

ENERGY AUDIT REPORT

FOR THE YEAR 2021-22



S.P.V.V.S.S.

G.P. PORWAL ARTS, COMMERCE
& V.V. SALIMATH SCIENCE COLLEGE, Sindagi.

Principal Lead Auditor:

Mallikarjun A Kambalyal.

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

Germany Energie Berater: Anbieter-Nr 1041388

Mauritius : REA-57

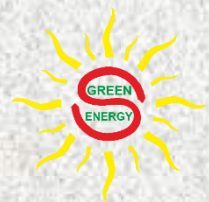
Audited by:

SUNBSHUBH TECHNOVATIONS PVT LTD.,

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

Hubli – 580029. Karnataka. India.

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



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OVERVIEW OF ENERGY AUDIT.

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

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

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

The benefits would then be transacted into stabilised rainfall pattern.

EXECUTIVE SUMMARY.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
1	Solar Power	Solar arrays in Shade area	Working efficiency down to 30% to 50%.	Relocation and dual connection On grid & Off grid.	Minimal, relocation charges and foundation laying cost.	More nearing to Net zero energy import.	7.1.
2	Battery placement	Battery shell in conductor loop	Low performance & self-discharge.	Design the stacking arrangements.	In house resources	25% of the cost of the batteries.	7.1.2 7.1.6
3	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
4	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*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
5	Natural Lighting	Un cleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the window-panes and allow maximum natural light penetration.	Nil, part of routine, In house manpower.	Substantial cost of energy bills on lighting.	7.1.2 7.1.6
6	Natural Ventilation	Permanently closed ventilators.	Creation of hot air pockets below the ceiling.	Open the Ventilators for easy exit of hot/warm air from the rooms.	Nil, In house manpower.	Eliminates use of Electrical Fans and Substantial cost of energy bills	7.1.2 7.1.6
<p style="text-align: center;">* For details, please follow the discussions in the report.</p>							

ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD is pleased to express its sincere gratitude to the management of **S.P.V.V.S.S. G.P. Porwal Arts, Commerce & V.V.Salimath Science College, Sindgi.**

for entrusting Sunshubh Technovations Pvt Ltd with the assignment on Green Earth practices based on Educate, Practice, Advocate & Manage the resources in their educational organization.

We acknowledge the assignment with order reference number GreenAudit/2021-22

We also wish to thank Shri D.M.Patil, Principal, and Dr M.I.Minch, NAAC Audit Co-Ordinator and Criterion VII Chairman, who have been constantly following with the Carbon Handprint initiatives and developments in the college. It was on their instance that we got to evaluate the initiatives undertaken. The officials and the maintenance staff for the help rendered during the energy flow study.

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

IQAC Co-Ordinator - Prof. D.M. Sarashetti

Shri V.R.Patil. Criterion 1 – Curricular Aspects

Dr. P R Rathod. Criterion II – Teaching, Learning & Evaluation.

Shri R.V.Lamani. Criterion III – Research, innovation & Extension.

Shri R.V.Gola. Criterion IV – Infrastructure & Learning Resources.

Dr. S.I.Bhandari. Criterion V – Students Support and Progression.

Smt S.S.Muttinpendimath. Criterion VI – Governance, Leadership & Management.,

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

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

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

ENERGY AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 21st Feb 2022 under the instructions of Shri D.M.Patil, Principal, and Dr M.I.Minch, NAAC Audit Co-Ordinator and Criterion VII Chairman and IQAC Co-Ordinator - Prof. D.M. Sarashetti

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

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

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

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

Authorised Auditor.



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

Certified Energy Auditors EA-3485.

ISO 50001:2011 & ISO14001:2015 Lead Auditor.

Date: 26TH Feb 2022

Credentials attached 7.1.6





BUREAU OF ENERGY EFFICIENCY



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

Certificate Registration No. : **2838**

Certificate For Certified Energy Manager

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

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

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

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

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

Secretary
Bureau of Energy Efficiency
New Delhi

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

Bureau of energy Efficiency Regd No: EA3485

Certificate of Successful Completion



This is to Certify that

MALLIKARJUN A KAMBALYAL

has successfully completed the

Intertek

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

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

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

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



Authorising Signature: Vystra Asunova

Course Dates: 14th – 16th July 2017

Certificate Number: 47730

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

121807

ISO Certified Lead Auditor. Certificate No: 47730

bsi.

BSI Training Academy

This is to certify that

Mallikarjun A. Kambalyal

has attended and passed

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



Premanand Ramakrishnan, Director of Training

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

Certificate Number: ENR-00253448

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

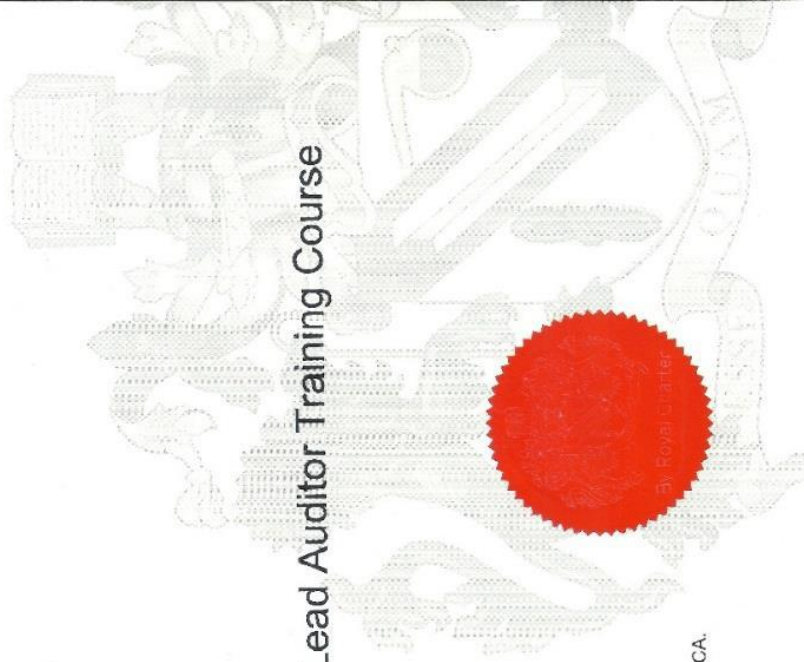


Course number A17583 certified by IRCA

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



By Royal Charter



...making excellence a habit.™

ISO Certified Lead Auditor. Certificate No: ENR-00253448

CARBON FOOTPRINT AUDIT OBJECTIVES.

Know

Why?

Where?

What?

When?

How?

about this Audit and the 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, energy 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.

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 bhair use of water generation of waste use of energy e environmental damage health damage and finally to explore if the campus or direction can go in in contributing to third-party emissions minimising

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

Recognise the cost saving methods through waste minimising and managing technologies.

Point out the prevailing and forth coming complications.

Authenticate conformity with the legal requirements.

Empower the organisation to frame a better environmental performance.

Portray a good image of the institution which helps build better relationships with the group's organisations, stakeholders in and around its operations

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

DAY's CARBON HANDPRINT PLEDGE

DAY's CARBON HANDPRINT PLEDGE (proposed)

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

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

We seek to comply with safety and environmental regulations to implement in-house 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 emphasis to minimising emissions of greenhouse gases, ozone depleting substance and particle matter. we endeavor to minimise environmental loads and adopt environmentally friendly technologies when ordering and purchasing necessary products and resources.

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

We endeavor 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

Vision Statement of the institute

Core Values of the Institution

<http://www.grgayapcci.org/index.php>



Vision

To provide advancement of knowledge, education and research fostering an equitable and productive growth in the complex global society.

Mission

To provide quality education to the rural Learners and to bring out in totality their innate potential for the overall wellbeing of the society.

Objectives

To bring out graduates of character and competence capable of undertaking any profession and vocation.

To activate the students Potential through personal attention and other allied efforts.

To inculcate that knowledge alone will lead to prosperity and peace.

Goal

To see the overall developments of the students physically, mentally, culturally and spiritually sound and convince to withstand challenges in the age of information and technology

Affiliation

Affiliated to Rani Channamma University, Belagavi

ABOUT THE COLLEGE

S.P.V.V.S.S. G.P. Porwal Arts, Commerce & V.V. Salimath Science College, Sindgi, KARNATAKA is located in a small town educating the rural children of nearby villages.

The college has Arts Commerce and Science stream.

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

DAY's ENERGY USE PLEDGE

DAY's CARBON HANDPRINT PLEDGE (proposed)

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

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

We shall practice to switch off all appliances when not in use.

PURPOSE:

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

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

CAMPUS: S.P.V.V.S.S. G.P. Porwal Arts, Commerce & V.V.Salimath Science College, Sindgi.

Karnataka

ABOUT ENERGY AUDIT:

S.P.V.V.S.S. G.P. Porwal Arts, Commerce & V.V. Salimath Science College, Sindgi, Karnataka has asked SUNSHUBH TECHNOVATIONS PVT LTD, Hubli, to conduct the Energy Audit for their Institution.

In this context, the management of the Institute represented by Prof S B Jadhav, Principal, entrusted us the task of conducting the feasibility study to reduce energy consumption and adopt green habits.

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

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

LIMITATIONS:

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

ONGOING STATUS:

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

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

NO WASTE – NO POLLUTION – NO HEALTH HAZARD.

DISCUSSIONS ON EXECUTIVE SUMMARY:




Energy Audit.



Aerial View of the College Campus

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

<u>Green Power On Grid</u>	<u>Category 7.1.2</u>
<p>The institute has installed Grid tied 20KW Solar power on net metering basis. In addition, the institute also has OFF grid Solar system to meet the high energy consuming department in the college.</p> <p>More importantly, the college can happily and proudly declare that the college is on near net zero energy use Institute.</p> <p>The institute also has more LT connections which are sourced independently.</p>	
<p><u>Green Power Off Grid</u></p> <p>The offline solar power unit is installed in shaded area. This suffers full power generation. The benefits of MPPT suffer when the site is wrongly chosen.</p> <p>It is important to move the assembly to a non-shaded area.</p> <p>To reap full power from the existing installed capacity, both the arrays need immediate shifting.</p> <p>In case of any technical issues, you may please write to us for the consultancy and selection of the suitable place.</p> <p>On implementation, the excess power generated may be tied to Online grid for export.</p>	

<u>Placing of Batteries</u>	Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5
<p>BATTERY PLACEMENT:</p> <p>The batteries should be placed on an insulated platform not touching any of the metal frames.</p> <p>Need cross ventilation for favourable breathing.</p> <p>Provision for periodical checking and maintenance should be made possible without major obstacles.</p> <p>In absence of the above placement conditions,</p> <p>The batteries will discharge faster.</p> <p>The charging time and current will increase as there is the return path for self-discharge.</p> <p>A well-maintained battery is known to serve for more than 7 years.</p> <p>The presence of oxidation marks at the point of contact should not develop over the time.</p> <p>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.</p> <p>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.</p> <p>For more information on battery management, Contact: SUNSHUBH TECHNOVATIONS PVT LTD., Hubli ceo@sunshubhrenewables.com</p>	 <p>Batteries stacked without ventilation.</p>  

Electrical Power Usage:

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

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

Solution:

It is therefore required to install Light Intensity Sensors in all the rooms.

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

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

Light Intensity & Occupancy sensor



<p><u>NATURAL LIGHTING:</u></p>	<p>Category 7.1.1, 7.1.2, 7.1.3 & 7.1.5</p>
<p>It is seen that the patches of bright light hits the board. This causes strain on the eyes.</p> <p>Solution: Keep the windows closed and with opaque glass so as to avoid direct rays. Opaque glass allows diffused lighting and does not glare the vision.</p>	
<p>The placing of LED lights above the display area, mainly the Blackboard and projector screen, has a straining effect on the eyes. It is against the interest of good practice. Placing the light fixtures should always be from behind or from the top .</p>	
<p><u>Electrical safety.</u></p> <p>All control gear should be treated with due concern and caution. Keep all flammable items away from area. Handle with safety gadgets.</p>	

Remove wrapper and allow the heat to dissipate.



Put the safety cover in place after attending to the service requests.



Asset management.



When working on couled devices, replace the set as a whole. Here only one belt is replaced. The difference in the tension exerted is on one single belt.

Load sharing on the V-Belt is not equal. The one that is tight bears the major load and the other slips while in operation.

From the two iomages above, the difference can be seen.

Slip loss or over tightening results into energy loss and strained working, thus minimising the effectiveness.



Asset management is key to efficient performance of the assets. In the newly installed STP, the pipes are placed with inappropriate supports. For the longevity, remove all unutilised pipes and electrical wires, carnels etc.

Place the running support (never point support) below the pipes to avoid any strain, damage and loss of working performance of the asset.



The beautiful structures planned by the administrators and built by the management clearly indicate that they are concerned about the environment and are committed to deliver good sense of civic discipline and knowledge. Unknowingly are exhaling the process of NEAR **ZERO CARBON FOOTPRINT**. Technical terms are evolved by the present generation. Our fore fathers respected the nature and the resources. The knowledge should be parted to the children as to why the garden is maintained in the centre.

When the infrastructure is in place, the temperature is low and cool conditions prevail, the staff are inclined to perform. There is nothing that can stop from achieving the required. What is required is the orientation and awareness sessions on the right use.

The designated staff be trained in understanding the needs and allowed to test their innovative skills to move towards Green practices will accelerate the process of green revolution.

FACTORS CONSIDERED.

It is vital factor to consider the limitations beyond human control. However, our work culture, should be oriented towards the better and safe dwelling. Considering the present health hazards, Not forgetting the ongoing COVID, the quality of air and after effects of the pollution caused by our activities need to be addressed and all the young generations should be educated to contribute towards positive impact

Geographical layout plays an important role when deciding on our energy use.

The conditions prevailing have been listed below (Courtesy: <https://en.wikipedia.org/wiki/Sindagi>)

Sindagi is a City and Taluk in Vijayapura district in the Indian state of Karnataka, about 60 km to the east of Bijapur.

Geography

Sindagi is located at 16.92°N 76.23°E.[1] It has an average elevation of 500 metres (1640 feet). Sindagi is 60 km/37.28 miles away from the main district city

of Bijapur, and 545 km/338.95 miles from the state capital, Bangalore. The nearest major railway station to Sindagi is at Indi (50 km), and the nearest airport is at Kalaburagi (96 km). Sindagi is a lesser Rainy Area and Most of the Area is Dry land. And Sindagi has a Good Planned City in Vijayapura District . Sindagi is Having Good Transportation System With National Highway 50.

Sindagi	
City	
	
Sindagi; Location in Karnataka, India Coordinates: 16.92°N 76.234°E	
Country	India
State	Karnataka
Region	Bayalu Seeme
District	Bijapur District
Elevation	500 m (1,600 ft)
Population (2011)	40,000
Languages	
• Official language	Kannada
Time zone	UTC+5:30 (IST)
PIN	586128
Vehicle registration	KA:28
Website	karnataka.gov.in www.sindagitown.mrc.gov.in

Demographics

As of 2011 India census,[2] Sindagi had a population of 53,213. Males constitute 51% of the population and females 49%. Sindagi has a middle range literacy rate of 61%. Male literacy is 69%, and female literacy is 55%. 16% of the population is under 6 years. Sindagi City is the best commercial taluk In Vijayapura District and one of the taluks eligible of being a new district also.

Sindagi Religion Data 2011

The population of Sindagi town was 37,226, as per the 2011 census by government of India. Hindus constitute 69.26% of the population, while Muslims closely follow with 30.12%.

Bijapur, officially known as Vijayapura, is the district headquarters of Bijapur District of Karnataka state of India. It is also the headquarters for Bijapur Taluka. Bijapur city is well known for its historical monuments of architectural importance built during the rule of the Adil Shahi dynasty. It is also well known for the sports by the popular Karnataka premier league team as Bijapur Bulls. Bijapur is located 530 km (330 mi) northwest of the State Capital Bangalore and about 550 km (340 mi) from Mumbai and 384 km (239 mi) west of the city of Hyderabad.

The city was established in the 10th-11th centuries by the Kalyani Chalukyas and was known as Vijayapura (City of victory). The city was passed to Yadavas after Chalukya's demise. In 1347, the area was conquered by the Bahmani Sultanate. After the split of the Bahmani Sultanate, the Bijapur Sultanate ruled from the city. Relics of the Sultanates' rule can be found in the city, including the Bijapur Fort, Bara Kaman, Jama Masjid, and Gol Gumbaz.

Vijayapura, one of the popular heritage cities located in the Karnataka state of India is also one of the top ten populated cities in Karnataka. The Bijapur city has been declared as one of the corporations in the state of Karnataka last year. Bijapur urban population as per 2011 census is 326,000, perhaps the 9th biggest city in Karnataka. Bijapur Mahanagara Palike (BMP) is the newest Municipal Corporation formed under the KMC act along with Shimoga and Tumkur Municipal Corporations.[2] Administratively, Vijayapura district comes under Belgaum division along with Bagalkote, Belgaum, Dharwad, Gadag, Haveri and Uttara Kanada (Karwar) districts.

Geographically, the district lies in the tract of the Deccan Plateaus. The lands of the district can be broadly divided into three zones: the northern belt consisting of the northern parts of Bijapur Taluks of Indi and Sindagi; the central belt consisting of Bijapur city; the southern belt consisting of the rich alluvial plains of the Krishna Rivers parted from the central belt by a stretch of barren Trap. The

northern belt is a succession of low rolling uplands without much vegetation, gently rounded and falling into intermediate narrow valleys. The upland soil being shallow, the villagers are generally confined to the banks of the streams and are far away from one another. The Don River Valley has plains and consists of rich tracks of deep black soils stretching from west to east in the central part of the district. Across the Krishna River is a rich plain crossed from west to east by two lines of sandstone hills. Further south towards Badami and southwest to east by two lines of sandstone hills. Further south towards Badami and southwest of Hurnagund, the hills increase the number and the black soil gives way to the red

There are 34 rain gauge stations in Bijapur District. The average annual rainfall for the district is 553 mm with 37.2 rainy days. The monsoon generally breaks in the district during June and lasts till October. The highest mean monthly rainfall is 149 mm in the month of September and lowest is 3 mm in February. The annual rainfall variation in the district is marginal from place to place.

The soils of Bijapur District can be categorized as a low to moderately yielding area (1000 to 8000 L/h) 72.2% of district falling in this category. From considerable part of the district (9%) poor yielding (less than 1000 L/h sources) or non-feasible areas have been reported. The talukas having largest poor yielding area, are Muddebihal (19%) followed by Indi (15%), Bijapur and Sindagi (13% each), Basavan Bagewadi (4%). Low yielding areas (1000 to 4000 L/h source) in the district constitute about 40% of the district, with the largest being Basavan Bagewadi (54%) and smallest in Indi taluka Moderate yields (4000 to 8000 L/h source) are reported from 36% of the district, highest being in Bijapur with 70% of the area, and lowest being in Sindagi with 19% of the taluka. High yielding areas (more than 8000 L/h sources) over 15% of the district. The smallest area under this category is in Sindagi Taluka (2% each) and largest is in Muddebihal (29% each) where very lengthy contact zones occur between traps and other formations

On the basis of projections from this information, the main parameters affecting water quality in Bijapur can be expected to be brackishness (salinity) and hardness (PH). Salinity affects the district in high to low groundwater problem areas and occurs in areas all along the major and minor river courses and stream courses.

Climate and temperature

Bijapur has a semi-arid climate. It is located at 16.83°N 75.7°E .^[8] It has an average elevation of 606 metres (1988 ft).

The climate of Bijapur district is generally dry and healthy. In summer, especially in April and May it is too hot; at that time the temperature lays between 40-degree

Celsius to 42-degree Celsius. In winter season, from November to January the temperature is between 15-degree Celsius to 20-degree Celsius. Usually the district has dry weather, so the humidity varies from 10% to 30%.

hideClimate data for Bijapur (1981-2010, extremes 1901-2012)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	39.4 (102.9)	41.1 (106.0)	41.9 (107.4)	43.3 (109.9)	44.9 (112.8)	43.0 (109.4)	36.9 (98.4)	36.5 (97.7)	37.4 (99.3)	37.3 (99.1)	35.0 (95.0)	34.6 (94.3)	44.9 (112.8)
Average high °C (°F)	30.8 (87.4)	33.9 (93.0)	36.9 (98.4)	39.0 (102.2)	39.1 (102.4)	33.6 (92.5)	30.9 (87.6)	30.5 (86.9)	31.4 (88.5)	31.6 (88.9)	30.5 (86.9)	29.7 (85.5)	33.1 (91.6)
Average low °C (°F)	16.5 (61.7)	18.3 (64.9)	21.9 (71.4)	24.1 (75.4)	24.0 (75.2)	22.7 (72.9)	22.0 (71.6)	21.7 (71.1)	21.6 (70.9)	21.0 (69.8)	18.5 (65.3)	15.7 (60.3)	20.7 (69.3)
Record low °C (°F)	7.0 (44.6)	8.9 (48.0)	11.2 (52.2)	15.8 (60.4)	17.8 (64.0)	17.2 (63.0)	16.1 (61.0)	16.7 (62.1)	16.1 (61.0)	12.2 (54.0)	5.6 (42.1)	6.0 (42.8)	5.6 (42.1)
Average rainfall mm (inches)	4.0 (0.16)	0.6 (0.02)	5.7 (0.22)	20.6 (0.81)	39.8 (1.57)	108.0 (4.25)	66.9 (2.63)	92.3 (3.63)	156.9 (6.18)	119.7 (4.71)	25.0 (0.98)	7.7 (0.30)	647.1 (25.48)
Average rainy days	0.2	0.1	0.8	1.4	3.3	5.8	5.5	5.6	8.3	5.7	2.0	0.4	39.1
Average relative humidity (%) (at 17:30 IST)	38	31	28	30	34	56	65	65	62	54	49	43	47

Source: India Meteorological Department^{WRI}

Rainfall

The district has 34 rain gauge stations. The average annual rainfall for the whole district is 552.8 mm, with 37.2 rainy days. The monsoon generally reaches the district by June and lasts till October. Though the total rainfall is not high, the district benefits both from the south-west and the north-east monsoons. The annual rainfall varies from place to place within the district.

Soil

The district has two types of soil. First one is, "deep black soil" (or yeari bhoomi), which is good for the crops like jawar, wheat, pulses, sunflower, etc. The major portion of the district consists of this kind of soil which has a great moisture-holding capacity. Second one is "red soil" (or masari /maddi bhoomi), which is generally poor, good for irrigation and horticulture.

Rivers

Krishna river, which is the most important river of the district. It flows about 125 miles in the district. A dam is built across the river at Almatti, Bhima river flows in northern part of district for about 20 miles. It overflows in the rainy season and spreads over a wider area, which is thereby rendered extremely fertile land. In central part of district Doni river flows.

Economy

Farming and agriculture related business is the main occupation for many people in the district. Of the total geographical area of 10,530 square kilometres, 7,760 square kilometres is available for cultivation which is 74% of the total area, while areas under forest account for only 0.19% of the total area. Only 17.3% of the net

cultivable area is irrigated and the balance 82.7% of the area has to depend on the monsoon.

The major oilseed crops are sunflower, groundnut and safflower. Horticulture crops like grapes, pomegranate, ber, guava sapota, lime are also grown. A recent trend shows that there is a low shift towards fruit crops like Pomegranate and grapes of the total area of 8,610 square kilometres. Covered during 2002-03 cereals occupy about 55.2% by oilseeds 24.5% pulse 15.6% and other commercial crops like [cotton](#) and [sugarcane](#) about 4.8%. There is a slight shift towards commercial crops like cotton and sugarcane over last 2 years. The land holding pattern in the district indicates that small and marginal farmers account for 4% of total land holdings and 0.6% of the total land, semi-medium for 27.5% with 10.1% of total land while 68% of the holdings are above 20,000 m², accounting for 89.3% of land. Many small-scale industries are working in the district however no large-scale industry can be found in the district.

Classification of Labour Force	No. of Workers
Cultivators or Farmers	2,21,060
Agricultural Laborers (Non-Land Owners)	2,87,778
Artisans	17,776
Home based / Cottage Industries	18,232
Services and Other sectors	1,95,573

Education

Of late Bijapur is emerging as a hub for professional education. Previously (i.e., before the 1980s) there were very few professional educational institutions. Along with the professional colleges there are many colleges which provide under-graduate and post-graduate degrees in the faculty of arts, science and social-sciences. Many of these colleges except professional are affiliated to Rani Chennamma University Belagavi viz, SPVVS Sindagi, B.L.D.E.A'S Bijapur. Rani Chennamma University has a Post-Graduation Centre at Bijapur also. Engineering colleges are affiliated to Visvesvaraya Technological

University viz, and SECAB and Medical colleges are affiliated to Rajiv Gandhi University of Health Sciences.[30] viz, BLDEA's B M Patil Medical College, Hospital and Research Centre and Al-Ameel Medical College, Hospital and Research Centre, Sainik School, Bijapur and Karnataka State Women's University. Various post-graduate courses like MBA, MCA are conducted here. Additionally, Bijapur boasts of the only Sainik school in the whole state. This is a residential school preparing cadets for the Defence forces.

The Bijapur district is known for its temples, structural monuments, art and architectural heritages, archaeological sites and cave temples. With the objective to spread education in this area, Karnataka University opened its Post-Graduate Centre in 1993.

Karnataka State Women's University, established in 2003 in the city of Bijapur is the only Women's University in Karnataka dedicated exclusively for women's education. It is recognized under 2(f) and 12(B) of the UGC Act. Seventy women's colleges spread in twelve districts of North-Karnataka are affiliated to this University. The University offers various UG programmes leading to bachelor's degree in Arts, Business Administration, Computer Applications, Commerce, Education, Fashion Technology, Home Science, Physical Education, Science and Social College of agriculture (Estd. 1990) under University of Agricultural Sciences, Dharwad is located 6 km away from city bus stand is one of the few institutes made for research on dry land agriculture.

LIST OF INSTRUMENTS:

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

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

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

Only appropriate instruments were used wherever necessary.

ACTION PLAN SUMMARY:

Earmark the action plan.

Invite subject experts for Tec talks,

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

Prioritize the initiatives and execute.

Observe the benefits and shortcomings.

Workout further improvement by involving the staff and students.

MODE OF ACTION:

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

Good housekeeping practices using available manpower.

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

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

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

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

For SUNSHUBH TECHNOVATIONS PVT LTD.

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

Certified Energy Auditors EA-3485

Note Sheet:

NOTES:

GREEN AUDIT REPORT

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