

The batteries should be placed

- In an insulated platform not touching any of the metal frames.
- Need cross ventilation for favourable breathing.
- Provision for periodical checking and maintenance should be made possible without major obstacles.
- In absence of the above placement conditions,
- The batteries will discharge faster.
- The charging time and current will increase as there is the return path for self-discharge.
- A well-maintained battery is known to serve for more than 7 years.
- The presence of oxidation marks at the point of contact should not develop over the time.
- We strongly advice for regenerating the batteries once every 3 to 4 years so that they serve over 15 years in lieu of 5 years under present conditions.
- A well-maintained battery will draw less charging power, i.e., saves on energy consumption, delivers more energy per charge thus resulting in better serviced life.

For more information on battery management, Contact: SUNSHUBH TECHNO-VATIONS PVT LTD., Hubli

ceo@sunshubhrenewables.com



Batteries stacked without ventilation.



ELECTRICAL POWER USAGE:

It is important to understand the significance of the Energy use implication. The use of electrical power has been observed to be unnecessary. The administration should initiate to keep all unwanted and unused appliances switched off.

It is observed that the lights are left switched ON at majority of places and thus causing financial losses to the management and energy loss to the country.

Solution:

It is therefore required to install Light Intensity & Occupancy sensor in all the rooms.

Lighting improvements should be carried out by using LED luminaries or The Induction Light systems in lieu of normal tube lights., it is advised to install 40W Induction lamps in all classrooms to avoid glare.

Source : Can be locally procured, However the load-based selection is key aspect in its installation. To set the visibility, the intensity of natural light is much stronger and hence LUX based setting doesn't work. Hence the technical supervision is key aspect.

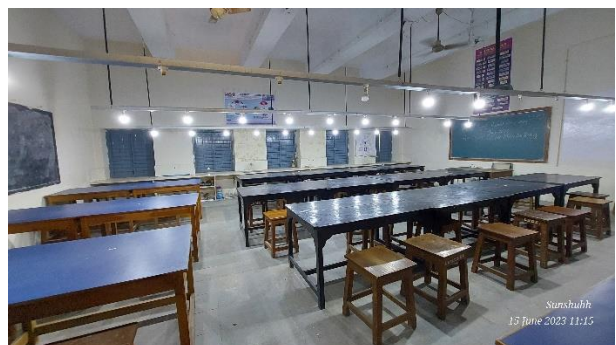
NATURAL LIGHTING:

It is seen that the patches of bright light hit the board. This causes strain on the eyes.

Solution: Keep the windows closed and with opaque glass so as to avoid direct rays. Opaque glass allows diffused lighting and does not glare the vision.



Category 7.1.1, 7.1.2, 7.1.3 & 7.1.5



The placing of LED lights should be restricted to one per table to avoid light pollution. Above the display area, mainly the Blackboard and projector screen, has a straining effect on the eyes. It is against the interest of good practice. Placing the light fixtures should always be from behind or from the top .



USE OF LED LIGHTS

Category 7.1.6

FAN	LED BULB	TUBE LIGHT	TOTAL
185	192	231	608

The institute is seen to use T8 Tube lights at various locations. The need to replace all such fixtures with LED lights is important from all aspects such as CAPEX, Energy savings, Energy conservation, reduction in energy bills. The Return On Investment is very lucrative and should be executed on priority.

It is also important from the fact that the institute has set its main objective as Knowledge sharing.



ELECTRICAL SAFETY

Category

7.1.5

All control gear should be treated with due concern and caution. Keep all flammable items away from area. Handle with safety gadgets.



Solution: Remove all dumped items and keep area clean and ready for access.

Label the room as Electrical room. Put a danger sign indicating people to keep away from the area.

NATURAL VENTILATION

Category 7.1.2, 7.1.6

Ventilators which are permanently closed should be opened and a mesh be provided to prevent birds' entry.

This helps cooling effect and avoided/minimal use of fans.



ASSET MANAGEMENT

The assets whether in use or to be should be placed in appropriate location.

Label the assets as deemed fit.



FUEL MANAGEMENT

The cylinders should be placed outside the room and at an elevated platform and in well-ventilated room.



GENERATOR EXHAUST

The generator exhaust opens lower than the top slab.

The exhaust pipe should be extended till the top most slab to prevent suffocation/inhaling hazardous gases by people moving/sitting above.



FACTORS CONSIDERED

Reference: <https://en.wikipedia.org/wiki/Raichur>


Raichur (formerly **Raichore**^[1]) is a city and [municipality](#) in the district of Raichur in the Indian [state](#) of [Karnataka](#). Raichur, located between [Krishna](#) and [Tungabhadra](#) rivers, is the headquarters of Raichur district. It is located 410 kms from the state capital, [Bangalore](#).

HISTORY[[EDIT](#)]



Iron Cannon On Hill Top Raichur

The recorded history of the district is traced as far back as the third century B.C.E. The fact that three minor rock edicts of [Ashoka](#) are found in district one at Maski in the [Lingasugur](#) taluk and the other two near Koppal, which proves that this area was included in the dominions of the great [Mauryan king Ashoka \(273 - 236 B.C.E\)](#). At that time, this region was under the governance of the Viceroy or Mahamatra of Ashoka. Thereafter, the district appears to have been a part of the kingdom of the [Satavahanas](#). The [Vakatakas](#), who reigned during the 3rd and 4th centuries CE, seems to have held sway over Raichur for some time, after which it appears to have been included in the [Kadamba](#) dominions. The next dynasty of importance, which ruled

Raichur or Rayachoor	
City	
Raichur	
Nickname: Cotton City	
	
Location in Karnataka , India Show map of Karnataka Show map of India Show all	
Coordinates: 16.2°N 77.37°E﻿ / ﻿16.2°N 77.37°E﻿ / 16.2; 77.37﻿ (N 77.37°E)	
Country	 India
State	Karnataka
District	Raichur
Government Body	RMC
Elevation	407 m (1,335 ft)
Population (2011)	
• City	232,456
• Rank	189
• Metro	251,555
Demonym	Raichurians
Languages	
• Official	Kannada
Time zone	UTC+5:30 (IST)
PIN	584101-103
Telephone code	91 8532
Vehicle registration	KA-36
Website	www.raichur.nic.in

over this region, was that of the [Chalukyas of Badami](#). According to an [inscription from Aihole](#), [Pulakeshin II](#) having defeated the [Pallavas](#), occupied this area and made it a province in his empire under the governance of his son [Adityavarma](#). Later the whole of the present Raichur district was included in the dominions of the [Rashtrakutas](#), who rose to power in the eighth century, as could be gathered from the inscriptions of that period found in this district. According to an inscription from [Manvi](#) taluk, Jagattunga, a subordinate ruler under the Rashtrakuta king [Krishna-II](#), was ruling the province of Adedore Eradusavirapranta, i.e., the area constituting the present Raichur district. [Amoghavarsha Nrupathunga I](#), a Rashtrakuta king, has described Koppal in his Kannada work, [Kavirajamarga](#), as the great Koppananagara.^[2]

Raichur has a rich history, having been a part of various empires, such as the [Bahmanis Sultanate](#), [Vijayanagara](#), the Adil Shahi dynasty of Bijapur and [nizam of hyderabad](#). The city is famous for its imposing [Raichur Fort](#).^[2] Here, stone inscriptions have been found in [Persian](#), [Urdu](#), and [Arabic](#) which belonged to the bastion of the fort, referring to its construction in 1294.^[3] Among the ruins of the immense fort are many [irrigation tanks](#) and old temples. The fort was built by [Kakatiya](#) king Rudra in 1284 CE which passed on to the Vijayanagar kingdom after the decline of the Kakatiyas. Thereafter the fort was under dispute for nearly two centuries. It was captured by the Bahmanis in 1323 CE. [Saluva Narasimha Deva Raya](#) expressed a wish in his testament that the city of Raichur be recaptured. This had been in the mind of Krishnadevaraya since his coronation in 1509. In the year 1520 Krishnadevaraya sent Saeed Maraikar, a Muslim in his service, to Goa with a large sum of money to buy horses. Maraikar instead went to Adil Khan with the money and offered his services. Krishnadevaraya made a demand that Maraikar be returned along with the money which was duly refused. During the period of peace, Krishnadevaraya made extensive preparations for a grand attack on Raichur doab. After the court decided that Raichur should be attacked the king invited all commanders (Nayakas) in his service to take part in the [battle](#).

Raichur is very rich from the epigraphical point of view. It has already yielded hundreds of inscriptions, ranging from the [Mauryan](#) period up to the end of the Muslim period. The inscriptions are in a variety of languages such as [Sanskrit](#), [Prakrit](#), [Kannada](#), [Telugu](#), Arabic, and Persian and belonging to almost all the dynasties that ruled over the Deccan. The most important places from this point of view are [Maski](#), [Koppal](#), [Kuknur](#), [Hatti Gold Mines](#), [Mudgal](#), [Lingsugur](#) and Raichur.^[4]

The District of Raichur was a part of the [Hyderabad State](#) until the re-organisation of State on 1 November 1956.

GEOGRAPHY[\[EDIT\]](#)

Raichur is located at [16.2°N 77.37°E](#) on [Deccan plateau](#).^[5] It has an average elevation of 407 metres (1335 ft)

The summers get really hot in this region with temperatures going beyond 40 °C. It receives rainfall during the months between May and August. Overall, the region is warm and humid during most part of the year.

DEMOGRAPHICS[[EDIT](#)]

As of the 2001 India [census](#),^[6]

Hinduism is majority religion in Raichur with 57.61% followers. Islam is second most popular religion in Raichur with approximately 39.87% following it. In Raichur, Christianity is followed by 1.18%, Jainism by 0.94%, Sikhism by 0.08% and Buddhism by 0.08%. Around 0.00% stated 'Other Religion', approximately 0.29% stated 'No Particular Religion'.

LANGUAGES[[EDIT](#)]

Languages of Raichur City (2011) Census

█ [Kannada](#) (37.10%)

█ [Urdu](#) (29.87%)

█ [Telugu](#) (25.71%)

█ Others (7.32%)

CLIMATE[[EDIT](#)]

Climate data for Raichur (1981–2010, extremes 1901–2012)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C	38.4	43.5	45.6	46.0	47.6	46.0	40.4	39.3	38.4	37.6	37.0	38.4	47.6
Average high °C	31.1	34.4	38.0	40.1	40.4	36.0	33.0	31.9	32.4	32.1	31.0	30.1	34.2
Average low °C	17.0	18.8	21.9	24.5	25.0	23.3	22.5	21.9	22.1	21.3	18.9	16.6	21.2
Record low °C	7.1	11.0	13.0	16.1	15.4	16.1	17.0	16.3	16.4	13.5	8.5	7.3	7.1
Average rainfall mm	3.2	4.0	3.6	17.7	45.5	106.2	124.6	128.5	152.4	117.7	19.7	5.1	728.2
Average rainy days	0.3	0.2	0.4	1.5	2.8	6.4	8.0	8.1	8.2	5.1	1.7	0.3	43.1
Average relative humidity (%) (at 17:30 IST)	35	29	23	24	28	46	56	59	59	54	46	40	42
Source: India Meteorological Department ^{[7][8]}													

LIST OF INSTRUMENTS

During the process of the Audit, the following lists of instruments were (considered for) use (wherever applicable).

Sr No.	INSTRUMENT	MAKE	APPLICATION
1	Digital Power Analyser(PC Interfaced)	SCHIVAN ARNOX	Electrical Machinery.
2	Accessories -3000 Amps	ARNOX	Higher load UPTO 3000 Amps,
3	Accessories -200 Amps	ARNOX	UPTO 200 Amps,
4	Thermal Imager	FLIR	Identify loose contacts and bearing losses
5	Power Analyser (Manual)	MECO	Electrical Machinery.
6	Infrared Thermometer	METRAVI	Thermal (Fuel) Energy.
7	Digital (Contact) Temperature & Humidity Meter.	METRAVI	Electrical Machinery. (A/C's And Cooling Towers)
8	Digital Tachometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
9	Lux Meter	METRAVI	General & Task Lighting.
10	Sound Level Meter	METRAVI	Electrical Machinery. Generator Sound Proofing
11	Digital Anemometer	METRAVI	Electrical Machinery.(A/C's And Cooling Towers)
12	Digital KW Meter	METRAVI	Electrical Machinery.

Sr No.	INSTRUMENT	MAKE	APPLICATION
13	Digital Power Factor Meter	METRAVI	Electrical Machinery.
14	Lap Top Computer	HP	To Interface The Instruments For More Accurate -Sophisticated Readings In Sensitive Equipment.
15	Ultrasonic flow meter		Measure liquid flow.
16	Portable Vibration Meter.	METRAVI	Structural Stability
17	Live cable detector probe	-	Detect hidden cables for safety audit.
18	Power Analyser – EMM 5	Beluk	For remote communication and detailed audit.
19	Power Analyser – ELITE PRO	Beluk	Power Analyser.
20	PTs for Transformer audits.	KALPA	On field auditing of transformer loading and imbalance evaluation.

Only appropriate instruments were used wherever necessary.

ACTION PLAN SUMMARY

Earmark the action plan.

Invite subject experts for Tec talks,

Organize in person panel discussions and interaction to propagate the knowledge and mitigate the problems in practicing the same.

Prioritize the initiatives and execute.

Observe the benefits and shortcomings.

Workout further improvement by involving the staff and students.

MODE OF ACTION:

The process of ENERGY AUDIT & ENERGY CONSERVATION should be carried out in three steps.

Good housekeeping practices using available manpower.

Minor alterations using in house work culture with minimum investments on accessories as discussed.

Capital investments, which may be required for installation of new methodologies may be taken up on phased manner.

We will be happy to assist you for any further advice/consultancy if required either on Rainwater management or on any of the measures discussed in the report.

We hope the measures are implemented in good spirit and to human convenience and comfort.

For SUNSHUBH TECHNOVATIONS PVT LTD.

Mallikarjun A. Kambalyal. B.E. (E&C)

Certified Energy Auditors EA-3485

Note Sheet: