

GREEN AUDIT REPORT

2021-22

in compliance with the statutory requirements under the NAAC accreditation procedures

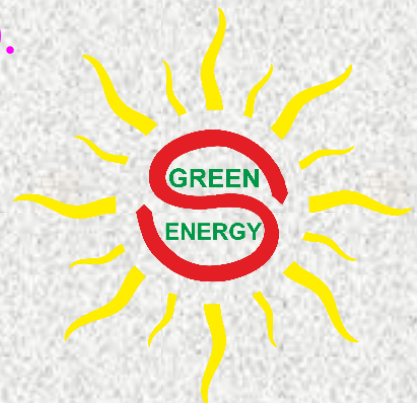


Principal Lead Auditor:
Mallikarjun A Kambalyal. CEA, ISO 50001, 14001 Lead Auditor.

SUNSHUBH TECHNOVATIONS PVT LTD.

120-2, LGE, 'A' wing, IT Park,
Hubli – 580029, Karnataka, India.
German off: Neuer Weg 166, 47803 Krefeld,
Dusseldorf, Germany Anbieter-Nr 1041388
Dusseldorf, Germany Anbieter-Nr 1041388

Website: www.sunshubhrenewables.com
Email: ceo@sunshubhrenewables.com





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.

Contents

IMAGES AS CAPTURED ON SITE.....	6
CARBON FOOTPRINT - GREEN PLEDE (PROPOSED)	7
EXECUTIVE SUMMARY.....	8
CRITERION VII – INSTITUTIONAL VALUES AND BEST PRACTICES	10
PART 1 – GENERAL	19
ACKNOWLEDGEMENT:	20
GREEN AUDIT COMPLETION CERTIFICATE	22
ONGOING STATUS:	28
WHY IS THIS AUDIT BEING CARRIED OUT?	28
WHAT IS AN ENERGY AUDIT?	29
WHY SHOULD YOU GET AN ENERGY AUDIT?	29
ENVIRONMENT AUDIT OBJECTIVES.	30
THE GOALS OF GREEN AUDIT	31
UNDERSTAND THE SCOPE OF AUDIT	32
Geography	34
Climate	35
Pollution control.....	36
Waste management	37
Culture	39
LIMITATIONS:.....	41
PART 2 TECHNICAL.....	42
DISCUSSIONS ON EXECUTIVE SUMMARY.	42
DIFFERENTLY ABLED CHILDREN.....	42
AUDIT OF SPECIFIC AREAS OF BUILDINGS	52

THE DISABILITY ACCESS AUDIT CHECKLIST	53
CHECK LIST FOR COMPLIANCE	54
GENDER EQUALITY UNDER SEC 7.1.1	71
USE OF RESOURCES:	72
SAFETY AND ACCIDENT PREVENTION METHODOLOGIES.....	74
REFERENCES	76
DISPOSAL OF USED BATTERIES	79
BATTERY PLACEMENT:.....	79
BATTERY MANAGEMENT:.....	80
LEAD	81
CADMIUM	82
SAFETY TIPS	83
VENTILATION	84
REGENERATION OF WEEK BATTERIES FOR THE NEW LEASE OF LIFE.	84
WORK CULTURE:	85
COMMUTING	90
WASTE MANAGEMENT:	99
OUTREACH	101
LIST OF INSTRUMENTS :	102
ACTION PLAN SUMMARY:	103
NOTES:	104

IMAGES AS CAPTURED ON SITE.

Figure 1 - Ecological pyramid	10
Figure 2 - Innovation key pointers	11
Figure 3 - Work order	20
Figure 4- Bureau of energy Efficiency Regd No: EA3485	23
Figure 5 - ISO Certified Lead Auditor. Certificate No: 47730.....	24
Figure 6 - ISO Certified Lead Auditor. Certificate No: ENR-00253448.....	25
Figure 7 - Manager training programme, Germany	26
Figure 8 - Fit for partnership with Germany	27
Figure 9 - Satellite view of the College campus.	42
Figure 10 - Placing of ramp for use by physically challenged.....	45
Figure 11 - CCTV for security.....	71
Figure 12 - Need based project allocation to the students.....	72
Figure 13 - placing of light points for comfort.	73
Figure 14 - Need based lighting	74
Figure 15 - PPE kit for hazardous tasks.....	74
Figure 16 - Electrical safety mats.....	76
Figure 17 - Placement of Fire extinguisher.....	77
Figure 18 - Fire extinguisher usage template	77
Figure 19 - types of extinguishers and Applications.	78
Figure 20 - Know your fire extinguisher.....	78
Figure 21 - Battery placement.....	79
Figure 22 - - Footwear and baggage placement.....	88
Figure 23 - Bulk storage of ACid bottles.....	89
Figure 24 - Placement of equipment to avoid hazard	89
Figure 25 - Curb stone, road design.	90
Figure 26 Car occupying space of second car.	91
Figure 27 - unorganised parking	91
Figure 28 - parking in inappropriate place.	91
Figure 29 - Locally sourced waste collection bin.....	100
Figure 30 - Identification and use of E-waste	100

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 comply 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	Artistic shearing of plants.				
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.				

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>

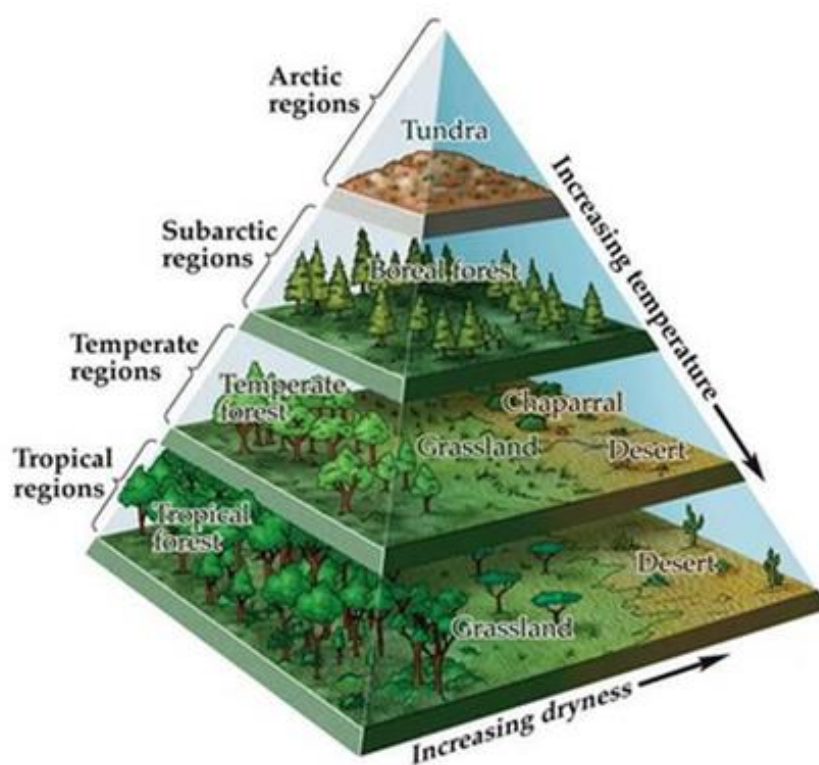


Figure 1 - Ecological pyramid

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,



Figure 2 - Innovation key pointers

	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</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 _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> <p>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 _{nM}	<p><i>Water conservation facilities available in the Institution:</i></p> <p>Rain water harvesting</p> <p>Borewell /Open well recharge</p> <p>Construction of tanks and bunds</p> <p>Waste water recycling</p>	<p>Complied .</p> <p>Open ground percolation,</p> <p>Open well restoration.</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.</p> <p>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>The Institution has a prescribed code of conduct for students, teachers, administrators and other staff and conducts periodic programmes in this regard.</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 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/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/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 BEEnergy Efficiency

August 2005 Vol 6 Issue 1

EDITORIAL BOARD

Patron-in-Chief: Shri Vilas Muttemwar,

Hon'ble Minister of State (MNES)

Patron: Shri A.M. Gokhale, Secretary, MNES

Editor-in-Chief: Shri Debashish Majumdar,

Managing Director, IREDA

Executive Editor: Dr P. Venkata Ramana, Winrock

International, USA

Editorial Coordinator: Mr Arvind Reddy, Winrock

International India

MEMBERS

Ms Anita Ahuja, Conserve

Shri A.K. Asthana, National Productivity Council

Ms Leena Mehendale, PCRA

Shri B.V. Rao, IREDA

Shri Brahmanand Mohanty, Energy Efficiency

Specialist

Shri Bhaskar Natarajan, India-Canada Environment

Facility

Shri S. Padmanaban, USAID/India

Shri V. Raghuraman, Confederation of Indian Industry

Shri S. Ramaswamy, GTZ - India

WINROCK EDITORIAL TEAM

Content Copyedit Layout & Design

Mathews Thayil Bhawani Shankar Jaison Jose

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

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

This publication is supported by

Indian Renewable Energy Development Agency

IREDA is a financial institution set up by MNES to provide concessional financial support to energy efficiency/conservation and renewable energy sectors. For more information, see IREDA web site www.iredaltd.com or contact:

Core-4A, East Court, 1st Floor
India Habitat Centre, Lodhi Road, New Delhi-110003
Tel: 91-11-2468 2214-21 Fax: 91-11-2468 2204
E-mail: efficiency@rediffmail.com
Website: www.iredaltd.com

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
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.)

ACKNOWLEDGEMENT:

SUNSHUBH TECHNOVATIONS PVT LTD., is pleased to express its sincere gratitude to the management of Rashtriya Shikshana Samithi Trust's R V College of Engineering. (Autonomous) Bangalore 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 Dr K N Subramanya 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 foot print at this point of time as the basic information from each of the students is yet to be collected; however, we will discuss the Carbon Foot print in the follow up compliance report.

RV College of Engineering
Autonomous Institution Affiliated to Visveswaraiah Technological University, Bangalore

Approved by AICTE, New Delhi, Accredited by NAAC, Bangalore And NBA, New Delhi

Service Purchase Order

Vendor Name & Address: Sunshubh Technovations Pvt. Ltd., #120-122, 121-2, W Block, IT Park, City Class House, HABA - 560029 Karnataka

Vendor Code: 15902105
Vendor GST Number: 29AAICG3282HQZ
Vendor PAN: AAICG3282HQ
Kind Attention:

PO No. / Version: 3300006238 / 0
Purchase Order Date: 22.09.2021
GST Number: 29AAICG3282HQZ
PAN: AAICG3282HQ
Order Currency: INR
Delivery Place Details: R.V. College of Engineering, R.V. Vidyaniketan Post, Bangalore-560029

Dear Sir/Madam,

With reference to your quotation, you are requested to take up the following Services as per the details given below:

Sl.No.	Service Code SAC	Service/Work Description	Delivery date	Qty.	UOM	Base/Unit	Price			Total
							Amount	Rate/Qty	Amount	
1	Condition of Green Audit in RVCE Campus	12.10.2021	1.00	LOT	Base/Unit	Amount	Rate/Qty	Amount	16,214.00	
	Vendor No. 30000109	SAC - Service Sheet Item	12.10.2021	1.00	LOT	Base/Unit	Amount	Rate/Qty	Amount	
		Professional Services				\$3,300.00	\$3,300.00	9.00	7,497.00	9.00
									Order Value(VAT)	16,214.00
									Grand Total	16,214.00

Amount in Words:- Rupees Ninety Eight Thousand Two Hundred Ninety Four

Terms & Conditions:

- Total value of Purchase Order is inclusive of all taxes.
- Delivery Date: As mentioned above in Purchase Order for each item.
- Delivery Place: As per details mentioned in Purchase Order.
- TDS will be deducted as per the standard.
- Invoice should be submitted in triplicate.
- You will have to co-ordinate with our representative at site during the execution and in consultation.

Signature Place, RV Vidyaniketan Post, Bangalore - 560029, Karnataka, India

080 - 6718020/ 6181 | principal@rvce.edu.in | rvcce.edu.in

Go, change the world

Page 1 of 2

Service Order No: 3300006238

7. Contractor personnel employed shall be physically and mentally fit in healthy condition and good character with age above 18 years.
8. Contractor shall be responsible for payment to this personnel regularly and the institution will not be responsible for the same.
9. Contractor shall take care of all statutory requirements like PF, ESI, Bonus etc., for his personnel.
10. Any casualities like accidents or any other incidents happening while working in institution, contractor should bear the expenses of the working personnel of this company under work man's compensation act 1928 and also the other responsible for the casualities.
11. Any deviation or departure from norms has to be brought to the notice of the undersigned.

For: R.V. College of Engineering
Authorized Signature: *[Signature]*
PRINCIPAL
R.V. College of Engineering
BANGALORE-560029

Figure 3 - Work order

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

We acknowledge the involvement of HODs & Coordinator

Dr K N Subramanya

Principal

Col Ishwar Doddamani

Deputy Director-Administration

Sunil Murthy

Civil Engineer – RV Campus.

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 29th Oct 2021 under the instructions of Principal, Dr K N Subramanya for R V College of Engineering, Bengaluru. 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 4- Bureau of energy Efficiency Regd No: EA3485



Figure 5 - ISO Certified Lead Auditor. Certificate No: 47730



Figure 6 - ISO Certified Lead Auditor. Certificate No: ENR-00253448

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

Dr. Steffi Artl
(Geschäftsführerin)

Hubert Smarowos
(Geschäftsführer)

TÜV Rheinland Akademie GmbH • Alboinstr. 56 • 12103 Berlin

© TÜV, TÜV und TÜV sind eingetragene Marken. Eine Nutzung und Verwendung bedarf der vorherigen Zustimmung durch das Unternehmen.

Figure 7 - 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,



Figure 8 - Fit for partnership with Germany

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.

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,

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!

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 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.

FACTORS CONSIDERED.

Source : <https://en.wikipedia.org/wiki/Bangalore>

GEOGRAPHY

Main article: [Bangalore geography and environment](#)

The [Hesaraghatta Lake](#) in Bangalore

Bangalore lies in the southeast of the [South Indian](#) state of Karnataka. It is in the heart of the [Mysore Plateau](#) (a region of the larger [Precambrian Deccan Plateau](#)) at an average elevation of 900 m (2,953 ft).^{[63]:8} It is located at [12.97°N 77.56°E](#) and covers an area of 741 km² (286 sq mi).^[64] The majority of the city of Bangalore lies in the [Bangalore Urban district](#) of Karnataka and the surrounding rural areas are a part of the [Bangalore Rural district](#). The Government of Karnataka has carved out the new district of [Ramanagara](#) from the old Bangalore Rural district.^[65]

The topology of Bangalore is generally flat, though the western parts of the city are hilly. The highest point is [Vidyaranyapura Doddabettahalli](#), which is 962 metres (3,156 feet) and is situated to the north-west of the city.^[66] No major rivers run through the city, although the [Arkavathi](#) and [South Pennar](#) cross paths at the [Nandi Hills](#), 60 kilometres (37 miles) to the north. [River Vrishabhavathi](#), a minor tributary of the [Arkavathi](#), arises within the city at Basavanagudi and flows through the city. The rivers [Arkavathi](#) and [Vrishabhavathi](#) together carry much of Bangalore's [sewage](#). A [sewerage](#) system, constructed in 1922, covers 215 km² (83 sq mi) of the city and connects with five [sewage treatment](#) centres located in the periphery of Bangalore.^[67]

In the 16th century, Kempe Gowda I constructed many lakes to meet the town's water requirements. The Kempambudhi Kere, since overrun by modern development, was prominent among those lakes. In the earlier half of 20th century, the Nandi Hills [waterworks](#) was commissioned by [Sir Mirza Ismail](#) ([Diwan](#) of Mysore, 1926–41 CE) to provide a water supply to the city. The river [Kaveri](#) provides around 80% of the total water supply to the city with the remaining 20% being obtained from

the Thippagondanahalli and Hesaraghatta reservoirs of the Arkavathi river.^[68] Bangalore receives 800 million litres (211 million US gallons) of water a day, more than any other Indian city.^[69] However, Bangalore sometimes does face water shortages, especially during summer- more so in the years of low rainfall. A random sampling study of the air quality index (AQI) of twenty stations within the city indicated scores that ranged from 76 to 314, suggesting heavy to severe air pollution around areas of traffic concentration.^[70]

Bangalore has a handful of freshwater lakes and water tanks, the largest of which are Madivala tank, Hebbal lake, Ulsoor lake, Yediyur Lake and Sankey Tank. Groundwater occurs in silty to sandy layers of the alluvial sediments. The Peninsular Gneissic Complex (PGC) is the most dominant rock unit in the area and includes granites, gneisses and migmatites, while the soils of Bangalore consist of red laterite and red, fine loamy to clayey soils.^[70]

Vegetation in the city is primarily in the form of large deciduous canopy and minority coconut trees. Though Bangalore has been classified as a part of the seismic zone II (a stable zone), it has experienced quakes of magnitude as high as 4.5.^[71]

Climate

Bangalore has a tropical savanna climate (Köppen climate classification Aw) with distinct wet and dry seasons. Due to its high elevation, Bangalore usually enjoys a more moderate climate throughout the year, although occasional heat waves can make summer somewhat uncomfortable.^[72] The coolest month is January with an average low temperature of 15.1 °C (59.2 °F) and the hottest month is April with an average high temperature of 35 °C (95 °F).^[73] The highest temperature ever recorded in Bangalore is 39.2 °C (103 °F) (recorded on 24 April 2016) as there was a strong El Niño in 2016.^[74] There were also unofficial records of 41 °C (106 °F) on that day. The lowest ever recorded is 7.8 °C (46 °F) in January 1884.^{[75][76]} Winter temperatures rarely drop below 14 °C (57 °F), and summer temperatures seldom exceed 36 °C (97 °F). Bangalore receives rainfall from both the northeast and the southwest monsoons and the wettest months are September, October and August, in that order.^[73] The summer heat is moderated by fairly frequent thunderstorms, which occasionally cause power

outages and local flooding. Most of the rainfall occurs during late afternoon/evening or night and rain before noon is infrequent. November 2015 (290.4 mm) was recorded as one of the wettest months in Bangalore with heavy rains causing severe flooding in some areas, and closure of a number of organisations for over a couple of days.^[77] The heaviest rainfall recorded in a 24-hour period is 179 millimetres (7 in) recorded on 1 October 1997.^[78]

Climate data for Bangalore (1981–2010, extremes 1901–2012)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	32.8 (91.0))	35.9 (96.6))	37.3 (99.1))	38.3 (100.9))	38.9 (102.0))	38.1 (100.6))	33.3 (91.9))	33.3 (91.9))	33.3 (91.9))	32.4 (90.3))	31.7 (89.1))	31.1 (88.0))	38.9 (102.0)
Average high °C (°F)	27.9 (82.2))	30.7 (87.3))	33.1 (91.6))	34.0 (93.2))	33.3 (91.9))	29.6 (85.3))	28.3 (82.9))	27.8 (82.0))	28.6 (83.5))	28.2 (82.8))	27.2 (81.0))	26.5 (79.7))	29.6 (85.3)
Average low °C (°F)	15.8 (60.4))	17.5 (63.5))	20.0 (68.0))	22.0 (71.6))	21.7 (71.1))	20.4 (68.7))	19.9 (67.8))	19.8 (67.6))	19.8 (67.6))	19.6 (67.3))	18.0 (64.4))	16.2 (61.2))	19.2 (66.6)
Record low °C (°F)	7.8 (46.0))	9.4 (48.9))	11.1 (52.0))	14.4 (57.9))	16.7 (62.1))	16.7 (62.1))	16.1 (61.0))	14.4 (57.9))	15.0 (59.0))	13.2 (55.8))	9.6 (49.3))	8.9 (48.0))	7.8 (46.0)
Average rainfall mm (inches)	1.9 (0.07))	5.4 (0.21))	18.5 (0.73))	41.5 (1.63))	107.4 (4.23))	106.5 (4.19))	112.9 (4.44))	147.0 (5.79))	212.8 (8.38))	168.3 (6.63))	48.9 (1.93))	15.7 (0.62))	986.9 (38.85)
Average rainy days	0.2	0.4	1.1	3.1	6.7	6.2	7.2	9.9	9.8	8.3	3.8	1.4	58.1
Average <u>relative humidity</u> (%) (at 17:30 <u>IST</u>)	41	32	29	35	47	62	65	67	64	65	61	53	52
Mean monthly <u>sunshine</u> <u>hours</u>	262.3	247.6	271.4	257.0	241.1	136.8	111.8	114.3	143.6	173.1	190.2	211.7	2,360.9
Source 1: India Meteorological Department ^{[79][80]}													
Source 2: NOAA (sun: 1971–1990) ^[81]													

Pollution control

Bangalore generates about 3,000 tonnes of **solid waste** per day, of which about 1,139 tonnes are collected and sent to **composting** units such as the Karnataka

Composting Development Corporation. The remaining solid waste collected by the municipality is dumped in open spaces or on roadsides outside the city.^[134] In 2008, Bangalore produced around 2,500 **metric tonnes** of **solid waste**, and increased to 5000 **metric tonnes** in 2012, which is transported from collection units located near **Hesaraghatta Lake**, to the garbage dumping sites.^[135] The city suffers significantly with dust pollution, hazardous waste disposal, and disorganised, unscientific waste retrievals.^[136] The IT hub, Whitefield region is the most polluted area in Bangalore.^[137] Recently a study found that over 36% of diesel vehicles in the city exceed the national limit for emissions.^[138]

Anil Kumar, Commissioner Bruhat Bengaluru Mahanagara Palike BBMP, said: "The deteriorating Air Quality in cities and its impact on public health is an area of growing concern for city authorities. While much is already being done about collecting and monitoring air quality data, little focus has been given on managing the impacts that bad air quality is having on the health of citizens."^[139]

Waste management

In 2012 Bangalore generated 2.1 million tonnes of **Municipal Solid Waste** (195.4 kg/cap/yr).^[143] The waste management scenario in the state of Karnataka is regulated by the Karnataka State Pollution Control Board (KSPCB) under the aegis of the Central Pollution Control Board (CPCB) which is a Central Government entity. As part of their Waste Management Guidelines the government of Karnataka through the Karnataka State Pollution Control Board (KSPCB) has authorised a few well-established companies to manage the **biomedical waste** and hazardous waste in the state of Karnataka.^[citation needed]

Economy:

Recent estimates of the economy of Bangalore's metropolitan area have ranged from \$45 to \$83 billion (**PPP GDP**), and have ranked it either **fourth- or fifth-most productive metro area** of India.^[140] In 2014, Bangalore contributed US\$45 billion, or 38 per cent of India's total IT exports.^[144] As of 2017, IT firms in Bengaluru employ about 1.5 million employees in the IT and IT-enabled services sectors, out of nearly 4.36 million employees across India.^[145]

With an economic growth of 10.3%, Bangalore is the second fastest-growing major metropolis in India,^[146] and is also the country's fourth largest [fast-moving consumer goods](#) (FMCG) market.^[147] *Forbes* considers Bangalore one of "The Next Decade's Fastest-Growing Cities".^[148] The city is the third largest hub for [high-net-worth individuals](#) and is home to over 10,000-dollar millionaires and about 60,000 super-rich people who have an investment surplus of ₹45 million (US\$630,900) and ₹5 million (US\$70,100) respectively.^[149]

The headquarters of several [public sector undertakings](#) such as [Bharat Electronics Limited](#) (BEL), [Hindustan Aeronautics Limited](#) (HAL), [National Aerospace Laboratories](#) (NAL), [Bharat Earth Movers Limited](#) (BEML), Central Manufacturing Technology Institute (CMTI) and [HMT](#) (formerly Hindustan Machine Tools) are located in Bangalore. In June 1972 the [Indian Space Research Organisation](#) (ISRO) was established under the Department of Space and headquartered in the city. Bangalore also houses several research and development centres for many firms such as [ABB](#), [Airbus](#), [Bosch](#), [Boeing](#), [General Electric](#), [General Motors](#), [Google](#), [Liebherr-Aerospace](#), [Microsoft](#), [Mercedes-Benz](#), [Nokia](#), [Oracle](#), [Philips](#), [Shell](#), [Toyota](#) and [Tyco](#).

Bangalore is called as the *Silicon Valley of India* because of the large number of information technology companies located in the city which contributed 33% of India's ₹1,442 billion (US\$20 billion) IT exports in 2006–07.^[150] Bangalore's IT industry is divided into three main [clusters](#) – [Software Technology Parks of India](#) (STPI); [International Tech Park, Bangalore](#) (ITPB); and [Electronics City](#). UB City, the headquarters of the [United Breweries Group](#), is a high-end commercial zone.^[151] [Infosys](#) and [Wipro](#), India's third and fourth largest software companies are headquartered in Bangalore, as are many of the global *SEI-CMM Level 5 Companies*.

The growth of IT has presented the city with unique challenges. Ideological clashes sometimes occur between the city's IT moguls, who demand an improvement in the city's infrastructure, and the state government, whose electoral base is primarily the people in rural Karnataka. The encouragement of high-tech industry in Bangalore, for example, has not favoured local employment development, but has instead

increased land values and forced out small enterprise.^[152] The state has also resisted the massive investments required to reverse the rapid decline in city transport which has already begun to drive new and expanding businesses to other centres across India. Bangalore is a hub for [biotechnology](#) related industry in India and in the year 2005, around 47% of the 265 biotechnology companies in India were located here; including [Biocon](#), India's largest biotechnology company.^{[153][154]}

CULTURE

Main article: [Culture of Bengaluru](#)

[Bangalore Karaga](#), one of the oldest and most important festivals in Bangalore [Yakshagana](#) – a theatre art of coastal Karnataka is often played in town hall Bangalore is known as the "Garden City of India" because of its greenery, broad streets and the presence of many public parks, such as [Lal Bagh](#) and [Cubbon Park](#).^[172] Bangalore is sometimes called as the "Pub Capital of India" and the "Rock/Metal Capital of India" because of its underground music scene and it is one of the premier places to hold international rock concerts.^[173] In May 2012, [Lonely Planet](#) ranked Bangalore third among the world's top ten cities to visit.^[174]

Bangalore is also home to many [vegan](#)-friendly restaurants and vegan activism groups, and has been named as India's most vegan-friendly city by [PETA India](#).^{[175][176]}

[Biannual](#) flower shows are held at the [Lal Bagh](#) Gardens during the week of [Republic Day](#) (26 January) and [Independence Day](#) (15 August). [Bengaluru Karaga](#) or "Karaga Shaktyotsava" is one of the most important and oldest festivals of Bangalore dedicated to the Hindu Goddess [Draupadi](#). It is celebrated annually by the [Thigala](#) community, over a period of nine days in the month of March or April. The [Someshwara Car festival](#) is an annual procession of the idol of the [Halasuru Someshwara Temple](#) (Ulsoor) led by the [Vokkaligas](#), a major land holding community in the southern Karnataka, occurring in April. [Karnataka Rajyotsava](#) is widely celebrated on 1 November and is a public holiday in the city, to mark the formation of [Karnataka](#) state on 1 November 1956. Other [popular festivals](#) in Bangalore are [Ugadi](#), [Ram Navami](#), [Eid ul-Fitr](#), [Ganesh Chaturthi](#), [St. Mary's feast](#), [Dasara](#), [Deepawali](#) and [Christmas](#).^{[177][178]}

The diversity of cuisine is reflective of the social and economic diversity of Bangalore.^[179] Bangalore has a wide and varied mix of restaurant types and cuisines and Bangaloreans deem eating out as an intrinsic part of their culture. Roadside vendors, [tea stalls](#), and South Indian, North Indian, [Chinese](#) and Western fast food are all very popular in the city.^[180] [Udupi](#) restaurants are very popular and serve predominantly vegetarian, regional cuisine.^[181]

Education:

Universities

[National Law School of India University](#), a premier law university

The [Central College of Bangalore](#) is the oldest college in the city, it was established in the year 1858. It was originally affiliated to [University of Mysore](#) and subsequently to [Bangalore University](#). Later in the year 1882 the priests from the [Paris Foreign Missions Society](#) established the [St Joseph's College, Bangalore](#). The [Bangalore University](#) was established in 1886, it provides affiliation to over 500 colleges, with a total student enrolment exceeding 300,000. The university has two campuses within Bangalore – Jnanabharathi and Central College.^[211] [University Visvesvaraya College of Engineering](#) was established in the year 1917, by [Sir M. Visvesvaraya](#), At present, the UVCE is the only engineering college under the [Bangalore University](#). Bangalore also has many private engineering colleges affiliated to [Visvesvaraya Technological University](#).

Some of the professional institutes in Bengaluru are:

- [International Centre for Theoretical Sciences](#)
- [Indian Institute of Astrophysics](#)
- [Indian Institute of Science](#), which was established in 1909 in Bangalore
- [Jawaharlal Nehru Centre for Advanced Scientific Research](#) (JNCASR)
- [National Centre for Biological Sciences](#) (NCBS)
- [National Institute of Mental Health and Neuro Sciences](#) (NIMHANS)
- [Raman Research Institute](#)
- [National Law School of India University](#) (NLSIU)
- [Indian Institute of Management, Bangalore](#) (IIM-B)

- Indian Statistical Institute
- Institute of Finance and International Management (IFIM)
- Institute of Wood Science and Technology
- International Institute of Information Technology, Bangalore (IIIT-B)
- National Institute of Design (NID),
- National Institute of Fashion Technology (NIFT),
- University of Agricultural Sciences, Bangalore (UASB)
- Bangalore Medical College and Research Institute (BMCRI)
- Sri Jayadeva Institute of Cardiovascular Sciences and Research (SJICR)

Some famous private institutions in Bangalore include Symbiosis International University, SVKM's NMIMS, CMR University, Christ University, Jain University, PES University, Dayananda Sagar University and M. S. Ramaiah University of Applied Sciences. Some famous private medical colleges include St. John's Medical College (SJMC), M. S. Ramaiah Medical College (MSRMC), Kempegowda Institute of Medical Sciences (KIMS), Vydehi Institute of Medical Sciences and Research Centre (VIMS), etc.^{[212][213]} The M. P. Birla Institute of Fundamental Research has a branch located in Bangalore.^[214]

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 - Aerial View of the College Campus.



Figure 9 - Satellite view of the College campus.

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.				

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,

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

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 institution has provided well planned access to differently abled children. There could be more ways to further enhance the ease of access and comfort. In the following discussions, we have tried to elaborate and provide a checklist to access internally the possibilities of improvising the ease of access.

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-today 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 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 between 900mm-1100mm?	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 (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 (Disabled Logo) displayed?	Yes/No*.
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:
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	Yes/No*.Size of logo: Yes/No*.If yes, describe signboard used:

	indicating that the lot is for the disabled driver?	
4	Are there directional signs within the parking lot to indicate the location of the parking lot for the disabled person?	Yes/No*.
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.	<p>Please tick on the box and delete accordingly for the following:</p> <p>There is kerb/no kerb at the Entrance of the lift lobby.</p> <p>There is a kerb ramp at the Entrance of the lift lobby. Gradient:</p> <p>There is a swing/automatic/ Manual* door leading to the main building</p> <p>Width of door entrance is at least 900 mm wide</p> <p>Width: Corridor width is at least 1200 mm wide</p> <p>Width: Width of lift door is at least 900 mm wide</p> <p>Width: State the type of flooring used:</p>
C	Taxi Stand	
1	Is there a taxi stand at the building? If yes, please state the location (e.g., at the main entrance)	<p>Yes/No*.</p> <p>Location:</p>

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*.
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	Yes/No*. Height between:

	between 900 mm - 1200 mm from the floor level	
7(i)	Are there grab bars inside the lift?	Slides: Yes/No*.
(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? Is the accessible toilet identified by a sign?	Yes/No*.
(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	State location of toilet checked Please tick on the box and delete accordingly for the following Individual washroom/compartment * Individual washroom: Have clear dimensions

<p>copies for each toilet surveyed</p> <p>Sketch toilet surveyed (include door, water closet, wash basin, door and grab bars)</p>	<p>between opposite walls of not less than 1750 mm. Actual dimension:</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:</p> <p>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 mm 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> <p>Water closet is located between 460 mm - 480 mm from the centreline of the water closet to adjacent wall.</p> <p>Actual distance: Clear dimension of 750 mm from the front edge of the toilet bowl to the rear wall.</p> <p>Actual distance: 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	Yes/No*.

	least 900 mm wide to allow the wheelchair user to move around the eating outlet and order their food?	
4	Is there a table reserved for the disabled?	<p>Yes/No*. If no, give details of seating arrangements:-</p> <p>Height of table-top not higher than 800 mm with a minimum clear knee of 700 mm x 480 mm deep. If no, provide</p> <p>Measurement: Table-top: Clear knee space: x</p> <p>Table with fixed stools/chairs</p> <p>Table without fixed stools/chairs</p>
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?	

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 grafting 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:	
	<div> <div>Name of Facilitator(s):</div> <div>Name of Surveyor(s):</div> </div>	

GENDER EQUALITY UNDER SEC 7.1.1

Sr 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

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

Providing safe and healthy practice is basic need for the convenience of the health safety which are an added advantage and great moral booster to the girl child and more so to the person having to handle the used pads.



USE OF 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. However it is taken up on phased manner. Considering the ROI, ie return on investment it is advised to install the LED luminaries in all the

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

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



Figure 12 - Need based project allocation to the students.

Considering the Educational objectives, a detailed explanation is that, *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.

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.



Figure 13 - placing of light points for comfort.

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.

A large, well-lit lecture hall with tiered seating, multiple windows with red curtains, and several ceiling fans. A small table with a water bottle is visible in the foreground.

Consider keeping lights OFF when not needed .

Electrical Safety :



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,

Human safety is the topmost priority in all our aspirations. Electrical infrastructure drives all our aspirations. When quality work is to be delivered all the support mechanism should be in good operating condition. For the system to be in good operating condition, we need to follow certain the regulatory 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



Figure 16 - Electrical safety mats

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.

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.



Figure 17 - Placement of Fire extinguisher.

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.

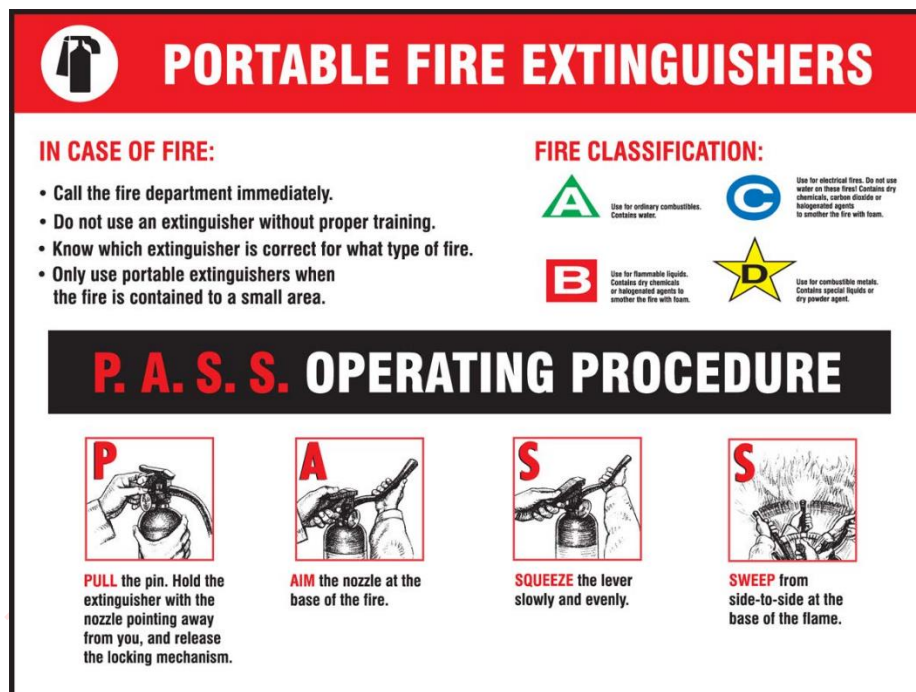


Figure 18 - Fire extinguisher usage template

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

While we educate on the use, it is also important to understand which product needs to be used in appropriate hazard conditions.

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
CO ₂		✗	✓	✗	✗	✓	✗	Safe on both high and low voltage
Wet Chemical		✓	✗	✗	✗	✗	✓	Use on extremely high temperatures

Figure 19 - types of extinguishers and Applications.

KNOW YOUR FIRE EXTINGUISHERS

TO BS EN 3 & BS 7863

WATER	FOAM	POWDER	CO ₂	WET CHEMICALS
For use on wood, paper, fabrics etc.	For use on flammable liquids, oils, fats, spirits etc.	For use on all risks, (including electrical) and flammable liquids.	For use on electrical and flammable liquid fires.	Specifically for use on fires in deep fat fryers
DO NOT use on electrical or flammable liquid fires	DO NOT use on electrical fires		DO NOT operate in confined spaces. Where there is a danger of fumes being inhaled.	DO NOT use on Live electrical equipment

Figure 20 - 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 21 - 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.

Cultural Responsibility (CR) is an attitude that should affect economic behavior 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 stakeholders 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.



Figure 22 -- Footwear and baggage placement



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,



Figure 23 - Bulk storage of ACid bottles

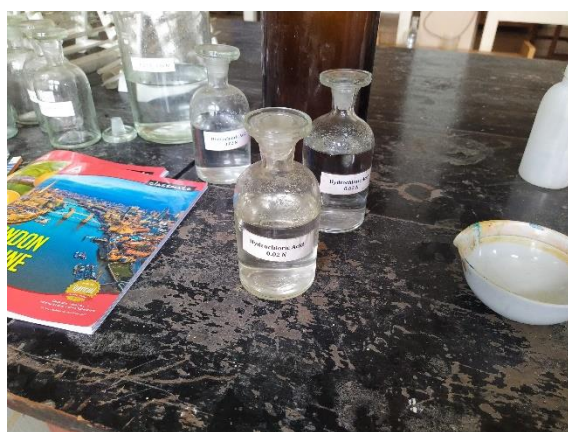


Figure 24 - Placement of equipment to avoid hazard

In the evidence above, the placement of chemicals need to be at the right place. If bulk, send them to the store room. If they are for use in the experiment, place them in a stack rack normally seen in the chemical laboratory.

The placement of the compressor inside the class room is another example of wrongly placed equipment.

COMMUTING

As a technical institute, it is important that the road design pointers are well followed. Key benefits would be that the student learn the significance and also replicate what has been thought in the classrooms.

Key pointers are,

- Marking of vehicle parking guides- the angular/slant yellow lines in parking area, significance of white and yellow continuous lines, broken lines, double lines.
- Placing of kerb stones – its height and painting.
- Orienting the road profile with significance to rainwater drain and placement of the openings.
- Placing of speed check humps – length and the height at the peak.



Figure 25 - Curb stone, road design.



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.



Figure 26 Car occupying space of second car.



Figure 27 - unorganised parking

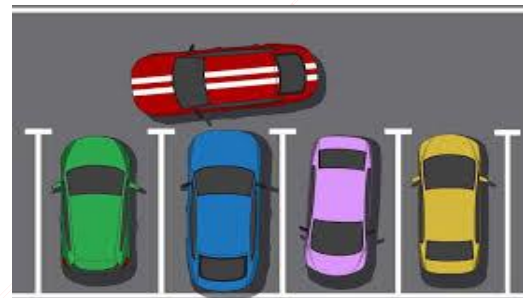


Figure 28 - parking in inappropriate place.

It is important to consider the factors that can disturb others behaviour. Few factors the college can consider to bring in change in are

PARKING:

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

The images shown below are for illustration only and are not captured in the campus. (Kindly see the gallery for campus related photos)

one need not struggle to move out of the place.

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 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.



CARBON FOOTPRINT PROJECTION:

The beautiful structures planed 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:

Sl. 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.

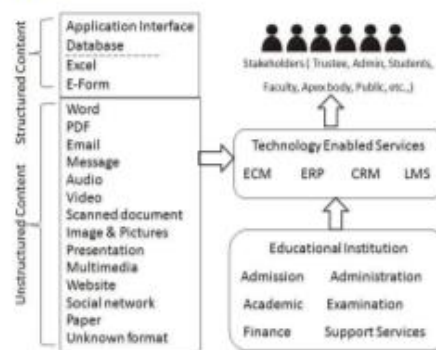


Figure 1. Educational Technology services deal with different content format

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

Revised Manuscript Received on April 10, 2019

Srimathi H, Assistant Director, Directorate of Admissions, SRM Institute of Science & Technology, Chennai, India.

Krishnamoorthy A, Associate Dean - EEE, SEEE, SASTRA Deemed University, Thanjavur, India.

Retrieval Number D6268048419/19@BEEESP

760

Published By:
Blue Eyes Intelligence Engineering &
Sciences Publication



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	Wifi 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	Shodhanga (digital repository of dissertation)
e-scholarship award & portal	e-ShodhSindhu (access to e-journals, e-books)
Anti-ragging mobile App	Indicat (online union catalog of bibliographic data)
Uniportal database of universities	Soul (State of art 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.

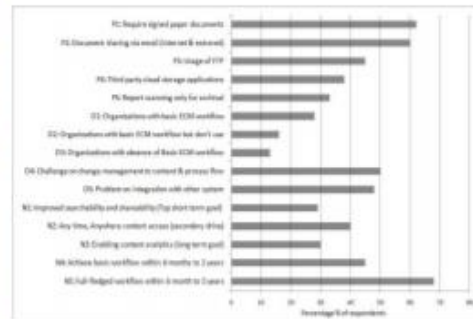


Figure 2. Organization view on ECM implementation
(Source: Larrivee et al., 2016)

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
- (AHIM, 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
- (Katuu, 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



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 initiative. 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.

REFERENCES

1. AACRAO, 2016, The impact of Electronic Content Management (ECM) system Ownership on Student Records Management Practice
2. AIIM, 2010a, What is Enterprise Content Management, <http://www.aiim.org/What-is-ECM-Enterprise-Content-Management.aspx>, accessed on April,10,2011
3. AIIM, 2010b, Connecting ERP and ECM: Measuring the benefits, <http://www.aiim.org/Connecting-ERP-and-ECM-Measuring-the-Benefits.aspx>, accessed on April,10,2011
4. AISHE, 2018, All India Survey on Higher Education, 2017-18, Government of India, MHRD, Department of Higher Education,
5. Alawan, J.A. Thomas, M.A. 2014, Decision Support Capabilities of Enterprise Content Management Systems, An Empirical Investigation, http://scholarscompass.vcu.edu/info_pubs/1
6. Balakrishnan, N. Reddy, R. Ganapathiraju, M. Ambati, V. (2006), Digital Library of India, TCDL Bulletin, Volume 3 Issue 1
7. Chronicle Central, 2018, <https://www.centralchronicle.com/paperless-university-project-still-remains-on-paper.html> accessed on August 3 2018
8. Cognizant, 2014, Architecting an Enterprise Content Management Strategy: A Four-Pillar Approach, Cognizant Technologies
9. DigiLocker, 2018, <https://digilocker.gov.in/> referred on August 2 2018
10. DTCA, 2014, Enterprise Content Management, Reference Architecture, California Enterprise Architecture Framework, Department of Technology, California
11. eGOV-PID, 2013, e-Governance Standard for Preservation Information Documentation (eGOV-PID) of Electronic Records, Department of Electronics and Information Technology, Ministry of Communications & Information Technology, Government of India
12. ePravesh, 2015 <https://www.blog.epravesh.com/online-admission-process-a-digital-initiative-for-a-digital-india/> retrieved on September 4 2017
13. eSAFE, 2010, eSAFE: eGovernance Security Assurance Framework Guidelines for assessment of effectiveness of security controls, Department of Electronics and Information Technology, Ministry of Communications & Information Technology, Government of India
14. Gartner, 2003, Magic quadrant for integrated document management, http://www.projectconsult.net/Files/GartnerQM2003_IDM.pdf accessed on April, 10, 2011
15. Genesis, E.O. Oluwale, O.N. 2018, Towards a "Paperless" higher Education System in Nigeria: Concept, Challenges and Prospects, Journal of Education, Society and Behavioural Science
16. Hullavarad, S. Hare, R.O. Roy, A.K. 2015, Enterprise Content Management solutions – Roadmap Strategy and implementation challenges, International Journal of Information Management
17. Isacva, M. Young, Y.H. 2016, Paperless university – how we can make it work ?, International Conference on Information Technology Based Higher Education and Training (ITHET), IEEE Xplore
18. Katuu, S. 2012, Enterprise Content Management Implementation: An Overview of Phases, Standards and Best Practice Guidelines, BilGI DUNYASI, 13(2)
19. Kaushik A, 2015, An evaluation of National Institutes of Technology (NITs) Library Website, DESIDOC Journal of Library & Information Technology, Vol 35, No. 3,
20. LaMonte, T. 2016, Three Reasons Higher Education Pros are Recruiting ECM, AIIM White paper, www.konicaminolta.co.uk
21. Larrivee, B. LaMonte, T. 2016, Enterprise Content Management, What I have ~ What I need, AIIM White paper, www.konicaminolta.co.uk
22. MHRD, 2017, <http://mhrd.gov.in/e-content/#> retrieved on November 20 2017
23. Mindlogix, 2016 <https://www.mindlogix.com/intelliexams/> accessed on July 30 2018
24. NDTV, 2017 <https://special.ndtv.com/cashless-bano-india-14/news-detail/universities-and-colleges-are-going-digital-to-eliminate-cash-payments-1710119/7> accessed on July 30 2018
25. NITRKL, 2018 <http://library.nitrkl.ac.in/> accessed on 25 July 2018
26. Nordheim, S. Piavarinta, T. 2004, Customization of Enterprise Content Management, An Exploratory Case Study, Proceedings of the 37th Hawaii International Conference on System Sciences, IEEE Xplore
27. SoftCo, 2016, Simplify Governance, Risk, and Compliance with Enterprise Content Management, http://softco.com/wp-content/uploads/2018/03/http_softco.com_wp-content_uploads_2017_04_SoftCoECM774517.pdf
28. SRM, 2016 <https://www.zoho.com/creator/customers/srm-university.html> accessed on July 30 2018
29. SUMS Consulting, 2017, Briefing Documents of Enterprise Content Management
30. UGC, 2017, National convention on digital initiatives for higher education, https://www.ugc.ac.in/ugc_notices.aspx?id=1706 retrieved on 4 January 2018
31. VTU, 2018, <https://bangaloremirror.indiatimes.com/bangalore/others/vivsvsvaraya-technological-university-wants-to-be-paperless/articleshow/62906243.cms>, accessed on August 4 2018.

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:

Sl 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.



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.

For management of solid waste, we advise to source local products.

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.



Figure 29 - Locally sourced waste collection bin.

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.

E-Waste is not actually a waste in a technical educational institute. This could be used for conducting research activities under the Projects. The electronic components can be used by Electronic students. The Plastic could be used for demonstrating and developing specific projects under chemistry department.



Figure 30 - Identification and use of E-waste

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 the 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 in day today basis.



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 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.

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:



NOTES:



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,

NOTES:



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,