

GREEN AUDIT REPORT 2020-21

In compliance with the statutory requirements under the NAAC accreditation procedures

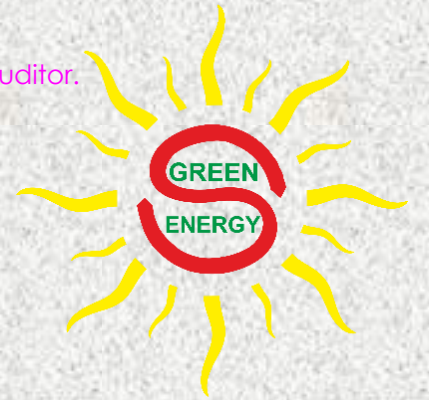


**Veerashaiva Vidhyavardhaka Sangha's
Shree Khasgateshwar College Of Arts, Commerce
And Science. Talikoti, Vijayapur, Karnataka.**

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THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year,

ABOUT SUNSHUBH TECHNOVATIONS PRIVATE LIMITED

Sunshubh Technovations Private Limited 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 22nd 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.

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CARBON FOOTPRINT - GREEN PLEDE (PROPOSED)

We the Principal, the 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 in front, backyard and all other non-approachable areas of all primary and secondary pollutions.

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 Green 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.

-Sd-

Principal

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

EXECUTIVE SUMMARY.

For details, please follow the discussions in the report.

Sr No	Ob servation*	Problems *	Resulting benefits*	Remedial measures*	Capital *	Projected savings*
1	Skill Develop ment	Explore the local handicraft.				
2	Differently abled children.	Committee to monitor and arrange the basic needs like commutation, sitting arrangements, washroom for these special children.				
3	Girl children	To provide safe and dignified study time by providing health safety provisions in the campus.				
4	Green Commute	To promote green commute within the campus and also outside the campus.				
5	Green energy concept	College has kickstarted an initiative of lab testing the Solar thermal energy (Fresnel concentrating solar)				
6	Battery manage ment	Battery disposal procrastination by following restoration method.				

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7	Work culture	Self-imposed discipline brings out the best results. Avoids accidents , saves time.	Dirty used packages in and around the college	Incorporate need for cleanliness and place waste collection bins.	Rs.4500 /- per set	Reduced cleaning hours and good hygienic conditions.
8	Paperless office.	On considering the present scenario, it is advised to communicate with No-Contact and safe distance method. This is possible under Paperless office method.				
9	Solid Waste Management	Spilling of waste				
10	Outreach	Share the knowledge by example, by demonstration, by habitual practice.				

CRITERION VII – INSTITUTIONAL VALUES AND BEST PRACTICES

(with regards to Green Audit Objectives)

Key Indicator - 7.1 Institutional Values and Social Responsibilities

Metric No.	Description	Compliance	Initiatives required
7.1.1 QIM	<p>Measures initiated by the Institution for the promotion of gender equity during the last five years.</p> <p>Annual gender sensitization action plan</p> <p>Specific facilities provided for women in terms of:</p> <p>Safety and security - Energy</p>	Partly Complied	<p>Our The concept of home energy management in relation to the environmental impact may be initiated for the women. Detailed discussion on CARBON HANDPRINT should be discussed at length. The typical illustration is reproduced.</p>

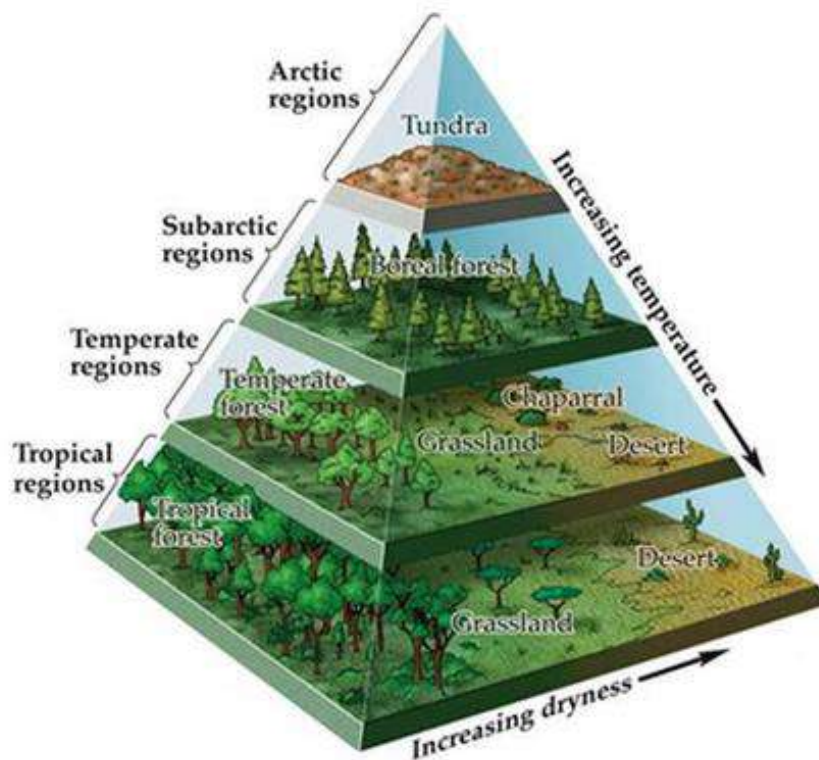


Figure 1 - Ecological pyramid

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Figure 2 - Innovation key pointers

	Environmental Consciousness and Sustainability		Discuss on why the recent calamities keep occurring more often than before.
7.1.2 QnM	<p>The Institution has facilities for alternate sources of energy and energy conservation measures</p> <ul style="list-style-type: none"> • Solar energy • Biogas plant • Wheeling to the Grid • Sensor-based energy conservation • Use of LED bulbs/ power efficient equipment 	Complied through parent society.	<p>Irrespective of the financial impact, the institute should consider the renewable energy projects as they impart the sense of green energy alternatives. Such as Solar Power, Wind energy, Biogas plant in Hostel mess.</p> <p>If renewable energy projects are installed the excess power</p>

			<p>can be exported to grid on non-working hours.</p> <p>Sensor based control is a must for energy use optimization.</p> <p>Complete the ongoing work at faster pace.</p>
7.1.3 Q ₁ M	<p><i>Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)</i></p> <p>Solid waste management Liquid waste management Biomedical waste management E-waste management Waste recycling system Hazardous chemicals and radioactive waste management</p>	<p>Complied partially wrt minimising .</p>	<p>Energy consumption details need to be monitored and the benefits of avoided accumulated energy use and power demand should be established.</p>
7.1.4 Q _n M	<p><i>Water conservation facilities available in the Institution:</i></p> <p>Rain water harvesting Borewell /Open well recharge Construction of tanks and bunds Waste water recycling</p>	<p>Complied .</p> <p>Open ground percolati on, Open well restoratio n.</p>	<p>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. Kindly refer to the article listed at the end of the table.</p>

	Maintenance of water bodies and distribution system in the campus	Percolation pond near to open well	
7.1.5 QnM	<p><i>Green campus initiatives include (4)</i></p> <p>7.1.5.1. The institutional initiatives for greening the campus are as follows:</p> <p>Restricted entry of automobiles</p> <p>Use of Bicycles/ Battery powered vehicles</p> <p>Pedestrian Friendly pathways</p> <p>Ban on use of Plastic</p> <p>landscaping with trees and plants.</p>	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 practicals on field and a competition in house should educate the society.
7.1.6 QnM	<p><i>Quality audits on environment and energy are regularly undertaken by the institution (5)</i></p> <p>7.1.6.1. The institutional environment and energy initiatives are confirmed through the following</p> <ol style="list-style-type: none"> 1.Green audit 2. Energy audit 3.Environment audit 4.Clean and green campus recognitions/awards 	Complied .	The audit findings should be predominantly projected by action from all stake holders of the institution.

	5. Beyond the campus environmental promotional activities		
7.1.7 Q _n M	<p><i>The Institution has disabled-friendly, barrier free environment</i></p> <p>Built environment with ramps/lifts for easy access to classrooms.</p> <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>)</p> <p>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>	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.
7.1.9 Q _i M	<p><i>Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens</i></p> <p>Describe the various activities in the Institution for inculcating</p>	Need to explore.	The sensitization of switching off the non-required electrical appliances and devices should be encouraged. Like organizing the inhouse competition.

	values for being responsible citizens as reflected in the Constitution of India within 500 words.		Every student to table their energy bills in the previous year. The savings in the fourth 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.
7.1.10 QnM	<p><i>The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and conducts periodic programmes in this regard.</i></p> <p>The Code of Conduct is displayed on the website There is a committee to monitor adherence to the Code of Conduct Institution organizes professional ethics programmes for students, teachers, administrators and other staff</p>	Complied	A range of activities can be brought in just as discussed in 7.1.9 above.

	Annual awareness programmes on Code of Conduct are organized		
7.1.11 Q _i M	<p><i>Institution celebrates / organizes national and international commemorative days, events and festivals</i></p> <p>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</p>	Complied	<p>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.</p> <p>https://en.wikipedia.org/wiki/Constitution_of_India</p>
7.2.1 Q _i M	Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.	Complied	When the listed activities from 7.1.1 to 7.1.11 are complied, the institute can have many creative best 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.

The Bulletin on energy Efficiency

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The views expressed in the articles are those of the authors and do not necessarily reflect those of IREDA or WIL.

इन लेखों में प्रकट विचार मूलतः लेखकों के हैं तथा यह आवश्यक नहीं है कि इरेडा या विनरॉक भी इन विचारों से सहमत हो ।

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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

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 CO₂ 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 CO₂ into the atmosphere is also reduced. Reduced CO₂ 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*

PART 1 – GENERAL**CARBON FOOTPRINT - GREEN PLEDGE (PROPOSED)**

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ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD., is pleased to express its sincere gratitude to the management of V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, 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 neglected to appreciate the sincere efforts put in by the 7th Criteria Team lead by the able and motivating Principal Prof. R.V. Jalawadi and the students who against all odds have kept the college premises clean to the possible limits. Without the crucial and significant support from the fellow teaching team the 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

We are not in a position to compute the carbon footprint 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.



Ref No: SKC/404/2020-21

Date: 20-07-2020

To,
Mr. Mallikarjun Kamblyal
Sunshubh Technovations Pvt.Ltd.,
Hubballi

Sub: To carry out Green, Energy and Environment Audits –reg.

Dear Sir,

With reference to the above cited subject and telephonic conversation, I request you to carry out Green Audit, Energy Audit and Environment Audits of our college and issue certificates and report of the same for the year 2020-21. Our student strength is 1040. I also request you to provide the details of charges for the same. Hope you will do the needful as early as possible.

Thanks with regards.

PRINCIPAL
S. K. College of Arts, Comm. & Science,
TALIKOTI-586214, Dist-Vijayapur
Principal

reductions.

We acknowledge the involvement of HODs & Coordinator

List of Department Heads Connected with NAAC Activities				
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1	Dr. A. S. Alalamath	English	IQAC Co-ordinator/ Convenor	2
2	Prof. Ramesh Jadhav	Commerce	Co-coordinator/ Member	2
3	Dr. Ajeya Abbar	Political Science	Convenor	1
4	Dr. Ashok Rathod	Economics	Convenor	3
5	Dr. D. B. Mugadlimath	Phy.Education	Convenor	4
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8	Prof. Sneha Navadagi	Commerce	Convenor	7
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10	Prof. Hema Jainapur	History	Member	2 & 3
11	Shri V. C. Kotyal	Librarian	Member	4
12	Prof. K. B. Desai	Zoology	Member	2 & 7
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17	Prof. S. C. Gogi	Botany	Member	3
18	Prof. Kavita Patil	Statistics	Member	1
19	Prof. Sharada Hiremath	Computer Science	Member	4 & 5

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year,

LIST OF FACULTIES AFTER MEDICINAL GARDEN				
Sl No	Name of Faculty	Department	Convenor/Member	Criteria
1	Prof. S. C. Gogi	Botany	Member	3
2	Prof. Daneshwari Talikoti	Botany	Member	7

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.

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

GREEN AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the GREEN Audit has been carried out on 8th Aug 2020 under the instructions of Principal Prof. R.V. Jalawadi, V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, Karnataka.

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

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.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.


We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

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.



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			

Figure 3 - Bureau of energy Efficiency Regd No: EA3485



Figure 4 - ISO Certified Lead Auditor. Certificate No: 47730

THOUGHT FOR EVERY MOMENT

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Figure 5 - ISO Certified Lead Auditor. Certificate No: ENR-00253448

THOUGHT FOR EVERY MOMENT

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Figure 6 - Manager training programme, Germany

THOUGHT FOR EVERY MOMENT

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Manager Training Programme



Federal Ministry
of Economics
and Technology



Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Certificate

Fit for Partnership with Germany

Mr Mallikarjun Kambalyal

has successfully participated in the

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

from September 2 to September 28, 2013 in Germany.

The programme was carried out by the TÜV Rheinland Akademie,
Cologne.

The Manager Training Programme is funded by the Federal Ministry of
Economics and Technology of the Federal Republic of Germany.
GIZ is the general manager and coordinator of the programme.

Bonn, September 2013

Reimut Düring

Head of Manager Training Programme
GIZ – Deutsche Gesellschaft für
Internationale Zusammenarbeit GmbH



Christina Otto

Senior Project Manager
GIZ – Deutsche Gesellschaft für
Internationale Zusammenarbeit GmbH

Figure 7 - Fit for partnership with Germany

THOUGHT FOR EVERY MOMENT

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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?

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!

GREEN 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 GREEN AUDIT

The purpose of carrying out 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 and 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

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 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 not to use the energy if necessary. At best it can be used judiciously.

- 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.
- 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 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.
- The net impact All the above energy audits should be 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
- 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.

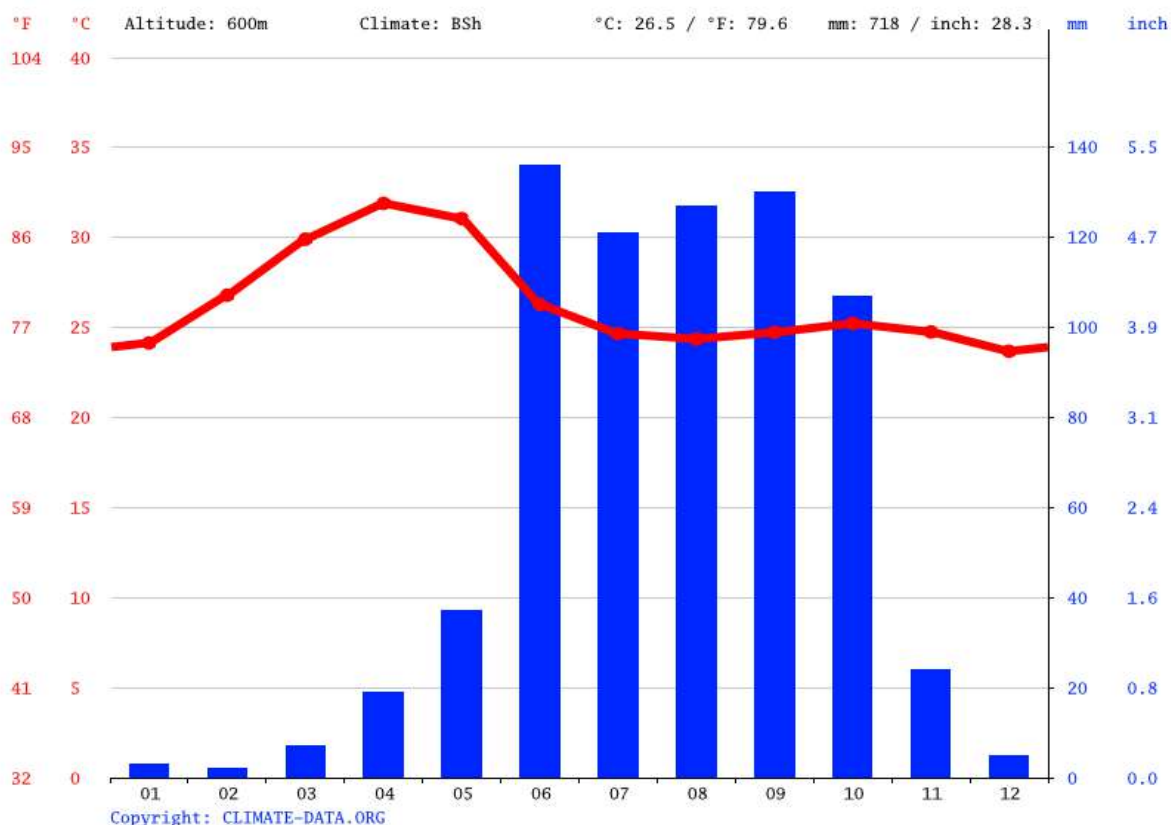
GEOGRAPHICAL CONSIDERATIONS:

Before we present our report, the factors that are considered for positive impact recommendations are,

CLIMATIC CONDITIONS

The prevailing climate in Vijayapura is known as a local steppe climate. In Vijayapura, there is little rainfall throughout the year. This location is classified as Hot semi-arid climates. The average annual temperature in Vijayapura is 26.5 °C | 79.6 °F. The rainfall here is around 718 mm | 28.3 inch per year.

CLIMATE GRAPH // WEATHER BY MONTH VIJAYAPURA



The driest month is February. There is 2 mm | 0.1 inch of precipitation in February. With an average of 136 mm | 5.4 inch, the most precipitation falls in June.

VIJAYPURA AVERAGE TEMPERATURE

With an average of 31.9 °C | 89.4 °F, April is the warmest month. December has the lowest average temperature of the year. It is 23.7 °C | 74.6 °F.

WEATHER BY MONTH // WEATHER AVERAGES VIJAYAPURA

The temperatures are highest on average in April, at around 31.9 °C | 89.4 °F. December has the lowest average temperature of the year. It is 23.7 °C | 74.6 °F.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temp °C	24.1 °C	26.8 °C	29.9 °C	31.9 °C	31.1 °C	26.3 °C	24.7 °C	24.4 °C	24.7 °C	25.2 °C	24.8 °C	23.7 °C
Min. Temp °C	17.9 °C	20.1 °C	23.1 °C	25.2 °C	24.9 °C	23 °C	22.1 °C	21.7 °C	21.5 °C	21 °C	19.5 °C	17.8 °C
Max. Temp °C	29.7 °C	32.6 °C	35.7 °C	37.9 °C	37.5 °C	30.9 °C	28.5 °C	28.2 °C	28.8 °C	29.8 °C	29.8 °C	29.2 °C
Rainfall mm (in)	3 (0.1)	2 (0.1)	7 (0.3)	19 (0.7)	37 (1.5)	136 (5.4)	121 (4.8)	127 (5)	130 (5.1)	107 (4.2)	24 (0.9)	5 (0.2)
Humidity (%)	39%	31%	26%	31%	41%	70%	76%	77%	75%	64%	50%	43%
Rainy days(d)	1	0	1	3	5	12	14	14	11	8	3	1
Avg. Sun Hrs	9.8	10.3	10.8	11.2	11.2	8.4	7.2	7.1	7.6	8.9	9.2	9.4

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year,

The precipitation varies 134 mm | 5 inches between the driest month and the wettest month. During the year, the average temperatures vary by 8.2 °C | 14.8 °F. The month with the highest relative humidity is August (77.25 %). The month with the lowest relative humidity is March (26.43 %).

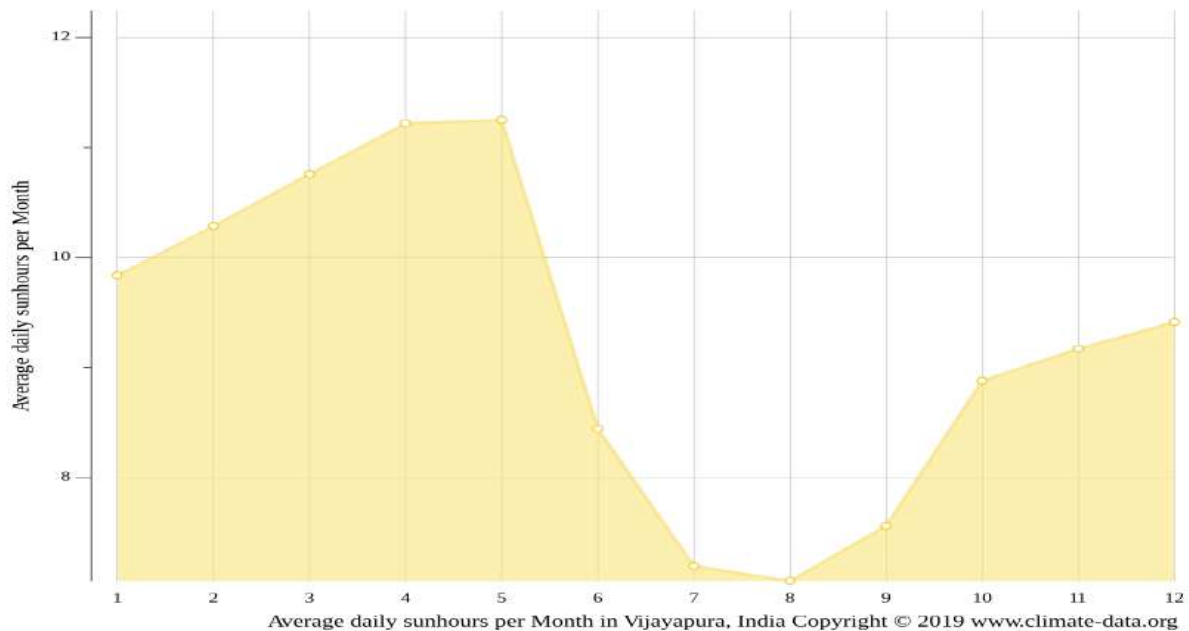
The month with the highest number of rainy days is July (18.17 days). The month with the lowest number of rainy days is February (0.47 days).

Vijayapura are in the middle and the summers are that easy to define. The best time to visit are January, February, March, June, July, August, September, October, November.

HOURS OF SUNSHINE IN VIJAYAPURA

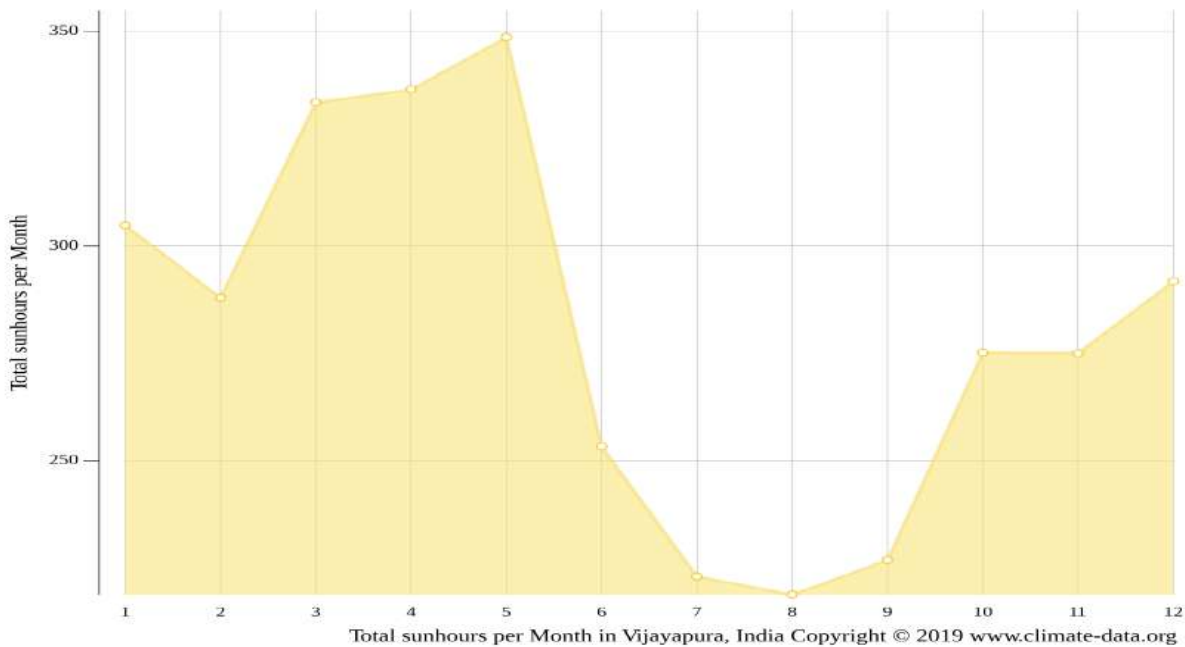
average hours of sunshine

Total hours of sunshine



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In Vijayapura, the month with the most daily hours of sunshine is May with an average of 11.25 hours of sunshine. In total there are 348.71 hours of sunshine throughout May.

The month with the fewest daily hours of sunshine in Vijayapura is January with an average of 7.06 hours of sunshine a day. In total there are 218.81 hours of sunshine in January.

Around 3375.79 hours of sunshine are counted in Vijayapura throughout the year. On average there are 111.07 hours of sunshine per month.

Source Courtesy: <https://en.climate-data.org/asia/india/karnataka/vijayapura-2796/>

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.

PART 2 TECHNICAL

DISCUSSIONS ON EXECUTIVE SUMMARY.

GEOGRAPHICAL LAYOUT.



Figure 8- Satellite view of the College campus.



Figure 9- College premises open for rainwater management.

The area marked at 1945ft is the lowest level and most ideal for rainwater harvesting and needs no major capital expenses. The college can erect a bund along the east border, along with the nala that flows by.

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W A T E R - H A P P Y S O C I E T Y .

Scanty rainfall → **M**an made water conservation methods → **A** little extra water → **U**sage like gardening & growth of grass → **M**ore greenery → **I**ncreased water percolation → **I**ncreased holding capacity → **M**ore water → **I**ncreased agri-greenery and forestry → **M**ore rainfall → **M**ore water →

..... **D**epleting water level suppressed → **W**ater available in open wells → **L**ow power consumption → **N**o deforestation → **M**ore greenery → **C**lean environment → healthy living → **H**appy family → **N**o more water problems → **H**appy society → **N**o conflicts → **T**ime to do good and constructive work → **A**wareness to conserve environment → **M**ore greenery → **M**ore Agri-greenery more happiness.

The knowledge of significance of water leads to a happy society. A society where each one looks for positive contribution. A society that can leave a healthy life.

SKILL DEVELOPMENT.

Sr No	Observation*	Problems*	Resulting benefits*	Remedial measures*	Capital *	Projected savings*
1	Skill Development	Explore the local handicraft.				

The institute has few hidden good practices which surfaced during the audit visit. It throngs with very creative activities. It has left no opportunity is making good.

The small town has established itself as one of the commercial hub for Toor, a pulse that is the basic dish in the rice plater across the country.

Well classified and packaged supply of the Toor dal can contribute to economical growth to the local civilians.

DIFFERENTLY ABLED CHILDREN

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
2	Differently abled children.	Committee to monitor and arrange the basic needs like commutation, sitting arrangements, washroom for these special children.				

GREEN AUDIT - Observations/Recommendations.

The institute has many short comings in meeting the requirements of the Physically challenged people. The college to setup a committee on immediate basis and come up with the action plan.

The check list is enclosed for compliance in line with the NAAC requirements under the 7th Criteria.

FACILITIES FOR DIFFERENTLY ABLED

This section needs to be self-evaluated by constituting an internal team.

The corrective measures would take time but a move towards the implementation would be appreciated.

NAAC co-ordinating team may please look into the aspects and act.

Need to form an inhouse committee on making the campus disabled friendly. A clear task is necessary and the required check list is presented for compliance.

Before we conduct check on compliance,

A Brief note on Green Audit.

Please refer to <http://www.disabilityindia.co.in/> for more information.

The green audit primarily lays focus on Energy use, its impact on environment and remedial measures.

It is equally focused on ways of making life of differently abled persons easy and readily adoptable to changing working environment.

Every citizen has to feel self-sufficient on economic front and self-reliant on meeting his daily chores.

While we have discussed elaboratively on Energy and Environmental aspects in the connecting audit reports, let us understand how we can focus on making differently abled life more meaningful Thus, the special focus.

Disabilities for Differently Abled.

In order to develop awareness in the higher education system and also to provide necessary guidance and counselling to differently-abled persons, it is expected that the Institutes

Facilitate admission of differently-abled persons in various courses.

Provide guidance and counselling to differently abled individuals.

Create awareness about the needs of differently abled persons and other general issues concerning their learning

Assist differently-abled graduates to gain successful employment in the public as well as private sectors.

The major functions of the institution should be,

- To provide counselling to differently - abled students on the types of courses they could study at the higher education institutions.
- To ensure admission of as many differently-abled students as possible through the open quota and also through the reservation meant for them.
- To gather orders dealing with fee concessions, examination procedures, reservation, policies, etc., pertaining to differently-abled persons.
- policies, etc., pertaining to differently-abled persons.
- To assess the educational needs of differently abled persons enrolled in the higher education institutes to determine the types of assistive devices to be procured.
- To conduct awareness programmes for teachers of the institute about the approaches to teaching, evaluation procedures, etc, which they should address in the case of differently-abled students.
- To study the aptitude of differently-abled students and assist them in getting appropriate employment when desired by them after their studies.
- To celebrate important days pertaining to disability such as the World Disabled Day, White Cane Day, etc., in the institute and also in the neighbourhood in order to create awareness about the capabilities of differently-abled persons.
- To ensure maintenance of special assistive devices procured by the higher education institute under the HEPSN scheme and encourage differently-abled persons to use them for enriching their learning experiences.
- To prepare annual reports with case histories of differently-abled persons who are benefited by the HEPSN scheme sanctioned to the higher education institute.

PROVIDING ACCESS TO DIFFERENTLY-ABLED PERSONS



Figure 10 - Placing of ramp for use by physically challenged

Suggest to give access to the ramp. Please refer to the checklist.

It has been felt that differently-abled persons need special arrangements in the environment for their mobility and independent functioning. It is also a fact that many institutes have architectural barriers that disabled persons find difficult for their day-to-day functioning. The colleges are expected to address accessibility related issues as per the stipulations of the Persons with Disabilities Act 1995, and ensure that all existing structures as well as future construction projects in their campuses are made disabled friendly. The institutes should



create special facilities such as ramps, rails and special toilets, and make other

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necessary changes to suit the special needs of differently-abled persons. The construction plans should clearly address the accessibility issues pertaining to disability. Guidelines on accessibility laid out by the office of the Chief Commissioner of Disabilities.

Providing Special Equipment to augment Educational Services for Differently abled Persons

Differently-abled persons require special aids and appliances for their daily functioning. These aids are available through various schemes of the Ministry of Social Justice and Empowerment. In addition to the procurement of assistive devices through these schemes, the higher education institute may also need special learning and assessment devices to help differently-abled students enrolled for higher education. In addition, visually challenged students need Readers. Availability of devices such as computers with screen reading software, low-vision aids, scanners, mobility devices, etc., in the institutes would enrich the educational experiences of differently-abled persons. Therefore, colleges are encouraged to procure such devices and provide facility of Readers for visually challenged students.

INTERNAL AUDIT GUIDELINES.

Audit Process

This section discusses the planning and implementation of the actual audit. The planning for the audit should cover:

- The core audit team
- Media management
- Overall coordination

Core Audit Team

- The audit team should assemble outside the venue in advance to discuss the process of the audit.
- The attendance sheet should be signed by all the members of the assembled team.
- The team members should know the parts of the building they are to audit.

- The appropriate part of the audit checklist should be used for each section of the building audited. It is important to address each item of the checklist.
- The group should assess the area taking all kinds of disability into account.
- The photographer must be briefed and be guided by a member of the core audit team.
- The results of the different parts of the audit must be compiled.
- The audit team should meet the authorities of the organization, with the media, to inform them of the findings of the audit and submit a representation. The team must get a commitment to incorporate the changes necessary to make the building disabled-friendly.

MEDIA MANAGEMENT

The media members should be asked to assemble at one place from where they will be transported to the venue of the audit or they should assemble at the site of the audit. A person must be appointed to coordinate with the media. A press briefing should be held and the media provided with a press kit. The media must be invited to join the team when it submits its representation to the head of the organization.

OVERALL COORDINATION

Since the audit process involves many people, a well-defined programme for the audit has to be drawn up. The following must be kept in mind:

- A schedule. A person should be nominated to monitor adherence to the planned programme.
- A designated Coordinator for overall synchronization of the audit goals

The following items must be carried by the audit team:

- copies of the audit checklist
- pens and hard boards
- attendance sheets
- copy of The Disability Act, 1995
- awareness materials
- copy of the representation to be submitted to the organization audited

- press kits

POST AUDIT REPORTING AND FOLLOW-UP

The reporting of the audit is in 2 parts:

- a. Report on the building being audited, for submission to the organization which houses the building; and
- b. Complete report containing all the details relevant to the entire audit exercise.

REPORTS TO BE SUBMITTED TO THE ORGANIZATION AUDITED

The data collected during the audit must be compiled and a report must be prepared. The report would be based on the following points:

- name of the place audited
- date of the audit
- members of the audit team
- observations on the areas audited, and the main conclusions of the audit
- suggestions for short-term and long-term improvement, based on the CPWD guidelines
- follow-up guidelines

A time-frame can be suggested for adopting the suggested changes. This report must be handed over to the audited organization, with a letter of appreciation for courtesies and cooperation extended, a copy of the completed audit checklist used to audit the institution and a copy of the relevant CPWD guidelines (sample formats)

REPORT OF THE ACCESS AUDIT PROJECT

A report of the audit itself must be drawn up. It should include the aims, the details of the audit process, i.e., the pre-audit preparation, the process itself and the post audit reporting and follow-up, including the results of the audit and suggestions for improvement, which have been made. The report should include photographs

and copies of news clippings of the audits. This report must be archived for future reference and follow-up action.

Brief Description Of The Essentials Of A Building That Are Evaluated

ENTRANCES/EXITS

The main entrances and exits of buildings must be clearly identifiable and easily accessible. They must be wide enough to accommodate wheelchair users. Steps and ramps must have hand railings of contrasting colours. Building should have automatic sliding doors. In multistorey buildings, the entrance should permit access to a conveniently located elevator. Emergency exits should be easily identifiable and accessible.

PARKING

Parking for people with disabilities should be available near the building. IT should be accessible to cross-disability groups equally. Accessible indoor parking spaces should be located closest to the elevators and within 50 metres of building entrance. The parking slots reserved for people with disabilities should be marked with the international symbol of accessibility. There should be procedures in place to make sure that non-disabled people do not use parking spaces reserved for people with disabilities. Drop off areas should be marked by a well-defined signage system and an accessible travel path from this area to the building should be available.

RAMPS

Complementary ramps should be available next to stairs. The gradient of ramps should allow easy use by wheelchair users. Appropriate landings should be available and the ramps should be wide enough for use by wheelchair users. Ramps surfaces should be slip-resistant and clear of obstacles. They should be protected on both sides. Ramps should be marked with the international symbol of accessibility.

ELEVATORS

Elevators should be easily accessible and identifiable. The doors should be wide enough to accommodate wheelchair users and the space inside should be sufficient for them. Elevators should have handrails of contrasting colours on three sides and be at appropriate heights. Visual and audible signals indicating the arrival at different floors should be available. Emergency intercoms should be usable without voice communication in emergencies. Tactile/ Braille instructions should be provided for the communication systems.

Stairs

Stairs should be easily accessible and identifiable. The minimum width of the stairs should be wide enough and the landings have enough space at the top and bottom. The stair surfaces and nosing should be slip resistant. Handrails should be provided for staircases.

Corridors

The minimum unobstructed width of corridors should be wide enough for wheelchair users and should allow manoeuvring through doors along the length of the corridor. The corridors should have guiding blocks along its length.

Washrooms, Toilets And Bathrooms

Separate toilets should be available for people with disabilities. They should be clearly identifiable and accessible. The doors should be wide enough and should be lockable from inside and releasable from outside. There should be enough manoeuvring space inside. All floor surfaces should be slip resistant. Mirrors, flushing arrangements, dispensers and toilet paper should be mounted at appropriate heights. They should be equipped with alarm systems for emergencies.

Public Telephones

There should be at least one telephone accessible to wheelchair users and should be equipped with hearing aids. The numbers should be embossed to allow easy identification. The coin slots should be at appropriate heights.

Counters

This includes reception counters, ticket counters, cash counters and administration counters. Counters should be easily identifiable and accessible to wheelchair users. Counter staff should be able to communicate with persons with hearing and visual disabilities.

Drinking Water Facilities

They should be easily accessible and the fountain head accessible to wheelchair users.

The area around the fountain should be dry to prevent falls. Glasses should be provided at drinking water facilities. The taps should be easily manoeuvrable.

Eating Outlets

Accessibility of eating outlets for people with various kinds of disability must be assessed. Tables, service counters and cash counters should be at appropriate heights. There should be enough place inside for easy movement by wheelchair users. A menu card should be available in Braille. Facilities should be available for people with speech impairment to place orders.

AUDIT OF SPECIFIC AREAS OF BUILDINGS

Some buildings have areas specific to them and different aspects must be looked when auditing them.

Hospitals

Patients have to visit the examination and sample collection rooms of hospitals and may get admitted to wards in them.

Examination Rooms

Examination rooms should be easily identifiable and accessible. The examination tables should be of the right size and height.

Sample Collection Rooms

Sample collection rooms should be easily identifiable and accessible. The rooms should be large enough to enable easy mobility within them. The toilets attached to sample collection rooms should be easy to use. The sample collection tables should be easily accessible.

Wards

Wards should be easily identifiable and accessible to people with different disabilities. Space in wards should allow easy mobility by wheelchair users. All fixtures should be at accessible heights. They should be obstacle free. Guiding lines should be available for people with visual impairment.

Banks

All counters should be easily identifiable and accessible. Counters should be at appropriate heights. The staff at the counters should be able to communicate with people with hearing impairments. The manager's office should be easily identifiable and accessible. Various forms should be placed at accessible counters and space should be available for the clients to fill the forms easily.

Automatic Teller Machines (ATM) should be easily accessible to clients with various types of disability. They should be placed in areas, which allow mobility for wheelchair users. They should be slip resistant and have grab bars.

Hotel Rooms

At least one room easily accessible should be located on the ground floor to enable rapid evacuation in case of emergencies. The room should be equipped with an alarm system. All fixtures and controls should be at accessible heights. The space in the room should allow mobility for a wheelchair user. The windows should

allow unobstructed viewing for wheel chair users. Room facilities, like phones, fire alarms, wake-up alarms, etc., should be accessible to people with different disabilities.

Cinema Halls

Tickets counters and the hall should be easily accessible. Specific seats should be allocated to wheelchair users.

Government Offices

The public areas should be accessible to people with different disabilities. The counter staff should be able to guide people with different disabilities. Letter boxes should be accessible.

Historical Sites

The site details should be available in Braille. Trained guides should be available for people with different disabilities. Shops should be accessible.

THE DISABILITY ACCESS AUDIT CHECKLIST

The disability access audit checklist includes details that have to be looked into for carrying out a disability access audit. They must be completely and accurately filled out to carry out a meaningful audit. The checklist has been divided into two parts. Part 1 (A to K) is for areas common to all buildings audited, while Part 2 (L to Q) deals with areas specific to locations, like banks, cinema halls, etc. It is non-exhaustive and should be adapted to specific needs.

The checklist must be filled in by answering " **yes** ", " **no** ", or " **not applicable** " to the questions. Observations made in the remarks column during the audit will determine how disabled friendly a location is.

Indicative In-house check list for disabled friendly persons.

CHECK LIST FOR COMPLIANCE

DISABILITY ACCESS AUDIT CHECKLIST		
Date of audit:		
Staff In charge		
Department:		
Audited by (organization):		
General Remarks & Suggestions:		
Name of the team leader and Signature		
A	ENTRANCE	
1	Before main entrance	
(i)	Are there steps?	Yes/No*. If yes, how many?
(ii)	Does the steps have railings?	Yes/No*. If yes, one/both sides?
(iii)	Is there a ramp? Does the ramp have railings?	Yes/No*
(iv)	Does the ramp have an edge protection?	Yes/No*. Width?
2	Main Entrance	
(i)	Is the width of the entrance greater than or equal to 900mm?	Yes/No*. Width?
(ii)	Type of door	Automatic/Swing/Sliding*
(iii)	Type of door handle(if applicable)	Lever/Knob*
(iv)	Is the height of the door handle	Yes/No*. Height of Kerb:

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	between 900mm-1100mm?	
(v)	Is there a kerb at entrance?	Yes/No*. Gradient:
(vi)	Is there a kerb ramp?	Yes/No*.
(vii)	Is there the International Symbol of Access (Disabled Logo) displayed?	Yes/No*.
3	Side Entrance	
(i)	Location (e.g., along Haig Road) (if there is more than one location, please specify all)	Yes/No*. If yes, location at
4	Side Entrance	
(i)	Is the width of the entrance greater than or equal to 900 mm?	Yes/No*. Width:
(ii)	Type of door	Automatic/Swing/Sliding*
(iii)	Type of door handle (if applicable)	Lever/knob*
(iv)	Is the height of door handle between 900 mm - 1100 mm?	Yes/No*. Height of kerb:
(v)	Is there a kerb at entrance?	Yes/No*. Gradient:
(vi)	Is there a kerb ramp?	Yes/No*.
(vii)	Is there the International Symbol of Access	Yes/No*.

	(Disabled Logo) displayed?	
5	Is side entrance accessible to the wheelchair-users?(Please use section A2 as a guideline).	Yes/No*. If no, give details:
6	Is the accessible entrance clearly identifiable?	Yes/No*. If no, give details:
7	Is the entrance wide enough?	Yes/No*. If no, give details:
8	Is the door a push-open door?	Yes/No*. If no, give details:
9	In multi-storey buildings, does the accessible entrance permit access to a conveniently located elevator?	Yes/No*. If no, give details:
10	Is the entrance landing area sufficient?	Yes/No*. If no, give details:
11	Is the entrance landing easily identifiable?	Yes/No*. If no, give details:
12	Are there tactile landing areas free of obstacles?	Yes/No*. If no, give details:
13	Is the entrance landing area free of obstacles?	Yes/No*. If no, give details:
14	Are emergency exits easily accessible?	Yes/No*. If no, give details:

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B	CAR PARKING	
1(i)	Is there a parking lot for the disabled person within the building?	
(ii)	Are there accessible parking facilities?	Yes/No*
(iii)	Are indoor parking spaces located closest to accessible elevators	Yes/No*
(iv)	Are accessible parking spaces within 50 meters of building entrances?	Yes/No*
2	If yes, how many are there and state location where these can be found (e.g., Basement 1, lot#112, near lift)	Yes/No*. If yes, location at
3(i)	Is there the International Symbol of Access (Disabled Logo) printed on the parking lot	Yes/No*.Size of logo: Yes/No*.If yes, describe signboard used:
(ii)	Is there a vertical and visible signboard indicating that the lot is for the disabled driver?	Yes/No*.Size of logo: Yes/No*.If yes, describe signboard used:
4	Are there directional signs within the parking lot to indicated the location of the parking	Yes/No*.

	lot for the disabled person?	
5	Size of parking lot.(Min. Size: 4800 mm x 3600 mm)	Dimension:
6	Please provide information on accessibility from the parking lot to the lift lobby/building entrance.	Please tick on the box and delete accordingly for the following: There is kerb/no kerb at the Entrance of the lift lobby. There is a kerb ramp at the Entrance of the lift lobby. Gradient: There is a swing/automatic/ Manual* door leading to the main building Width of door entrance is at least 900 mm wide Width: Corridor width is at least 1200 mm wide Width: Width of lift door is at least 900 mm wide Width: State the type of flooring used:
C	Taxi Stand	
1	Is there a taxi stand at the building? If yes, please state the location (e.g., at the main entrance)	Yes/No*. Location:
2	Is there a kerb at the taxi stand?	Yes/No*.
3	Are these one/two kerb ramps for boarding and alighting the taxi?	One/Two* Kerb Ramos Ramp for Boarding. Yes/No*. Ramp for Alighting. Yes/No*.

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D	Lift	
1(i)	Is the lift accessible to every floor?	Yes/No*.
(ii)	Is there an accessible path leading to the elevator?	If no, please specify which floor(s) the lift stops on:
(iii)	Is the elevator door easy to identify?	If no, please specify which floor(s) the lift stops on:
2	Is the clear door opening width more than 900 mm?	Yes/No*. Width:
3(i)	Is the height of the call button (outside the lift) between 900 mm-1100 mm?	Yes/No*. Height between:
(ii)	Is the space inside the elevator enough?	Yes/No*. Height between:
4	Is there an audio system installed (talking lift) for the lift?	Yes/No*.
5	Are there Braille/raised (for the visually impaired persons) numbers used on the control panel?	Yes/No*. Height between:
6	Is the control panel placed at a height of between 900 mm - 1200 mm from the floor level	Yes/No*. Height between:
7(i)	Are there grab bars inside the lift?	Slides: Yes/No*.

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(ii)	Are the doors and handrails of the elevator of contrasting colour?	Slides: One/Both* Rear: Yes/No*.
8	Are the grab bars placed at height of 900 mm from the floor?	Yes/No*. Height:
9	Is the emergency intercom usable without voice communication?	Yes/No*.
10	Is the door opening/closing interval long enough?	Yes/No*.
11	Is the floor of the elevator non-slippery	Yes/No*.
E	Public Telephone	
1	Are there public telephones for the disabled person. If yes, provide location (e.g., level 1,2)	Yes/No*. Location:
2	Is the height of the operable parts (highest and lowest) of the public Phone between 800 mm-1200mm	Yes/No*. Actual height between:
3	Is there a clear knee space of more than 680 mm	Yes/No*. Actual clear knee space:

4	Is there at least one telephone equipped with hearing aids?	
5	Are the numerals on the telephone raised to allow identification by touch?	
6	Is the coin slot mounted at an appropriate height?	
7	Are accessible facilities identification?	
F	Counters	
1	Is the counter easily identifiable?	
2	Is the level of the counter accessible?	
3	Is the staff able to communicate with people with visual, hearing and speech impairment?	
4	Is the staff supportive to mentally-challenged clients?	
G	Public Toilets	
1(i)	Are there separate toilets for the disabled person?	Yes/No*.

	Is the accessible toilet identified by a sign?	
(ii)	Is the entrance to the public toilet accessible to people with disabilities?	Yes/No*.
(iii)	Is the width of the door wide enough?	Yes/No*.
(iv)	Is there enough manoeuvring space in the toilet?	Yes/No*.
2	Are the toilets for the disabled person available on every floor?	Yes/No*. If no, specify on which floor they are available
3	What type of toilets is provided?	Individual/Compartment/Both*
4	Are the measurements of the toilet for the disabled person the same (if there are more than one toilet)?	Yes/No*.
5	If the toilets for the disabled persons are different from one another, please complete separate copies for each toilet surveyed	State location of toilet checked Please tick on the box and delete accordingly for the following Individual washroom/compartment * Individual washroom: Have clear dimensions between opposite walls of not less than 1750 mm. Actual dimension:

<p>Sketch toilet surveyed (include door, water closet, wash basin, door and grab bars)</p>	<p>mm x mm</p> <p>Water Closet Compartment</p> <p>Have clear dimensions of not less than 1500 mm by 1750 mm</p> <p>Actual dimension: mm x mm</p> <p>Door width more than 900 mm Actual width:</p> <p>No kerb/kerb ramp* at the Entrance to the toilet. If there is a kerb ramp, the gradient is:</p> <p>Door handles are located: Inside/Outside/Both sides*</p> <p>Door opens outwards / inwards*</p> <p>Door is a swing / folding / sliding* door</p> <p>One horizontal grab bar is mounted at a height of between 280 mm and 300 mm from the top of the water closet seat and one horizontal grab bar is mounted on the side wall closet to the water extending from the rear wall to at least 450 mm-in-front of the water closet seat.</p> <p>Actual height:</p> <p>Actual height:</p> <p>Water basin has a clear knee Space of at least 750 mm wide by 200 mm deep by 680 m high with an additional toe space of at least 750 mm wide by 230 mm deep by 230 mm high.</p> <p>Actual clear knee space: (W) x (D) (H)</p>
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		<p>Water closet is located between 460 mm - 480 mm from the centreline of the water closet to adjacent wall.</p> <p>Actual distance:</p> <p>Clear dimension of 750 mm from the front edge of the toilet bowl to the rear wall.</p> <p>Actual distance:</p> <p>The passage way leading to the cubicle is at least 900 mm.</p> <p>Actual width:</p>
6	Is there at least one accessible shower?	
7	Are grab bars installed in bathtubs and showers at an appropriate height?	
8	Are accessible showers equipped with shower seats?	
9	Are the grab bars slip resistant?	
10	Can grab bars withstand load?	
11	Is the mirror at an appropriate height?	
12	Is the rest room equipped with an alarm system accessible to people with different disabilities?	

13	Are flushing arrangements, toilet paper and other dispensers mounted at an appropriate height?	
14	Are flushing mechanisms easy to operate?	
15	Are the doors lockable from inside and released from outside in emergency situations?	
H	Drinking Water Facility	
1	Is the water tap easily accessible?	
2	Can it be easily manoeuvred by a person with poor hand function?	
3	Is the area dry?	
4	Are glasses provided?	
I	Cafeteria	
1	Is there an eating outlet located within the building?	Yes/No*. Location
2	Is the eating outlet generally accessible to the disabled?	Yes/No*.
3	Is there a circulation path/passageway of at least 900 mm wide to	Yes/No*.

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	allow the wheelchair user to move around the eating outlet and order their food?	
4	Is there a table reserved for the disabled?	Yes/No*. If no, give details of seating arrangements:- Height of table-top not higher than 800 mm with a minimum clear knee of 700 mm x 480 mm deep. If no, provide Measurement: Table-top: Clear knee space: x Table with fixed stools/chairs Table without fixed stools/chairs
5	Are there directional signs to lead the disabled person to the reserved table?	Yes/No*.
6	Is there enough leg clearance space below the table?	Yes/No*.
7	Is the height of the table appropriate?	Yes/No*.
8	Is the height of the cash counter appropriate?	Yes/No*.
9	Is there a menu card available in Braille?	Yes/No*.
10	Is there a facility for a person with speech impairment to be able to place an order?	Yes/No*.

11	Do the tables have straight legs?	Yes/No*.
J	Staircase	
1	Applies to flights of steps Check the following:	State where the staircase is located:
2	Are there handrails	Yes/No*. If yes, one/both sides
3	Height of hand rails between 800 and 900 mm from the floor	Yes/No*. Actual height:
4	Are the handrails continuous	Yes/No*.
5	Is there a levelled platform at the top and bottom step extending not less than 300 mm (with railing)	Levelled platform: Yes/No*. Extended railing: Yes/No*.
6	Steps specifications	Uniform riser: Yes/No*. Open Riser: Yes/No*. Height of risers: Protruding nosing: Yes/No*.
7	Is the minimum width of the stairs enough?	
8	Is the landing space at the top and bottom of the stairs enough?	
9	Are the stair nosing slip-resistant?	
10	Is the location of the stairs clearly identifiable?	
11	Is a handrail installed?	

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12	Do the stairs have guide strips?	
K	Slop Ramps	
	Applies to slope ramps Check the following:	State where the slope ramps are located:
1	Are there handrails	Yes/No*. If yes, one/both sides
2	Height of hand rails between 800 and 900 mm from the floor	Yes/No*.Actual height:
3	Are the handrails continuous	Yes/No*.
4	Is there a levelled platform at the top and bottom ramp extending not less than 300 mm (with railing)	Levelled platform: Yes/No*.Levelled railing: Yes/No*.
5	Is the width of the ramp at least 1200 mm	Yes/No*.Actual width:
6	Ramp landings are provided at regular intervals of not more than 9000 mm of every horizontal run	Yes/No*.Length of horizontal run:
7	Is an edge protection available	Yes/No*.
8	Type of flooring used	Specify:
9	Describe the condition of the flooring	e.g., levelled, tiles popping up, uneven surfaces
10	Are graffiti found in the open area	Yes /No*

11	Are the gratings covered?	Yes/No*
12	Are grating placed across the dominant placed across the dominant of travel	Yes/No*
13	Is the width of spaces found between the grating strips less than 12 mm	Width:
	General description of accessibility within the premises	Paths to various locations of Attractions are easy and Accessible.
		Not quite accessible, there are Many obstacles such as
		Quite accessible but there are Steps (manageable).
		Inaccessible in most areas. (please specify)
L	Corridors	
	Is the minimum unobstructed width of the corridor wide enough for wheelchair users?	
	Does the corridor width allow manoeuvring through doors located along its length	

	Does the corridor have guide strips?	
	Is the corridor pathway obstruction-free?	
	Any other comments:	
	Name of Facilitator(s):	Name of Surveyor(s):

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GENDER EQUALITY UNDER SEC 7.1.1

Sl No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
3	Girl children	To provide safe and dignified study time by providing health safety provisions in the campus.				



Figure 11- CCTV for security

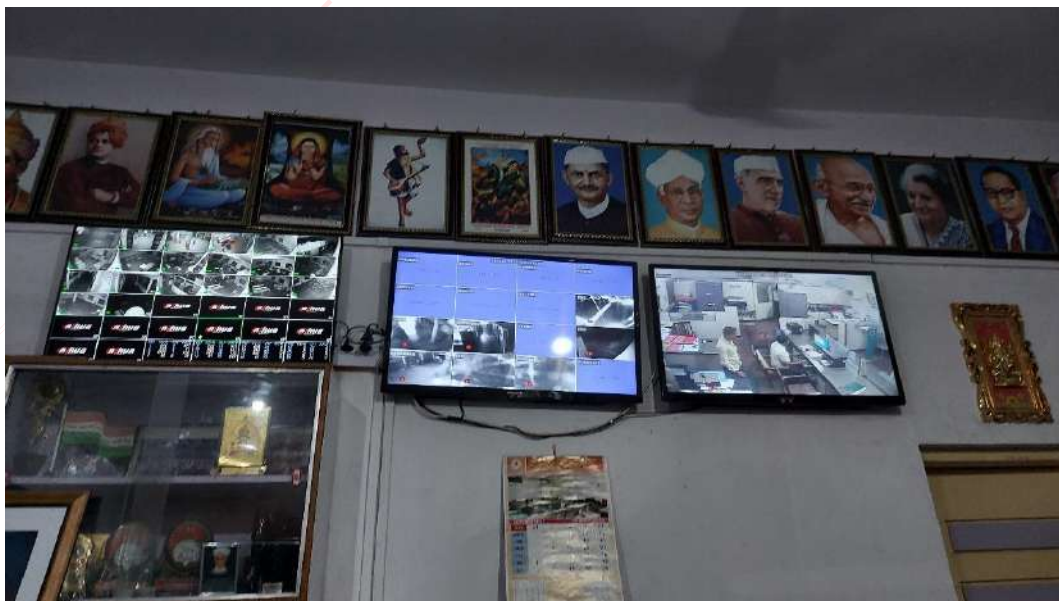


Figure 12 - Centrally monitored activities through CCTV

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The placement of CCTV surveillance builds confidence among the girl child to perform without fear.



Figure 13 - Pad incinerator

The convenience of the health safety arrangements are an added advantage and great moral booster.

COMMUTING.

Sr No	Observation *	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
4	Green Commute	To promote green commute within the campus and also outside the campus.				
5	Green energy concept	College has kickstarted an initiative of lab testing the Solar thermal energy (Fresnel concentrating solar)				

REDUCE CARBON FOOTPRINT BY CYCLING

Cycling is usually a low-carbon way to travel – but it depends on what you eat, and it helps you to Reduce Your Carbon Footprint by Cycling.

The UN climate change report warns that we need to reduce our *carbon footprint* before it's too late. Here's how *bike* commuting can help.



Figure 14 - GREEN PLEDGE TEMPLET.

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You're probably well aware of cycling's numerous health benefits. But its impact on the planet can make life better and safer for all people, not just individuals aiming for a healthier lifestyle.

That's according to a new report from the UN's [Intergovernmental Panel on Climate Change](#) (IPCC). The panel's scientists determined that if the global temperature rises by 1.5°C or more by 2030, the worldwide risk of events like extreme droughts, wildfires, and floods will increase exponentially.

The bad news: If no changes are made, the global temperature could rise by as much as 3°C—double the rate that scientists agree would already be catastrophic. But everyone from governments and large corporations to private citizens can take steps to fight the effects of climate change. The IPCC suggested ways to reduce our carbon footprint—and cycling for transportation is one of them.

One thing that can be done is cities planning and implementing complete street policies—things like funding infrastructures, building protected bike lanes, and talking to citizens about what would make them feel safe," Whitaker told *Bicycling*. By using bike lanes and other infrastructure to better connect neighbourhoods with schools, offices, and shopping centers, she said,



Figure 15 - Reserved for green commute

cities and towns could encourage more people to ditch their cars and bike instead. This is the best way to Reduce Carbon Footprint by Cycling.

Taking the leaf off the Harvard university, We suggest that the concept of commute to work be explored. We present the link to understand how the Harvard university encourages and practices.

<https://green.harvard.edu/tools-resources/how/10-tips-harvards-bike-commuting-pros>

Although the formation of the rules is out of the purview of the College management, It can initiate a self imposed action plan to set an example and draw the attention of the law makers. We suggest the ECO-CLUB to explore the possibilities and say no to NO-VEHICLES at least three days in a week.

USE OF NATURAL RESOURCES:

The institute has taken good initiatives in incorporating various measures to adopt to new technologies available.

The institute has started use of LED lights. At places where they are not in use, they are planed to be replaced by LED lights as and when they fuse out.

We suggest that the LED replacement project be takenup immediately to put the solar energy into good use.

When replacing the LED lights care should be taken to prevent LIGHT Pollution.

Light pollution is the presence of anthropogenic and artificial *light* in the day or night environment. It is exacerbated by excessive, misdirected or obtrusive use of *light*, but even carefully used *light* fundamentally alters natural conditions.

Light pollution is caused by inefficient or unnecessary use of artificial light. Specific categories of light pollution include light trespass, over-illumination, glare, light clutter, and skyglow. A single offending light source often falls into more than one of these categories.

Every day, people are exposed to hours of artificial light from computers, office lights and even 24-hour lighting in hospitals.

Now, new research in animals shows that excessive exposure to "light pollution" might be worse for you than previously known, taking a toll on muscles and bones. Researchers at Leiden University Medical Center in the Netherlands tracked the health of rats exposed to six months of continuous light compared with a control group of rats living under normal conditions -- 12 hours of light, followed by 12 hours of dark.

During the study, reported in *Current Biology*, the rats exposed to continuous light had less muscle strength and showed signs of early-stage osteoporosis. They also got fatter, and some markers of immune system health worsened.

While earlier research found excessive light exposure might affect cognition, the new research showed a surprising effect on muscles and bones.

"Not only did motor performance go down on tests, but the muscles themselves just atrophied, and mice physically became weaker after just two months," said Chris Colwell, a sleep specialist at the University of California-Los Angeles, who was not involved with the study.

The good news is the effects of light exposure appear to be reversible. When the study rats returned to their natural light-dark cycle, their health returned to normal after two weeks.

The data suggest more research is needed into the health effects of artificial light. One concern is the health of patients in hospital intensive care units, people in nursing homes and babies in neonatal units -- places where artificial lights often are kept on for 24 hours a day.

"We keep the sickest people in our society under constant light conditions," Colwell said.

The research also might have implications for people exposed to the blue wavelength light emitted from computers, which might be more disruptive to the body than the light that comes from traditional artificial lights.

mechanism should be in good operating condition. For the system to be in good operating condition, we need to follow certain the regulatpory bodies.

The campus lacks this vital fact. We have discussed the situation with site photos. We have also given solutions where necessary. Before we proceed, it is important for all the stake holders to understand few key aspects and why these standards have been specified.

ACCESSIBILITY: Electrical hazards are among the most common safety hazards found during compliance, occupational safety and health inspections. Electrical systems in the workplace should have mechanisms in place to protect employees from injury. However, these systems must be maintained properly in order to be effective. Electrical panels are the primary units that control the flow of electricity to different parts of an office or building equipment. Each connection on the panel has a switch that can stop the flow of current to specific electrical circuits and appliances.

If an employee receives an electrical shock, shutting down the source of power may be the only safe method to stop the electrical current. OSHA requires enough access and working spaces around all electrical equipment, or panels, serving 600 volts or less. 29 CFR 1910.303(g). For equipment operating at 600 volts, nominal or less to ground, electrical panels must have a minimum of three feet of clearance in front of the panel and a minimum clearance width of 2.5 feet or the width of the equipment, whichever is greater. This assures that in case of an electrical emergency, there is a clear working space in front of the panel for quick access to

the circuit breakers. Electrical panels should also have secure covers to ensure no wires are exposed that could cause electrical shock. This also prevents the internal mechanisms from being exposed to dust, dirt, and moisture. Electrical panel boxes in commercial buildings should be secured and accessible by trained personnel only.

It is important that these trained electrical staff be provided with appropriate PPE ie Personal Protective Equipment's for safe handling of these devices. We

have shown few of the PPE's which need to be provided in all sizes so that every staff is well protected.

The floor of the electrical room housing the panel boards are not covered with Insulated rubber mat. It is important to have them in place to avoid accidental electrocution.



Figure 18 - Electrical safety mats

REFERENCES

IEEE standard 1100-2005: Recommended practice for power and grounding sensitive electronic equipment.

IEEE standard 518-1982: Guide for installation of electrical equipment to minimize noise inputs to controllers from external sources.

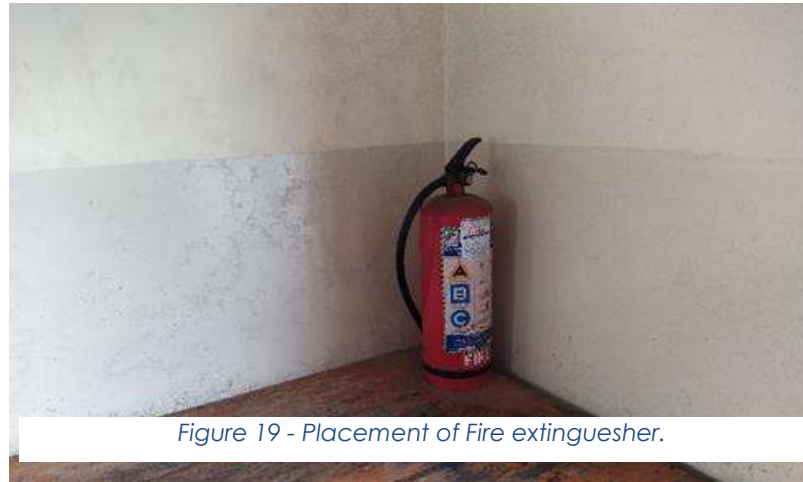
Note: IEEE now has withdrawn this standard.

IEEE standard 142-1991: Recommended practices for grounding of industrial and commercial power systems.

IEEE standard 81-1983 and 81.2-1991: Guide for measuring earth resistivity, ground impedance, and earth surface potentials of a ground system.

NFPA-78 Lightning Protection Code 1986, Quincy, Massachusetts: National Fire Protection Association, 1986.

Fire SAFETY : The fire extinguishers should be placed at the entrance of the room housing dangerous devices. So that, they are handy when need to be used.



It is also important that the handling instructions are predominantly displayed. The sample poster is reproduced for replication.

PORTABLE FIRE EXTINGUISHERS

IN CASE OF FIRE:

- Call the fire department immediately.
- Do not use an extinguisher without proper training.
- Know which extinguisher is correct for what type of fire.
- Only use portable extinguishers when the fire is contained to a small area.

FIRE CLASSIFICATION:

A

Use for ordinary combustibles. Contains water.

C

Use for electrical fires. Do not use water on these fires! Contains dry chemicals, carbon dioxide or halogenated agents to smother the fire with foam.

B

Use for flammable liquids. Contains dry chemicals or suspended agents to smother the fire with foam.

D

Use for combustible metals. Contains special liquids or dry powder agent.

P. A. S. S. OPERATING PROCEDURE

P

PULL the pin. Hold the extinguisher with the nozzle pointing away from you, and release the locking mechanism.

A

AIM the nozzle at the base of the fire.

S

SQUEEZE the lever slowly and evenly.

S

SWEEP from side-to-side at the base of the flame.

Figure 20 - Fire extinguisher usage template

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year,

In case of fire, appropriate Fire extinguishers should be placed at the entrance but outside the room. The details of such classified Extinguishers is indicated for reference.

Type Extinguisher	Fire		CLASS A	CLASS B	CLASS C	CLASS D	Electrical	CLASS F	Comments
	Fire	Extinguisher	Combustible materials (e.g. paper & wood)	Flammable liquids (e.g. paint & petrol)	Flammable gases (e.g. butane and methane)	Flammable metals (e.g. lithium & potassium)	Electrical equipment (e.g. computers & generators)	Deep fat fryers (e.g. chip pans)	
Water	✓	✗	✓	✗	✗	✗	✗	✗	Do not use on liquid or electric fires
Foam	✓	✓	✓	✓	✗	✗	✗	✗	Not suited to domestic use
Dry Powder	✓	✓	✓	✓	✓	✓	✓	✗	Can be used safely up to 1000 volts
CO ₂	✗	✓	✗	✓	✗	✗	✓	✗	Safe on both high and low voltage
Wet Chemical	✓	✗	✗	✗	✗	✗	✗	✓	Use on extremely high temperatures

Figure 21 - types of extinguishers and Applications.

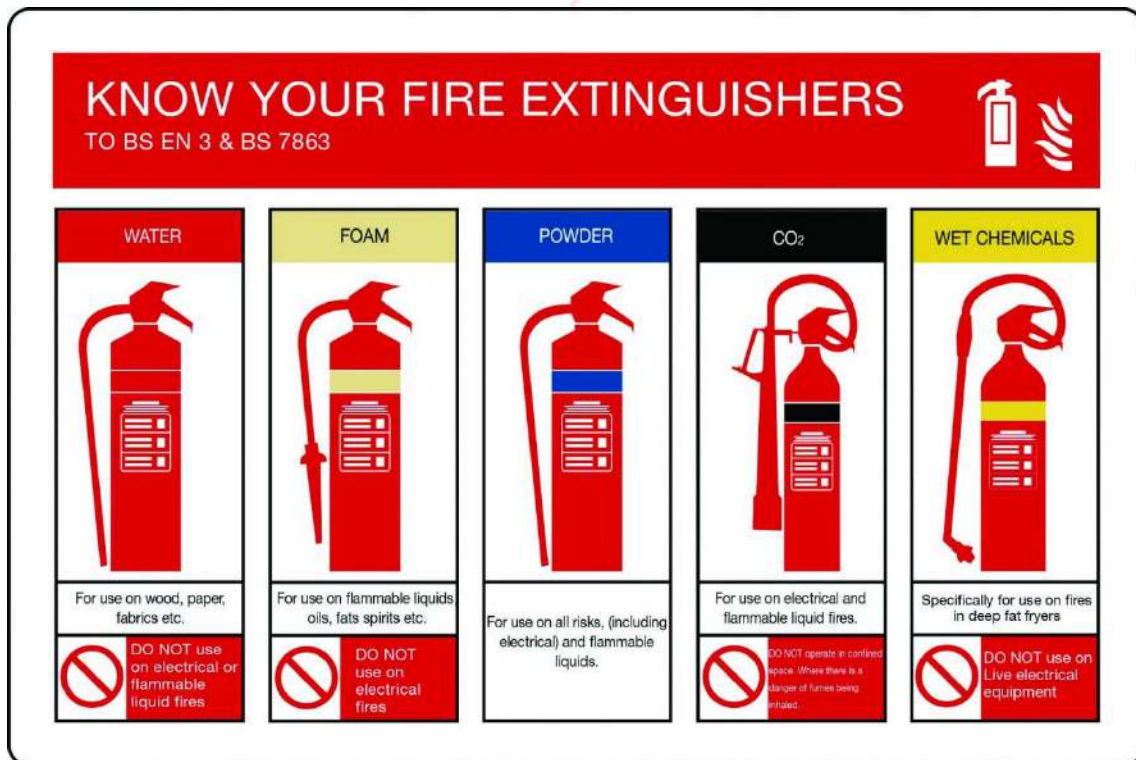


Figure 22 - Know your fire extinguisher

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.

DISPOSAL OF USED BATTERIES

Sr No	Observation*	Problems*	Resulting benefits*	Remedial measures*	Capital *	Projected savings*
6	Battery management	Battery disposal procrastination by following restoration method.				

In compliance with - Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5

The procrastination of used batteries after the fixed life span of 4-5 years by proper handling, checks and restoration methods.

BATTERY PLACEMENT:



Figure 23 - Battery placement

The batteries disposal is an environment threat. The lead which is a major component has serious adverse effects. The acidic fumes damage the electronic components and when disposed to environment through uncertified local ragpickers either as scrap or buyback option, the institute stands to be morally responsible to such environmental pollution.

Hence the disposal of the batteries should be prolonged. This is possible by putting into use the Battery regenerative system

However, much before the regeneration It is good practice to make room for cross ventilation for the batteries to be placed in cool place.

The benefits include –

In normal operating mode, the batteries are known to last for 5 to 6 years.

With good working practice, they would last for almost three times the life.

Prolonged life of the Batteries.

Avoids acid fumes accumulation on the Batteries.

Increased life of all electronic gadgets around the Battery bank.

Delayed discarding of the Batteries avoids environment pollution and Revenue outflow for the organisation.

WE suggest to regenerate the batteries once every 3 years, so that the sulfur lining is minimized. If the regeneration is executed once every three years, we can regain the working performance to 95 to 98% of its original status.

However, this needs to be backed up with necessary periodical check with the density of the battery solution.

BATTERY MANAGEMENT:

The batteries breath acid fumes. It is good practice to make room for cross ventilation for the batteries to be placed in cool place.

The benefits include –

Prolonged life of the Batteries.

Avoids acid fumes accumulation on the Batteries.

Increased life of all electronic gadgets around the Battery bank.

Delayed discarding of the Batteries avoids environment pollution and Revenue outflow for the organisation.

All batteries should be placed in well ventilated area. As battery disposal is turning out to be a serious issue, ways to prolong the life of the batteries is very important from the environmental point and also from the Financial implications.

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'ts 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. (See [BU-705: How to Recycle Batteries.](#))

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 NEW LEASE OF LIFE.

Significance...

- The early regeneration results into second tenure of the batteries i.e. another term of 3 to 5 years as per Battery specifications.
- Optimised energy consumption. Thus, reduced cost of operation.
- Delayed disposal results into elimination of environment pollution.

Reduced impact on CARBON FOOTPRINT BATTERY MANAGEMENT :

All batteries should be placed in well ventilated area. As battery disposal is turning out to be a serious issue, ways to prolong the life of the batteries is very important from the environmental point and also from the Financial implications.

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.

SOLUTION: The placement of batteries needs to be at the place very close to cross ventilation, if possible, in open but shaded place. The following clippings are explained.

WORK CULTURE:

Sr No	Observation*	Problems*	Resulting benefits*	Remedial measures*	Capital *	Projected savings*
7	Work culture	Self-imposed discipline brings out the best results. Avoids accidents, saves time.	Dirty used packages in and around the college	Incorporate need for cleanliness and place waste collection bins.	Rs.4500 /- per set	Reduced cleaning hours and good hygienic conditions.



Figure 24 - House keeping practices

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year,

Cultural Responsibility (CR) is an attitude that should affect economic behaviour by making it more respectful of the symbolic worlds of individuals and communities. Thus, conditions can be established that allow everyone a shot at happiness. Furthermore, CR is an implication of CSR (Corporate Social Responsibility), because it refers to one of the three aspects of the triple bottom line of CSR: people. As a consequence, the practice of CSR forces organizations to look after economic growth through the satisfaction of social needs, environmental protection and cultural requirements. CR has to be translated into standards of conduct and values, the main ones being humanity and reciprocity. These values must be respected by all organizations and they need to be taught in schools from an early age.

CR combines the words "culture" and "responsibility". According to Hans Jonas responsibility is

- The ethical duty to care about present and future generations, to respect human beings and their integrity. Culture, in its anthropological sense, looks at man as a system of beliefs, symbols, imagination and rationality that allows the individual to represent the world around him in a continuous social interaction with other individuals.
- According to Clifford Geertz, man builds his symbolic worlds within the social circles in which he is embodied, and culture is a web of meanings woven by men. This statement leads us to reflect, on one hand, on cultural capital, that is, according to Pierre Bourdieu, all that is acquired through different contexts of socialization, and, on the other hand, on intangible cultural heritage, i.e. everything that communities, groups and individuals recognize as part of their cultural heritage and it is constantly modified through their relationships with the physical world, the culture that precedes them and the practice of life.

CR is a respectful attitude towards different cultural expressions within a society characterized by globalization and the spread of knowledge-based economy,

both of which offer new opportunities but also have unclear implications. That is what happens, for example, with the definitions of cultural and creative industries in many studies.

As we learn, the Europeans have, as their main goal, the promotion of economic growth by creating new jobs and fostering cultural tourism and cities of art with the aim of realizing the Lisbon Strategy (*an action and development plan devised in 2000*) and making the most competitive and dynamic knowledge-based economy in the world. Therefore, they contribute to the process of a sort of “aesthetisation” or “spectacularization of life”, an environment where human relationships are mediated by images. In this “society of spectacle”, according to Walter Benjamin, masses want to satisfy their own needs to be socially recognized, and culture is reduced to a commodity, justifying the supremacy of “profit” and the power of huge corporations. Cultural industries are mainly interested in short-term environmental and economic impacts, at the expense of long-term social and cultural ones. These include the impact on life-styles, habits, cultural expressions, and the active involvement of the people living in the contexts in which cultural industries operate. Economic growth has to be realized even through the fulfilment of social needs and cultural requirements.

The modern social context is also characterized by the spread of Corporate Social Responsibility (CSR), a form of self-regulation where the enterprise decides to take responsibility for the consequences of its behaviour. A culturally responsible attitude has much in common with what is suggested by CSR: the attention to human capital, the stakeholder's involvement, active citizenship and the concept of sustainable development, which is strictly connected with that of responsibility.

Sustainable development looks at development as a human-centred and not as a commodity-centred process. According to Amartya Sen, it is a “human capability expansion”, i.e. an enhancement of the capacities of people to live the sort of life they decide, including their access to cultural resources and cultural participation. It requires the removal of major sources of lack of freedom, often

caused by social and economic inequalities. Development is not only economic growth but also cultural growth. It has its roots in cultural diversity: it asks for all cultures to be respected and for there to be the principle of cultural freedom in a democratic context. It is stated in the UNESCO Universal Declaration on Cultural Diversity (2001): “*cultural diversity is a necessary for humankind as biodiversity is for nature (...) it is one of the roots of development, understood not simply in terms of economic growth, but also as a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence*”. After economic growth, environmental balance and social inclusion, cultural diversity could be seen as the fourth pillar of sustainable development. Thought of in this way, culture could be a means to promote social cohesion and inclusion.

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
5	Work culture	Self-imposed discipline brings out the best results. Avoids accidents, saves time.				

Placement of footwear: Placing of footwear is a typical example. Our work culture is depicted in the way we behave and exhibit.

Value for all commodities is important to conserve the mother earth. Hence the placement of material of use/substance/importance should find appropriate placing. The passage should be clear from all obstacles weather small or large. Here the placement of footwear is only an example. One needs to practice and exhibit in all sectors, be it waste or unused materials or the vehicles parked in wrong place.

The other example is the vehicle parking.


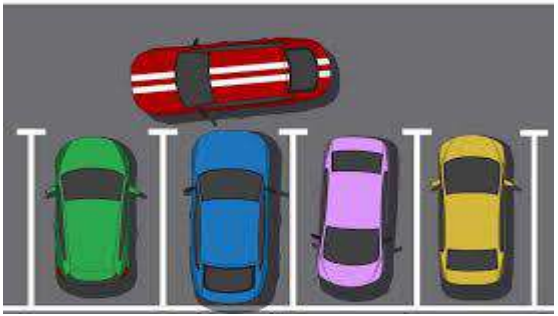
City has seen very high traffic growth and the vehicle parking is a burning issue.

Children exhibit what they learn at home and educational institutions.

Today's crisis of vehicular movement is mainly due to erratic parking of vehicles at every space one finds it. It may also be known that; the majority of the lives are lost due to road accidents caused by rough driving.

It is seen from the college campus that the need for disciplined parking and vehicle movement is necessary step to be initiated.

To build-up sense of responsible citizenship, The management should educate the children and the staff in following traffic rules and parking in its designated location. The illustrations below set the way forward.

<p>Culture</p> <p>It is important to consider the factors that can disturb others behaviour. Few factors the college can consider to bring in change in are</p> <p>PARKING:</p> <p>Random parking, be it two-wheeler or the four/six wheelers. We often see randomly parked. It is important that all the vehicles are parked in specified areas in such a way that one need not struggle to move out of the place.</p> <p>Educational institutes should inculcate these basic best practices so that the three to five years of their college days, the student learn the sense of social responsibility. There</p>	<p>The images shown below are for illustration only and are not captured in the campus. (Kindly see the gallery for campus related photos)</p>  
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behavioural culture makes a positive change when they walk out and behave responsibly. It is a matter of pride for the college too, to speak and practice best practices.

SUGGESTION:

We suggest that the parking space be marked with borders so that the staff and students park the vehicles at the designated space.

The image shown on the right, gives an indication for good parking.



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 knowingly or unknowingly are exhaling the process of heading towards **ZERO CARBON FOOTPRINT**.

With the infrastructure is in place, the staff are inclined to perform, there is nothing that can stop from achieving the required.

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.

PAPERLESS OFFICE:

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
8	Paperless office.	On considering the present scenario, it is advised to communicate with No-Contact and safe distance method. This is possible under Paperless office method.				

In the present working conditions, transmission of infection has become vital and to address the issue, we can consider to accept digital documentation process. It has also been now legalized in accepting all such documents and a step towards paperless office is the next office administration process. We have discussed few aspects in the article presented below. For more details, the link provided at the end may be browsed.

With due credit to the authors This article can be downloaded using the link <https://www.ijeat.org/wp-content/uploads/papers/v8i4/D6268048419.pdf>

Paperless Administration in Indian Higher Education

Srimathi H, Krishnamoorthy A

Abstract: The Higher Education sector in India is witnessing massive and exponential growth in terms of number of students and institutions. The procedures associated with the academic processes such as admission, teaching, examination and support services have also grown manifold. Institutions, irrespective of the size and scale, can practice better paperless administration using content ecosystem and digital tools. Both government and institutions make use of digital communication and customized applications. However, the over-dependence on paper in data processing is still a continued practice which necessitates the maintenance of volumes of physical documents by the administrative and academic departments that many times leads to delays in responses. The ideal scenario of a paperless learning environment may not be feasible in reality but the extents of paper usages can be brought down drastically to minimum levels with proper knowledge of information life cycle. The digitization with complete e-governance ensures paperless administration process. The institutions are having improbable idea to process automation and reducing paper consumption. This paper analyses the practices and methods in vogue that minimize usage of paper – based system and explores the feasibilities of interdependent work flow automation to make it better.

Index Terms: Admission, Paperless, Digital India Initiative, ECM, ERP

I. INTRODUCTION

Though computers are extensively used in universities, the administration process is paper based. The digitization of information content is easy, but there is no clue to proceed further with respect to application integration, control over scattered electronic documents, smooth information flow between departments, consistency and de-duplication, where the Enterprise Content Management (ECM) system provides solution to this. According to (Gartner, 2003), ECM refers all type of enterprise content and a bundle of software products which manage the entire content life cycle. (AIIM, 2010a) further extends ECM definition as “the strategies, methods and tools used to capture, manage, store, preserve and deliver content and documents related to organizational processes including unstructured information”. ECM reduces burden of toggle between different Enterprise Resource Planning (ERP) applications, Customer Relationship Management (CRM), Learning Management System (LMS) and physical documents for decision support. The main challenge is in

creating well-defined document flow since the process deals both structured and unstructured data formats as the activities are interlinked in nature as given in Figure 1. The research is motivated by the growing amount of Government initiatives with Digital India movement and technological implementation in higher education institutions to serve students of digital era. The study examines and evaluates the existing paper processes and workflow which will result in the implementation of electronic solutions. The need of best practices in information exchange, system complying with recordkeeping laws and information security managements is also highlighted.

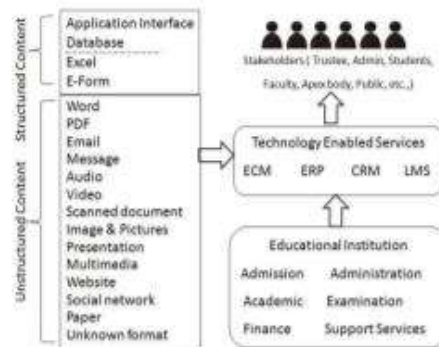


Figure 1. Educational Technology services deal with different content format

II. GOVERNMENT INITIATIVES

Department of Electronics and Information Technology (DeitY), Government of India is taking significant steps towards Digital India program and the same is supported and extended by Ministry of Human Resource Development (MHRD), Accreditation bodies and higher education councils. The announcements, notices, circulars and other communications from apex bodies to respective institutions are shared via email and hosted in website for quick reference. All India Council for Technical Education (AICTE) insists institutions to upload the approval documents of technical and management programme. University Grants Commission (UGC) accepts online submission for course approvals and institute affiliations in Distance Education, where it continues the hard copy submission for other programmes and affiliations. The online submission and electronic form (E-form) upload can be

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Paperless Administration in Indian Higher Education

extended and practiced by UGC and all other statutory professional councils. The E-Form is used in self-study report of accreditation bodies such as National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA). The supporting documents are also to be submitted in the form of scanned digital documents.

The digital submission and facility of system decision support system on various parameters helps the accreditation bodies to scale up their reach and serve as pre-qualifier to plan evaluation. (MHRD, 2017) MHRD has adopted digital technology for information transmission under National Mission on Education through Information Communication Technology (NMEICT):

- Know your college portal for students
- National Program on Technology Enabled Learning (NPTEL). Indian Institute of Technology has promoted Massive Open Online Courses (MOOC) with edX platform (a digital initiative of MIT and Harvard University) to offer quality education from the best teachers to Indian students and ensure the improvement of individual academic performance.
- Educational satellite (EDUSAT) to home platforms
- A-View as multimedia platform for video delivery
- Virtual Labs helps in establishing remote access of lab experiments in various disciplines of science and engineering.
- E-Yantra (next generation embedded system). Talk to teachers, Spoken tutorial and free open source software to be used for academic purpose
- Data collection in data capture format (DCF) in annual All India survey on Higher Education (AISHE) and National Institute Ranking Framework (NIRF). The structured DCF used in data collection fasten the computation of Gross Enrollment ratio (GER) of higher education and useful to other statistical analysis.
- Library Resources: As a part of Universal Digital Library Initiative, the digital library India has scanned books written on English and Indian language. (Balakrishnan et al, 2006) The project fosters several research activities such as language technologies in text summarization, machine translation, hand writing recognition, optical character recognition etc.,
- DigiLocker facility: There are several school boards made their board result certificates digital and this enable the institutions to verify the scores. This will ease the merit list preparation of educational institutions in admission process, when the service is utilized by all boards of school education. As admission application went online, the digital verification of certificates minimizes the submission of hard copy submission of grade sheets and time taken for manual certificate verification as happened in case of Tamil Nadu Engineering Counseling 2018.

(UGC, 2017) UGC has also taken significant digital initiatives at its end and also through Information Library Network (INFLIBNET) as listed in Table 1.

III. AT INSTITUTION LEVEL

Apart from Government directives, institutions realized that the millennial students are technology oriented and demanding quick response on rendered services. The computerized business systems improve administrative efficiency and reduce a toll on management and faculty to process paper documents on students, courses and exams.

Table 1. List of digital initiatives of UGC and INFLIBNET

e-Office implementation	Public finance management system
e-Governance	University activity monitoring portal
Direct benefit transfer	Wide connectivity to 40 central universities
Regional office website	Integrated portal for planning, finance, coordination
Academic job portal	National academic depository (NAD) exam certificates
UGC NET online	Online courses SWAYAM (Active learning platform)
Public grievance portal	E PG pathshala (Post graduate programme)
Student grievance portal	Shodhganga (digital repository of dissertation)
e-scholarship award & portal	e-ShodhSanthi (access to e-journals, e-books)
Anti-ragging mobile App	Indicat (online union catalog of bibliographic data)
Uniportal database of universities	Soul (State of an integrated Library Management)
SWAYAMPRAHA DTH channel	IRIS (Web Research Management System)

Universities incorporated electronic communication process for any kind of communication, upload the same on website and sends individual institution approval letter through email. (VTU, 2018) One of the universities hopes to gradually move towards a less paper and paperless office, since it serves digital communication to more than 200 affiliated colleges under its control.

(ePravesh, 2015) Considering the Indian youth population who aspires to tertiary education, the 'go online' in admission process reduces the paper usage. In addition, it helps to minimize problems related to overlapping counseling dates and in turn reduce physical / mental / financial burden of candidates due to multiplicity and transportation. The counseling process of engineering, medical and other professional courses are carried out online. Most of the entrance examination, application submissions and counseling are made online. As the medical entrance is mandate for admission throughout India, the strength of students who appear for medical entrance is increased and council planned to conduct medical entrance through online from year 2019.

(SRM, 2016) One of the biggest private institutions made its student course registration and support services as online for its fully flexible credit system, where the students have the liberty to choose course of study and select faculty members. Students receive individualized time table upon completion of registration. The students are serviced with quick response on cloud and eliminated to shuttle from one office to another for processing paper documents..

(Mindlogix, 2016) There are quite a few universities adopted paperless exam and digital evaluation system. The first initiative was sending question paper online through a digital secure network and affiliated colleges download the same, take sufficient printout and distribute. In the next level, the answer scripts are scanned and sent to examiners for evaluation. In the paperless exam, the students will get question paper on their computer screens, which avoid question paper leak and



printing & dispatch of answer scripts. The technological advancement in digital exams permit candidates to write exam on flexible Tab devices, automatic dummy number allocation, quick process of multiple and re-evaluation processes, simplify the review of evaluated answer scripts and result processing with dashboard analytics.

(Kaushik, 2015) The university libraries are extended to do innovative e-resource services using technology such as OPAC search facility for both print and e-books of different publishers with links to full texts, digital scanning facility, host vide lectures and archive, online question bank, coordinate with MOOC initiatives, online reservation and renewal of books, indexing & abstracting services usage of Web 2.0 tools to disseminate new arrivals, maintain e-dissertations and subscribe e-journals. The digital libraries also face few challenges like archival of resource, longevity of storage media, removal of obsolete information to speed up the search process, deal copyright issues and intellectual property of resources and Universal access to knowledge and maintenance.

(NDTV, 2017) In accomplishing the government's challenging task of shifting India from cash dependent to a less cash-reliant economy, UGC issued an advisory to adopt online payment methods for tuition fees, exam fees, vendor payments, salary, wages and other campus services. All shops and vendors in institution premises including photocopier services, canteen and cooperative shops have adopted different mode of cashless transactions. In addition, all these shops come equipped with point of sale machines. One of the institutions has introduced smart cards to the students to buy food from canteen and shops in campus premises. The money is deposited by the parents online.

(Chronicle, 2018) Despite the digital initiatives of apex body in central and state governments and higher educational institutions own mission on implementing automation, there are institutions who could not achieve desired result in paperless office. The simple conversion of paper based activities to e-form will not be sufficient. The strong domain expertise with business process workflow, interconnectivity of data must be required. This necessitated knowledge on both ECM guidelines and Higher education administration.

IV. CHALLENGES IN ACHIEVING PAPERLESS

(LaMonte, 2016) indicates that the paper process still dominate in the office administration and increased the challenge on digital transformation. The mere implementation of ECM tools may not be sufficient, the performance to be measured for removing paper from operational processes in terms of response time, collaboration, back-office cost and compliance regulation to be focused as ECM is a process defined & utilized by stakeholder., (Larrivee et al., 2016) survey reveals organization perception (P1 to P5), operation (O1 to O5) and need (N1 to N5) on ECM implementation as shown in the Figure 2.

The initial budget on technology investment may be high in paperless, but the paper based operations are costly in terms of back-office operation with duplication and siloed information. The main difficulties of ECM implementation

are listed in the order as follows: re-orienting staff, integration with existing system, define process with clarity and making a business case, convincing legal compliance and dealing exceptions. (Genesis et al., 2018) The paperless higher education mission is affected by organizational cultural change, re-orienting staff, integration with existing system, verbatim implementation of traditional workflow, lack of network connectivity & power supply in rural area and overdependence on consultants. (Isaeva et al., 2016) The goal of developing ECM is to overcome the listed challenges and to make the system more transparent with efficient service integration.

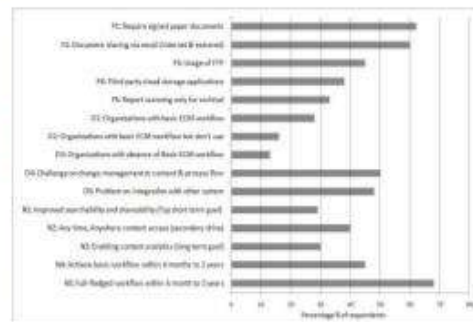


Figure 2. Organization view on ECM implementation (Source: Larrivee et al., 2016)

V. ECM GUIDELINES

(SUMS, 2017) As it is easy to create and repurpose digital documents over paper documents, a number of questions need to be answered prior to implementation.

- (SoftCo, 2016) storing as document as opposed to store as data
- (AIIM, 2010b) Assess the functional gap in content management, integration of business application & link to database and document system with its affordability
- (Hullavarad et al., 2015) Version control to avoid duplication and inconsistency especially in concurrent access
- (Katu, 2012, eGOV-PID, 2013) Fully automated retention rules of those records & documents, Compliance with Institutional governance & Record and Document retention policies
- (eSAFE, 2010) Security impact & third party access requirements
- (Nordheim et al., 2004) Balancing user expectations and policies of information governance in customization
- (Cognizant, 2014) Technical viability of current/future content tools with ECM architecture.

(DTCA, 2014) The ECM reference architecture framework given in Figure 3 answers all the listed questions and provides services beyond the expectations. Apart from content capture & delivery of both human created and application created information, ECM is designed to manage document, web content, forms, records, digital assets of

Paperless Administration in Indian Higher Education

rich media content, multi-format content repositories, business flow, preservation policies and development tools of workflow, taxonomy, forms template and content authoring. The core content services include indexing, searching, digital rights, security, collaboration, approvals, digital signature and etc. (Alawan et al., 2014) Thus the properly implemented ECM positively influences on speed of problem identification and decision quality. In addition, it ensures centralized control with local flexibility that helps higher educational institutions to provide better services.

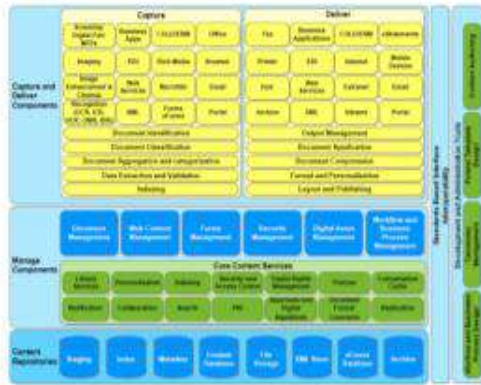


Figure 3. ECM Reference Architecture Framework (Source : DTCA, 2014)

VI. AREAS TO GO PAPERLESS

(AACRAO, 2016) Education sector is one of the important industries which not only creates and maintains large amount of information but also in the need of secured storage access and efficient business process. The functions of higher education system are segmented based on the nature of information impact, stakeholder's presence and kind of ECM implementation. The high impact business information which involves strategic decision on approvals and permanent preservation are grouped and listed in Table 2. The lack on preserving high impact strategic documents creates sever administration issues. The process flow of admission with both paperless and paper-based options is listed in Table 3, where the technology usage in every stage improves response in admission process.

The online admission process will enable the distributed target audience across the country and attract International students. The required ECM guidelines on academic, accounts and support services are briefed in Figure 4. Effective university websites speak clearly, even to yet-to-be students, and make it understandable by all. Table 4 provides guidelines on web content creation / maintenance.

Table 2. ECM guidelines for high impact Enterprise Content

Category	Examples	Key points
Office of Administration	<ul style="list-style-type: none"> Student Approval, Admissions, Correspondence, Art, Finance, Bids, Admission Counsel, Policy Manual, Safety & Security, Student Ministry of Health of India, Academic records, Finance, Senior & Advisory Board Strategic Plan, Organizational, Institutional documents, Committee & Award Report Event Calendar & Approval, Legal records, Purchase Order, General Document Contract, Affidavit, Insurance, Proprietary, Grant Application, Travel pass Office of Human Quality Assurance (OHQA) Quality records, Accreditation, Training, Faculty records, Recognition, Academic report 	<ul style="list-style-type: none"> Paper-based records are approved and distributed through mail. Preservation in the form of Office documents PDF in a network server Lack in access of content repository, which leads to inconsistency, version control in consistency across, difficulty in document identification and retrieval
Office of Registrar, Registrar, Approval, Correspondence, Biographical, Service records, Finance office	<ul style="list-style-type: none"> College Fee, Donations, Services, Loans, Freshmentations Financial records, Budget, Source Fee 	<ul style="list-style-type: none"> Usage of ECM Manage repository Document & Digital Asset Management Storage: Centralized access of centralized location specific content repository Records management services to be enabled to document preservation of Digital, Finance, and other departments in this system & follow
Public Affairs	<ul style="list-style-type: none"> Press Release, News, Community event, Donating, Advertisement, Marketing & research Brand Identity Security records & records, Terrorism, Cyber protection, National emergency 	<ul style="list-style-type: none"> Digital copy access control to be established in case of Media & Social Media Workflow with enough time to be in case of more content usage content such as creation, modification, approval, collaboration and generation is required Centralized Controlled Mail version of Documents in hard copy
Academic	<ul style="list-style-type: none"> Admission records, Registration, Curriculum, In-Sem, Lab Testimonials Examination Examination process records, Final Declaration, Certificate Letter & International Call Library record, International studies, relationships 	
Faculty	<ul style="list-style-type: none"> Research, Service, Quality assurance 	

Table 3. Admission

Admission Stage	Paperless Service	Paper based service
Marketing	Website, CRM, Digital Marketing (Email, SMS, Webinars, Social Media, pay per click, Search Engine optimization, Chatbot, etc.) & Lead conversion from info sources & career guidance websites.	News Paper advertisement, Brochure, Handouts, Brochure, & Programms usage in Open house and info session.
Application	Online	Download Form, Optical Mark Recognition (OMR)
Examine Exam	Online	Paper Based
Ball Ticket	Download	Through Courier - Postal service (each practice is stopped)
Certificate verification	Online & DigLocker	Manual verification
Merit list & Counseling schedule	Online	Through Courier - Postal service (each practice is stopped)
Centering	Online	On-campus
Payment	Online	Download draft
Enrollment	Online for data capture	On-campus for student ID, document submission
Result tracking	Online	On-campus



Figure 4. ECM guidelines in Academic, Accounts and support services

Table 3. ECM / Web guidelines & Best practices on Web Content

- Establish Web Governance Board to set the direction and policies, where the process should clearly mention the content type and responsibility of contributor, approval and publisher
- Apply Web Accessibility Standard Guidelines to optimize the impact of institution web content
- Ensure all content of university page is published within the university domain (no external website for any reason)
- Gear the content to target audience with quick scan rather than reading (prospective students, parents, current students, faculty, staff, alumni, prospective employer, press and general public)
- Do not upload video content as primary source of information
- Page should contain some useful information, prior to linking
- Emphasize strengths in Placements, Student achievements, Career guidance, Student affairs, Campus life, International alliances & Semester abroad programs, Industry internships, Faculty & Infrastructure facilities, Admission procedure and mandate information etc.
- Utilize content management tool for web publishing (especially pages with frequent updation)
- Audit web content prior to publishing. Perform usability testing to improve



VII. CONCLUSION

(AISHE, 2018) In India, there are 903 universities, 9050 college and 10011 stand alone institutions as on date with cumulative enrollment of 36.6 million. Implementing paperless in simple office communication itself makes great change in cost cutting on paper usage and move towards green imitative. The research covered the government initiatives on digitization and the prospects of paperless in higher education academic, administration, research and support services. The present disintegrated / stand alone applications / paper based services to be integrated using ECM reference architecture with reference to capture / storage / security / access & deliver compliance. The institutions need to understand the importance of managing content life cycle from creation to final disposition. The study recommends the institution to investigate their present operation, future need, scale up with short /mid / long term plan of action in ECM implementation in turn make the administration go paperless. This helps in enhancing the communication, student experience, student support services and creating a campus with technology excellence.

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AUTHORS PROFILE



Prof. H. Srimathi has two decades of experience in higher education and services. She is employed at SRM Institute of Science and Technology since 1999 and served in various domains such as academics and administration. She is passionate about the studies on higher education systems, qualification framework, and academic mobility.



Prof. A. Krishnamoorthy has three decades of experience in engineering education. He is currently employed at SASTRA Deemed University. He is passionate about the studies on optimization techniques, machine design, renewable energy sources and higher education systems.

EXHIBIT GREEN HABITS:

WASTE MANAGEMENT:

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
9	Waste Management	Spilling of waste	Dirty used packages in and around the college	Incorporate need for cleanliness and place waste collection bins.	Rs.4500 /- per set	Reduced cleaning hours and good hygienic conditions.

Segregated waste management is key initiative to minimise costs. In addition, the reuse of the anticipated waste can be considered as and when the need arises. We also advice to source local.

These locally sourced bins may be placed all along the campus.

We suggest that these bins be colour coded to segregate the waste at source.

This option may look to be off the date but enriches the lives of local artisans and preserves the old art.

It is important to place a small placard as to why hand sewed bins are being put to use.

- The biggest being the empowering the rural youth in being economically self-sufficient.
- Bins are organic and biodegradable. Hence do not contribute to the carbon emissions. Leading to a very innovative Carbon Handprint initiative.
- Readily visible and easy to empty when half full.



Figure 25 - Locally sourced waste collection bin.

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year,

OUTREACH

Sr No	Ob servation*	Problems*	Resulting losses*	Remedial measures*	Capital *	Projected savings*
10	Outreach	Share the knowledge by example, by demonstration, by habitual practice.				

The innovative approach should reach out to the society by predominantly exhibiting the same .



Rainwater management is important. However, being an educational institute, it is more important to disseminate the knowledge and information on Why, How, when where should be discussed so that the importance and the benefits of Rainwater management is carried forward to the field and the students speak for the technology on a day-to-day basis.



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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.

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 GREEN 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.

Define the deadline for establishing the CARBON FOOTPRINT

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

NOTES:



THOUGHT FOR EVERY MOMENT

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Certified Energy Auditors EA-3485

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I Q A C Co-ordinator,

S
PRINCIPAL

**S. K. College of Arts, Col
Science, Talkoti, Dist: Vijay**

**S. K. College of Arts, Comm, & Science
TALIKOTI-586214, Dist: Vijayapur**

There are about 19,00,00,000 students in India. Each student uses about 100 sheets of paper per day. 19,00,00,000 sheets of paper mean 1884 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.

ENERGY AUDIT REPORT

2020-21

in compliance with the statutory requirements under the NAAC accreditation procedures



Veerashaiva Vidhyavardhaka Sangha's Shree Khasgateshwar College Of Arts, Commerce And Science. Talikoti, Vijayapur, Karnataka

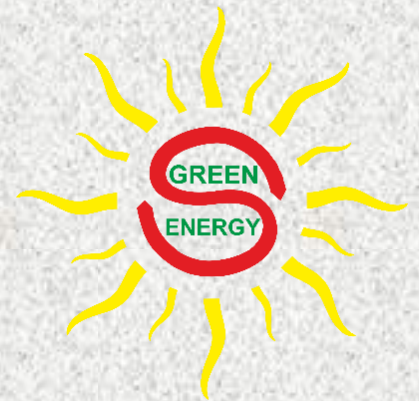
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ENERGY AUDIT REPORT

THOUGHT FOR EVERY MOMENT

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ABOUT SUNSHUBH TECHNOVATIONS PRIVATE LIMITED

Sunshubh Technovations Private Limited 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 22nd 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.

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THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 ton of paper will be saved every day. This is equivalent to saving 2748.54 ton of wood a day. This will lead to saving about 33,00,678 trees per year.

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EXECUTIVE SUMMARY

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
1	Power Consumption	PF Penalty	Energy & revenue loss	Install Capacitor bank.	Rs.50,000/- approximately	Avoided revenue penalty	
2	Solar Power	Suggest to install Solar Power to minimise use of energy during Offgrid 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

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Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
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
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.

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CRITERION VII – INSTITUTIONAL VALUES AND BEST PRACTICES

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	Our The concept of home energy management may be initiated for the women. The typical illustration is reproduced.

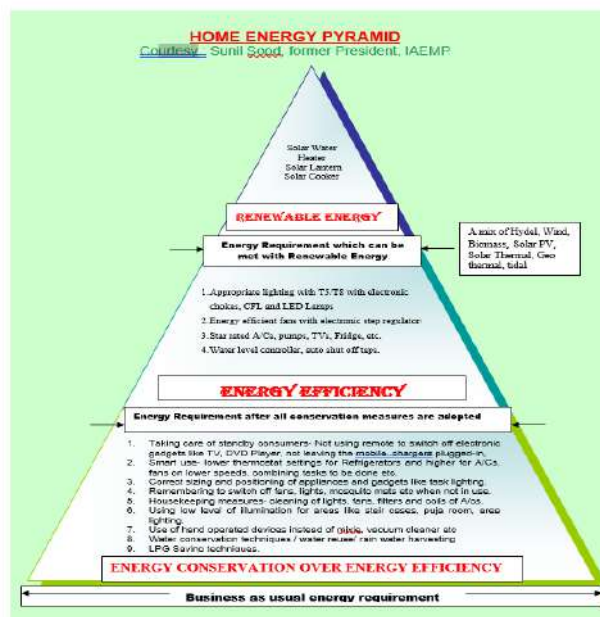


Figure 1 - Home energy pyramid

THOUGHT FOR EVERY MOMENT

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	Environmental Consciousness and Sustainability		Discuss on why the recent calamities keep occurring more often than before.
7.1.2 Q _n M	<p><i>The Institution has facilities for alternate sources of energy and energy conservation measures</i></p> <ul style="list-style-type: none"> • Solar energy • Biogas plant • Wheeling to the Grid • Sensor-based energy conservation • Use of LED bulbs/ power efficient equipment 	Complied through parent society.	<p>Considering the cost of energy use, serious consideration may be taken up for,</p> <p>Solar</p> <p>Biogas plant in Hostel mess.</p> <p>If solar is installed the power can be exported to grid on non-working hours.</p> <p>Sensor based control is a must for energy use optimization.</p> <p>Complete the ongoing work at faster pace.</p>
7.1.3 Q _i M	<p><i>Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)</i></p> <p>Solid waste management</p> <p>Liquid waste management</p> <p>Biomedical waste management</p> <p>E-waste management</p> <p>Waste recycling system</p>	Complied partially wrt minimising .	Energy consumption details need to be monitored and the benefits of avoided accumulated energy use and power demand should be established.

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	Hazardous chemicals and radioactive waste management		
7.1.4 Q _n M	<p><i>Water conservation facilities available in the Institution:</i></p> <p>Rain water harvesting Borewell /Open well recharge Construction of tanks and bunds Waste water recycling Maintenance of water bodies and distribution system in the campus</p>	<p>Complied .</p> <p>Open ground percolation, Open well restoration. Percolation pond near to open well</p>	<p>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. Kindly refer to the article listed at the end of the table.</p>
7.1.5 Q _n M	<p><i>Green campus initiatives include (4)</i></p> <p>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.</p>	<p>Partially complied.</p>	<p>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.</p>

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7.1.6 QnM	<p><i>Quality audits on environment and energy are regularly undertaken by the institution (5)</i></p> <p>7.1.6.1. The institutional environment and energy initiatives are confirmed through the following</p> <ol style="list-style-type: none"> 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 QnM	<p><i>The Institution has disabled-friendly, barrier free environment</i></p> <p>Built environment with ramps/lifts for easy access to classrooms.</p> <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 (Divyangjan)</p> <p>accessible website, screen-</p>	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.

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	reading software, mechanized equipment Provision for enquiry and information: Human assistance, reader, scribe, soft copies of reading material, screen reading		
7.1.9 Q ₁ M	<i>Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens</i> Describe the various activities in the Institution for inculcating values for being responsible citizens as reflected in the Constitution of India within 500 words.	Need to explore.	The sensitization of switching off the non-required electrical appliances and devices should be encouraged. Like organizing the inhouse competition. 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.
7.1.10 Q _n M	<i>The Institution has a prescribed code of conduct for students, teachers, administrators and other staff</i>	Complied .	A range of activities can be brought in just as discussed in 7.1.9 above.

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	<p><i>and conducts periodic programs in this regard.</i></p> <p>The Code of Conduct is displayed on the website</p> <p>There is a committee to monitor adherence to the Code of Conduct</p> <p>Institution organizes professional ethics programs for students, teachers, administrators and other staff</p> <p>Annual awareness programs on Code of Conduct are organized</p>		
7.1.11 Q1M	<p><i>Institution celebrates / organizes national and international commemorative days, events and festivals</i></p> <p>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</p>	Complied	<p>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</p>

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			<p>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.</p> <p>https://en.wikipedia.org/wiki/Constitution_of_India</p>
7.2.1 Q/M	Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.	Complied .	<p>When the listed activities from 7.1.1 to 7.1.11 are complied, the institute can have many creative best 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.</p>

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The Bulletin on energy Efficiency

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The views expressed in the articles are those of the authors and do not necessarily reflect those of IREDA or WIL.

इन लेखों में प्रकट विचार मूलतः लेखकों के हैं तथा यह आवश्यक नहीं है कि इरेडा या विनरॉक भी इन विचारों से सहमत हो ।

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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

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 CO₂ 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 CO₂ into the atmosphere is also reduced. Reduced CO₂ 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

PART 1 – GENERAL**CARBON FOOTPRINT - GREEN PLEDGE**

(PROPOSED)

We the Principal, the 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 in front, backyard and all other non-approachable areas of all primary and secondary pollutions.

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 Green 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.

-Sd-

Principal

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

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ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD., is pleased to express its sincere gratitude to the management of V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, 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 neglected to appreciate the sincere efforts put in by the 7th Criteria Team lead by the able and motivating Principal Prof. R.V. Jalawadi and the students who against all odds have kept the college premises clean to the possible limits. Without the crucial and significant support from the fellow teaching team the 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 footprint 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.



Ref No: SKC/404/2020-21

Date: 20-07-2020

To,
Mr. Mallikarjun Kamblyal
 Sunshubh Technovations Pvt.Ltd.,
 Hubballi

Sub: To carry out Green, Energy and Environment Audits -reg.

Dear Sir,

With reference to the above cited subject and telephonic conversation, I request you to carry out Green Audit, Energy Audit and Environment Audits of our college and issue certificates and report of the same for the year 2020-21. Our student strength is 1040. I also request you to provide the details of charges for the same. Hope you will do the needful as early as possible.

Thanks with regards.

PRINCIPAL
 S. K. College of Arts, Comm. & Science,
 TALIKOTI-586214, Dist-Vijayapur
 Principal

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We acknowledge the involvement of HODs & Coordinator

List of Department Heads Connected with NAAC Activities				
Sl No	Name of Faculty	Department	Convenor/ Member	Criteria
1	Dr. A. S. Alalamath	English	IQAC Co-ordinator/ Convenor	2
2	Prof. Ramesh Jadhav	Commerce	Co-coordinator/ Member	2
3	Dr. Ajeya Abbar	Political Science	Convenor	1
4	Dr. Ashok Rathod	Economics	Convenor	3
5	Dr. D. B. Mugadlimath	Phy.Education	Convenor	4
6	Dr. Deepa Malage	Economics	Convenor	5
7	Prof. R. V. Miskin	Hindi	Convenor	6
8	Prof. Sneha Navadagi	Commerce	Convenor	7
9	Dr. Sujata C	Kannada	Member	3 & 6
10	Prof. Hema Jainapur	History	Member	2 & 3
11	Shri V. C. Kotyal	Librarian	Member	4
12	Prof. K. B. Desai	Zoology	Member	2 & 7
13	Prof. S. S. Mane	Chemistry	Member	5 & 7
14	Prof. M. S. Hunashyal	Mathematics	Member	1 & 2
15	Prof. N. R. Choukimath	Physics	Member	1 & 3
16	Prof. B. S. Biradar	Sociology	Member	3 & 5
17	Prof. S. C. Gogi	Botany	Member	3
18	Prof. Kavita Patil	Statistics	Member	1
19	Prof. Sharada Hiremath	Computer Science	Member	4 & 5

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LIST OF FACULTIES AFTER MEDICINAL GARDEN				
Sl No	Name of Faculty	Department	Convenor/Member	Criteria
1	Prof. S. C. Gogi	Botany	Member	3
2	Prof. Daneshwari Talikoti	Botany	Member	7

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.

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

THOUGHT FOR EVERY MOMENT

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Criteria 7.1.6**ENERGY AUDIT COMPLETION CERTIFICATE**

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 8th Aug 2020 under the instructions of Principal Prof. R.V. Jalawadi, V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, Karnataka. This report is generated based on the site visits and evidence collected from the site.

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.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

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.

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 ton of paper will be saved every day. This is equivalent to saving 2748.54 ton of wood a day. This will lead to saving about 33,00,678 trees per year,



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			

Figure 2 - Bureau of energy Efficiency Regd No: EA3485

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

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

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Figure 5 - Manager training programme, Germany

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Figure 6 - Fit for partnership with Germany

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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?

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.

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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!

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

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The other intention of organising Energy 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 if 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 ENERGY AUDIT

- The purpose of carrying out Energy 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 and efficient use of those resources contributing to minimum waste generation.

How is the Energy 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

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 Energy 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 not to use the energy if necessary. At best it can be used judiciously.

- 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.
- 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 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.
- The net impact All the above energy audits should be 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
- 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.

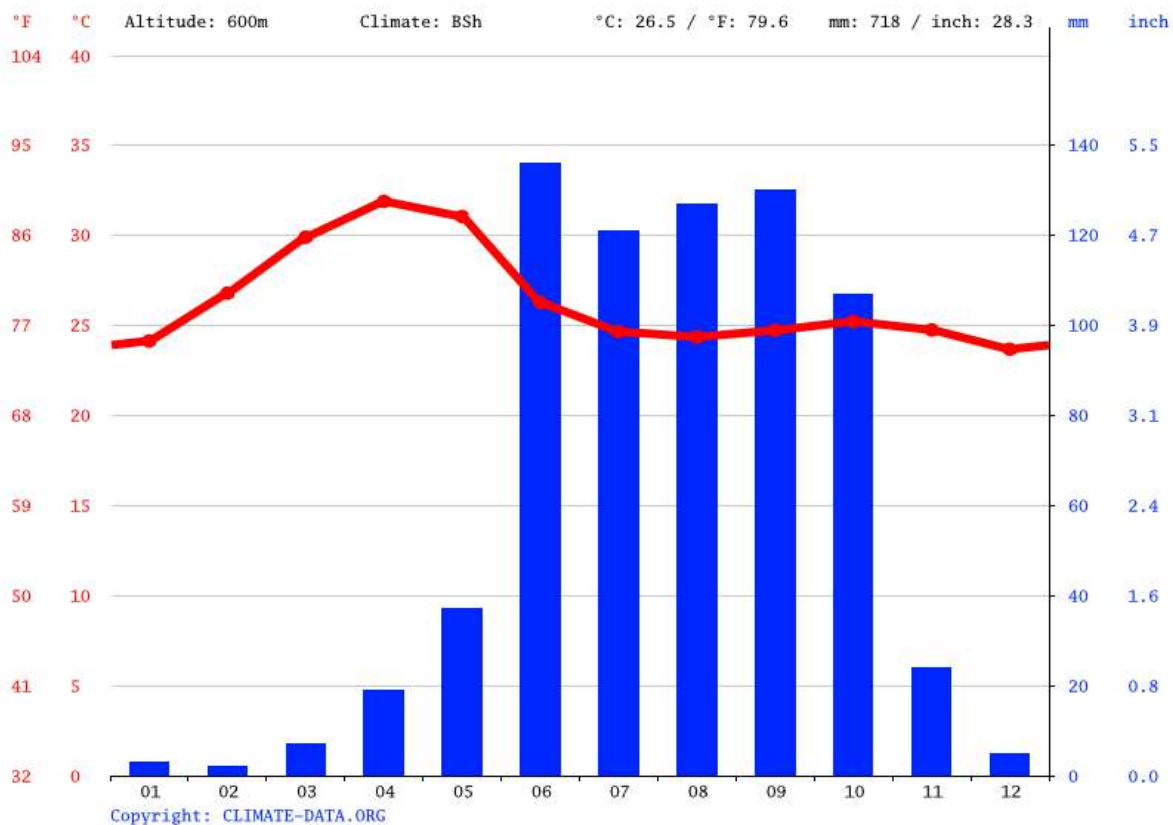
GEOGRAPHICAL CONSIDERATIONS:

Before we present our report, the factors that are considered for positive impact recommendations are,

CLIMATIC CONDITIONS

The prevailing climate in Vijayapura is known as a local steppe climate. In Vijayapura, there is little rainfall throughout the year. This location is classified as Hot semi-arid climates. The average annual temperature in Vijayapura is 26.5 °C | 79.6 °F. The rainfall here is around 718 mm | 28.3 inch per year.

CLIMATE GRAPH // WEATHER BY MONTH VIJAYAPURA



The driest month is February. There is 2 mm | 0.1 inch of precipitation in February. With an average of 136 mm | 5.4 inch, the most precipitation falls in June.

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VIJAYPURA AVERAGE TEMPERATURE

With an average of 31.9 °C | 89.4 °F, April is the warmest month. December has the lowest average temperature of the year. It is 23.7 °C | 74.6 °F.

WEATHER BY MONTH // WEATHER AVERAGES VIJAYAPURA

The temperatures are highest on average in April, at around 31.9 °C | 89.4 °F. December has the lowest average temperature of the year. It is 23.7 °C | 74.6 °F.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temp	24.1 °C	26.8 °C	29.9 °C	31.9 °C	31.1 °C	26.3 °C	24.7 °C	24.4 °C	24.7 °C	25.2 °C	24.8 °C	23.7 °C
Min. Temp	17.9 °C	20.1 °C	23.1 °C	25.2 °C	24.9 °C	23 °C	22.1 °C	21.7 °C	21.5 °C	21 °C	19.5 °C	17.8 °C
Max. Temp	29.7 °C	32.6 °C	35.7 °C	37.9 °C	37.5 °C	30.9 °C	28.5 °C	28.2 °C	28.8 °C	29.8 °C	29.8 °C	29.2 °C
Rainfall mm (in)	3 (0.1)	2 (0.1)	7 (0.3)	19 (0.7)	37 (1.5)	136 (5.4)	121 (4.8)	127 (5)	130 (5.1)	107 (4.2)	24 (0.9)	5 (0.2)
Humidity (%)	39%	31%	26%	31%	41%	70%	76%	77%	75%	64%	50%	43%
Rainy days(d)	1	0	1	3	5	12	14	14	11	8	3	1
Avg. Sun Hrs	9.8	10.3	10.8	11.2	11.2	8.4	7.2	7.1	7.6	8.9	9.2	9.4

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The precipitation varies 134 mm | 5 inches between the driest month and the wettest month. During the year, the average temperatures vary by 8.2 °C | 14.8 °F.

The month with the highest relative humidity is August (77.25 %). The month with the lowest relative humidity is March (26.43 %).

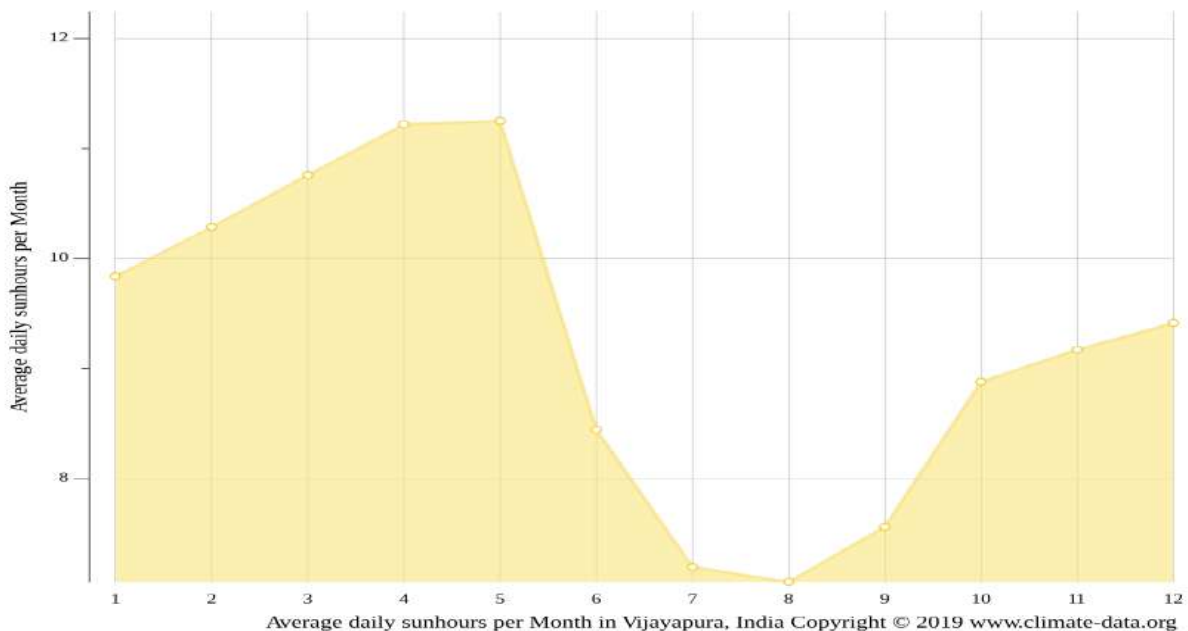
The month with the highest number of rainy days is July (18.17 days). The month with the lowest number of rainy days is February (0.47 days).

Vijayapura are in the middle and the summers are that easy to define. The best time to visit are January, February, March, June, July, August, September, October, November.

HOURS OF SUNSHINE IN VIJAYAPURA

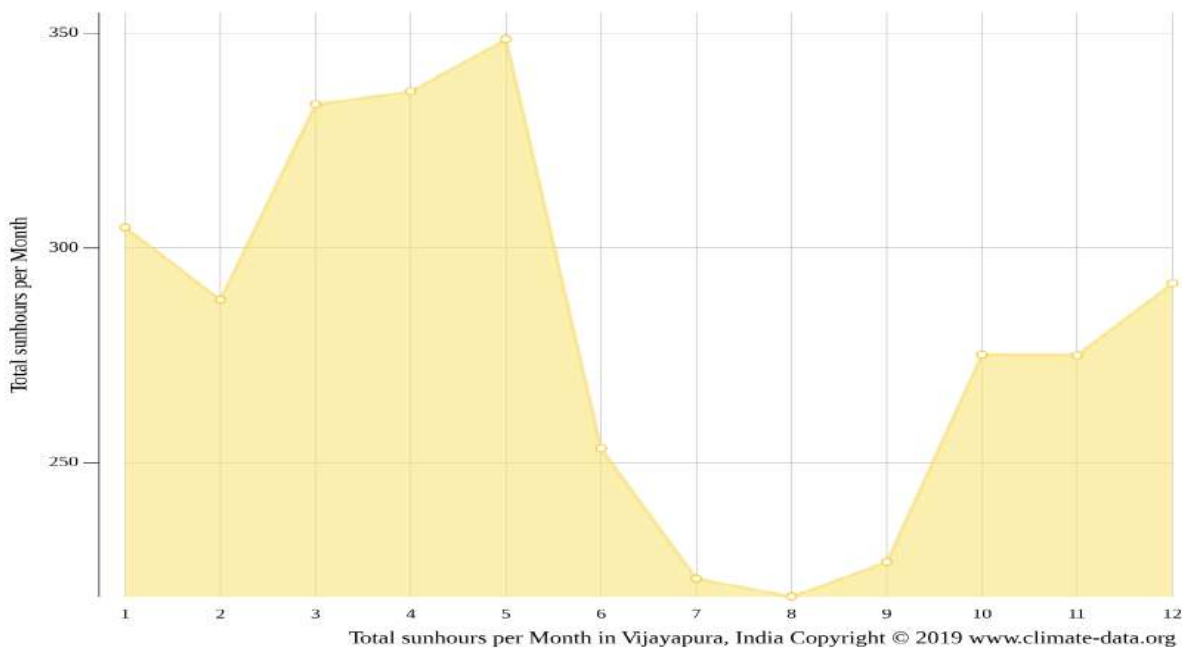
average hours of sunshine

Total hours of sunshine



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In Vijayapura, the month with the most daily hours of sunshine is May with an average of 11.25 hours of sunshine. In total there are 348.71 hours of sunshine throughout May. The month with the fewest daily hours of sunshine in Vijayapura is January with an average of 7.06 hours of sunshine a day. In total there are 218.81 hours of sunshine in January.

Around 3375.79 hours of sunshine are counted in Vijayapura throughout the year. On average there are 111.07 hours of sunshine per month.

Source Courtesy: <https://en.climate-data.org/asia/india/karnataka/vijayapura-2796/>

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.

PART 2 - TECHNICAL

DISCUSSIONS ON EXECUTIVE SUMMARY:

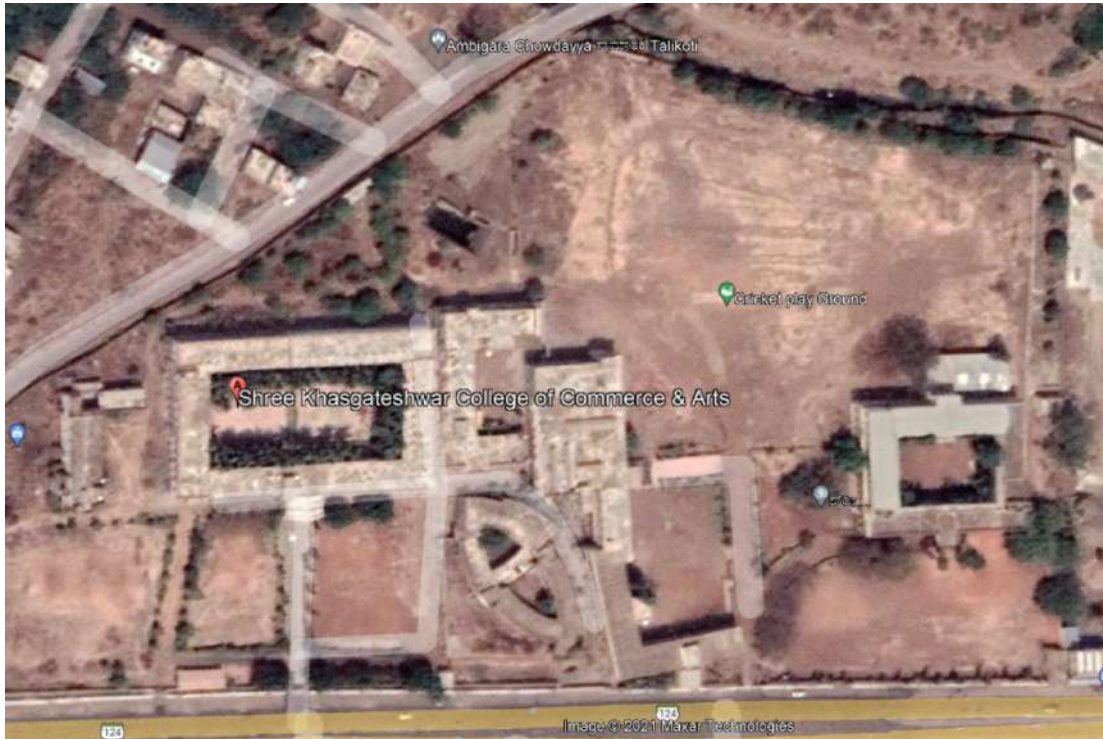


Figure 7- AERIAL VIEW OF THE COLLEGE CAMPUS.



Figure 8 - Aerial view of campus

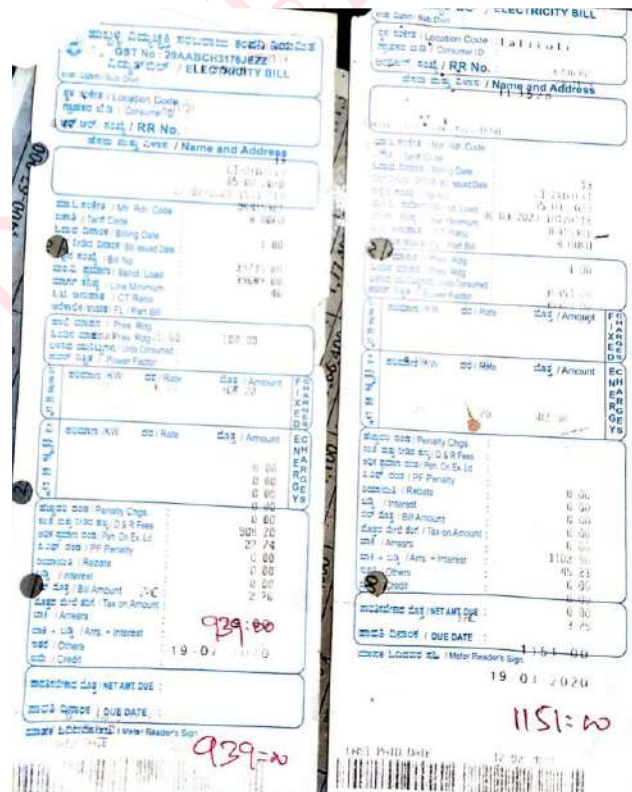
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POWER CONSUMPTION

Sr No	Observation *	Benefits/ Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
1	Power Consumption	The institute has availed multiple LT connections.					

The college has availed electrical power from the utility. It is also recorded that the college has availed from their sister institute which is mainly from Soar Power. The institute has large open terrace for the inhouse power generation.



Additionally, the incoming distribution box is very tightly placed. It is important that the ventilation be provided as the electrical panels are heat generating sources and may lead to fire and eventually ARC flash. This may pose a grave threat to human life. The indication is already seen from one of the power sources.

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The electrical panel room should be used exclusively for housing the switchgear. Nothing other than the switchgear devices should be placed on or below the panel which may give catalytic effect in case of fire.

It is important to avoid loose ends in the electrical cable laying system. In case of emergency, proper care should be taken to display the warning/danger sign. It should also display the duration of its necessity so that one gets the reminder for restoration at the end of the event.



Figure 9 - Loose wiring

Need based lighting.



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RENEWABLE ENERGY

Sr No	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
2	Solar Power	Suggest to install Solar Power to minimise use of energy during Off grid times.					7.1.2

The institute has good space to explore rooftop Solar power to meet the energy requirement of the institute. The initiative can take the institute to net zero energy.



Figure 10 - Solar water heater

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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

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.

It may also be noted that during the day hours with direct sunlight, the lights remain on. Hence it is important that the sensing system should take care of monitoring the LUMEN and the human presence in the hall to operate the lights.



Figure 11 - day light sensor application

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



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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.

ie., Task – normal or critical.

General lighting ie open area or living room lighting.

External lighting ie yard lighting for security reasons.

We find use of T5, 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 their failure may not be justified.



Figure 12 - T5 & T8 tube lights with Electromagnetic choke

In the above roof, it may be considered to replace couple of the Galvalume sheets with green tinted Translucent (frp) sheets as below.

LIGHT INTENSITY SENSOR REQUIREMENT.

It may be seen that the Light is illuminated. However, the brightness on the students is seen to be coming from the sides. The shadow indicates natural light coming from the windows is brighter. Natural light is more predominant than the tube light. Hence

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tube light being switched off has no adverse effect. However, it would save on the energy consumption and contribute to green practices.

NATURAL LIGHTING: **Category 7.1.1, 7.1.2, 7.1.3 and 7.1.5**

NATURAL LIGHTING

	Observation*	Problems*	Resulting losses*	Remedial measures*	Capital*	Projected savings*	Category 7
5	Electrical	Old tube lights	High energy consumers	LED lights of appropriate ratings.	Rs.80/- to Rs.250/- per unit	Rs.175/- per tube per annum. ROI of 1 years.	7.1.6
6	Natural Lighting	Un cleaned windows and ventilators, forced switching on of tube lights	High energy bills	Clean the windowpanes, use light coloured curtains 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

We observe that the placement of the cupboards prevent natural lighting. The placement should be such that the use of electrical lighting is avoided. Also for normal and safe operation, the source of light rays should be coming from the sides and not from front.

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Figure 13- Lighting, use of natural lighting with anti-glare roofing sheets



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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 resources	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:

The batteries should be placed on an

Batteries should be placed on an insulated platform not touching any of the metal frames with top clearance of 6". It may be known to all the stored energy users that, the batteries breath. The acidic fumes are breathed out and for ease of handling and breathing.



Figure 14 - batterieus in enclosed box.

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Figure 15- Battery placement, Need cross ventilation.

Provision for periodical checking and maintenance should be made possible without major obstacles.



Figure 16- Galvanic reaction causing damage to battery life.

The safe distance between two batteries placed on an insulated rubber mat or the wooden platform is important and very much necessary. Typical case of galvanic reaction shows self-discharging effect of the batteries.

In absence of the above placement conditions,

The batteries will discharge faster leading to Loss of energy.

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

A well-maintained battery is known to serve for more than 7 years.

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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.

ENERGY AUDIT REPORT

THOUGHT FOR EVERY MOMENT

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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 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

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

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** accumulates in the bodies of water organisms and soil

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. You can also use the battery preconditioner for annual maintenance to strongly prolong the lifespan of your batteries.

Main Benefits are :

Removes excessive sulphate

Prolongs the lifespan of your battery

Generates detailed reports in Word, Excel or PDF

Fully automatic, easy to handle

Free software included with wireless data transfer to computer

Combination of charging/discharging

Works with all types of lead-acid-based batteries:

Gel batteries,

Traction(semi-) batteries,

Starter batteries,

Stationary 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.



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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 fetuses 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.

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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.

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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.

THE FINANCIALS AND RETURN ON INVESTMENTS ARE:

First Investment and periodical expenses.		Earnings and Units Regenerated.	
Cost of Initial Capital Comprehensive. The system includes cost of Regeneration system, Digital Battery media Tester One Computer preloaded with Battery Monitoring System with required Report generating Templet. And other tools.	22,00,000	Monthly units of Batteries for regeneration targeted	45
Provision for GST charges	3,96,000	Cost of regenerating the batteries.	500
Energy Bills for the year @ Rs.640 per Battery	28,800	Cost of a new 120Ah battery is considered to be 10000	
Manpower for regular attendance – in house.	In-house	For Automobile batteries which are 65Ah, we may consider connecting in Parallel.	
Total first Year Capital cost.	26,24,000	Monthly Revenue	135000
Monthly Expenses recurring	₹500/- per Battery.	Monthly Net Earnings after expenses	107600
Return on investment Computation.	22+2	GST refund on (If Considered) sales	24300
Space required for the regeneration operation.	100 sqft	Net GST recovery in months	Can be offset.

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The rest of the regeneration capacity/option can be extended to sister (group) concerns. In addition, the positive impact on the environment and health benefits with delayed investment on new batteries are few added feature.

Putting the Batteries into Regeneration cycle once every two years, the life of the Batteries can be enhanced to 12-15 years.

Hence the Future Value of Capital over the Rupee.

It may also be considered under the soft skill training to generate self-employment. A town like Talikoti located very near to two district headquarter, most of the houses using INVERTER and the economy driven by agriculture, and industries, the battery regeneration should be a viable self-employment to couple of students. Thus, the institute may consider to act as a catalyst in the battery management.

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 energy bills	7.1 .2 7.1 .6

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The natural ventilators are missing below the roofing. We also see that the roof is of Galvalume sheets. This makes the room hotter and more intolerable during the summer days. In absence of cross ventilation, the room turns out to be a oven. WE strongly suggest that the rooms be provided with cross ventilation just below the roof, making it easy for the hot air to vent out by thermosyphon.

Illustrative.



Figure 17 - Cross ventilation for illustration only.

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

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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 100 regular ceiling fans in the institute 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.

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

No of fans (Approximated for computation): 100 Units

Maximum power drawn: 75W/Fan, ie 7500 W ie 7.5 KW

If these fans were to operate for 5 Hours per day, we have 7.5KW x 5 Hours ie **37.5Units per day.**

In the event of replacing these normal fans with BLDC energy efficient fans,

Maximum power drawn by BLDC fans: 35W/Fan, ie 3500 W ie 3.5 KW

If these BLDC fans were to operate for 5 Hours per day, we have 3.5KW x 5 Hours ie **17.5 Units per day.**

The net savings per day would be 20 Units per day. For working of 200 days in a year, the total savings would be 4000 Units.

When converted to revenue, it leads to a savings of ₹28000/-

Now consider, the capex, cost of each fan as ₹3000/-. The net outflow would be ₹3.00 Lacs.

The capex would yield a Return on Investment of around 6 years.

From the finance department point of view, the ROI of 6 years may not be acceptable, but here, we are in an institute where we educate. Hence the ROI discussions are for the purpose of discussions and should not to be seen from business view.

If the same is to be considered for their application in the residence, we find the fans being in operation for over 15 Hours. Leading to ROI of 2 years.

For actual capex, please contact one of the suppliers.,

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 institute's discount.

SAFETY.

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



Figure 18 - Safety, electrical earthing compliance

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Name plate :	Computer room.	
Earth pit connected to :	xxxx system.	
Date of inspection :	dd/mm/yyyy	
Next due date :	Dd/(mm+6)/yyyy	
Values	Measured values.	Required values.
Reasistance:	xx Ω	< 5 Ω
Leakage current :	aa Amps.	< 3.5mA

Monitoring of Earthing is very significant considering the dryness factor. Regular monitoring should be carried out to make sure that the electrical mishaps don't occur.

Electrical mishaps, may be Internal fire due to various faulty connections, It may be failure of light fixtures, loss of computer data, failure of devices, non-switching on of devices or even the abrupt failure of devices during lightning.

A perfect earthing should avoid all of them.

While we discuss about earthing, it is equally important to understand the significance of Bonding and shielding.

Special mention is to be noted that, the earthing of electronic devices such as computer loads, UPS loads and other non-electronic devices should be separately followed. More discussions within the institute should be conducted on,

Concept of shielding, bonding, Grounding and/or earthing with respect to energy saving.

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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.

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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.

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

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NOTES:

ENERGY AUDIT REPORT

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Certified Energy Auditors EA-3485

B
I Q A C Co-ordinator,

**S. K. College of Arts,
Science, Talikoti, Dist. Vijayanagara**

THOUGHT FOR EVERY MOMENT

S
PRINCIPAL

S. K. College of Arts, Comm, & Science

TALIKOTI-586214, Dist. Vijayanagara

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ENVIRONMENT AUDIT REPORT

2020-21

in compliance with the statutory requirements under the NAAC accreditation procedures



Veerashaiva Vidhyavardhaka Sangha's Shree Khasgateshwar College Of Arts, Commerce And Science. Talikoti, Vijayapur, Karnataka

Principal Lead Auditor:

Mallikarjun A Kambalyal. CEA, ISO 50001, 14001 Lead Auditor.

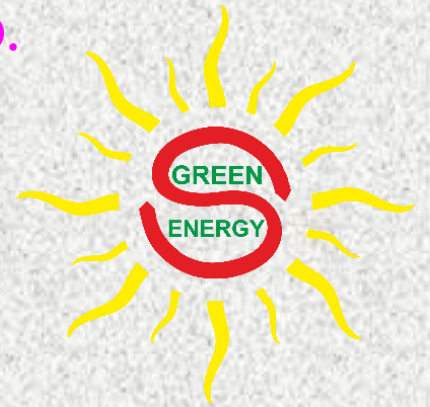
SUNSHUBH TECHNOVATIONS PVT LTD.

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Website: www.sunshubhrenewables.com

Email: ceo@sunshubhrenewables.com



ENVIRONMENT AUDIT REPORT

THOUGHT FOR EVERY MOMENT

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SO LET US ALL USE BOTH SIDES OF THE SHEET even better adopt E-CORRESPONDENCE.

ABOUT SUNSHUBH TECHNOVATIONS PRIVATE LIMITED

Sunshubh Technovations Private Limited 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 22nd 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.

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

SI	Observations	Issues & Problems	Resulting losses	Remedial measures	Capital	Projected savings
1	Water management.	Flooding the lawns.	Excess water consumed.	Sprinkler.	@ Rs1000 /- per unit.	Energy & Water savings
2	Organic waste management.	System needs to be brought into order.	Handling costs	Composting at point of source	Nil.	Third party handling costs
3	Clear windows	Distraction of attention	Failed objective.	Filming	Few thousands	Better academic results.
4	Rainwater Harvesting Abuse and Use.	Water contamination	Loss of quality water source.	Proper filtration should be incorporated.	@ ₹8000/ -	Third party supply.
4	Chemical waste disposal	Attracts pollution control boards authorities and capital costs	Loss of revenue	Good use practices.	Nil	Longer/extended life of Batteries

SI	Observations	Issues & Problems	Resulting losses	Remedial measures	Capital	Projected savings
	LPG (Fuel) cylinders storage and management.	Fire hazards	Loss of life and loss of assets	Organise d way of handling of explosives	Nil or minimum	Safety in place.
5	HACCP practices.	Inconvenient and non-operation of assets and utilities provided.	Added manpower costs.	Provide Sanitary pad dispensers at easy & where required.	₹. 15000/- per unit.	Health safety compliance.
6	Utility Management.	Maintenance	Inefficient operation.	Periodical cleaning	NIL	Increased efficiency.
7	Food wastage and waste minimisation.	Random disposal	unaccountability	Segregate, weigh and deliver.	NIL	Minimised wastage.
8	Construction waste management.	Unaccountability	Call for or penalty for pollution	Land use change	Labelling & Transportation	Organise d and compliance.
9	Asset management.	Unaccountability	Loss of records	Move the unused assets to proper store area.	NIL	Increased accountability.

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.

Sl	Observations	Issues & Problems	Resulting losses	Remedial measures	Capital	Projected savings
10	Indoor Air Quality	Inhaling of polluted air	Human inefficiency	Fresh air filters	₹.10k-100k	Complains OSHO Safety standards
11	Fire Safety	No training, awareness and non-suitable place.	Loss of assets	Training and awareness	NIL/Minimum	Emergency preparedness.

ENVIRONMENTAL AUDIT REPORT

THOUGHT FOR EVERY MOMENT

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CRITERION VII – INSTITUTIONAL VALUES AND BEST PRACTICES

With respect to environment.

Key Indicator - 7.1 Institutional Values and Social Responsibilities

Metric No.	Description	Compliance	Initiatives required
7.1.1 QIM	<p>Measures initiated by the Institution for the promotion of gender equity during the last five years.</p> <p>Annual gender sensitization action plan</p> <p>Specific facilities provided for women in terms of:</p> <p>Safety and security - Energy</p>	Partly Complied	<p>Our The concept of home energy management in relation to the environmental impact may be initiated for the women. Detailed discussion on CARBON HANDPRINT should be discussed at length. The typical illustration is reproduced.</p>

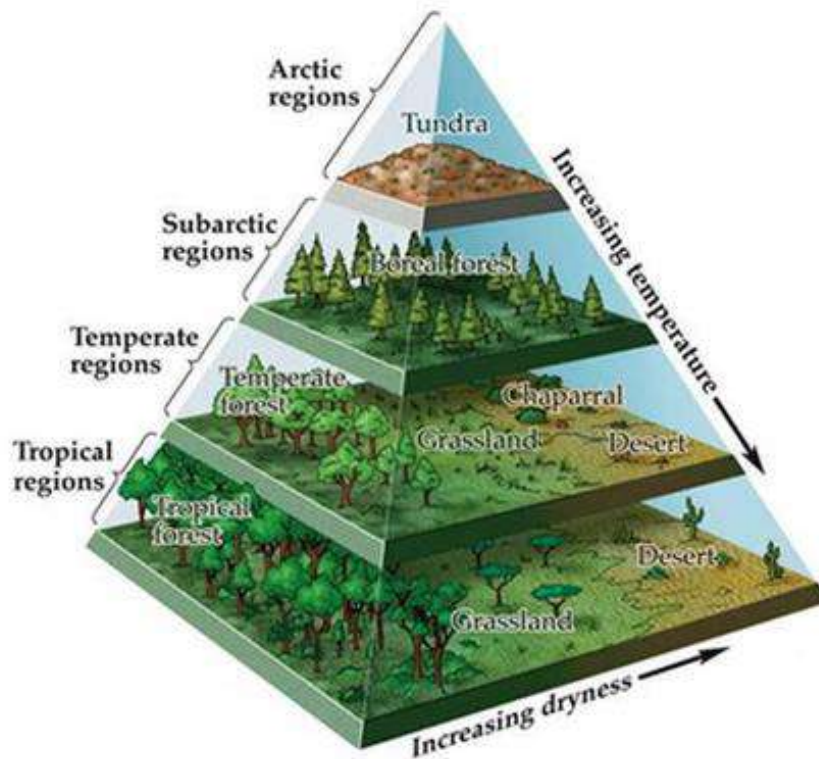


Figure 1 - Ecology Pyramid.

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.

	Environmental Consciousness and Sustainability		Discuss on why the recent calamities keep occurring more often than before.
7.1.2 Q _n M	<p><i>The Institution has facilities for alternate sources of energy and energy conservation measures</i></p> <ul style="list-style-type: none"> • Solar energy • Biogas plant • Wheeling to the Grid • Sensor-based energy conservation • Use of LED bulbs/ power efficient equipment 	Complied through parent society.	<p>Irrespective of the financial impact, the institute should consider the renewable energy projects as they impart the sense of green energy alternatives. Such as Solar Power, Wind energy, Biogas plant in Hostel mess.</p> <p>If renewable energy projects are installed the excess power can be exported to grid on non-working hours.</p> <p>Sensor based control is a must for energy use optimization.</p> <p>Complete the ongoing work at faster pace.</p>
7.1.3 Q _i M	<p><i>Describe the facilities in the Institution for the management of the following types of degradable and non-degradable waste (within 500 words)</i></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 minimising .	Energy consumption details need to be monitored and the benefits of avoided accumulated energy use and power demand should be established.

7.1.4 QnM	<p><i>Water conservation facilities available in the Institution:</i></p> <p>Rain water harvesting Borewell /Open well recharge Construction of tanks and bunds Waste water recycling Maintenance of water bodies and distribution system in the campus</p>	<p>Complied .</p> <p>Open ground percolation, Open well restoration. Percolation pond near to open well</p>	<p>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. Kindly refer to the article listed at the end of the table.</p>
7.1.5 QnM	<p><i>Green campus initiatives include (4)</i></p> <p>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.</p>	<p>Partially complied.</p>	<p>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's on field and a competition in house should educate the society.</p>
7.1.6 QnM	<p><i>Quality audits on environment and energy are regularly undertaken by the institution (5)</i></p>	<p>Complied .</p>	<p>The audit findings should be predominantly projected by action from all stake holders of the institution.</p>

	<p>7.1.6.1. The institutional environment and energy initiatives are confirmed through the following</p> <ol style="list-style-type: none"> 1.Green audit 2. Energy audit 3.Environment audit 4.Clean and green campus recognitions/awards 5. Beyond the campus environmental promotional activities 		
7.1.7 Q _n M	<p><i>The Institution has disabled-friendly, barrier free environment</i></p> <p>Built environment with ramps/lifts for easy access to classrooms.</p> <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 (Divyangjan)</p> <p>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>	<p>The initiatives have been considered.</p>	<p>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>
7.1.9	<p><i>Sensitization of students and employees of the Institution to</i></p>	<p>Need to explore.</p>	<p>The sensitization of switching off the non-required electrical</p>

Q _n M	<p><i>the constitutional obligations: values, rights, duties and responsibilities of citizens</i></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>		<p>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 _n M	<p><i>The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and conducts periodic programmes in this regard.</i></p> <p>The Code of Conduct is displayed on the website There is a committee to monitor adherence to the Code of Conduct Institution organizes professional ethics programmes for students, teachers, administrators and other staff Annual awareness programmes on Code of Conduct are organized</p>	Complied .	A range of activities can be brought in just as discussed in 7.1.9 above.

7.1.11 Q _i M	<p><i>Institution celebrates / organizes national and international commemorative days, events and festivals</i></p> <p>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</p>	Complied	<p>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.</p> <p>https://en.wikipedia.org/wiki/Constitution_of_India</p>
7.2.1 Q _i M	Describe two best practices successfully implemented by the Institution as per NAAC format provided in the Manual.	Complied	When the listed activities from 7.1.1 to 7.1.11 are complied, the institute can have many creative best 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.

The Bulletin on energy EFFICIENCY

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इन लेखों में प्रकट विचार मूलतः लेखकों के हैं तथा यह आवश्यक नहीं है कि इरेडा या विनरॉक और इन विचारों से सहमत हो ।

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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

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.

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 CO₂ 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 CO₂ into the atmosphere is also reduced. Reduced CO₂ 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*

PART 1 - GENERAL**CARBON FOOTPRINT – ENVIRONMENT IMPACT PLEDE (PROPOSED)**

We the Principal, the 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 in front, backyard and all other non-approachable areas of all primary and secondary pollutions.

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 Green 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.

-Sd-

Principal

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

ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD., is pleased to express its sincere gratitude to the management of V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, 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 neglected to appreciate the sincere efforts put in by the 7th Criteria Team lead by the able and motivating Principal Prof. R.V. Jalawadi and the students who against all odds have kept the college premises clean to the possible limits. Without the crucial and significant support from the fellow teaching team the 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

We are not in a position to compute the carbon footprint 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.



Ref No: SKC/404/2020-21

Date: 20-07-2020

To,
Mr. Mallikarjun Kamblyal
 Sunshubh Technovations Pvt.Ltd.,
 Hubballi

Sub: To carry out Green, Energy and Environment Audits –reg.

Dear Sir,

With reference to the above cited subject and telephonic conversation, I request you to carry our Green Audit, Energy Audit and Environment Audits of our college and issue certificates and report of the same for the year 2020-21. Our student strength is 1040. I also request you to provide the details of charges for the same. Hope you will do the needful as early as possible.

Thanks with regards.

PRINCIPAL
 S. K. College of Arts, Comm. & Science,
 TALIKOTI-586214, Dist-Vijayapur
 Principal

reductions.

We acknowledge the involvement of HODs & Coordinator

List of Department Heads Connected with NAAC Activities				
Sl No	Name of Faculty	Department	Convenor/ Member	Criteria
1	Dr. A. S. Alalamath	English	IQAC Co-ordinator/ Convenor	2
2	Prof. Ramesh Jadhav	Commerce	Co-coordinator/ Member	2
3	Dr. Ajeya Abbar	Political Science	Convenor	1
4	Dr. Ashok Rathod	Economics	Convenor	3
5	Dr. D. B. Mugadlimath	Phy.Education	Convenor	4
6	Dr. Deepa Malage	Economics	Convenor	5
7	Prof. R. V. Miskin	Hindi	Convenor	6
8	Prof. Sneha Navadagi	Commerce	Convenor	7
9	Dr. Sujata C	Kannada	Member	3 & 6
10	Prof. Hema Jainapur	History	Member	2 & 3
11	Shri V. C. Kotyal	Librarian	Member	4
12	Prof. K. B. Desai	Zoology	Member	2 & 7
13	Prof. S. S. Mane	Chemistry	Member	5 & 7
14	Prof. M. S. Hunashyal	Mathematics	Member	1 & 2
15	Prof. N. R. Choukimath	Physics	Member	1 & 3
16	Prof. B. S. Biradar	Sociology	Member	3 & 5
17	Prof. S. C. Gogi	Botany	Member	3
18	Prof. Kavita Patil	Statistics	Member	1
19	Prof. Sharada Hiremath	Computer Science	Member	4 & 5

LIST OF FACULTIES AFTER MEDICINAL GARDEN				
Sl No	Name of Faculty	Department	Convenor/Member	Criteria
1	Prof. S. C. Gogi	Botany	Member	3
2	Prof. Daneshwari Talikoti	Botany	Member	7

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.

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

ENVIRONMENTAL AUDIT REPORT

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.

CRITERIA 7.1.6**ENVIRONMENT AUDIT COMPLETION CERTIFICATE**

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 8th Aug 2020 under the instructions of Principal Prof. R.V. Jalawadi, V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, Karnataka.

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

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.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

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.

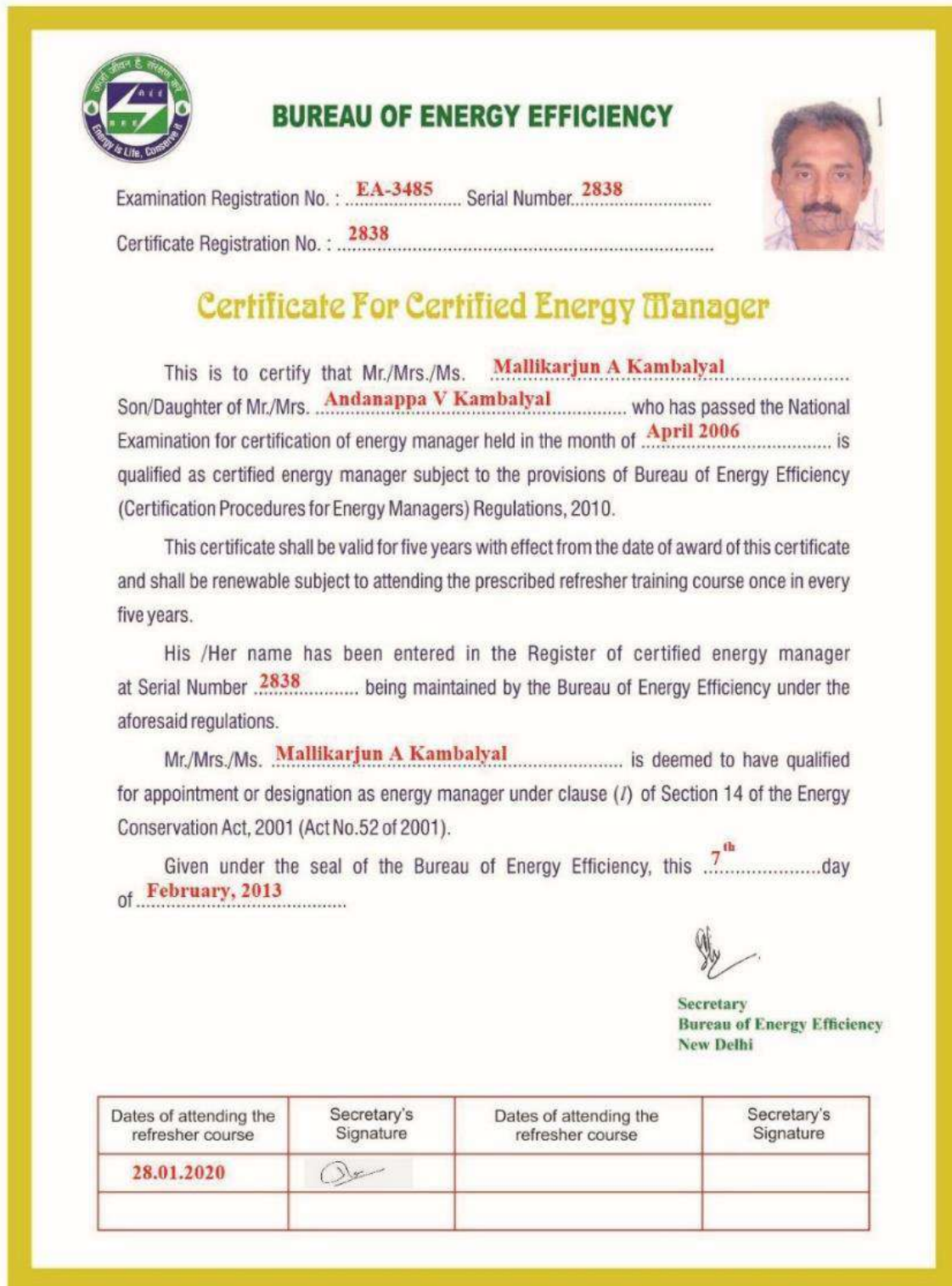


Figure 2 - Bureau of energy Efficiency Regd No: EA3485



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



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

Figure 5 - Manager training programme, Germany

THOUGHT FOR EVERY MOMENT

There are about 19,00,00,000 students in INDIA. If every student saves one sheet per day, 19,00,00,000 sheets of paper meaning 988 tonnes of paper will be saved every day. This is equivalent to saving 2748.54 tonnes of wood a day. This will lead to saving about 33,00,678 trees per year.



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 28th, 2013

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Figure 6 - Fit for partnership with Germany

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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?

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 the basis for evaluation of impact on environment. It 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.

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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!

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ENVIRONMENT 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 GREEN AUDIT

- The purpose of carrying out 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 and 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

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 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 not to use the energy if necessary. At best it can be used judiciously.
- 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.
- 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 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.
- The net impact of all the above audits should be 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

- 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.

ENVIRONMENTAL AUDIT REPORT

THOUGHT FOR EVERY MOMENT

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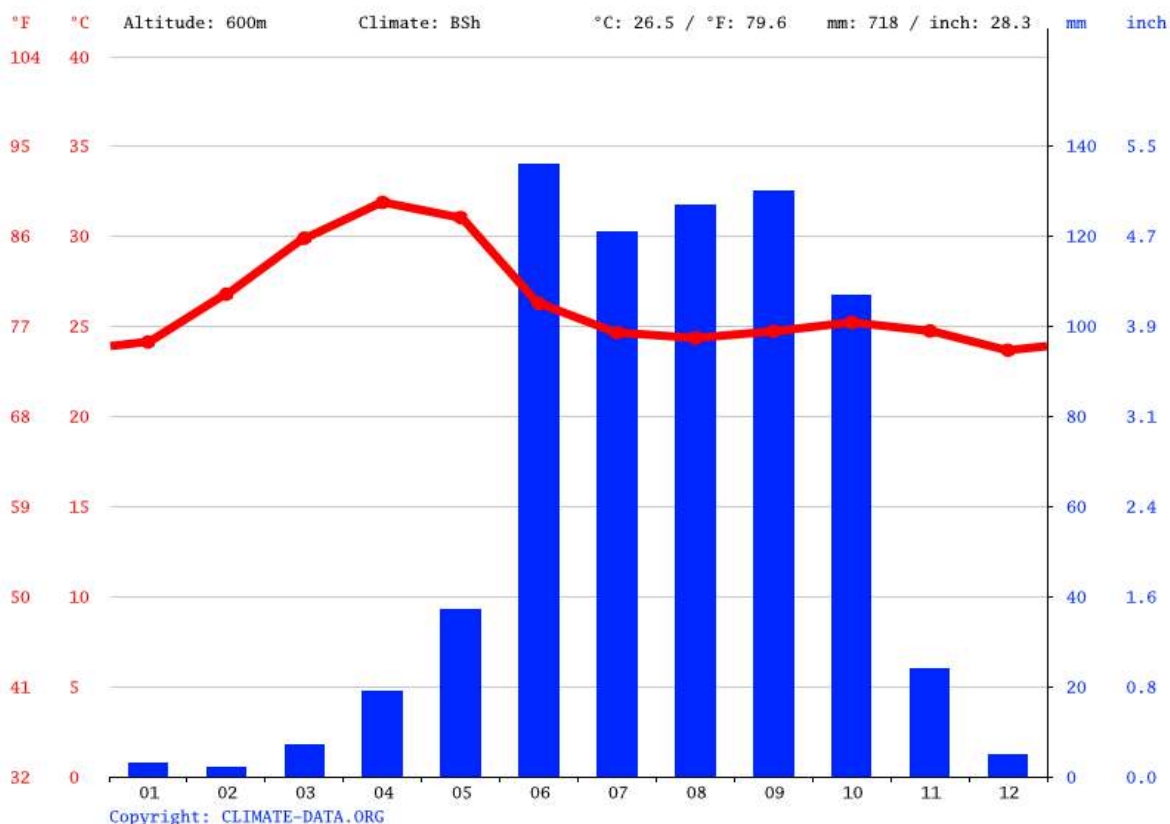
GEOGRAPHICAL CONSIDERATIONS:

Before we present our report, the factors that are considered for positive impact recommendations are,

CLIMATE VIJAYAPURA (INDIA)

The prevailing climate in Vijayapura is known as a local steppe climate. In Vijayapura, there is little rainfall throughout the year. This location is classified as Hot semi-arid climates. The average annual temperature in Vijayapura is 26.5 °C | 79.6 °F. The rainfall here is around 718 mm | 28.3 inch per year.

CLIMATE GRAPH // WEATHER BY MONTH VIJAYAPURA



The driest month is February. There is 2 mm | 0.1 inch of precipitation in February. With an average of 136 mm | 5.4 inch, the most precipitation falls in June.

AVERAGE TEMPERATURE VIJAYAPURA

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With an average of 31.9 °C | 89.4 °F, April is the warmest month. December has the lowest average temperature of the year. It is 23.7 °C | 74.6 °F.

WEATHER BY MONTH // WEATHER AVERAGES VIJAYAPURA

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Sun Hrs	9.8	10.3	10.8	11.2	11.2	8.4	7.2	7.1	7.6	8.9	9.2	9.4
Rainy days(d)	1	0	1	3	5	12	14	14	11	8	3	1
Humidity (%)	39%	31%	26%	31%	41%	70%	76%	77%	75%	64%	50%	43%
Rainfall mm (in)	3 (0.1)	2 (0.1)	7 (0.3)	19 (0.7)	37 (1.5)	136 (5.4)	121 (4.8)	127 (5)	130 (5.1)	107 (4.2)	24 (0.9)	5 (0.2)
Max. Temp °C	29.7 °C	32.6 °C	35.7 °C	37.9 °C	37.5 °C	30.9 °C	28.5 °C	28.2 °C	28.8 °C	29.8 °C	29.8 °C	29.2 °C
Min. Temp °C	17.9 °C	20.1 °C	23.1 °C	25.2 °C	24.9 °C	23 °C	22.1 °C	21.7 °C	21.5 °C	21 °C	19.5 °C	17.8 °C
Avg. Temp °C	24.1 °C	26.8 °C	29.9 °C	31.9 °C	31.1 °C	26.3 °C	24.7 °C	24.4 °C	24.7 °C	25.2 °C	24.8 °C	23.7 °C

The precipitation varies 134 mm | 5 inches between the driest month and the wettest month. During the year, the average temperatures vary by 8.2 °C | 14.8 °F.

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The month with the highest relative humidity is August (77.25 %). The month with the lowest relative humidity is March (26.43 %).

The month with the highest number of rainy days is July (18.17 days). The month with the lowest number of rainy days is February (0.47 days).

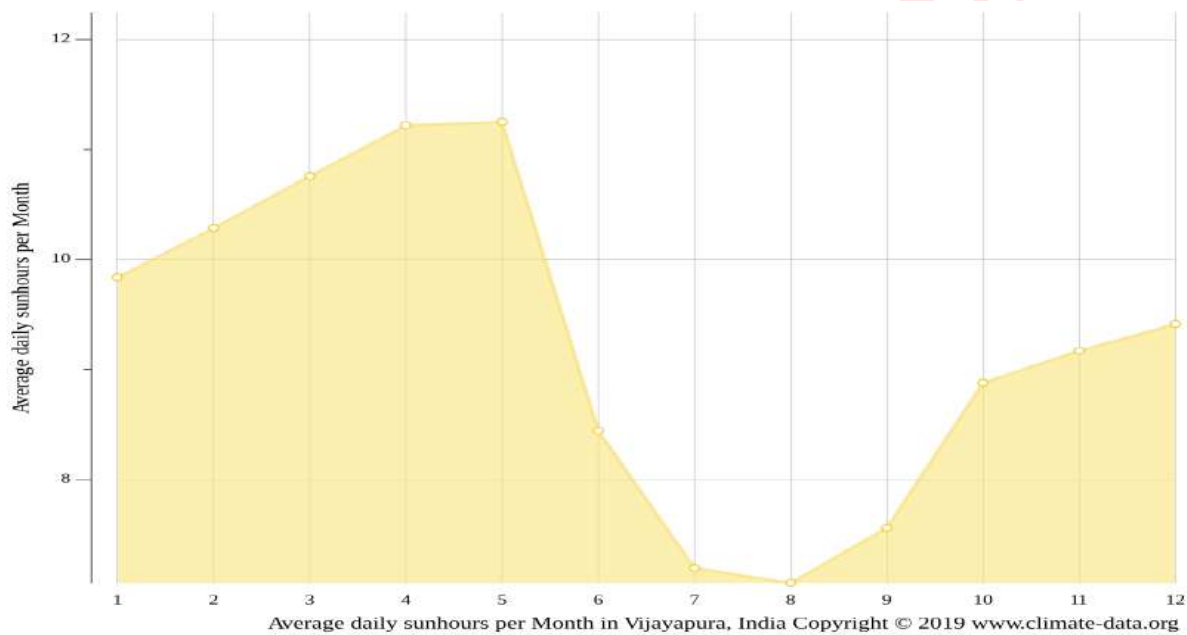
Vijayapura are in the middle and the summers are that easy to define.

The best time to visit are January, February, March, June, July, August, September, October, November.

HOURS OF SUNSHINE IN VIJAYAPURA

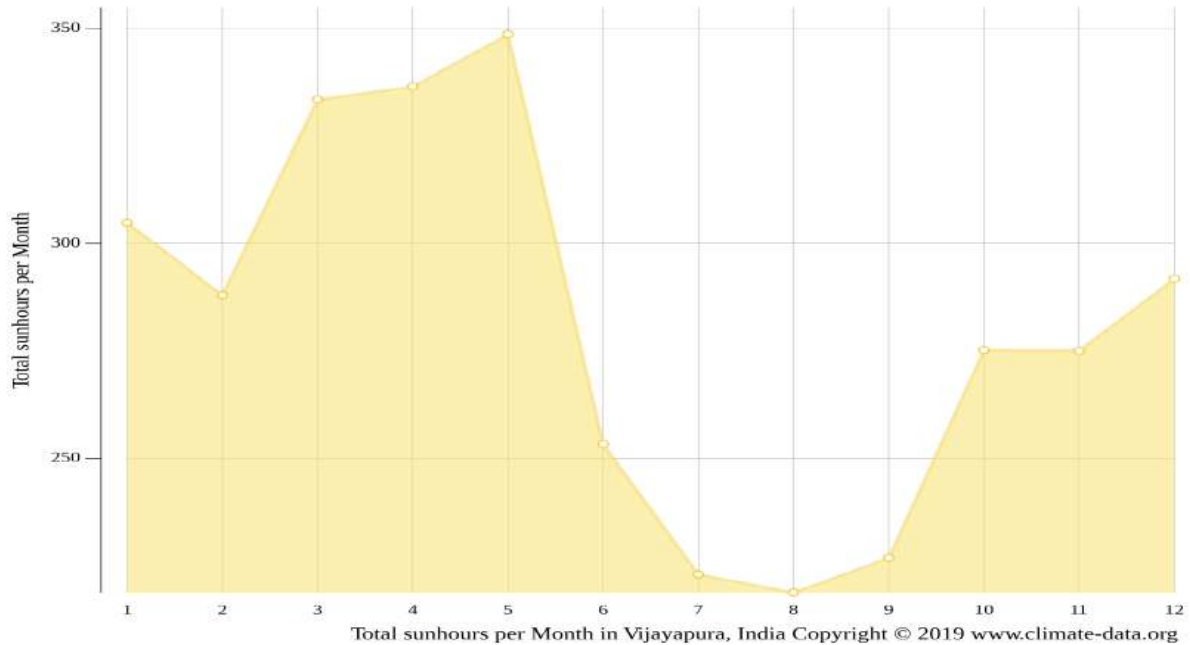
average hours of sunshine

Total hours of sunshine



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In Vijayapura, the month with the most daily hours of sunshine is May with an average of 11.25 hours of sunshine. In total there are 348.71 hours of sunshine throughout May.

The month with the fewest daily hours of sunshine in Vijayapura is January with an average of 7.06 hours of sunshine a day. In total there are 218.81 hours of sunshine in January.

Around 3375.79 hours of sunshine are counted in Vijayapura throughout the year. On average there are 111.07 hours of sunshine per month.

Source Courtesy: <https://en.climate-data.org/asia/india/karnataka/vijayapura-2796/>

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.

PART 2 – TECHNICAL DISCUSSIONS.

DISCUSSIONS ON EXECUTIVE SUMMARY:

- Water management.
- Organic waste management.
- Clear windows
- Rainwater Harvesting Abuse and Use.
- Chemical waste disposal
- LPG (Fuel) cylinders storage and management.
- HACCP practices.
- Utility Management.
- Food wastage and waste minimisation.
- Construction waste management.
- Asset management.
- Indoor Air Quality
- Fire Safety

It is important to discuss the geographical layout for better understanding.

GEOGRAPHICAL LAYOUT.



Figure 7- Satellite view of the College campus.

Water availability and the quality of water decides the environment in the campus.

Considering the geographical parameters and weather conditions, water management methodology has evolved and the barren land is now fully covered with grass, shrubs and plants.

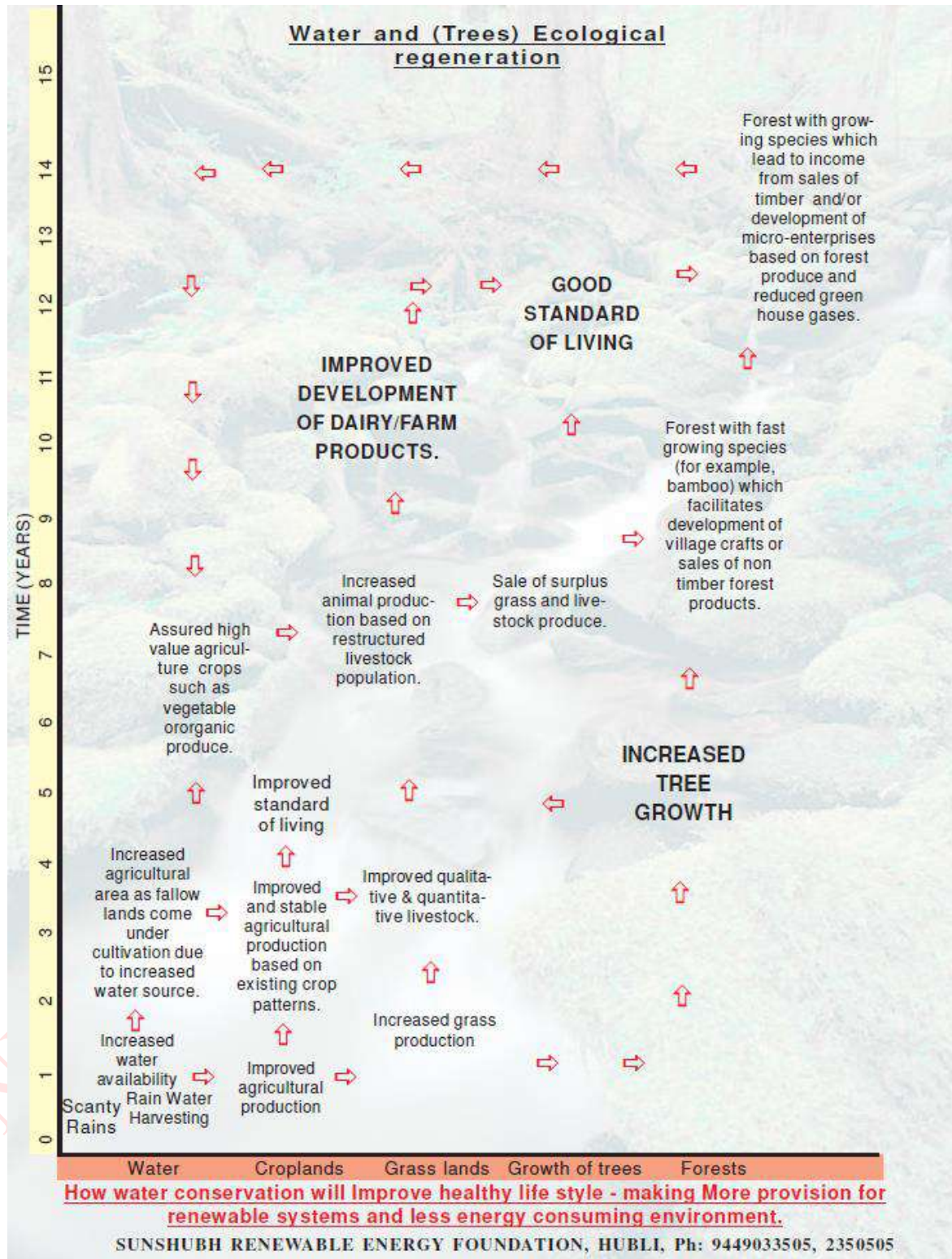


Figure 8- College premises open for rainwater management.

The area marked at 1945ft is the lowest level and most ideal for rainwater harvesting and needs no major capital expenses. The college can erect a bund along the east border, along with the nala that flows by.

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NOT BURNING OR UPROOTING THE GRASS – SUPPORTS THE FOREST GROWTH.

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PLACING OF WASTE COLLECTION BINS.



Figure 9 - Missing waste collection bins in the corridor

Considering human tendency, not to walk the distance, the waste collection bins should be placed before every room for ease of handling and convenience. Once the people get to the habit the waste collection will automatically be self-driven.

It is important to implement the measure for imparting sense of responsibility and good civic sense.

Few options are provided. The management can select the method based on cost factor.



If the rural technology is opted, the colour code need to be maintained.



If sufficient bins are placed before every room with colour code i.e., Green bins for organic and compostable waste. Yellow/Red for non-compostable wastes. (The management may choose to have any colour options as required) the manpower required to clear the same will be reduced as well.

These locally sourced bins may be placed all along the campus. We suggest that these bins be colour coded to segregate the waste at source.

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This option may look to be off the date. It should be important in placing a small placard as to why hand sewed bins are being put to use.

- **The biggest being the empowering the rural youth in being economically self-sufficient and promoting ethnic skills.**

- Bins are organic and biodegradable. Hence do not contribute to the carbon emissions. Leading to a very innovative Carbon Handprint initiative.

- Readily visible and easy to empty when half full.

WATER MANAGEMENT.

The institute is located on the first floor. However, the voluntary team may be formed to educate the other stake holders in managing the water appropriately.

The images shown are typical methods followed by many of the people for keeping green cover live.



Figure 11 - Watering the lawn



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Figure 12 - Watering the lawn

Water is money. Water is Energy and water is life. Judicious use of water is crucial considering the availability of water we suggest that the team of gardeners get educated on...

How we should water, How much should we water, How often should we water and when to stop watering are few check points.

Proper watering is crucial to having the best-looking lawn on the block. Here are some key points:

Since we reside in tropical zone, it is important that we operate the sprinklers after sunset to avoid

evaporation and allow the water to percolate deep into the top soil.

- Lawn needs *at least* 1"-1 ½" of water per week, year-round, during the winter, too.
- It's important to retain moisture content hence, Water deeply 2-3 times per week, rather than daily.
- Watering early in the morning also is favoured, when possible.
- We will need more water during the day hours.



Figure 13 - Sprinkler, Consumer much less water and time.

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- Should not water the lawns for so long that, water runs down.
- It is important to have automatic sprinklers and also to check them regularly to be sure that we get complete coverage. Going a step further, one can place the moisture sensor and automate the operation of sprinklers if one can afford the system.

ENVIRONMENT AUDIT REPORT

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BATTERY MANAGEMENT:

Placing the batteries is the beginning of prolonging the life. It is important to increase the life of batteries than regenerate.

The batteries regeneration if incorporated, can also be a revenue ear



Figure 14 - Placement of battery is in danger

ning model for the college by educating the students and training them by undertaking third party batteries for re-generation.

This also takes the institute to

reducing its Carbon Footprint and closely interacting with the Industries, other educational institutes and the society at large.

First is to enhance the life of these batteries by properly placing them.



Figure 15 - Placement of battery without ventilation

All batteries should be placed in well ventilated area. As battery disposal is turning out to be a serious issue, ways to prolong the life of the batteries is very important from the environmental point and also from the Financial implications. We will elaborate on why and how batteries underperform and/or fail much before the expected life tenure.

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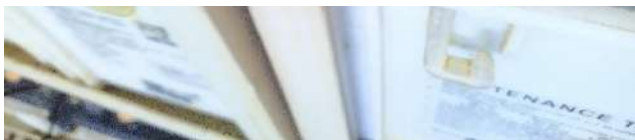
WHAT IS GALVANIC CORROSION?

Galvanic corrosion is caused by self-induced current created by electrical potential of two dissimilar metals in contact with an electrolyte. It can occur when two dissimilar metals (such as copper tube and steel pipe) are connected in the presence of an electrolyte. Water is a weak electrolyte. ie When Two Dissimilar Metals Come Into Contact - Electrolysis Occurs, Causing Corrosion - Rusting Of Both Surfaces.



Figure 16 - Galvanic reaction.

The similar case is present in the college battery bank. It is obvious that the battery discharges by itself at all times when charged.



HOW DO WE PREVENT GALVANIC CORROSION - ELECTROLYSIS FROM OCCURRING?

OCCURRING?

The quickest way to prevent Galvanic Corrosion or Electrolysis from occurring is to place two batteries away from each other without physical contact.

It is also required to prevent batteries resting or coming in contact with metal stand supports.

Placing the batteries on an insulated mat will be an added advantage.

THOUGHT FOR EVERY MOMENT

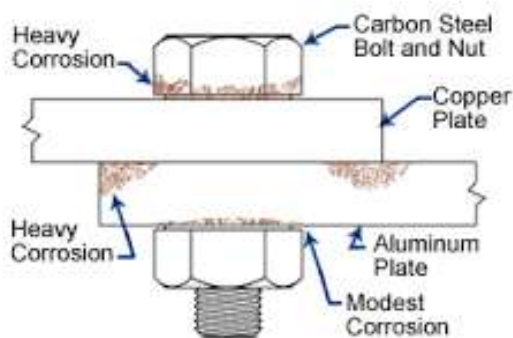
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We will discuss the regenerative system of used and week batteries to enhance the life. It is important to know few points on handling of batteries. BU-703: Health Concerns with Batteries

Become familiar with the do's and don'ts 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.



Effects of Galvanic Corrosion

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 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.

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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. (See [BU-705: How to Recycle Batteries.](#))

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/THIRD LEASE OF LIFE.

Significance

- The early regeneration results into second tenure of the batteries i.e., another term of 3 to 5 years as per Battery specifications.
- Optimised energy consumption. Thus, reduced cost of operation.
- Delayed disposal results into elimination of environment pollution.
- Reduced impact on CARBON FOOTPRINT.

HACCP PRACTICES – GENDER EQUALITY:

Sanitary Pad dispenser :

We appreciate the placement of the sanitary pad dispenser and also being used by the members. One improvement is however needed. The custodian of the pads contact details may be displayed. This should help to draw the attention of the stock holder to replenish the dispenser when empty.



Figure 18 - Pad dispenser

Sanitary pad Incinerator:

The pad incinerator is placed higher for easy reach. The short children may find it difficult to use it. The unit should be lowered down to 3' for



Figure 19 -- No easy access to incinerator

easy use.

The women empowerment committee should be asked to check for all the women comfort necessities. It may be stressed more as a necessity and not as a luxury.

It would be important to display the usage instructions in Kannada, Hindi and English so that the members can operate the incinerator by themselves.

FIRE PREVENTION & SAFETY :

The fire extinguishers should be placed at the entrance of the room housing dangerous devices and chemistry lab. So that, they are handy when need to be used.

The detailed information chart on fire extinguishers is to be prominently displayed and all staff should be educated and trained.

A typical discussion is made for better understanding below.

It is also important that the handling

instructions are Predominantly displayed. The sample poster is reproduced for replication.



Figure 20- Need ready access to fire extinguisher.

PORTABLE FIRE EXTINGUISHERS

IN CASE OF FIRE:

- Call the fire department immediately.
- Do not use an extinguisher without proper training.
- Know which extinguisher is correct for what type of fire.
- Only use portable extinguishers when the fire is contained to a small area.

FIRE CLASSIFICATION:

A
Use for ordinary combustibles. Contains water.

C
Use for electrical fires. Do not use water on these fires! Contains dry chemicals, carbon dioxide or halogenated agents to smother the fire with foam.

B
Use for flammable liquids. Contains dry chemicals or halogenated agents to smother the fire with foam.

D
Use for combustible metals. Contains special liquids or dry powder agent.

P. A. S. S. OPERATING PROCEDURE

P

A

S

S

extinguisher with the nozzle pointing away from you, and release the locking mechanism.

base of the fire.

slowly and evenly.

side-to-side at the base of the flame.

Figure 21- Fire extinguisher Operating instructions

THOUGHT FOR EVERY MOMENT

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Type Extinguisher	Fire		CLASS A	CLASS B	CLASS C	CLASS D	Electrical	CLASS F	Comments
			Combustible materials (e.g. paper & wood)	Flammable liquids (e.g. paint & petrol)	Flammable gases (e.g. butane and methane)	Flammable metals (e.g. lithium & potassium)	Electrical equipment (e.g. computers & generators)	Deep fat fryers (e.g. chip pans)	
Water	✓	✗	✗	✗	✗	✗	✗	✗	Do not use on liquid or electric fires
Foam	✓	✓	✗	✗	✗	✗	✗	✗	Not suited to domestic use
Dry Powder	✓	✓	✓	✓	✓	✓	✗	✗	Can be used safely up to 1000 volts
CO2	✗	✓	✗	✗	✗	✓	✗	✗	Safe on both high and low voltage
Wet Chemical	✓	✗	✗	✗	✗	✗	✓	✓	Use on extremely high temperatures

Figure 22 - Fire extinguisher: Class

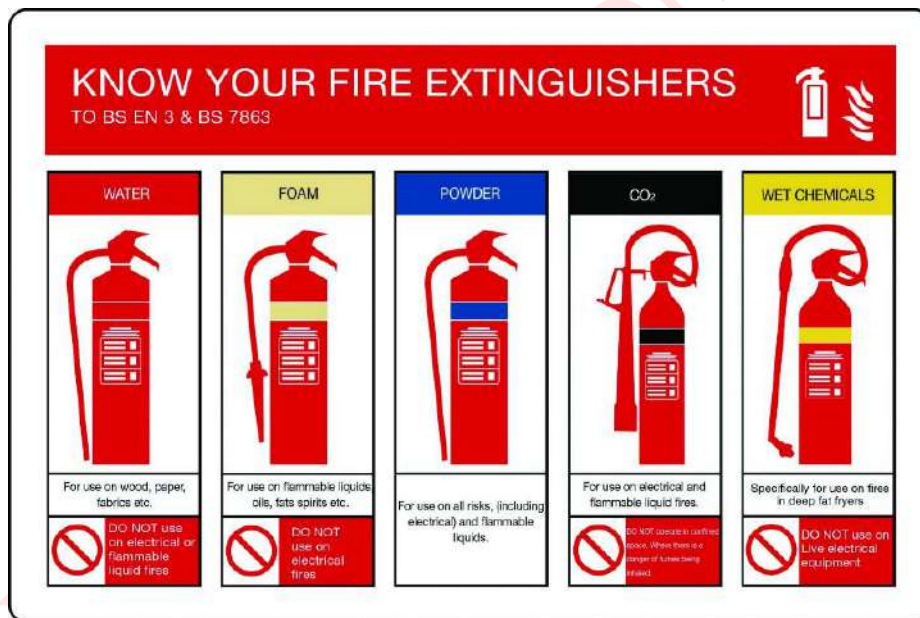


Figure 23 - Types of Fire extinguishers

In case of fire, the appropriate Fire extinguishers should be placed at the entrance but outside the room. The details of such classified Extinguishers is indicated for reference.

PLACEMENT GAS FUEL CYLINDERS:



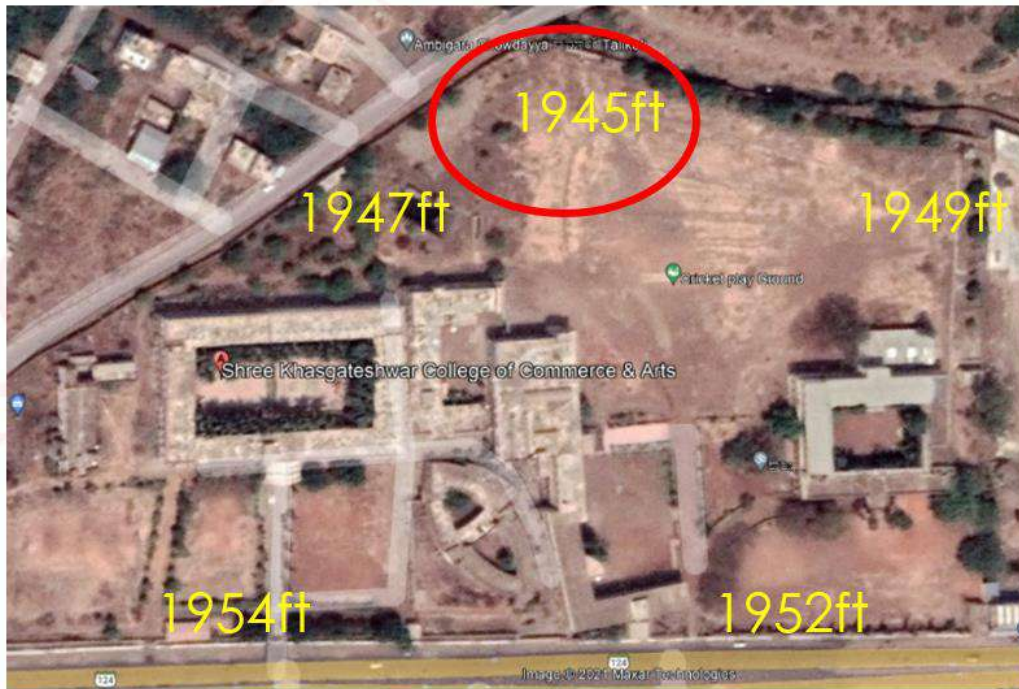
Figure 24- Placement of LPG cylinders in wrong location.

The LPG and other high pressure cylinders should be placed outside the room in well ventilated area as shown above.

If there is any space constraint, it is necessary that the lowest part of the space should be open and free ventilation provided.

The slope should be leading towards the outer wall and proper bund be made to prevent any leakage flowing into the hall/room/laboratory.

RAINWATER MANAGEMENT.



As indicated above, the lowest level is at 1945 feet. The west entry to the college campus lies at an elevation of 1952 & 1954 feet. However, as we move to the college building, the elevation lowers down.

As we move further, the elevation drops to 1945 feet to the east end and flows in to the nala. A small rise of 2' should retain all the water and help to conserve.

SOLID WASTE MANAGEMENT:

While one looks for exotic plantations, we suggest not to weed out the grass, instead the over grown grass can be chopped retaining the

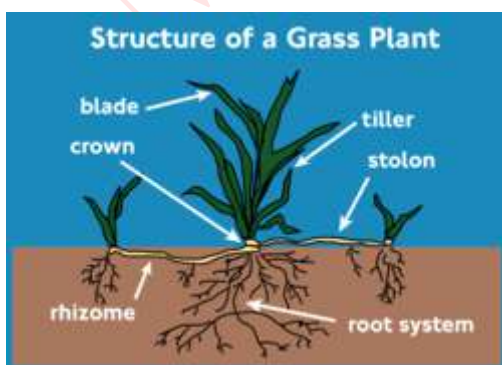


Figure 25 - Normally grown grass

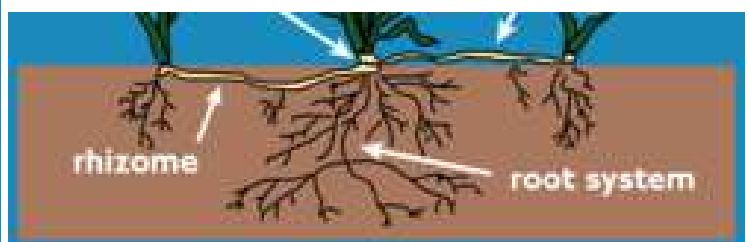


Figure 26 - chopped grass retaining the crown and the root system

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The significance of the grass can be best viewed in the video link below and the concepts can be appropriately followed.

https://www.youtube.com/results?search_query=video+AGRI+-+Green+Gold+-+Documentary+by+John+D.+Liu.mp4



Figure 27- Burning chopped and dry organic waste

It is advised not to burn the dry organic matter. The benefits of chopped grass are well described in the link given above.

ENVIRONMENTAL AUDIT REPORT

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MEDICINAL GARDEN:

The college has a well laid medicinal garden.



Figure 28 - Medicinal Garden.

The importance of the medicinal plants should be elaborated and displayed in local language as well.

VERMICOMPOST

Presently the institute has not made any provision for Vermicompost. It is mainly because of the pandemic time and newly constructed campus. As the canteen gets established and the plantations take shape, the need for organic manure can be explored.

The organic waste composting structure should be created, needs the attention of all the stake holders in making it successful. Collective effort will take the initiative to a great and meaningful implementation. The infrastructure can be planned and discussed elaboratively before execution. The different species that help catalyse the composting process can be considered.

The compost so formed should be exhibited for the information of the farming community through the students coming to college for education.

The chemical analysis of the organic manure so produced can be carried out by the science stream students and the same can be carried out of the campus.

The experience and pride of discussing the initiatives may be recorded and the same may be projected during the functions and honoured. These initiatives will be a motivator for other students to explore similar opportunities.

Just to quote, The commerce students may take-up a project where the local product say agricultural produce is marketed after value addition in any possible way.

These measures give financial stability to the weaker sections of the society and thus the moral responsibility of the establishment.

A typical working model where one can replicate the rural economy is by managing kitchen waste. This may be used to showcase the ways of developing the vermicompost.

The benefits of vermicompost if exhibited, the children can disseminate the same to their parents back home.



Figure 29 - composted kitchen waste

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GREY WATER MANAGEMENT.:



Figure 30 - Grey water pond (for illustration only)

In today's context, use of soaps and cosmetics has increased multifold. The water that is let out along with the soap and cosmetic chemicals is termed as Grey water. This water is containing valuable chemicals which form micro nutrients to the fertilizers. If this water if left open untreated, would cause foul smell and would be a breeding zone for mosquito and other harmful insects.

It is important to arrest the negative impact and extract the useful nutrients for good use. The botany department can initiate and do some research to come up with first hand experience on benefits of grey water use.

Planting Canna Indica locally known as kaabaali and water hyacinth which is predominantly seen in polluted water ponds are known as water purifying plants. While kaabaali grows in greywater accumulated areas. Water hyacinth grows well in polluted water ponds.

The images of the two plants are reproduced below.

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Canna Indica (Kaabaali)



Water Hyacinth.

More information can be drawn from the two links below.

<https://www.sciencedirect.com/science/article/pii/S0048969719347229>

<https://www.researchgate.net/publication/323278568> Waste Water Treatment using Water Hyacinth

ENVIRONMENT AUDIT REPORT

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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 Equipment.
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.

MODE OF ACTION:

The process of environment protection should be carried out in three steps.

- Good housekeeping practices.
- Minor alterations using in house work culture and 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

NOTES:

ENVIRONMENT AUDIT REPORT

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Notes:

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

(Signature)
I Q A C Co-ordinator,

S. K. College of Arts, Comm. & Science, Talikoti, Dist. Vijayapur

(Signature)
PRINCIPAL


S. K. College of Arts, Comm. & Science

TALIKOTI 586214, Dist-Vijayapur

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Germany off: NeuerWeg 166, 47803 Krefeld, Dusseldorf.

WATER	ENERGY	POLLUTION	ORGANIC	
Harvesting	Efficiency	Minimize	Farming	
Conservation	Conservation	Eliminate	Worm compost	
Management	Generation	Manage	Benefits	

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CIN : U74999KA2020PTC136321, PAN:ABECS0250Q, TAN:BLRS77362F GST No: 29ABECS0250Q1ZX

ENERGY AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Energy Audit has been carried out on 8th Aug 2020 under the instructions of Principal Prof. R.V. Jalawadi, V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, Karnataka.

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

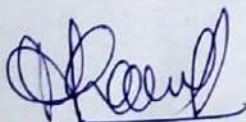
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I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on, Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives.

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

Authorised Auditor.



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ISO 50001:2011 & ISO14001:2015 Lead Auditor.

Date: 18th Jan 2020.



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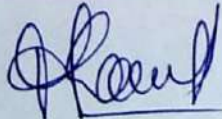
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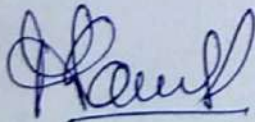
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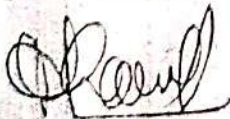
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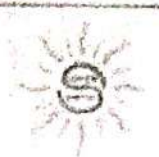

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PRINCIPAL
S. K. College of Arts, Comm, & Science

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

WATER	ENERGY	POLLUTION	ORGANIC	
Harvesting	Efficiency	Minimize	Farming	
Conservation	Conservation	Eliminate	Worm compost	
Management	Generation	Manage	Benefits	

www.sunshubhirenewables.com, Email: gen@sunshubhirenewables.com, Ph: 94492 83505, 94490 33505
CIN : U74999KA2020PTC136321, PAN-ABECS0250Q, TAN:BLRS77362F GST No: 29ABECS0250Q1ZX

ENVIRONMENT AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Environment Audit has been carried out on 8th Aug 2020 under the instructions of Principal Prof. R.V. Jalawadi, V.V.S's Shree Khasgatreshwar College of Arts And Commerce, Talikoti, Vijayapur, Karnataka.

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

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.

I also confirm and sign this certificate, in case the institution needs demonstration, my team of professionals shall be happy to do so.

We present this report to much more than the legal or mandatory compliances. This report is tabled in two parts. The first forms the core discussions which are general in nature. The second section is subject specific under the statutory requirements of the NAAC accreditation norms. They are Audit reports on. Green aspects, Energy aspects, Environment aspects, Health aspects and the discussions on net CARBON FOOTPRINT & the CARBON HANDPRINT initiatives. 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: 8th Jan 2020.





IQAC Co-ordinator,
S. K. College of Arts, Comm. &
Science, Talikoti, Dist: Vijaya,


PRINCIPAL
S. K. College of Arts, Comm, & Science
TALIKOTI-586214, Dist Vijayapur

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CIN : U74999KA2020PTC136321, PAN:ABECS0250Q, TAN:BLRS77362F GST No: 29ABECS0250Q1ZX

GREEN AUDIT COMPLETION CERTIFICATE

I, Mallikarjun A Kambalyal, endorse and confirm that the Green Audit has been carried out on 8th Aug 2020 under the instructions of Principal Prof. R.V. Jalawadi, V.V.S's Shree Khasgateshwar College of Arts And Commerce, Talikoti, Vijayapur, Karnataka.

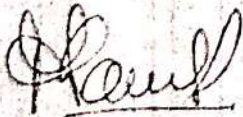
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Authorised Auditor.



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

Certified Energy Auditors EA-3485&
ISO 50001:2011 & ISO14001:2015 Lead Auditor.
Date: 18th Jan 2020.



IQAC Co-ordinator,
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V.V.Sangha's

S K College of Arts, Commerce and Science Talikoti

Green Plantation Outside the Campus




I Q A C Co-ordinator,
S. K. College of Arts, Comm. &
Science, Talikoti. Dist: Vijayanagara


PRINCIPAL
S. K. College of Arts, Comm, & Science
TALIKOTI-586214 Dist: Vijayanagara

V. V. Sangha's
**S. K. College of Arts, Commerce & Science,
Talikota**

Appreciation letter

This appreciation letter was given by "HASIRU SAMPAD BALAGA" for organization of Environmental awareness programme. Our College students participated in the Environmental related programmes organized by this organization. In collaboration with this organization many programmes have been organized. For this an appreciation letter by this organization


IQAC Co-ordinator,
S. K. College of Arts, Comm. &
Science, Talikota. Dist: Vijayapur


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TALIKOTI-586214, Dist-Vijayapur