

# ENERGY AUDIT REPORT

## 2022-23

in compliance with the statutory requirements under the NAAC  
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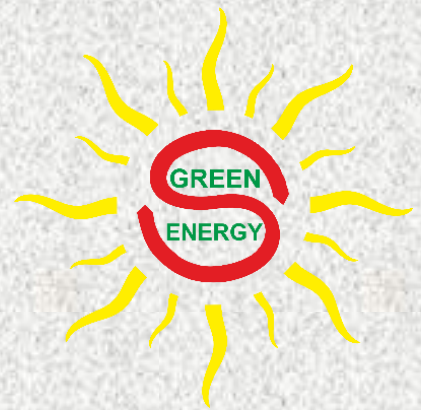
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ENERGY AUDIT REPORT

## CONTENTS

LIST OF ONSITE PHOTOS AND DISCUSSIONS.....	5
EXECUTIVE SUMMARY.....	6
Objectives of Auditors:.....	8
Criterion vii – Institutional values and best practices from energy audit perspective.....	9
PART 1 – GENERAL .....	16
OVERVIEW OF ENERGY AUDIT.....	17
CARBON FOOTPRINT AUDIT OBJECTIVES .....	18
STEPS UNDER CARBON FOOTPRINT AUDIT.....	20
CARBON FOOTPRINT - GREEN PLEDGE 7.1.6 .....	22
DAY'S ENERGY USE PLEDGE.....	23
ACKNOWLEDGEMENT: .....	24
ENERGY AUDIT COMPLETION CERTIFICATE .....	26
ABOUT THE INSTITUTE.....	32
ONGOING STATUS:.....	32
WHY IS THIS AUDIT BEING CARRIED OUT? .....	33
WHAT IS AN ENERGY AUDIT? .....	33
WHY SHOULD YOU GET AN ENERGY AUDIT? .....	33
ENERGY AUDIT OBJECTIVES.....	35
THE GOALS OF AUDIT .....	36
UNDERSTAND THE SCOPE OF AUDIT .....	36
GEOGRAPHICAL CONSIDERATIONS: .....	39
<b>History[edit]</b> .....	39
<b>Geography[edit]</b> .....	40
<b>Demographics[edit]</b> .....	41
Languages[edit].....	41
<b>Climate[edit]</b> .....	41
LIMITATIONS:.....	42
DISCUSSIONS ON EXECUTIVE SUMMARY:.....	43
PART 2 -TECHNICAL.....	43
Aerial View of the College Campus. ....	43

POWER CONSUMPTION .....	44
RENEWABLE ENERGY .....	44
SENSOR TECHNOLOGY .....	45
NATURAL LIGHTING	Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5
.....	47
LIGHT INTENSITY SENSOR REQUIREMENT.....	47
BATTERY MANAGEMENT. ....	51
BATTERY PLACEMENT:.....	51
BATTERY REGENERATION .....	53
NECESSITY AND ISSUES .....	53
RISK IDENTIFICATION OF LEAD-ACID BATTERIES .....	54
LEAD .....	55
SULFURIC ACID .....	56
CADMIUM.....	56
SAFETY TIPS .....	57
VENTILATION.....	57
NATURAL VENTILATION.....	59
WHY SUPER ENERGY EFFICIENT CEILING FANS? .....	60
SAFETY.....	62
Why International Days are Observed .....	64
LIST OF INSTRUMENTS: .....	73
ACTION PLAN SUMMARY:.....	74
MODE OF ACTION: .....	75
NOTES: .....	76

**LIST OF ONSITE PHOTOS AND DISCUSSIONS.**

Figure 1 - Home energy pyramid .....	9
Figure 2 - Bureau of energy Efficiency Regd No: EA3485 .....	27
Figure 3 - ISO Certified Lead Auditor. Certificate No: 47730 .....	28
Figure 4 - ISO Certified Lead Auditor. Certificate No: ENR-00253448 ....	29
Figure 5 - Manager training programme, Germany .....	30
Figure 6 - Fit for partnership with Germany .....	31
Figure 7 -Satelite view of the Academic block.....	43
Figure 8 - Sensor activated lighting.....	45
Figure 9- occupancy sensor .....	46
Figure 10- Lighting, use of natural lighting .....	48
Figure 11- T5 & T8 tube lights with Electromagnetic choke .....	49
Figure 12 – Where ever possible Provide double layered - lighter curtains .....	50
Figure 13 - Galvanic reaction causing damage to battery life.....	51
Figure 14 - Battery placement, Need cross ventilation.....	52
Figure 15 - Use BLDC fans to save energy. ....	59
Figure 16 - Use ventilators effectively.....	60

## EXECUTIVE SUMMARY

Sr No	Observation*	Observations*	Resulting benefits*	Remedial measures*	Capital*	Projected savings*	Category 7	
1	Power Consumption	All Energy parameters need to be monitored	Possible reduction in Power demand. Energy & revenue loss	on regular monitoring	Nil, Use the existing meter already in place.	Avoided revenue penalty		
2	Solar Power	Suggest to install Hybrid Solar Power to minimise/avoid use of generator during Off grid times.						7.1.2
3	Occupancy sensor	Wastage of power	High	Occupancy sensor-based switching	₹1500 per room	Resulted ROI of one year.	7.1.2	
4	Battery placement	Concealed enclosure. 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	
5	Battery regeneration.	Short life span	300% of the cost of the battery.	Subject all batteries to regeneration made.	Rs.20.00 Lacs or as per user agreement	300 %	7.1.2, 7.1.6	
6	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	

Sr No	Observation*	Observations*	Resulting benefits*	Remedial measures*	Capital*	Projected savings*	Category 7
7	Natural Lighting	Un cleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the windowpanes 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
8	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.

## Objectives of Auditors:

Sunshubh Technovations Private Limited (Formerly Sunshubh Renewables & Research Centre since 2008) is registered in the year 2020 and has evolved from initial proprietary concern, Sunshubh Renewables & Research Centre. Sunshubh has been in operation since 2008. Sunshubh today is led by a team of well experienced Certified Energy Auditors and tech- savvy young engineers.

We believe in Identifying opportunities and executing solutions based on need with highest priority to Energy conservation over efficiency.

Since beginning, Sunshubh has been growing and today, we have wide range of clientele In the field of Industry : Tool room, Chemicals and refinery, Mining, Health, Hospitality, Food processing, Infrastructure and Educational institutions under NAAC compliance. Our approach has been very aggressive in equipping ourselves with the latest instruments. After decade of professional experience, we restructured ourselves and thus the formation of a Private Limited company on 22<sup>nd</sup> July 2020.

Today we have with us the technical team comprising three Certified Energy Auditors, One Certified Energy Manager and support team of young and enthusiastic engineers to comply to the client requirements.

### POLICY MATTERS

Learning from our training in Germany and their policies, SUNSHUBH does not supply any energy saving equipment's or systems. However, we do stand up to support and execute the measures to prove our findings right. This is mandatory to assure the client that we do not market any self-centred product or orient the Audit assignment to sell any third party product. Meaning to say **we stand neutral to all methodologies in the interest of adopting best technologies.**

We strongly believe in sharing our knowledge and training inhouse manpower for continual improvement in energy flow.

We have set a policy not to hire the instruments from third party but to procure every small or big ones to do justice to our clients.



## Criterion vii – Institutional values and best practices from energy audit perspective.

### Key Indicator - 7.1 Institutional Values and Social Responsibilities

Metric No.	Description	Compliance	Initiatives required
7.1.1  QIM	Measures initiated by the Institution for the promotion of gender equity during the last five years. Annual gender sensitization action plan  Specific facilities provided for women in terms of: Safety and security - Energy	Partly Complied	<ol style="list-style-type: none"> <li>1. Placing sanitary pad incinerator and dispenser is required in all women rest rooms and waiting halls.</li> <li>2. The concept of home energy management may be initiated for the women. The typical illustration is reproduced.</li> </ol>

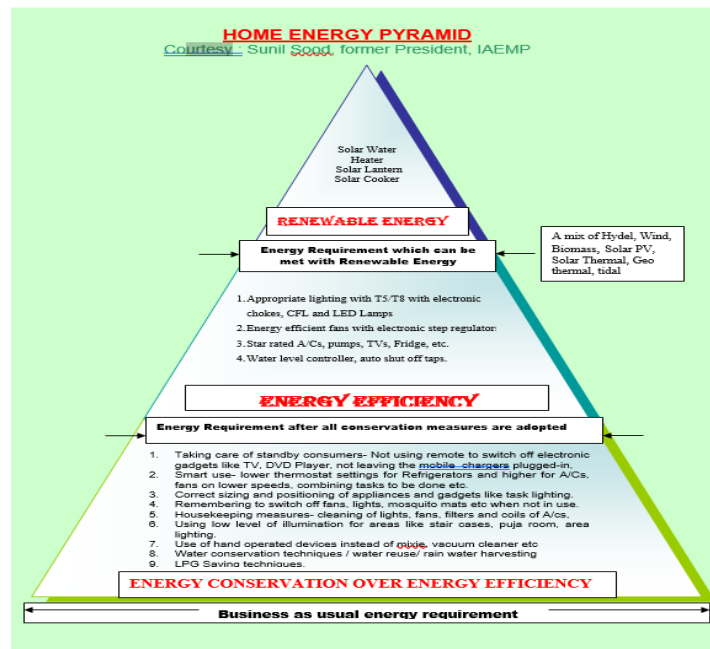


Figure 1 - Home energy pyramid

Environmental Consciousness Sustainability	and	Discuss on why the recent calamities keep occurring more often than before.
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7.1.2 Q <sub>n</sub> M	<p>The Institution has facilities for alternate sources of energy and energy conservation measures</p> <ul style="list-style-type: none"> <li>• Solar energy</li> <li>• Biogas plant</li> <li>• Wheeling to the Grid</li> <li>• Sensor-based energy conservation</li> <li>• Use of LED bulbs/ power efficient equipment</li> </ul>	Complied through parent society.	<p>Considering the cost of energy use, serious consideration may be taken up for, Solar Biogas plant in Hostel mess. If solar is installed the power can be exported to grid on non-working hours. Sensor based control is a must for energy use optimization. Complete the ongoing work at faster pace.</p>
7.1.3 Q <sub>i</sub> M	<p>Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)</p> <p>Solid waste management Liquid waste management Biomedical waste management E-waste management Waste recycling system Hazardous chemicals and radioactive waste management</p>	Complied partially wrt minimizing	Energy consumption details need to be monitored and the benefits of avoided accumulated energy use and power demand should be established.
7.1.4 Q <sub>n</sub> M	<p>Water conservation facilities available in the Institution:</p> <p>Rain water harvesting Borewell /Open well recharge Construction of tanks and bunds</p>	Complied. Open ground percolation. Open well restoration Percolation pond	The institution should consider in measuring the energy and power demand at various ground water table to demonstrate the impact of increased water table by rainwater harvesting methods.

	Waste water recycling Maintenance of water bodies and distribution system in the campus	near to open well	Kindly refer to the article listed at the end of the table.
7.1.5 Q <sub>n</sub> M	Green campus initiatives include (4) 7.1.5.1. The institutional initiatives for greening the campus are as follows: Restricted entry of automobiles Use of Bicycles/ Battery powered vehicles Pedestrian Friendly pathways Ban on use of Plastic landscaping with trees and plants.	Partially complied.	With disciplined vehicle parking the reduction in fuel consumption can be demonstrated in the college campus. The students can be given a task of conducting such practical on field and a competition should educate the society.
7.1.6 Q <sub>n</sub> M	Quality audits on environment and energy are regularly undertaken by the institution (5) 7.1.6.1. The institutional environment and energy initiatives are confirmed through the following 1.Green audit 2. Energy audit 3.Environment audit 4.Clean and green campus recognitions/awards 5. Beyond the campus environmental promotional activities	Complied.	The audit findings should be predominantly projected by action from all stake holders of the institution.
7.1.7 Q <sub>n</sub> M	The Institution has disabled-friendly, barrier free environment Built environment with ramps/lifts for easy access to classrooms.	The initiatives have been considered.	The demand for muscle power to climb the ramp may be considered as one such case and ideally establish the gradient of the ramp.

	<p>Disabled-friendly washrooms</p> <p>Signage including tactile path, lights, display boards and signposts</p> <p>Assistive technology and facilities for persons with disabilities (<i>Divyangjan</i>) accessible website, screen-reading software, mechanized equipment</p> <p>Provision for enquiry and information : Human assistance, reader, scribe, soft copies of reading material, screen reading</p>		
7.1.9 Q <sub>1</sub> M	<p>Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens</p> <p>Describe the various activities in the Institution for inculcating values for being responsible citizens as reflected in the Constitution of India within 500 words.</p>	Need to explore.	<p>The sensitization of switching off the non-required electrical appliances and devices should be encouraged. Like organizing the inhouse competition.</p> <p>Every student to table their energy bills in the previous year. The savings in the forth coming year should be recorded and an energy ambassador award be shouldered on the top students. This activity brings in the sense of responsibility, accountability and importantly knowing their energy use and abuse.</p>
7.1.10 Q <sub>n</sub> M	<p>The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and</p>	Partially Complied.	<p>A range of activities can be brought in just as discussed in 7.1.9 above. The Code of Conduct is displayed on the website</p>

	conducts periodic programs in this regard.		There is a committee to monitor adherence to the Code of Conduct Institution organizes professional ethics programs for students, teachers, administrators and other staff Annual awareness programs on Code of Conduct are organized
7.1.11 Q <sub>1</sub> M	Institution celebrates / organizes national and international commemorative days, events and festivals  Describe the efforts of the Institution in celebrating /organizing national and international commemorative days, events and festivals during the last five years within 500 words	Complied	In today's practices, the celebration has been formal. The actual celebration has to be yearlong. The theme for the year has to be laid and the activities should be conducted and on the day of celebration the selective activities be carried out. Just to illustrate, Consider the Republic Day. We celebrate the flag hoisting and with cultural activities. Consider the week-long program where in, students can discuss what is the Republic Day. How the final draft got to be written and who all are the members of the draft committee. <a href="https://en.wikipedia.org/wiki/Constitution_of_India">https://en.wikipedia.org/wiki/Constitution_of_India</a>
7.2.1 Q <sub>1</sub> M	Describe two best practices successfully implemented by the Institution as per NAAC	Complied.	When the listed activities from 7.1.1 to 7.1.11 are complied, the institute can have many creative best

	format provided in the Manual.		practices and the achievements can really bring in the name, fame and the recognition and appreciation not just on records but on monetary contributions as well.
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ENERGY AUDIT REPORT

The *Bulletin on*  
**BE E** *nergy*  
*fficiency*

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FROM THE EDITOR-IN-CHIEF

## The simple economics of water and energy security



It is estimated that the global annual use of commercial energy is about 400 Quads (quadrillion BTUs). The sun pours an additional 6 million Quads of radiant energy into the Earth's atmosphere each year. Thus in absolute terms, energy available is several orders of magnitude higher than demand. Yet, the world continues to struggle against an acute energy crisis. This leads one to believe that the problem is not merely of energy availability but rather a problem of affordability. Energy is a matter of pure economics, of demand and supply – at a cost.

A similar principle applies to water. Though roughly 80 percent of the Earth's surface is water, cheap potable and clean water is simply beyond the reach of millions across the world. Potable water sourcing, treatment, and distribution require considerable amounts of energy. Access to water is therefore closely linked to energy availability and affordability.

This close interdependence between energy and water needs to be clearly recognized and the nexus addressed suitably at the policy level. The first and foremost priority of any energy policy should be the wise, efficient use of whatever energy supplies are available. Similarly, priority should be given to the efficient use of whatever water supplies exist. Once the issue of efficient use has been tackled, focus can then be shifted on creating new energy and water supplies that meet sustainability and environmental requirements. And this may not be as difficult to achieve as it appears.

As in the case of energy use, the difficult part is reducing the quantum of water use while maintaining the level of benefits both for the customer and the utility. If this can be addressed, water utilities can save money as the reduced demand effectively creates more system capacity. With decreasing demand, the water utility effectively avoids additional investments in new facilities and equipment. Reduced volume of water flowing through the system has the attendant advantage of reduced frictional energy losses, thereby reducing the cost of pumping. This leads to a win-win situation for both the consumer and the utility, with the consumer benefiting through the reduced cost of delivery, diminished chances of water shortfalls, and the utility benefiting from decreased likelihood of major investment expenditures.

Needless to say that all this also saves energy. In rural areas, a large number of irrigation pump sets are either operated at highly subsidized electricity tariff from the power utilities or at no cost at all, encouraging the use of poorly designed inefficient pump sets which are over-rated and over-used. Replacing these pump sets with energy-efficient ones is one option, but who bears the cost? Another option is rainwater harvesting. For every one foot increase of the water table one achieves an approximate savings of 1 percent power.

Which means one gets more for the same energy use. That's simple economics.

*Debashish Majumdar*  
Debashish Majumdar  
Managing Director, IREDA

## INSIGHT

## Water–Energy: two faces of a coin

*There is a direct relationship between water and power. A reduced water table is directly proportional to the square of the increased electrical power consumption, says the author*

We all presume that if the dams and reservoirs are full then electrical power could be available in plenty. However, we tend to ignore that the demand for electrical power has been growing at a much faster rate than what we can produce and, hence, any amount of rain and or electrical power generated is insufficient to meet our demand. Most thermal power plants are running low owing to a short supply of coal. So where are we?

The recent changes in temperature and erratic rainfall has a direct relationship with urbanization. With increased urbanization and industrialization, we have only created a greater need for energy. This energy is sourced primarily from fossil fuels such as coal and nuclear power plants. In the absence of rains, the only means of generating electrical power is by burning fossil fuels. The burning releases emissions into the atmosphere, resulting in increased CO<sub>2</sub> concentration in the troposphere, and subsequently the greenhouse effect. The disturbed rainfall pattern is a result of this global warming.

The demand for power can be classified into four areas: agricultural need-based; industrial need-based; commercial need-based; and domestic need-based.

Today, a number of agencies such as the Bureau of Energy Efficiency (BEE), Petroleum Conservation Research Association (PCRA), the National Productivity Council (NPC) and a host of voluntary organizations, are working at ensuring energy efficiency in industries. But while the commercial and domestic need-based sectors have the potential, little is being done in this area. These sectors need a lot of education, motivation and awareness.

The agricultural industry needs the greatest attention, mainly in irrigation pump-sets (IPs). Most IPs are being operated free or on highly subsidized electricity supply. But eventually they consume a lot of power.

For instance, there are 16,000 irrigation pumps reportedly being operated under the HESCOM (Hubli Electric Supply Company), a division in North Karnataka. If, on an average each 5 HP pump consumes 3.73 kW of power per hour (there are actually a greater number of 10 HP pumps), the total consumption is as below:

For 10 hours per day = 37.30 kWh

For 200 days of watering = 7,460 kWh (7.46 MWh/pumpset)

For 16,000 sets, it is 119,360 MWh which means, 358,080 MWh of power generation at the power plant.

To reduce this consumption, should the IP users be asked to change over to energy-efficient sets? The question is:

- can the users afford the change?
- are they willing to accept the new brands of sets imposed on them?
- can the sale of inefficient IP sets be controlled?

Or should measures be adopted where the users may not use the IPs at all? Or can power consumption be reduced?

One good method is to reduce power consumed by IP sets by increasing the water table. If the water table can be increased by, say, 13 ft, then for the same 150 LPM delivery we will need a 4 HP (2.984 kW), and the savings for 16,000 IP sets would be 23,872 MWh, which is 20 percent – approximately 1.5 percent power saving for every feet of increase in the water table. This increase in water table can be achieved by adopting rainwater harvesting – through either bunds or by natural

filtration tanks or by preventing pumping of water by making use of rainwater.

Now who meets the cost of these programs is one big question. Let us see how the electrical supply company benefits: If the organization spends around Rs 5,000 per IP set, we have Rs 800 crore as the capital investment on rainwater harvesting. For an annual savings of 23,872 MWh of electrical power, a savings of Rs 9.55 crore at the rate of Rs 4 per kWh for every feet increase in the water table.

It is always better not to use energy than try and save energy.

When a process industry utilizes water for its operations, then this water has to be demineralized or softened. To do this, it will need electrical power. Also due to dissolved solids and increased concentration, repeated breakdowns may happen, demanding periodic maintenance and scraping of industrial components, which means more energy consumption.

Now, greater the amount of rainwater harvested, lesser will be the dissolved solids, which means less breakdowns and increased fuel savings. Once the fuel consumption comes down, the release of CO<sub>2</sub> into the atmosphere is also reduced. Reduced CO<sub>2</sub> means lesser effect on global warming. This will then lead to stable weather conditions and predictable monsoons. Once the ecological cycle is renewed, achieving a balance between industrial, agricultural and environmental growth is easy.

Water is a renewable source of energy and must be conserved.

*Courtesy: Mallikarjun A. Kambalyal, President, Sunshubh Renewable Energy Foundation  
E-mail: mallu\_solar@yahoo.co.uk*



## 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., CO<sub>2</sub>. 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.

**CARBON FOOTPRINT - GREEN PLEDGE 7.1.6****DAY'S CARBON HANDPRINT 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 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

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

### ENERGY USE POLICY

I, ..... The Principal, I .....the staff member, I..... a student, I ..... a visitor of the Institute,

adopt responsible practices, in our day's energy use with due regard to the environment. I pledge to avoid using electrical power where not needed either in the Campus or at my home. I pledge to use judiciously the electrical power by using Energy efficient products. I shall practice to switch off all lights and appliances when not in use. I will use natural energy ie the Light, breeze to keep myself visible and fresh.

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

Objective of my Energy use Policy:

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. (not to be printed in the Pledge)

**CAMPUS:** TARANATH SHIKSHANA SAMSTHE'S, Soma Subhadramma Ramangoud Arts and Commerce College for Women, Raichur. Karnataka

## ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD., is pleased to express its sincere gratitude to the management of TARANATH SHIKSHANA SAMSTHE'S, Soma Subhadramma Ramangoud Arts and Commerce College for Women, Raichur, Karnataka, 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 also wish to thank 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 7<sup>th</sup> Criteria Team lead by the able and motivating Principal, Faculty and the students who have kept the college premises clean to the possible limits. Without the crucial and significant support from the fellow teaching team the energy savings 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.

We are not in a position to compute the carbon foot print at this point of time as the basic information from each of the students is yet to be collected; however, we will discuss the Carbon Foot print in the follow up compliance report.

Wishing the team, a great success we deeply express our gratitude and heartfelt "THANKYOU" for allowing us to assess the energy flow scenario there by the ENERGY STATUS.

We acknowledge the involvement of Criteria Coordinator and supporting team.

---



Name	Designation
Prof. Amaregouda. S	Principal
Mr. Sanjay Power	IQAC Coordinator
Dr. Rajeshwari.	Co-ordinator Criteria 7
Mr.Sanna veranagouda	Co-ordinator Criteria 1
Dr. Venkatappa nail	Co-ordinator Criteria 2
Smt. Eramma. J	Co-ordinator Criteria 3
Miss Triveeni	Co-ordinator Criteria 4
Dr. Hanumantha Naik	Co-ordinator Criteria 5
Smt. Gowri Pallakki	Co-ordinator Criteria 6

Mallikarjun A. Kambalyal. B.E.(E&C).  
Certified Energy Auditors (EA-3485)  
SUNSHUBH TECHNOVATIONS PVT LTD.,

ENERGY AUDIT REPORT

## ENERGY AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 16th May 2024 at,

**TARANATH SHIKSHANA SAMSTHE'S  
Soma Subhadramma Ramangoud Arts and Commerce  
College for Women, Raichur.**

under the instructions of Prof. Amaregouda. S Principal

This report is generated based on the site visits and energy data collected from the site.

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.

Authorised Auditor.

Digitally Signed

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


Certified Energy Auditors EA-3485.

ISO 50001:2011 & ISO14001:2015 Lead Auditor.


Date: 27<sup>th</sup> May 2024.

Credentials attached 7.1.6

Refer to [ceo@sunshubhrenewables.com](mailto:ceo@sunshubhrenewables.com) for confirmation.



## 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 **7<sup>th</sup>** 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
<b>28.01.2020</b>			

Figure 2 - Bureau of energy Efficiency Regd No: EA3485



Figure 3 - ISO Certified Lead Auditor. Certificate No: 47730



Figure 4 - ISO Certified Lead Auditor. Certificate No: ENR-00253448



Teilnahmebescheinigung

**Mr. Mallikarjun Andanappa Kambalyal**

has successfully completed the

**Manager Training Programme  
of the Federal Ministry of  
Economics and Technology**

Germany, September 02 – 28, 2013

*Energy Efficiency in Industrial Enterprises*

Cologne, September 28<sup>th</sup>, 2013

Dr. Steffi Artl  
(Geschäftsführerin)

Hubert Smarowos  
(Geschäftsführer)

TÜV Rheinland Akademie GmbH • Alboinstr. 56 • 12103 Berlin

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Figure 5 - Manager training programme, Germany



Figure 6 - Fit for partnership with Germany

## ABOUT THE INSTITUTE.

TARANATH SHIKSHANA SAMSTHE'S, Soma Subhadramma Ramangoud Arts and Commerce College for Women, Raichur. Karnataka is a centre for excellent learning, it is founded in the year 1964 with a vision to provide quality education for the empowerment of the rural youth and to promote human excellence.

The college is located in Raichur of Karnataka State. The campus is spread over black cotton soil in an area of 11.2 acres. Institute provides education in Arts, Science and Commerce stream.

TARANATH SHIKSHANA SAMSTHE									
SOMA SUBHADRAMMA RAMAN GOUD WOMEN'S									
COLLEGE RAICHUR									
STUDENT		PROFILE		2022 23		RESULT	EXCELLENCE		
CLASS	GM	SC	ST	BC	TOTAL	BA	PERCENT		
BA	01	48	14	61	159	BCOM	100		
B.COM	25	45	13	185	268	BSW	100		
BSW	0	01	03	01	05	B.COM	IV	RANK	
TOTAL					432				
TEACHING STAFF									
P D			01						
ASSO PR F			01						
ASST PROF			15						
LIBRARIAN			01						
PHDS									
M PHIL									
						NSS UNIT			01
						ROLL	00		
						NON TEACHING			10

## 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.

**NO WASTE – NO POLLUTION – NO HEALTH HAZARD.**



## WHY IS THIS AUDIT BEING CARRIED OUT?

Why it's important to have an Energy Audit

Whether you own or manage a small business, a large commercial facility, or a manufacturing operation, it's important to take advantage of any tips, programs and incentives that will help you save money on your energy bills. There are measures that will generate savings to positively impact your bottom line immediately, as well as longer-term strategic initiatives to assess your needs and stabilize your energy spend in the longer term – which is great news for your budget!

One such initiative is an energy audit. Energy audits reveal your usage patterns, identify waste, over-expenditure and, generally, make you fully cognizant of where your energy dollars are going. This knowledge will enable you to be more efficient with your energy use and be able to track and accelerate savings. Energy Audits may sound expensive or complicated, but they can be free and are easier than you think.

## WHAT IS AN ENERGY AUDIT?

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility bill.

## WHY SHOULD YOU GET AN ENERGY AUDIT?

Energy costs are soaring and your business can be at considerable risk if you do not take the guesswork out of your energy usage and the budget you need to cover it. Energy audits identify where your business is wasting energy. Residential and commercial properties account for around 10% of carbon emissions in the US, according to the EPA, which means they are very inefficient and waste huge amounts of energy and... revenue. An energy audit helps by revealing just how and where energy is being wasted. With thousands of commercial energy customers nationwide, we are well-qualified to advise you on which methods are best used for reducing energy waste and overall energy consumption. Let's start with a simple free evaluation of your bills and show you how we have been found to save between 5% and 35% for many of our customers.

In the case of energy, less is more. Lower energy consumption equals lower energy costs. And, of course, less energy consumption is obviously good for the environment.

As you can see, to be truly effective, energy management requires a strategy just like the other aspect of your operation and measures to curb costs can be simple and in some cases free. Gaining more control over your energy costs will improve the general health of your budget. Not only that but reducing your CARBON FOOTPRINT is great for the environment too!

ENERGY AUDIT REPORT

## ENERGY AUDIT OBJECTIVES.

Energy 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 green 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.

Through green 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 green 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, green 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++", "A+", "A", Grade "B", .... according to the scores assigned at the time of accreditation.

The other intention of organising green 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 AUDIT

The purpose of carrying out Environment & Green 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 organisation utilising minimum natural resources.
- Efficient use of those resources contributing to minimum waste generation.

How is the green 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 focused end user comfort 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 green 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.
- 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.

It deals with use of energy in the conduct of the process. The priority is topmost for conservation over efficiency; hence, energy auditor should always consider potential operations that can be executed without the use of energy or minimised if necessary. At best it can be used judiciously.

Audit 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.

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.

To make an organisation net zero, near to net zero carbon emission. Use of renewable resources including energy such as solar wind biogas geothermal energies are put into ooh utilisation.

The net impact, all the above audits should be to make an organisation contribute zero emissions which are caused by use of water, generation of waste, use of energy, environmental damage, health damage. Finally, to explore if the campus can go in contributing to third-party emissions minimisation.

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

## GEOGRAPHICAL CONSIDERATIONS:

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

**Raichur** (formerly **Raichore**<sup>[1]</sup>) is a city and [municipality](#) in the district of Raichur in the Indian [state](#) of [Karnataka](#). Raichur, located between 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 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

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

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 Kopananagara.<sup>[12]</sup>

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](#).<sup>[12]</sup> 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.<sup>[13]</sup> 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.<sup>[14]</sup>

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](#).<sup>[15]</sup> 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](#),<sup>[6]</sup>

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	Ja n	Fe b	Ma r	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	No v	De c	Yea r
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 <a href="#">relative humidity</a> (%) (at 17:30 <a href="#">IST</a> )	35	29	23	24	28	46	56	59	59	54	46	40	42

Source: [India Meteorological Department](#)<sup>[7][8]</sup>

## 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.

ENERGY AUDIT REPORT

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**DISCUSSIONS ON EXECUTIVE SUMMARY:****PART 2 -TECHNICAL****Aerial View of the College Campus.**

*Figure 7 -Satelite view of the Academic block*

It is also prominently exhibited in all prominent places. Aerial view indicates that the management has shown keen interest in providing the amenities and is focusing on keeping the campus green there by the cool environment within the boundaries of the college.

Image : courtesy, Google Earth Pro, 16°11'44.33" N 77°21'44.58" E

The observations are drawn from the site visits and aerial survey of the campus when the corrective measures are discussed.

## POWER CONSUMPTION

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
1	Energy consumption	Use of T8 & T5 tube lights.	Excess energy use	Replace with LED Lamps	@ 300/- per Fixture	50% of the energy used in lighting systems.	

<b>Soma Subhadramma Ramangoud Arts and Commerce College for Women, Raichur</b>		
<b>Month</b>	<b>Unit (KWh)</b>	<b>Amount in Rs.</b>
22-Jun	1500	18940
22-Jul	2068	21505
22-Aug	2151	21535
22-Sep	1379	14620
22-Oct	1129	12138
22-Nov	1521	16030
22-Dec	1208	12850
23-Jan	1111	11927
23-Feb	1242	13185
23-Mar	1125	12031
23-Apr	1231	13077
23-May	2656	29925
Annual Total	20021	213412
Annual average	1540	16416

## RENEWABLE ENERGY

The college uses grid power. The college can demonstrate the benefits of Solar power over its roof top and conduct on field financial calculations of various principals such as, ROI, Present value of Money, Future Value of Money, and the like.

## SENSOR TECHNOLOGY

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
3	Occupancy sensor	Wastage of power	High	Occupancy sensor based switching	₹1500 per room	Resulted ROI of one year.	7.1.2

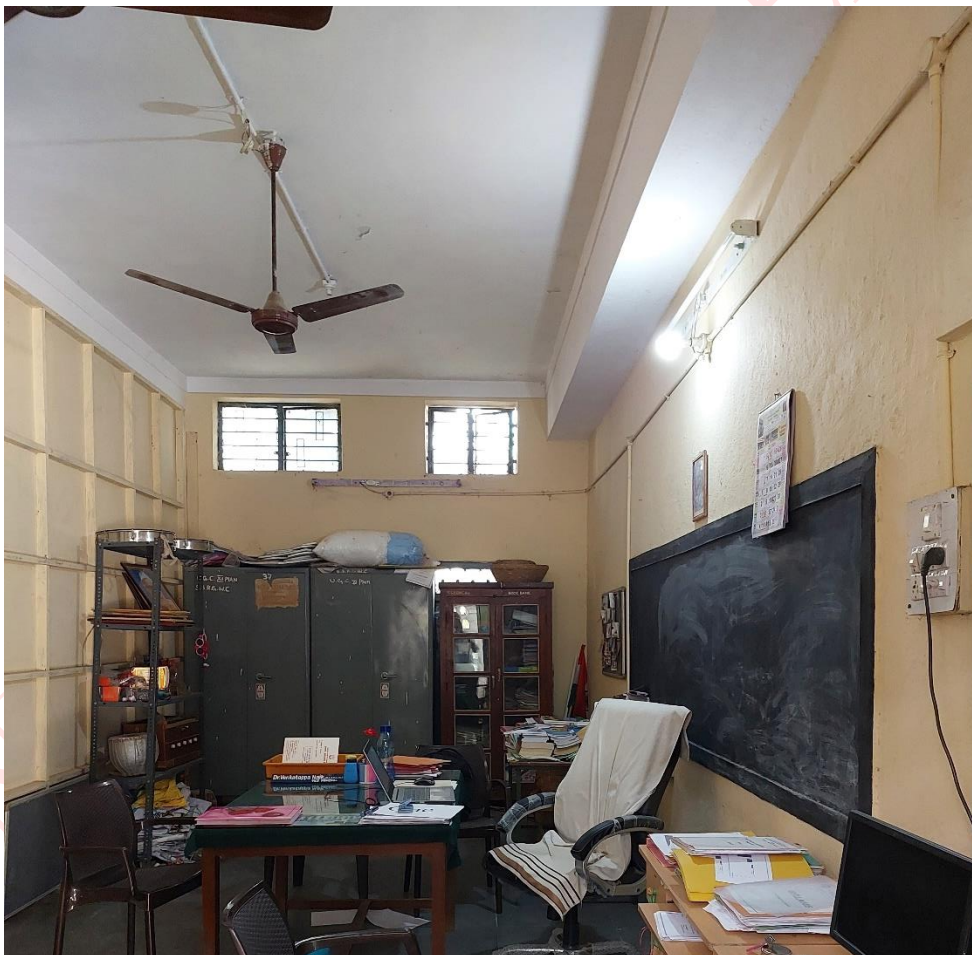


Figure 8 - Sensor activated lighting

It is also observed that the lights are left switched ON at majority of places during daylight, thus calling for wastage of electrical power. Thus

causing financial losses to the management and energy loss to the country.

Solution:

It is therefore required to install Light Intensity Sensors in all the rooms. Lighting improvements should be carried out by using T5/LED or The Induction Light systems in lieu of normal tube lights. If the finance department permits, it is advised to install 40W Induction lamps in all classrooms.

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.

We suggest to allocate this to the Physics stream of students to understand the science and application of technology.

Need based light energy utilisation should be imparted to the children so as to take it forward to the society.

The other aspect to the light energy is the task-based lighting. i.e., Task – normal or critical.

General lighting ie open larea or living room lighting.

External lighting ie yard lighting for security reasons.

We find use of T8 & T12 tube lights. It is wise to replace the same with LED tube lights on immediate basis. Considering the energy savings, the wait for there failure may not be justified.



Figure 9- occupancy sensor

## NATURAL LIGHTING

Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5

## LIGHT INTENSITY SENSOR REQUIREMENT.

6	Natural Lighting	5	Electrical	Observation*
Un cleaned windows and ventilators, forced switching on of tube lights	High energy bills	Old tube lights	High energy consumers	Problems*
Clean the windowpanes and allow maximum natural light penetration.	High energy bills	LED lights of appropriate ratings.	High energy consumers	Resulting losses*
Nil, part of routine, In house manpower.	High energy bills	Rs.80/- to Rs.250/- per unit	High energy consumers	Resulting losses*
Substantial cost of energy bills on lighting.	High energy bills	Rs.175/- per tube per annum. ROI of 1 years.	High energy consumers	Resulting losses*
7.1.2, 7.1.6	7.1.2, 7.1.6	7.1.6	7.1.6	Category 7



*Figure 10- Lighting, use of natural lighting*

We also suggest to make best use of natural lighting  
In the above roof, it may be considered to replace couple of the Galvalume sheets with green tinted Translucent (frp) sheets as below.  
It may be seen that the Light is illuminated. However, the brightness The shadow indicates natural light coming from the windows is brighter.





Figure 11- T5 & T8 tube lights with Electromagnetic choke

Natural light is more predominant than the tube light. Hence tube light being switched off has no adverse effect. It would save on the energy consumption and contribute to green practices.

ENERGY AUDIT



Figure 12 – Where ever possible Provide double layered - lighter curtains

The Book racks and cupboards may be placed vertical to the windows to allow the natural light to illuminate the task area.

## BATTERY MANAGEMENT.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
3	Battery placement	Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house re sources	25% of the cost of the batteries.	7.1.3

Criteria 7.1.1, 7.1.2, 7.1.3 and 7.1.5

## BATTERY PLACEMENT:

Batteries should be placed on an insulated platform not touching any of the metal frames with top clearance of 6" for ease of handling and breathing. Need cross ventilation for favourable breathing. Provision for periodical checking and maintenance should be made possible without major obstacles.



Figure 13 - Galvanic reaction causing damage to battery life.

*Figure 14 - Battery placement, Need cross ventilation.*

In absence of the above placement conditions,

The batteries will discharge faster. Loss of energy

The charging time and current will increase as there is the return path for self-discharge. Increased Energy Demand.

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.

Batteries should be placed well ventilated and avoid dumping of any material on the breathers provided.

For more information on battery regeneration, Contact

Sunshubh Technovations Pvt Ltd, Hubli [ceo@sunshubhrenewables.com](mailto:ceo@sunshubhrenewables.com).

ENERGY AUDIT REPORT

## BATTERY REGENERATION

Battery regeneration is very popular. 80% of the batteries breaking down and losing capacity are sulphated, but can be restored with the right equipment. Battery regenerator successfully replaces sulphation by active material thanks to an electrical high-frequency pulsation process. This process restores the battery capacity, giving you the ability to reuse old and sulphated batteries. You can also use the battery regenerator for annual maintenance to considerably prolong the lifespan of your batteries. The battery regenerator can be used in every lead-acid-based battery: starter batteries, stationary batteries, traction & semi-traction batteries, Ni-Cad batteries ... Since the college uses BATTERIES in large numbers, the management can consider to procure one unit at the centralised station in the college campus.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
4	Battery regeneration.	Short life span	300% of the cost of the battery.	Subject all batteries to regeneration measures* made.	Rs.20.00 Lacs or as per user agreement	300 %	7.1.2, 7.1.6

## NECESSITY AND ISSUES

It is customary in the present energy scenario to use Batteries either in our office or working environment. In continuation, The old week batteries are a nuisance as they need to be discarded in to the environment for further process. Which is a costly option both in terms of Health and pollution issues. Let us review our use of application and consider if we can improve our battery use methods. A brief note, before we consider to take corrective step.

Lead-acid batteries are widely used as important power supply devices that include automotive, uninterruptible power supply (UPS), telecommunication systems and various traction duties.

Lead-acid batteries are the workhorse of the rechargeable battery systems for its reliability, low cost, and good operational life. Predictably,

approximately million tons waste batteries are generated every year and the production of lead-acid batteries will continue to rise even more sharply with sustained and rapid development of economy. The lead-acid battery is a complex industrial product, constituted by several different materials, the consequence was very serious which often caused much property loss, casualties and environment pollution once accidents happen

Based on "Technical Guidelines for Environmental Risk Assessment on Projects" and in consideration of the characteristics of the chemical compositions and contents, a framework of environmental risk assessment framework on lead-acid batteries was established. The work procedure included risk identification, sources analysis, pollution forecast, and defensive measures. By analysing the environmental risk assessment of lead-acid batteries, the study opined for directions both for the preventive measures and safe use, according to the forecast results of lead-acid batteries.

## RISK IDENTIFICATION OF LEAD-ACID BATTERIES

Lead-acid batteries generally consist of four parts, which are electrolyte, lead and lead alloy grid, lead paste, and organics and plastics, which included lots of toxic, hazardous, flammable, explosive substances that can easily create potential risk sources. The materials contained in lead-acid batteries may bring about lots of pollution accidents such as fires, explosions, poisoning and leaks, contaminating environment and damaging ecosystem. The main chemical compositions and contents of spent lead-acid batteries are listed below. The main chemical compositions and contents of spent lead-acid batteries

Compositions	Contents (wt.%)
Electrolyte	11–30%
Lead and lead alloy grid	24–30%
Lead paste	30–40%
Organics and plastics	22–30%

The recognition & scope of lead-acid batteries, mainly focused on the pollutants involved in the process of centralized recovery, Storage areas and transport. Based on "Technical Guidelines for

**Environmental effects of lead** can end up in water and soils through corrosion of leaded pipelines in a water transporting system and through corrosion of leaded paints. ... **Lead** accumulat

Environmental Risk Assessment on Projects" and "Identification of hazard installations for dangerous chemicals

With change in times, new solutions keep coming up. One such option is to Regenerate the dead or non-usable batteries. Energetic Plus battery regenerator successfully removes sulphating due to an electrical high-frequency pulsation process.

This process restores the battery capacity, giving you the ability to reuse old and sulphated batteries.

Concealed batteries in operation or used batteries should be properly named and placed in proper order. The used batteries should be considered for REGENERATION for the second and subsequent cycles and prolong the disposal as the chemicals cause high level of damage to the environment.

We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries.

BU-703: Health Concerns with Batteries.

Become familiar with the do's and don't's when handling batteries. Batteries are safe, but caution is necessary when touching damaged cells and when handling lead acid systems that have access to lead and sulfuric acid. Several countries label lead acid as hazardous material, and rightly so. Lead can be a health hazard if not properly handled.

## LEAD

Lead is a toxic metal that can enter the body by inhalation of lead dust or ingestion when touching the mouth with lead-contaminated hands. If leaked onto the ground, acid and lead particles contaminate the soil and become airborne when dry. Children and foetuses of pregnant women are most vulnerable to lead exposure because their bodies are developing. Excessive levels of lead can affect a child's growth, cause brain damage, harm kidneys, impair hearing and induce behavioural problems. In adults, lead can cause memory loss and lower the ability to concentrate, as well as harm the reproductive system. Lead is also known to cause high blood pressure, nerve disorders, and muscle and joint pain. Researchers speculate that Ludwig van Beethoven became ill and died because of lead poisoning. By 2017, members of the International Lead Association (ILA) want to keep the lead blood level of workers in mining, smelting, refining and recycling below 30 micrograms per decilitre (30µg/dl). In 2014, the average participating employee checked in at

15.6µg/dl, but 4.8 percent were above 30µg/dl. (Source Batteries & Energy Storage Technology, Summer 2015.)

In 2019, the University of Southern California published the detection of lead in teeth of children living near the Exide Technologies battery recycling plant in Vernon, California.

Lead occurs naturally in soil at 15–40mg/kg level. This level can increase multi-fold near lead battery manufacturing and recycling plants. Soil levels in developing countries, including on the continent of Africa, recorded lead contamination levels of 40–140,000mg/kg.

## SULFURIC ACID

The sulfuric acid in a lead acid battery is highly corrosive and is more harmful than acids used in most other battery systems. Contact with eye can cause permanent blindness; swallowing damages internal organs that can lead to death. First aid treatment calls for flushing the skin for 10–15 minutes with large amounts of water to cool the affected tissue and to prevent secondary damage. Immediately remove contaminated clothing and thoroughly wash the underlying skin. Always wear protective equipment when handling sulfuric acid.

## CADMIUM

Cadmium used in nickel-cadmium batteries is considered more harmful than lead if ingested. Workers at NiCd manufacturing plants in Japan have been experiencing health problems from prolonged exposure to the metal, and governments have banned disposal of nickel-cadmium batteries in landfills. The soft, whitish metal that occurs naturally in the soil can damage kidneys. Cadmium can be absorbed through the skin by touching a spilled battery. Since most NiCd batteries are sealed, there are no health risks in handling intact cells; caution is required when working with an open battery.

Nickel-metal-hydride is considered non-toxic and the only concern is the electrolyte. Although toxic to plants, nickel is not harmful to humans.

Lithium-ion is also benign — the battery contains little toxic material. Nevertheless, caution is required when working with a damaged battery. When handling a spilled battery, do not touch your mouth, nose or eyes. Wash your hands thoroughly.

Keep small batteries out of children's reach. Children younger than four are the most likely to swallow batteries, and the most common types that



are ingested are button cells. Each year in the United States alone, more than 2,800 children are treated in emergency rooms for swallowing button batteries. According to a 2015 report, serious injuries and deaths from swallowing batteries have increased nine-fold in the last decade.

The battery often gets stuck in the oesophagus (the tube that passes food). Water or saliva creates an electrical current that can trigger a chemical reaction producing hydroxide, a caustic ion that causes serious burns to the surrounding tissue. Doctors often misdiagnose the symptoms, which can reveal themselves as fever, vomiting, poor appetite and weariness. Batteries that make it through the oesophagus often move through the digestive tract with little or no lasting damage. The advice to a parent is to choose safe toys and to keep small batteries away from young children.

## SAFETY TIPS

Keep button batteries out of sight and reach of children. Remote controls, singing greeting cards, watches, hearing aids, thermometers, toys and electric keys may contain these batteries.

Similar to pharmaceutical products, keep loose batteries locked away to prevent access by small children.

Communicate the danger of swallowing button batteries with your children, as well as caregivers, friends, family members and babysitters. If you suspect your child has ingested a battery, go to the hospital immediately. Wait for a medical assessment before allowing the child to eat and drink.

## VENTILATION

Charging batteries in living quarters should be safe, and this also applies to lead acid. Ventilate the area regularly as you would a kitchen when cooking. Lead acid produces some hydrogen gas but the amount is minimal when charged correctly. Hydrogen gas becomes explosive at a concentration of 4 percent. This would only be achieved if large lead acid batteries were charged in a sealed room.

Over-charging a lead acid battery can produce hydrogen sulphide. The gas is colourless, very poisonous, flammable and has the odour of rotten eggs. Hydrogen sulphide also occurs naturally during the breakdown of

organic matter in swamps and sewers; it is present in volcanic gases, natural gas and some well waters. Being heavier than air, the gas accumulates at the bottom of poorly ventilated spaces. Although noticeable at first, the sense of smell deadens the sensation with time and potential victims may be unaware of its presence.

As a simple guideline, hydrogen sulphide becomes harmful to human life if the odour is noticeable. Turn off the charger, vent the facility and stay outside until the odour disappears. Other gases that can develop during charging and the operations of lead acid batteries are arsine (arsenic hydride,  $AsH_3$ ) and (antimony hydride,  $SbH_3$ ). Although the levels of these metal hydrides stay well below the occupational exposure limits, they are a reminder to provide adequate ventilation. Regeneration of week batteries for the second lease of life.

ENERGY AUDIT REPORT

### NATURAL VENTILATION.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
7	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	7.1.2, 7.1.6



Figure 15 - Use BLDC fans to save energy.

The natural ventilators are provided. This makes the room cooler and results in reduced fresh air intake. In some of the rooms the ventilators are closed. It is best practice to keep them open. Keeping the ventilators open calls for free movement of rodents. Hence a protective Stainless steel mesh should be provided.



Figure 16 - Use ventilators effectively.

We also suggest to use BLDC fans in Liew of normal ceiling fans which are energy intensive.

## WHY SUPER ENERGY EFFICIENT CEILING FANS?

Regular old ceiling fans

Ceiling fans escape one's mind when thinking about reducing electricity cost. This forgotten appliance contributes significantly to electricity consumption due to its numbers and hours of usage. The following estimation supports this claim. A regular ceiling fan (1200 mm span) consumes about 75 W at the highest speed. There are over 400 million regular ceiling fans in India and each of them creates an electricity demand about 39W\* (consumption at medium speed).



1. Metal Fan Body
2. Metal Fan Blade.
3. Double Bearings.
4. External Controller.
5. Brushless DC Motor.
6. Pure Copper Winding.
7. Five Levels Remote Control.
8. DC12V Input Fan.
9. DC6V-24V Operating.
10. 36W Power Consumption.
11. 380RPM Super High Speed.
12. 10+ Years Life Time Motor.

Super energy efficient ceiling fans

At present Brushless Direct Current (BLDC) ceiling fan is the popular choice of [super energy efficient ceiling fans](#) in India. There are two premier BLDC ceiling fan brands in India – [Superfan](#) (Versa Drives Private Limited) and Gorilla fans (Atomberg Technologies)\*\*. These ceiling fans (1200mm span) consume 35W at the highest speed so they save over 50% of electricity consumption.

The higher efficiency comes with no compromise in air delivery. Now consider replacing all the ceiling fans in India with [best energy saving ceiling fan](#). The reduction in electricity demand created by ceiling fans will be:

Please contact M/s VERSA DRIVES PRIVATE LIMITED  
38 B, Vadakku Thottam Part, Idikarai, Coimbatore. Tamil Nadu, India  
641022

Tel: 0422-2972798 / 2972799 / 2972800

Reference to the audit report may be made to avail educational-additional discount.

**SAFETY.**

8	Electrical safety	Failure of electrical equipment	Loss of valuable data and assets.	Proper earthing and periodical maintenance with measurement.	Nil, In house manpower.	Eliminates electrical hazards and threat to life. Substantial cost of energy bills	7.1.2, 7.1.6
Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category
8	Electrical safety	Failure of electrical equipment	Loss of valuable data and assets.	Proper earthing and periodical maintenance with measurement.	Nil, In house manpower.	Eliminates electrical hazards and threat to life. Substantial cost of energy bills	7.1.2, 7.1.6
Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category



It is required to keep the Transformer area clean and free from vegetative growth. In addition, The earthing should be maintained and labelled as per below name plate.

Name plate : Cumpster room.

Date of inspection :

Measured values.

Resistance: xx  $\Omega$

Leakage current : xx Amps.

Date of next inspection :

Earth pit connected to : xxxx system.

dd/mm/yyyy

Required values.

Resistance: **< 5  $\Omega$**

Leakage current : **< 3.5mA**

dd/(mm+6)/yyyy

## Why International Days are Observed

Criteria 7.1.11

As per the United Nations Organization, international days are occasions to **educate the general public on issues of concern**, to mobilize political will and resources to address global problems, and to celebrate and reinforce achievements of humanity. Educational institutes are the best platforms to achieve this Nobel thought.

International Days and Weeks play a vital role in our society, serving as platforms to raise awareness, foster solidarity, and promote action on crucial issues. These dedicated observances enable us to focus our attention on specific topics, mobilizing individuals, organizations, and governments worldwide. By designating particular days or weeks, we create opportunities to educate, advocate, and celebrate milestones in various areas.

Several international organisations designate international days and weeks. The United Nations is one such organisation which designates most number of days and also for varied purposes. World Health Organisation designates days related to health issues. Food and Agricultural Organisation, International Labour Organisation and other organisations formed for specific purposes also designate days to focus on international contemporary issues.

Following is list of important days in India. Some of them only celebrated in World and some in India only as different country have different days for that event.

The list discusses the days in close proximity to Energy and factors in its immediate affiliate.

The institutional vision and creativity in relating the days to energy conservation and energy efficiency, establishes the best practices.

<b>Day &amp; Month</b>	<b>Celebration.</b>	<b>Reason for celebration</b>
12-Jan	National Youth Day.	<p>National Youth Day, also known as Vivekananda Jayanti, is celebrated on 12 January, being the birthday of a Hindu monk, Swami Vivekananda. In 1984, the Government of India declared this day as National Youth Day and since 1985 the event is celebrated in India every year.</p> <p>Energy perspective: Youth to consider educating the society on global warming, food security and</p>



Day & Month	Celebration.	Reason for celebration
		clean air by opting for energy conservation and efficiency measures.
11-Feb	International Day of Women and Girls in Science	<p>The International Day of Women and Girls in Science is an annual observance adopted by the United Nations General Assembly to promote the full and equal access and participation of women in Science, Technology, Engineering and Mathematics (STEM) fields. The United Nations General Assembly passed resolution 70/212 on 22 December 2015, which proclaimed the 11th day of February as the annual commemoration of the observance. A theme is selected annually to highlight a particular focus and area of discussion around a focus point for gender equality in science.</p> <p>The International Day of Women and Girls in Science is implemented annually by UNESCO in collaboration with UN Women. Both organisations work with national governments, intergovernmental organisations, civil society partners, universities and corporations in order to achieve the shared goal of promoting the role of women and girls in scientific fields and celebrate those already successful in the field.</p> <p>Energy perspective: Energy conservation and efficiency is part of human work culture. Home being the first school, learnings on energy significance starts from home. Hence awareness to women.</p>
28-Feb	National Science Day.	<p>National Science Day is celebrated in India on February 28 each year to mark the discovery of the Raman effect by Indian physicist Sir C. V. Raman on 28 February 1928. For his discovery, Sir C.V. Raman was awarded the Nobel Prize in Physics in 1930</p> <p>Energy perspective: Energy is backbone for all development. Talking about energy during science day makes relevance.</p>
6-March	World Energy Efficiency Day	<p>March 6<sup>th</sup> is World Energy Efficiency Day, which raises awareness of the need to reduce energy consumption and promote sustainable energy use. Finding ways to avoid energy waste - electricity, gas, water - is critical in the fight against climate change as it contributes to emitting less carbon and methane into the atmosphere. As an example, electricity is generated by fossil fuels, like natural gas and coal, but also nuclear energy. Yet, there are simple actions one can take all year long to promote energy efficiency! For example, using daylight hours for tasks that require lighting, turning off lights and electrical devices when not in use,</p>

<b>Day &amp; Month</b>	<b>Celebration.</b>	<b>Reason for celebration</b>
		<p>using LEDs, replacing old appliances with class A ones, and prioritizing public transport or cycling.</p> <p>Energy perspective: Energy efficiency observation is just a reminder to keep continual improvisation.</p>
8-Mar	International Women's Day.	<p>International Women's Day is a global holiday celebrated annually on March 8 as a focal point in the women's rights movement, bringing attention to issues such as gender equality, reproductive rights, and violence and abuse against women.</p> <p>Energy perspective: Energy conservation and efficiency is part of human work culture. Home being the first school, learnings on energy significance starts from home. Hence awareness to women.</p>
21-Mar	World Forestry Day.	<p>The International Day of Forests was established on the 21st day of March, by resolution of the United Nations General Assembly on November 28, 2013.</p> <p>Energy perspective: Energy and forest cover do not go well together. Minimizing energy use helps forest growth. Increased green roof helps to reduce surface temperature. This in effect results into reduced cooling requirements. In addition we also have increased oxygen and reduced CO<sub>2</sub> PPM count.</p>
22-March	World Water Day	<p>World Water Day is an annual United Nations (UN) observance day held on 22 March that highlights the importance of fresh water. The day is used to advocate for the sustainable management of freshwater resources. The theme of each year focuses on topics relevant to clean water, sanitation and hygiene (WASH), which is in line with the targets of Sustainable Development Goal 6. The UN World Water Development Report (WWDR) is released each year around World Water Day.</p> <p>UN-Water is the convener for World Water Day and selects the theme for each year in consultation with UN organizations that share an interest in that year's focus. The theme for 2021 was "Valuing Water" and the public campaign invited people to join a global conversation on social media to "tell us your stories, thoughts and feelings about water".</p> <p>Energy perspective: Water and Energy are like two faces of a coin. Reduced water demand reduces Energy demand. Increased energy conservation in turn helps Water conservation.</p>

<b>Day &amp; Month</b>	<b>Celebration.</b>	<b>Reason for celebration</b>
22-Apr	Earth Day.	<p>Earth Day is an annual event on April 22 to demonstrate support for environmental protection. First held on April 22, 1970, it now includes a wide range of events coordinated globally by EARTHDAY.ORG including 1 billion people in more than 193 countries. The official theme for 2023 is Invest in Our Planet.</p> <p>Energy perspective: Unjustified energy use has serious impact on the environment. Reduced energy demand helps enriching the environment in multi dimensions like clean air, increased water percolation, reduced surface temperature, consistent and predictable rains etc.</p>
11-May	National Technology Day.	<p>The Pokhran-II tests were a series of five nuclear bomb test explosions conducted by India at the Indian Army's Pokhran Test Range in May 1998. It was the second instance of nuclear testing conducted by India; the first test, code-named <i>Smiling Buddha</i>, was conducted in May 1974.</p> <p>The tests achieved their main objective of giving India the capability to build fission and thermonuclear weapons with yields up to 200 kilotons. The then-Chairman of the Indian Atomic Energy Commission described each one of the explosions of <i>Pokhran-II</i> to be "equivalent to several tests carried out by other nuclear weapon states over decades". Subsequently, India established computer simulation capability to predict the yields of nuclear explosives whose designs are related to the designs of explosives used in this test.</p> <p>Energy perspective: Energy generation and storage has seen dynamic change. It is important to educate our youth on the importance and career opportunities.</p>
17-May	World Telecommunication Day.	<p>World Telecommunication and Information Society Day is an international day proclaimed in November 2006 by the International Telecommunication Union Plenipotentiary Conference in Antalya, Turkey, to be celebrated annually on 17 May.</p> <p>Energy perspective: Energy conservation in communication is discrete in nature. With the multifold increase in Mobile charging and other communication devices, It is important that the focus on increased energy performance of the devices is discussed and awareness is created.</p>

<b>Day &amp; Month</b>	<b>Celebration.</b>	<b>Reason for celebration</b>
5-Jun	World Environment Day.	<p>World Environment Day (WED) is celebrated annually on 5 June and encourages awareness and action for the protection of the environment. It is supported by many non-governmental organizations, businesses, government entities, and represents the primary United Nations outreach day supporting the environment.</p> <p>First held in 1973, it has been a platform for raising awareness on environmental issues as marine pollution, overpopulation, global warming, sustainable development and wildlife crime. World Environment Day is a global platform for public outreach, with participation from over 143 countries annually. Each year, the program has provided a theme and forum for businesses, non-government organizations, communities, governments and celebrities to advocate environmental causes.</p> <p>Energy perspective: Unjustified energy use has serious impact on the environment. Reduced energy demand helps enriching the environment in multi dimensions like clean air, increased water percolation, reduced surface temperature, consistent and predictable rains etc.</p>
5-Sep	Teachers' Day.	<p>Teacher's Day is a special day for the appreciation of teachers, and may include celebrations to honor them for their special contributions in a particular field area, or the community tone in education. This is the primary reason why countries celebrate this day on different dates, unlike many other International Days. For example, Argentina has commemorated Domingo Faustino Sarmiento's death on 11 September as Teachers' Day since 1915. In India the birthday of the second president Sarvepalli Radhakrishnan, 5 September, is celebrated as Teacher's Day since 1962, while Guru Purnima has been traditionally observed as a day to worship teachers/gurus by Hindus.</p>
8-Sep	World Literacy Day.	<p>International Literacy Day is an international observance, celebrated each year on 8 September, that was declared by UNESCO on 26 October 1966 at the 14th session of UNESCO's General Conference. It was celebrated for the first time in 1967. Its aim is to highlight the importance of literacy to individuals, communities and societies. Celebrations take place in several countries.</p> <p>Energy perspective: increased Literacy calls for increased study hours. This calls for availability of</p>

Day & Month	Celebration.	Reason for celebration
		energy for illumination. In todays energy use pattern, it is often misused. Need to educate on the correct illumination is necessary.
16-Sep	World Ozone Day.	<p>International Day for the Preservation of the Ozone Layer (informally and simply called Ozone Day) is celebrated on September 16 designed by the United Nations General Assembly. This designation had been made on December 19, 2000, in commemoration of the date, in 1987, on which nations signed the Montreal Protocol on Substances that Deplete the Ozone Layer. In 1994, the UN General Assembly proclaimed 16 September the International Day for the Preservation of the Ozone Layer, commemorating the date of the signing, in 1987, of the Montreal Protocol on Substances that Deplete the Ozone Layer. The closure of the hole in the ozone layer was observed 30 years after the protocol was signed. Due to the nature of the gases responsible for ozone depletion their chemical effects are expected to continue for between 50 and 100 years.</p> <p>Energy perspective: Unjustified energy use has serious impact on the environment. Reduced energy demand helps enriching the environment in multi dimensions like clean air, increased water percolation, reduced surface temperature, consistent and predictable rains etc.</p> <p>Energy perspective: Ozone depletion is a serious issue caused due to use of PFC's. PFC's are mainly used in Air conditioning systems. Hence use of energy efficient AC's is important.</p> <p>Use of perfumes, solvents, spray aerosols, refrigerators, air-conditioners, etc., these molecules of chlorofluorocarbons in the stratosphere are broken down by ultraviolet radiations and release chlorine atoms. Avoiding use of these chemicals helps minimize Ozone depletion.</p>
13-Oct	UN International Day for National disaster reduction.	<p>International Day for Disaster Risk Reduction (IDDRR) is an international day that encourages every citizen and government to take part in building more disaster-resilient communities and nations. The United Nations General Assembly designated October 13 as International Day for Natural Disaster Reduction as part of its proclamation of International Decade for Natural Disaster Reduction.</p> <p>In 2002, by a further resolution, the General Assembly decided to maintain the annual</p>

Day & Month	Celebration.	Reason for celebration
		<p>observance as a vehicle to promote a global culture of natural disaster reduction, including prevention, mitigation, and preparedness.</p> <p>In 2009, the UN General Assembly decided to designate October 13 as the official date for this day, and also changed the name to International Day for Disaster Reduction. The word <i>risk</i> was added to the name later.</p> <p>Energy perspective: Disasters are caused by environment disturbances arising out of global warming. Unpredicted and torrential rains also bring in eroded effects on the infrastructure. Restoring the same calls for increased energy demand. Hence judicious energy consumption yields stable weather. Predictable rains and remedial measures.</p>
14-Oct	World Standards Day.	<p>World Standards Day (or International Standards Day) is an international day celebrated internationally each year on 14 October. The day honours the efforts of the thousands of experts who develop voluntary standards within standards development organizations such as the American Society of Mechanical Engineers (ASME), International Electrotechnical Commission (IEC), International Ethics Standards Board for Accountants (IESBA), International Organization for Standardization (ISO), International Telecommunication Union (ITU), Institute of Electrical and Electronics Engineers (IEEE) and Internet Engineering Task Force (IETF). The aim of World Standards Day is to raise awareness among regulators, industry and consumers as to the importance of standardization to the global economy.</p> <p>14 October was specifically chosen to mark the date, in 1946, when delegates from 25 countries first gathered in London and decided to create an international organization focused on facilitating standardization. Even though ISO was formed one year later, it wasn't until 1970 that the first World Standards Day was celebrated.</p> <p>Around the globe, various activities are chosen by national standards bodies and intergovernmental organizations to commemorate the date.</p> <p>The Standards Council of Canada (SCC), Canada's national accreditation body, celebrates World Standards Day together with the international community by observing the day near the dates of the international observance. In 2012 SCC</p>

<b>Day &amp; Month</b>	<b>Celebration.</b>	<b>Reason for celebration</b>
		<p>celebrated World Standards Day on Friday, 12 October.</p> <p>The World Trade Organization, for the celebration of World Standards Day, 14 October 2020, discussed the TBT Committee's Six Principles for the development of international standards</p> <p>The United States holds an annual U.S. Celebration of World Standards Day</p>
24-Oct UN Day,	World development information Day.	<p>In 1972, the United Nations General Assembly decided to institute a World Development Information Day coinciding with United Nations Day on October 24. The General Assembly had the object of drawing the attention of world public opinion each year to development problems and the necessity of strengthening international co-operation to solve them.</p> <p>The day was further recognized as the date on which the International Development Strategy for the Second Nations Development Decade was adopted in 1970.</p> <p>On May 17, 1972, the UN Conference on Trade and Development (UNCTAD) proposed measures for information dissemination and for the mobilization of public opinion relative to trade and development problems. These became known as resolution 3038 (XXVII), which the UN General Assembly passed on December 19, 1972. This resolution called for introducing World Development Information Day to help draw the attention of people worldwide to development problems. A further aim of the event is to explain to the general public why it is necessary to strengthen international cooperation to find ways to solve these problems. The assembly also decided that the day should coincide with United Nations Day to stress the central role of development in the UN's work. World Development Information Day was first held on October 24, 1973, and has been held on this date each year since then.</p> <p>In recent years many events have interpreted the title of the day slightly differently. These have concentrated on the role that modern information-technologies, such as the Internet and mobile telephones free from digital divide can play in alerting people and finding solutions to problems of trade and development. One of the specific aims of World Development Information Day was to inform and motivate young people and this change may help to further this aim.</p>

<b>Day &amp; Month</b>	<b>Celebration.</b>	<b>Reason for celebration</b>
14- dec	Energy conservation day	<p>National Energy Conservation Day aims to generate awareness among the masses in India about the importance of saving energy. People are also kept in the loop on new courses of action and plans that are being formulated. Information is given on minimizing energy waste and how the public can do their part in conserving resources. Essentially, the main objective of the day is to reduce the use of energy and to encourage people to use it efficiently.</p> <p>Formed under the Union Ministry of Power, the Bureau of Energy Efficiency – BEE, has been leading the celebrations of National Energy Conservation Day annually on December 14 since 1991. A constitutional body that falls under the Government of India, the Bureau of Energy Efficiency assists in the development and implementation of strategies and policies to reduce excessive consumption of energy. The committee also executed 'The Energy Conservation Act' in 2001.</p> <p>As part of its awareness campaign, awards are distributed annually on this day in 56 sub-sectors of the country to recognize achievements in energy efficiency. The National Energy Conservation Awards Programme commends the efforts of the industry, institutions, and establishments ranging from power plants to hotels to shopping malls. Prizes are also awarded by the BEE to winners of the National Painting Competition centered on the theme of energy conservation.</p> <p>India's development sectors are flourishing, which leads to an increase in the demand for energy. It is expected that India's resource requirements will double by the year 2030. The BEE strategizes and develops policies that will help decrease this demand by advocating the adoption of efficient measures for energy use.</p>
23-Dec	Kisan Divas Farmer's Day.	<p>The National Farmers Day in India is also known as Kisan Divas in Hindi. Farmer's Day is celebrated every year on 23 December, on the birthday of the 5th Prime Minister of India, Choudhary Charan Singh, also a farmer's leader, who introduced many policies to improve the lives of the Indian farmers. It is celebrated by organising various programs, debates, seminars, quiz competitions, discussions, workshops, exhibitions, essays writing competitions and functions.</p>



**LIST OF INSTRUMENTS:**

During the process of the Audit, the following lists of instruments were used.

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.
13	Digital Power Factor Meter	METRAVI	Electrical Machinery.
14	Lap Top Computer	HP	To Interface The Instruments For More Accurate -Sophisticated Readings In Sensitive Equipments.
15	Ultrasonic flow meter		Measure liquid flow.
16	Portable Vibration Meter.	METRAVI	Effect Of Filtration - Sewing System. 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	ETV meter, KWh & PF meters for site recording.	Secure	
21	PT's for Transformer audits.	KALPA	On field auditing of transformer loading and imbalance evaluation.

Only appropriate instruments will 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.

ENERGY AUDIT REPORT

**MODE OF ACTION:**

The process of 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

ENERGY AUDIT REPORT

**NOTES:**

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