



KHADKI EDUCATION SOCIETY'S

Tikaram Jagannath Arts, Commerce & Science College



Principal

Dr. Sanjay Chakane

M.Sc., M.B.A., Ph.D.

7.1.3-Quality audits on environment and energy

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Dr. Rajendran
PRINCIPAL
Tikaram Jagannath Arts Commerce &
Science College, Khadki, Pune-411003.

491, Dr. Babasaheb Ambedkar Road, Khadki, Pune - 411 003.

(Affiliated to Savitribai Phule Pune University - ID / PU / PN / 0146 / 1983)

☎ Office : (020) 25811491 Principal : 9890171857 / 7020674545

Web Site : www.tjcollege.org E-mail : admin@tjcollege.org / schakane@gmail.com



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Tikaram Jagannath Arts, Commerce & Science College



Principal

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M.Sc., M.B.A., Ph.D.

Declaration

7.1.3

The photographs are available on college website as well as with audit reports.


Co-ordinator
Internal Quality Assurance Cell
Tikaram Jagannath College
Khadki, Pune-411 003




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3

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Environment Policy

Waste Management Processes

The Tikaram Jagannath College strives to have a minimal impact on the environment and is dedicated to reduce and manage the waste generated by the college campus. The following specific procedures will be undertaken to ensure the Tikaram Jagannath contribution in protecting the environment

Solid waste management

- Use of sanitary disposal machine is one of the best practices adopted by the college towards eco friendly disposal mechanisms.
- Collected solid waste is picked up by KCB regularly.
- 4 'R' principles are continuously followed viz., refuse, reduce, reuse and recycle.
- Ruined metal and wooden furniture are given to KES approved vendor for disposal.
- Minimal use of paper to be practiced by using electronic platforms for academic and administrative purposes.

Liquid Waste Management

- Maintain leak proof water fixtures.
- Continued maintenance to take immediate steps to stop any water leakage through taps, pipes, tanks and toilet flush etc.
- Liquid waste is diverted to outlet of KCB drainage.



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E-Waste Management

The Tikaram Jagannath College ensures that its usage of technology and generation of e-waste does not impact the environment. For this purpose, the college plans to strive towards:

- Usable parts of nonworking computers are reused to restore another computer.
- Scrap computers and equipment are given to approved vendor for disposal.

Water Management

All living things depend on water, a valuable resource, to survive. Tikaram Jagannath College, Khadki ,Pune understands the need of conserving water. Environmental issues have arisen as a result of the growing population and industrialization, which has significantly increased the demand for water. The college has put the following strategies into place to support sustainable water management and conserve water.

Rain Water Harvesting

The institute has a rainwater harvesting system. In campus the rain water is collected and stored in Bore well. The Collected water is then used for watering trees and plant in summerseason.

Bore well Recharge:

There are one bore-well in the college campus. These bore well are recharged during the Monsoon season. The rain water is collected in bore well so water level of the bore- wells increases automatically. The capacity of underground Bore well is 10,000 liters.

Waste water recycling:

Waste water pipelines connected to KCB main drainage line

Maintenance of water bodies and distribution system in the campus:

Drinking water is stored in the tank on the terrace of the main Building, Water purifier machine are installed for students. The regular maintenance of the tank, taps and pipeline is done by local plumber. Thus any leakage of water is prevented.



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Tikaram Jagannath Arts, Commerce & Science College



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Policy for Green Campus w.r.t. Action taken and Achievements

by TJ College.

- TJ College, Pune maintains a strong commitment to environmental sustainability and responsible living practices along with the primary educational objectives. The College has incorporated a comprehensive Green, Energy, and Environment Audit into its policy framework to ensure that environmental responsibility remains a central focus. The College has undertaken external audits in recognition of the College's efforts for sustainable development.
- A human being requires minimum 14 full grown trees to provide the oxygen for his/her lifetime. Hence TJ College has decided to plant trees on every occasion, small or big; in the campus or outside the campus. So far College has planted many trees along the periphery as well as in the TJ College campus as well as Khadki Education Society campus adjacent to it and also in nearby areas.
- College has created Nakshatra Garden, Miyawaki Udyaan, Atal Ghan Wan etc. in the campus to inculcate the Green thinking process among the students, staff and visitors.
- College has also promoted Gardening workshop and training for staff and students to inculcate the habit of plantation and maintaining the same.



For *Rajendra*
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Rorchit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY



Certificate No: AV/GA/26-10-2021/748

Green Audit Certificate

This is to certify that

**KHADKI EDUCATION SOCIETY'S TIKARAM
JAGANNATH ARTS, COMMERCE AND SCIENCE
COLLEGE**

LOCATED AT

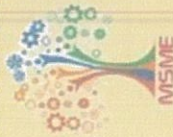
491, Elphinston Road Khadki

DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for
scrutiny for Green Initiatives in the institutional premises.*

*The activities and measures carried out by the institution was
verified. The efforts taken by the institute towards environment
& green initiatives is highly appreciated and commendable.*

UDYAM Regd. # UDYAM-MH-26-0018234



MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

Audited by (Dr. Priti Kolhe)
Ph.D. (Environmental Science)

Date: 26th October 2021 Valid upto: 25th October 2022



Aarchit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Certificate No: AV/GA/17-11-2022/235

Green Audit Certificate

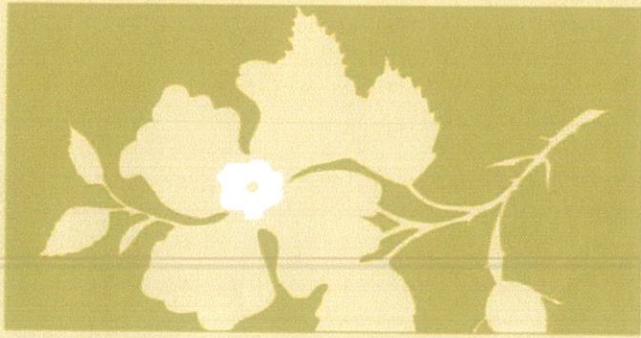
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सूक्ष्म, लघु एवं मध्यम उद्यम

Audited by (Dr. Priti Kolhe)

Ph.D. (Environmental Science)

Date: 17th November 2022 Valid upto: 16th November 2023



Parchit Venture

Driven By Trusted Services

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Certificate No: AV/GA/27-11-2022/045

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JAGANNATH ARTS, COMMERCE AND SCIENCE
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Audited by (Dr. Priti Kolhe)
Ph.D. (Environmental Science)

Date: 27th November 2022 Valid upto: 26th November 2023

2



Archit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY



Certificate No: AV/GA/14-09-2018/454

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LOCATED AT

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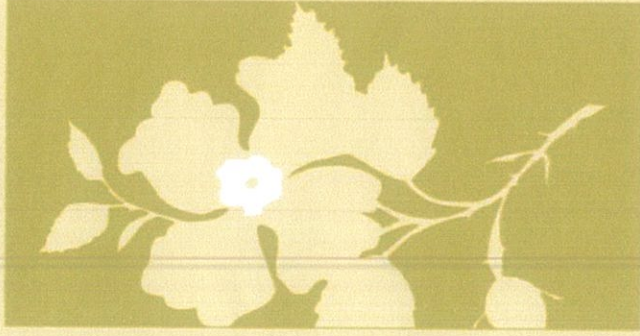
Date: 14th September 2018 Valid upto: 13th September 2019



Rorchit Venture

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Certificate No: AV/GA/28-09-2019/289

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491, Elphinston Road Khadki

DIST - PUNE - 411003

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MSME

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सूक्ष्म, लघु एवं मध्यम उद्यम

Audited by (Dr. Priti Kolhe)

Ph.D. (Environmental Science)

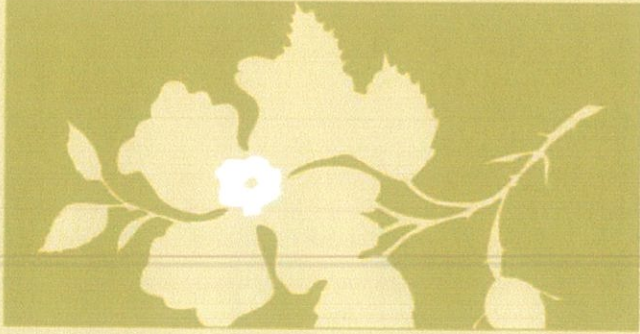
Date: 28th September 2019 Valid upto: 27th September 2020



Rarchit Venture

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Certificate No: AV/GA/13-10-2020/197

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LOCATED AT

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UDYAM Regd. # UDYAM-MH-26-0018234



Audited by (Dr. Priti Kolhe)
Ph.D. (Environmental Science)

Date: 13th October 2020 Valid upto: 12th October 2021

Green Audit

Khadki Education's Society

Tikaram Jagannath

Arts, commerce & Science College



Prepared By

Aarchit Venture

Bharekar Estate Nanded Gaon




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Near Nanded City Pune 411041

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1. Introduction

The rapid environmental degradation at local, regional and global level is leading us to global “Environmental poverty”. Stabilization of human population, adoption of environmentally sound and sustainable technologies, reforestation and ecological restoration are crucial elements in creating an equitable and sustainable future for all humans in harmony with nature and natural resources. The main objective to carry out green audit is to check green practices followed by university and to conduct a well formulated audit report to understand where we stand on a scale of environmental soundness. Green audit is the procedure of systematically identifying, quantifying, recordings, reporting and analyzing the environmental diversity components of any organization. It aims to analyze the environmental practices inside and outside of the relevant place, which will have an impact on the environment. Focus was given to assess the consumption of energy, electricity, water as well as disposal of liquid waste, solid waste, hazardous waste, e-waste and an inventory of trees on campus is also prepared to check how much CO₂ is sequestered and O₂ is released. It is an important tool for universities to determine their consumption of energy, water, or other resources; and then consider and planned to implement changes and make savings. It can create health awareness and promote environmental awareness and ethics. It allows faculty, students and other staff to better understand the impacts of green activities on the premises.

Self-inquiry is a natural and expected development of quality education. Therefore, the institute must evaluate its contribution towards a sustainable future. An environmental sustainability has become an increasingly crucial issue for the every nation; the role of higher education institutions in environmental sustainability has become more important. The rapid urbanization and economic development at the regional and global levels have led to several environmental and ecological problems. In this context, it is necessary to adopt a green campus system for the institute, which will lead to sustainable development while reducing the large amount of atmospheric carbon emissions in the environment.

Government of India through its National Environment Policy (2006) has made mandatory for every organization to have green audit / environmental audit in their organization. The process of environmental audit was formalized by Supreme Audit Institution

Green Audit Report



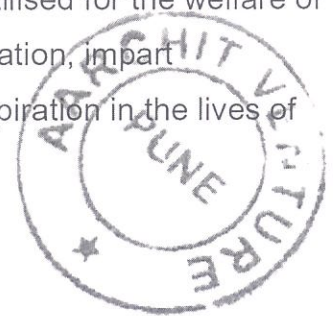

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(SAI) according to the guidelines given in Manual of Standard Orders (MSO) issued by Authority of the Controller and Auditor General of India 2002. University Grants Commission has mentioned "Green Campus, Clean Campus" mission mandatory for all higher educational institutes. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. Accordingly, realizing the need of being responsible towards environment, NAAC (National Assessment and Accreditation Council), an autonomous body under UGC has also added the concept of Environmental Audit in accreditation methodologies of State and Central Universities as well as colleges. Accordingly, Khadki Education's Society, **Tikaram Jagannath Art, Commerce & Science College** has also initiated a Green/Environmental Audit/Energy Audit of its campus at 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411 003

2. About the College

Tikaram Jagannath (T.J.) College provide "Gateway of Higher Education" and started its academic journey as a single faculty college with Commerce as the pioneer faculty. Presently, T.J. College is a multi-faculty College, imparting higher education in the fields of Arts, Commerce and Computer Science. T.J. College has already completed three cycles of NAAC Accreditations with a rising graph. Score of the last NAAC cycle was better than the first. As an institute our goals will be to achieve success in the fields of Academics, Cultural Activities, Co-curriculum and Extra Curriculum Activities. T.J. College also has a legacy of providing ace sportsmen at international, national and state levels especially in hockey, football and shooting. We, as a team, will strive to take forward the legacy to greater heights in the times to come. All the resources available at our disposal will be optimally utilised for the welfare of students at large. The entire staff will give the students a strong foundation, impart knowledge, righteousness and core values and will be a source of inspiration in the lives of our students.



Green Audit Report




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3. College Vission

- To enable our students for facing challenges of globalization.
- To make them self-sufficient, self-reliant and encourage them to become self-employed.

4. College Mission

- To empower the students of the disadvantaged classes of society.
- To create health and environmental awareness among the students. To nurture the scientific and technological aptitude in the students.
- To cultivate moral, ethical, social and cultural values among the students.
- To inculcate the principles of Democracy in the students for the national development.

6. Objectives

The main objectives of Environmental Audit in Academic Institution are:

- To encourage students in general and girls in particular.
- To encourage students to learn modern techniques and methodologies.
- To develop the competencies among students to face global challenges.
- To inculcate a scientific temper and a humanitarian approach among society.
- To address global and local needs towards national development.
- To sensitize students with a sense of belongingness, integrity, and grattitudeness.

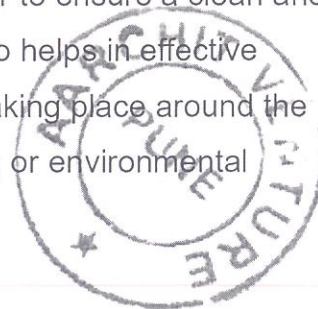
7. Scope and Goal of Environmental Auditing

Government of India through its National Environment Policy in 2006 has made mandatory for every organization to conduct green audit / environmental audit in order to ensure a clean and healthy environment within and outside the organization. Further, it also helps in effective learning and provides a conducive learning environment. Efforts are taking place around the world in order to address various environmental issues. Green auditing or environmental

Green Audit Report




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auditing is one among them for educational institutions. Green auditing helps organization to understand various environmental issues of the organization and identify existing lacuna or gap towards meeting the objective of National Environmental Policy and thus, to plan accordingly.

8. Methodology

An environmental audit has three phases - pre-audit stage, audit stage and post-audit stage, accordingly the environmental audit was conducted

Pre-Audit Stage

Pre-audit stage involved the identification of target areas for environmental auditing.

Accordingly following target areas were identified:

- Land Use System
- Biodiversity Status
- Climatic Conditions
- Air Quality
- Noise Pollution
- Water Resources and Management
- Energy Consumption
- Waste disposal and management
- Environmental Awareness
- Mitigation and Management practices




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Audit Stage

(A). Collection of data, observation and interaction: This stage of the Audit involved the activities relating to collection of data, observation, interactions and discussion with the concerned stakeholders i.e., faculty, administration and staff members from different departments and sections of the university. A mixture of open ended and closed ended questionnaires were developed and used for data collection. Meetings with specific stakeholders of different target groups identified in the pre-audit stage were conducted for getting the desired information. Detailed discussions on some specific topic were also held.

(B). Review of previous records and policies: This was carried out in order to understand the various initiatives taken by the university towards sustainable environmental conservation and amelioration. For the purpose, office registers, visitor's book, purchase registers, office communications, policy level documents of AC/ EC were also examined. Further, the published material such as prospectus, university annual reports, bulletins, and other magazines were also studied by the audit team for getting information / data on the target aspects.

(C). Inspection of departments/sections/various sites: The audit team also visited the various departments, sections, offices and its premises in order to have an idea of various activities carried. Campus greenery and gaps were identified. Team also had a visit to play ground, canteen, library, office rooms and parking area.

(D). The stakeholders: The stakeholders included were teaching staff from different schools, people from administration, water supply and maintenance, electricity department and ICT. The committee set up for the purpose discussed the issues related with key target areas. Questionnaires were prepared for getting information and accordingly meeting with concerned stakeholders were conducted. Data on water and energy use was collected from maintenance department.




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Post-Audit Stage

The Post-Audit Stage includes the production of the final report, prepare action plan to overcome the flaws and to keep a watch on the action plan.

9. Audit Report

(A) Land Use System

Khadki Education's Society, **Tikaram Jagannath Art, Commerce & Science College** 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411 003. The college latitude 18.5643° N and longitude is 73.8582° E . The greenery inside the campus is not only natural, but also added up by the efforts of the staff, faculty and students in the institute.

The college has adequate learning resources, including classrooms with smart classrooms, library and reading area, laboratories & computer centre with LAN, printers, scanners, good quality internet connection, sports ground, IQAC office, Examination Strong Room, seminar hall, and conference hall, RO water purifier system, safe drinking water, separate restrooms for ladies & gents, parking space, and lawns. The available infrastructural facilities are optimally utilized.





MAP- Tikaram Jagannath Arts, commerce & Science College

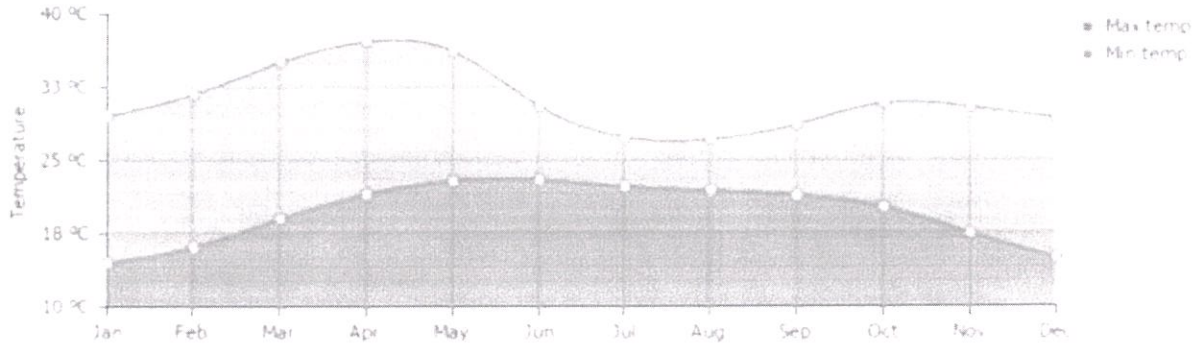


[Handwritten Signature]
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(B) Climatic Parameters

i. Climate: Average day and night temperature



Average min and max temperatures in Pune, India. Copyright © 2023 weather-and-climate.com

ii. Monthly hours of sunshine :

The average monthly total hours of sunshine over the year



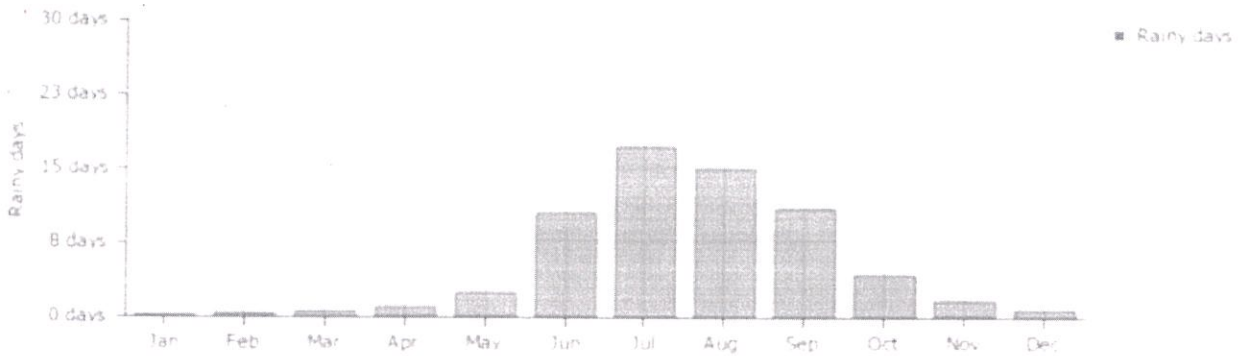
Average monthly sunhours in Pune, India. Copyright © 2023 weather-and-climate.com



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iii. Monthly rainy days:

The average number of days each month with rain, snow, hail etc.



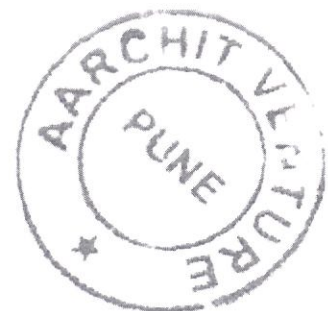
Average rainy days (rain/snow) in Pune, India. Copyright © 2023 weather-and-climate.com

V. Average humidity:

The mean monthly relative humidity over the year



Average relative humidity in Pune, India. Copyright © 2023 weather-and-climate.com



Green Audit Report



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(C) Biodiversity Status

The campus of the College is located at sub tropical climatic conditions. The campus has a patch of natural forest having a major tree species like Tectona grandis, Dalbergia sissoo, Mallotus philippinensis, Acacia catechu, Shorea robusta etc. Plantation activities are usually undertaken during rainy season and National Festivals like 15th August, World Environment Day etc. Accordingly many new species of economic and medicinal importance such as Amla, Harar, Bahera, Ashoka, Jacrenda, Neem, Ficus etc, have been introduced. Some herbs and shrubs were also planted in the campus. There are some faunal species are also found in the area. Table 2, 3, 4 and 5 shows the status of the Floral and Faunal diversity of the campus

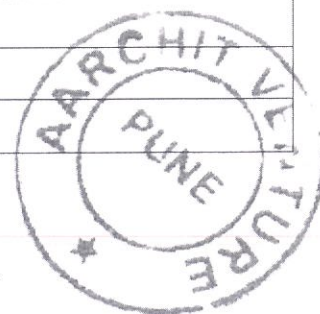
Table 2. List of Tree/Shrubs/Herbs species found in the campus

S. No.	Common Name	Botanical Name
TREE		
1.	Aamala,	Phyllanthus emblica
2.	Kunchala,	Kunchala
3.	Umbar	Ficus racemosa L.
4.	Jambhul	Syzygium cumini
5.	Khair	Senegalia catechu
6.	Krushna garu	Krushna garu
7.	velu,	velu
8.	Pimple	Acne vulgaris
9.	Naagchapha	Mesua ferrea
10.	Vad	Ficus benghalensis
11.	Palas	Butea monosperma
12.	Payar	Jacaranda
13.	Jaai	Jasminum grandiflorum
14.	Bel	Aegle marmelos
15.	Arjun	Terminalia arjuna
16.	Naagkeshar	Mesua ferrea
17.	Ficus roxburghii	Bombax
Shrubs		

Green Audit Report



Tikaram Jagannath Arts Commerce & Science College, Khadki, Pune-411003.



18.	Lantana camara	Kuri
19.	Calotropis procera	Ankh
20.	Cestrum nocturnum	Rat ki rani
21.	Murraya koenigi	Kari Patta
22.	Ricinus cummunis	Arandi
Grasses/Herbs		
23.	Cynodon dactylon	Durba
24.	Desmostachya bipinnata	Kus
25.	Cymbopogon martini	Lemmon Grass

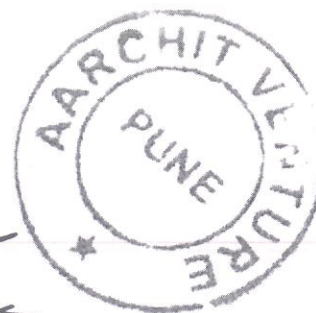


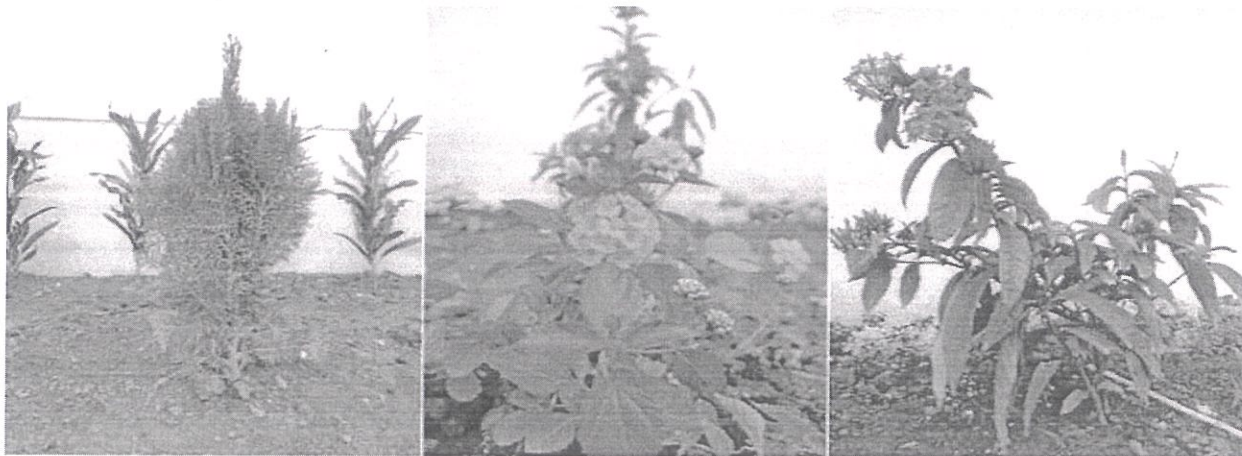
Green Cover of the College Campus.

Green Audit Report



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Plants in the college campus

Table 3. List of Birds found in and around the Campus

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S. No.	Zoological Name	Common Name
26.	<i>Myophonus caeruleus</i>	Blue Whistling Thrush
27.	<i>Passer domesticus</i>	House Sparrow
28.	<i>Corvus splendens</i>	House Crow
29.	<i>Pycnonotus leucogenys.</i>	Himalayan Bulbul
30.	<i>Pycnonotus cafer</i>	Red Vented Bulbul
31.	<i>Psilopogon asiaticus</i>	Blue throated Barbet
32.	<i>Psilopogon haemacephalus</i>	Coppersmith Barbet
33.	<u><i>Acridotheres tristis</i></u>	Common Myna
34.	<u><i>Lanius schach</i></u>	Long Tailed Shrike
35.	<u><i>Psittacula cyanocephala</i></u>	Plum Headed Parakeet
36.	<u><i>Psittacula krameri</i></u>	Rose Ringed Parakeet
37.	<u><i>Milvus migrans</i></u>	Black Kite
38.	<u><i>Cinnyris asiaticus</i></u>	Purple Sunbird
39.	<u><i>Aethopygasiparaja</i></u>	Crimson Sunbird
40.	<u><i>Cercomela fusca</i></u>	Brown Rock Chat
41.	<u><i>Saxicola ferreus</i></u>	Grey Bush Chat
42.	<u><i>Copsychus saularis</i></u>	Grey Bush Chat
43.	<u><i>Cinnyris asiaticus</i></u>	Purple Sunbird
44.	<u><i>Aethopygasiparaja</i></u>	Crimson Sunbird
45.	<u><i>Cercomela fusca</i></u>	Brown Rock Chat
46.	<u><i>Saxicola ferreus</i></u>	
47.	<u><i>Aquila nipalensis</i></u>	Steppe Eagle

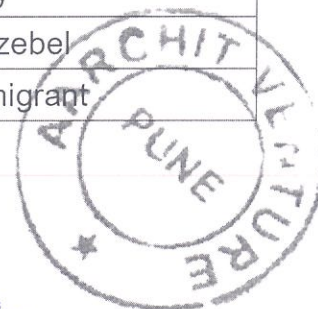
Table 4. List of Butterflies found in and around the campus

S. No.	Zoological Name	Common Name
	<i>Pachliopta aristolochiae</i>	Common Rose
	<i>Papilio polytes</i>	Common Mormon
	<i>Graphium doson</i>	Common Jay
	<i>Delias cucharis</i>	Common Jezebel
	<i>Catopsilia crocale</i>	Common Emigrant

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Eurema hecabe	Common Grass Yellow
Pieris canidia	Indian Cabbage White
Danaus chrysippus	Plain Tiger
Danaus genutia	Striped Tiger
Euploea core	Common Crow
Cupha erymanthis	Rustic
Freyeria trochilus	Grass Jewel
Jamides celeno	Common Cerulean
Melanitis leda	Common Evening Brown
Pareronia hippia	Indian Wanderer



Birds In the campus

Table 5. List of Animal found in and around the campus

S. No.	Zoological Name	Common Name
--------	-----------------	-------------

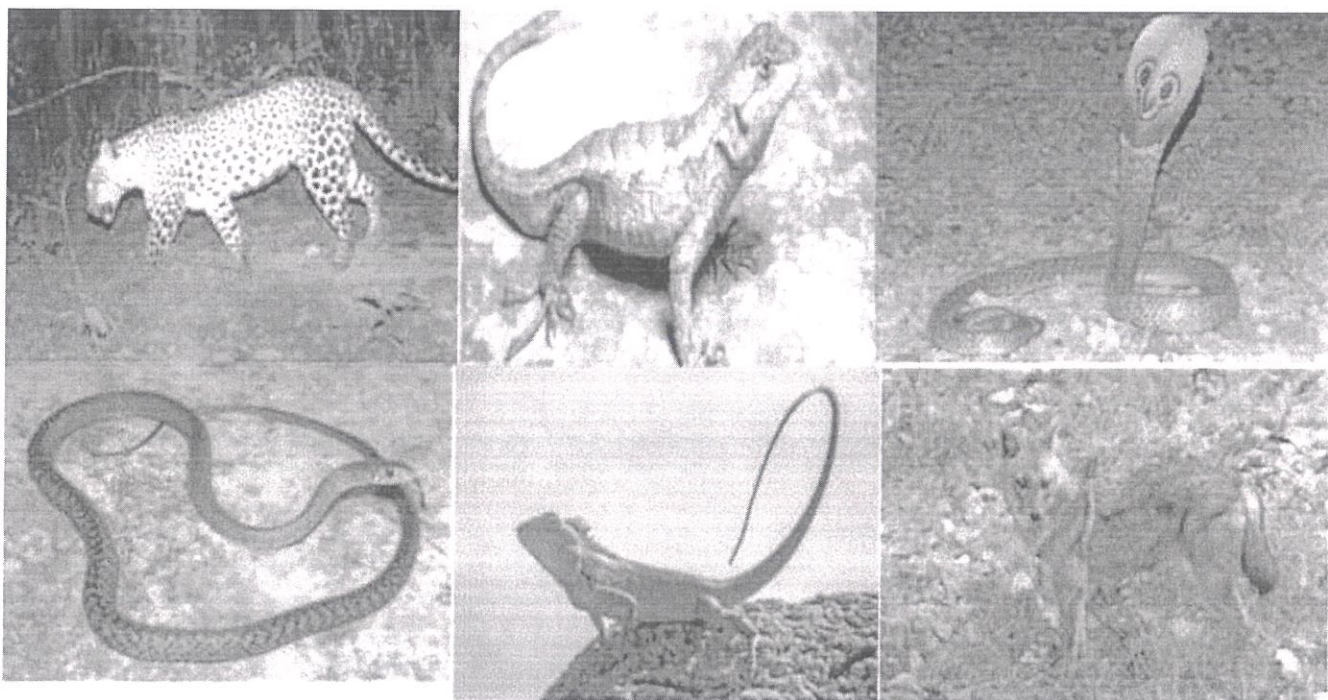
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	Panthera pardus	Leopard
	Monitor lizard	Monitor Lizard
	Garden lizard	Garden Lizard
	Naja naja	Cobra Snake
	Python molurus	Indian Python
	Bangaru caeruleus	Common Kraits
	Naja Hannah	King Cobra
	Gloydius himalayanus	Himalayan Pit Viper
	Naja naja	Himalayan Pit Viper
	Ptyas mucosus	Rat Snake



Animal in the campus

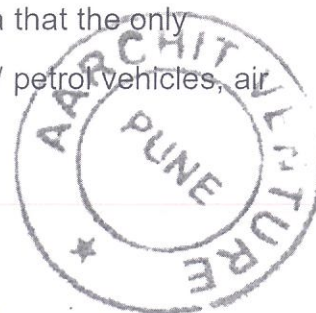
(D) Pollution

i. Sources of air pollution: It was observed and revealed from data that the only possible sources of pollution in the College campus are as use of diesel / petrol vehicles, air

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conditioners, power generator, kitchen waste and other biodegradable waste from canteen, use of electronic appliances and other.

ii. Sources of noise pollution: It was observed that there is no industrial as well as the sound generating activities near the College campus and it was revealed from that due to limited number of vehicles the chances of noise pollution seems to be quite below of standard limit. There is no other source of noise pollution in the campus.

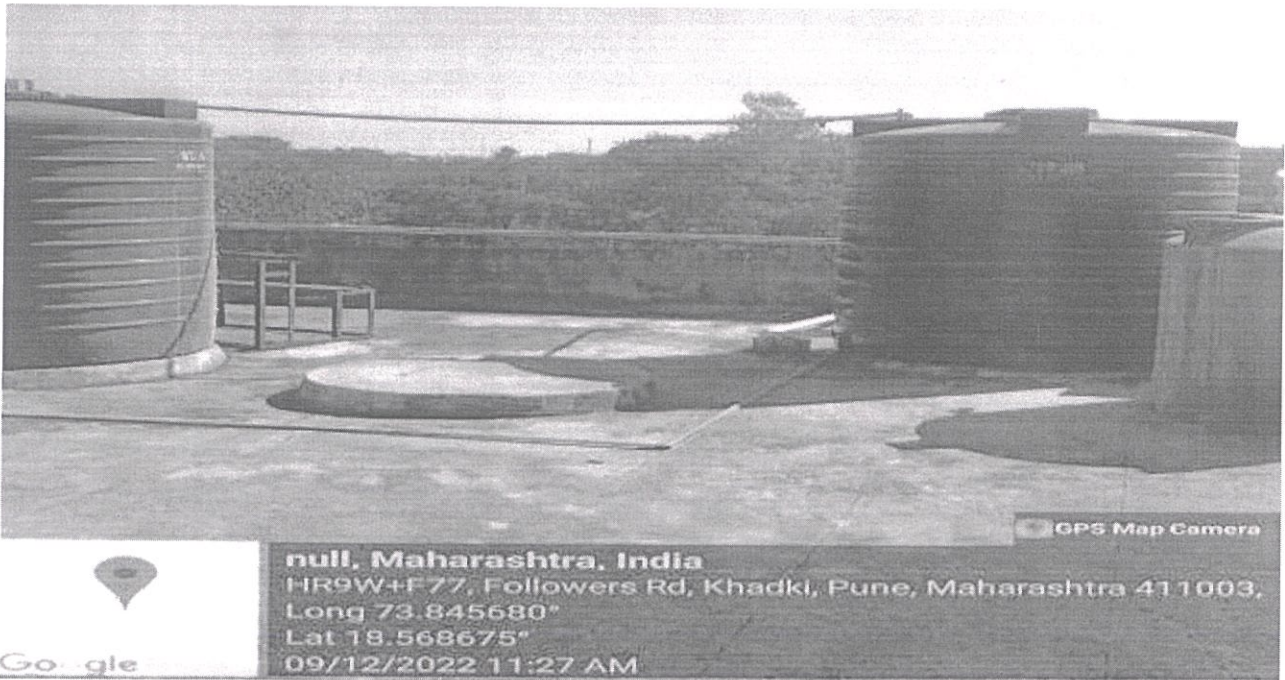
(E) Water Resource and Management

The College has its own tube-well for meeting its water requirements for various purposes such as drinking, use in washrooms, canteen and gardening. Since the university does not have staff quarters at present in the College premises, thus, no household domestic water demand, water consumed in the university premises is for drinking, canteen, sanitary and gardening purposes. There is a water coolers maintained by the organization for meeting drinking water demand of the employee. The audit team did not find any leakage in the taps of washrooms and in other areas.



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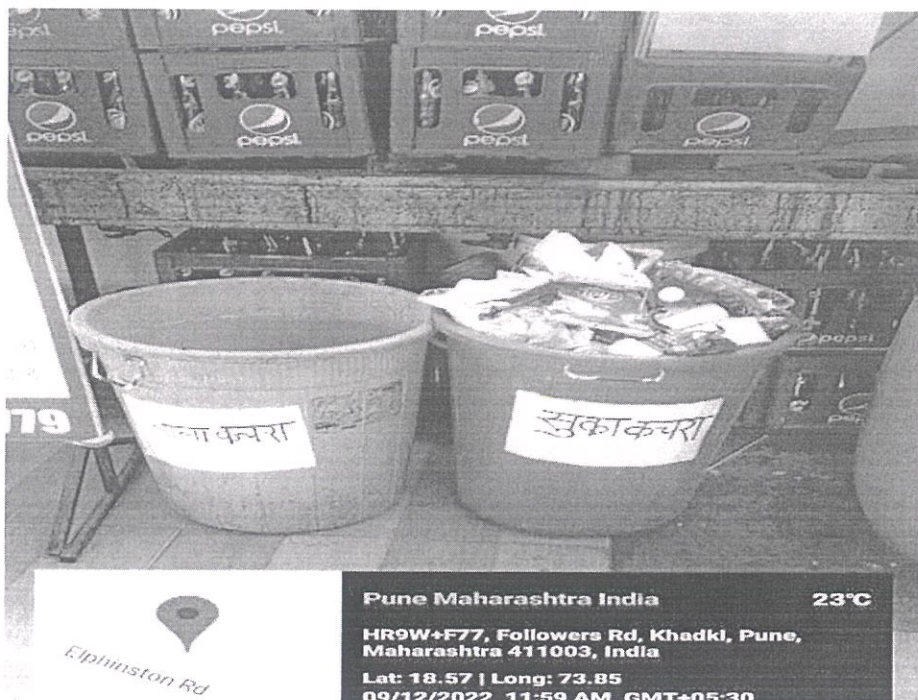
(F) Energy Consumption and Management

Electricity is mainly needed for lighting the rooms, cooling the rooms in summer and heating the rooms in winter and running computer systems. The college has a server room which needs electricity all the day and night

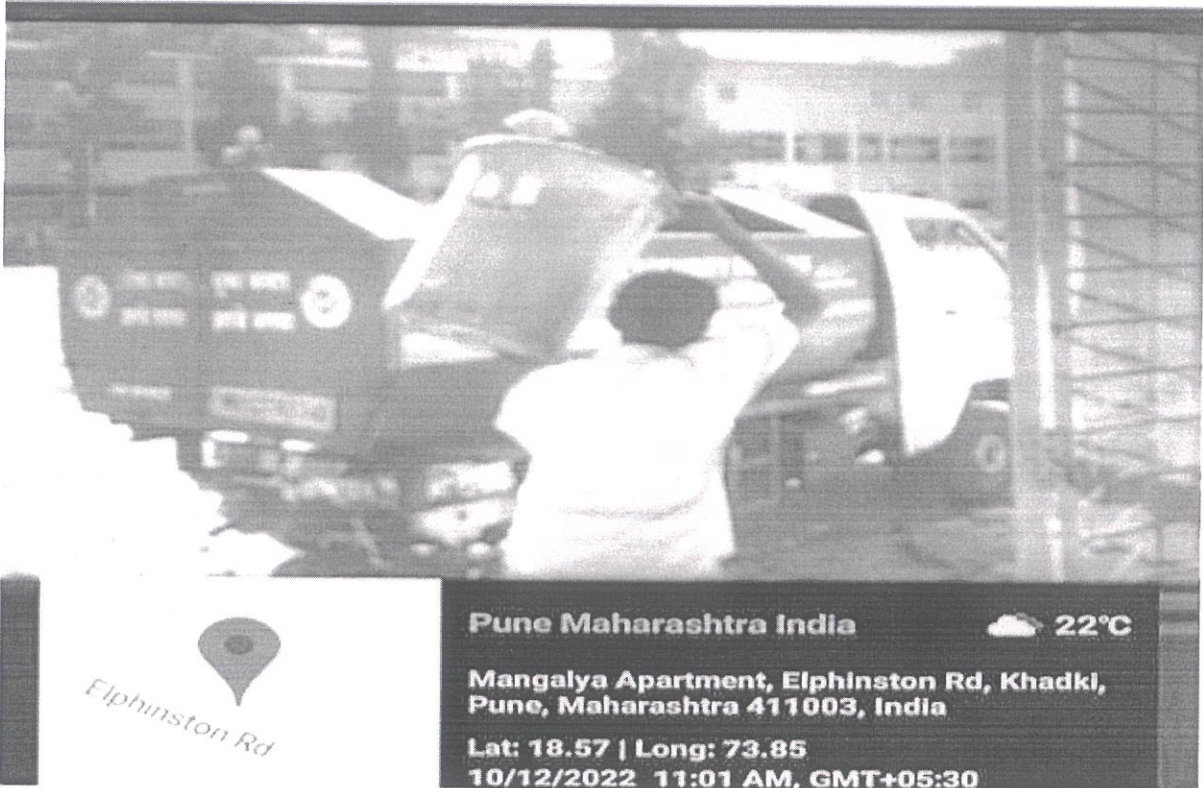
(G) Waste Disposal and Management

Both biodegradable as well as non-biodegradable wastes are generated from various departments/sections of the university. The principal waste includes paper, grasses, electronic wastes, canteen waste and other solid wastes. Since, The college operates on ODL mode therefore number of students visiting the campus are comparatively less compared to regular universities. Therefore, the waste generated through classroom activity and student's activities is negligible. Whereas, plastic wastes is completely or strictly banned in the university campus. However, following provisions have been made:

Waste Management




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Elphinston Rd

Pune Maharashtra India

 22°C
Mangalya Apartment, Elphinston Rd, Khadki,
Pune, Maharashtra 411003, India

Lat: 18.57 | Long: 73.85

10/12/2022 11:01 AM, GMT+05:30

i. E-Waste: Besides the above wastes there are another category of waste is E-waste which includes computers, laptops, pen drives, printers, hard discs, CD's and other solid waste, electrical & electronics equipments generated through different department/sections is disposed and managed by the ICT, maintenance and store department of the college and the details are properly maintain in the stocks register. Thereafter in every five year the concerned departments categorize the useless items in to the wastes and disposed through auction and buyback from the authorized buyers as per the Maharashtra Government Rules.



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(H) Environmental Awareness

The college staff is aware of the various environmental issues and the various green measures to be adopted in office as well as in their houses. A course on Environmental Studies is compulsory for all under graduate students. Further, college conducts plantation drives in the campus during Environment Day, 15 August and during other important events in the university. Further, college has also adopted nearby villages for environmental awareness activities, health camps and other community programmes being conducted through their participation.

i. Maintenance of Lush Green Campus: College has ten hectares of land which was transferred to it from Forest Department for the purpose of creating infrastructure required for the development of various Offices/ Departments of the college. Further felling of trees for development of various infrastructures will be done with least disturbance following government rules.

ii. Plantation Drives: Plantation drives are regular activities in the campus, and usually in all important occasions, plantation activity is taken up. College has maintained a garden in which different ornamental plants have been raised.

iii. Organic Composting: The activity of making organic compost has been initiated in the campus where all the biodegradable waste materials are filled up in the compost pit. In the course of time, organic compost is prepared. This organic compost is utilized for manuring in flowerbeds and plantations

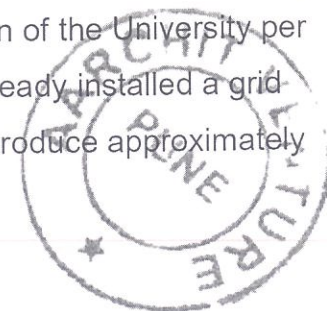
iv. Energy Conservation efforts:

The college is using star rated Electrical & Electronics equipment which saves energy. LED Bulbs/ Tube-light, 4-5 star Rated Air Conditioners. College has always been effortful in making use of renewable energy resources. The average electricity consumption of the University per month is approximately 12940.38units. For the purpose, College has already installed a grid-connected solar power plant of 120 Kw. It is expected that College will produce approximately

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400 to 500 units of electricity per day which will be equivalent to 80 % of energy consumption of the University. This is the step forward for energy conservation and will definitely reduce the electricity consumption of the college and save the money for college.

v. Water Conservation Measures through Water Harvesting Tank

Globally, our water resources are depleting each year. Additionally, we cannot generate artificial water and must depend on water sources available on our planet earth. In this context, to reduce dependency of water from tube-well and also to recharge underground water resources, the college adopted one of the simplest and best measures for conserving water. The university had created a water harvesting tank in the back side of the campus. It is a simple strategy by which rainfall is stored for future usage. The process involves collection and storage of rainwater with help of artificially designed systems, that runs off natural or man-made catchment areas e.g. rooftop, compounds, rocky surface, artificially repaired impervious/semiprecious land surface. The collected rainwater from surfaces on which rain falls may be filtered, stored and utilized in different ways or directly used for recharge purposes. The use of a rainwater harvesting system provides excellent merits. This simple water conservation method



10. Recommendations

A green audit of any academic institution reveals, ways by which institute can reduce energy consumption, water use and reduction in emission of carbon dioxide in the environment. It is a process to look into and ask ourselves whether we are also contributing to the degradation of the environment and if so, in what manner and how we can minimize this contribution and bring down to zero and preserve our environment for future generation. This process of green audit enables us to assess our life style, action and assess its impact on the environment. Green auditing is the process of identifying and determining whether institutional practices are ecofriendly and sustainable. Traditionally, we are good and efficient users of natural resources. But over the period of time excess use of resources, viz., energy, water, chemicals are become habitual for everyone especially, in common areas. Now, it is necessary to check whether our activities are consuming more than required resources? Whether we are handling waste carefully? Green audit regulates all such practices and gives an efficient way of natural resource utilization. In the era of climate change and resource depletion it is necessary to verify the processes and convert it in to green and clean one.

As an outcome efforts will be made to reduce carbon foot prints by using electrical vehicles in the campus, and green computing in the administration and examination.

Focus to assess the consumption of energy, electricity, water as well as disposal of liquid waste, solid waste, hazardous waste, e-waste and an inventory of trees in the campus is also prepared to check how much CO₂ is sequestered and O₂ is released.

- The College will follow No Vehicle Day on first Saturday of every month to saved fuel consumption.
- Various awareness programmes will be helpful to motivate all the staff members for optimized sustainable use of available resources.
- The long term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issue.
- To prepare an Environmental Statement Report on green practices followed by different departments, support services and administration.




- The Green Audit Report on environment must reach the public so that it would succeed in reducing the environmental issues and its popularization among stakeholders.
- If possible an environmental audit report must be published annually by the college.
- Government can play significant role for environmental legislation and quality adoption of cleaner and environmentally begin technologies in Government organizations like Universities.

11. References

NEP (2006). National Environment Policy, 2006. Ministry of Environment, Forest and Climate Change, Govt.




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सूक्ष्म, लघु एवं मझम उद्योग



Environment Audit Certificate

This is to certify that

**KHADKI EDUCATION SOCIETY'S TIKARAM JAGANNATH
ARTS, COMMERCE AND SCIENCE COLLEGE**

ADDRESS: 491, Elphinston Road Khadki

DIST - PUNE-- 411003

has submitted necessary data, evidences and credentials for scrutiny for sustainable environmental initiatives in the institutional premises.

The activities and measures carried out by the institution was verified.

The efforts taken by the institute towards environment & sustainability is highly appreciated.

Certificate No: AV/EnA/04-09-2018/267

Date: 4th September 2018

Validity : 3th September 2019

(Dr. Priti Kolhe)

(Manish Matheshwari)

Auditors



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has submitted necessary data, evidences and credentials for scrutiny for sustainable environmental initiatives in the institutional premises.

The activities and measures carried out by the institution was verified.

The efforts taken by the institute towards environment & sustainability is highly appreciated.

Certificate No: AV/EnA/16-09-2019/234

Date: 16st September 2019

Validity : 15th September 2020

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(Manish Maheshwari)

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has submitted necessary data, evidences and credentials for scrutiny for sustainable environmental initiatives in the institutional premises.

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The efforts taken by the institute towards environment & sustainability is highly appreciated.

Certificate No: AV/EnA28-09-2020/234

Date: 28th September 2020

Validity : 27th September 2021

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(Manish Matheshwari)

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environmental initiatives in the institutional premises.*

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Certificate No: AV/EnA07-10-2021/093

Date: 7th October 2021

Validity : 6th October 2022

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DIST - PUNE-- 411003

*has submitted necessary data, evidences and credentials for scrutiny for sustainable
environmental initiatives in the institutional premises.*

The activities and measures carried out by the institution was verified.

The efforts taken by the institute towards environment & sustainability is highly appreciated.

Certificate No: AV/EnA19-10-2022/151

Date: 19th October 2022

Validity : 18th October 2023

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(Manish Maheshbavri)

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**KHADKI EDUCATION SOCIETY'S TIKARAM JAGANNATH
ARTS, COMMERCE AND SCIENCE COLLEGE**

ADDRESS: 491, Elphinston Road Khadki

DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for scrutiny for sustainable environmental initiatives in the institutional premises.
The activities and measures carried out by the institution was verified.
The efforts taken by the institute towards environment & sustainability is highly appreciated.*

Certificate No: AV/EnA/14-11-2023/403

Date: 14th November 2023

Validity : 13th November 2024

(Dr. Priti Kolhe)

(Manish Maheshwari)

Auditors

Environment Audit Report

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Khadki Education's Society

Tikaram Jagannath
Arts, commerce & Science College



Prepared By

Aarchit Venture

Bharekar State Near NandedCity Nanded Goan Pune 411041



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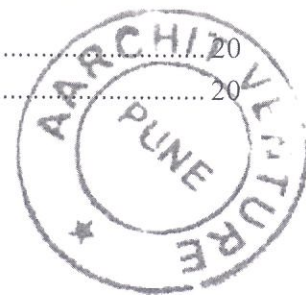
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Acknowledgment

We at Aarchit Venture, Pune wish to express our sincere gratitude to the management of **Khadki Education's Society, Tikaram Jagannath Art, Commerce & Science College, 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411003** for assigning the work of Environmental Audit of college campus.

We appreciate the co-operation and support extended to our team members during the entire tenure of field study.

We are also thankful to various Head of Departments & other Staff members for helping us during the field measurements.

We are also thankful to all other staff members who helped us during the Measurements at the field and for giving us the necessary inputs to carry out this vital exercise.




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Executive Summary

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the dependency on Natural resources & reduce the pollution.

Tikaram Jagannath Art, Commerce & Science College, 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411003 consumes various resources for day to day operations, namely: Air, Water, Electrical Energy & LPG.

Various Pollution due to College Activities:

- Air pollution: Mainly CO₂ on account of Electricity & LPG Consumption
- Solid Waste: Bio degradable Kitchen Waste, Garden Waste
- Liquid Waste: Human liquid waste

Present Level of CO₂ Emissions:

CO₂ Emissions from Lighting:

- CO₂ Emissions from Lighting = 96 kWh * 0.5 kgCO₂/kWh
- CO₂ Emissions from Lighting ≈ 48 kgCO₂

CO₂ Emissions from Electronic Equipment:

- CO₂ Emissions from Electronic Equipment = 37.4 kWh * 0.5 kgCO₂/kWh
- CO₂ Emissions from Electronic Equipment ≈ 18.7 kgCO₂

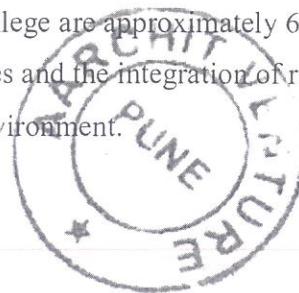
Total CO₂ Emissions

- Total CO₂ Emissions = CO₂ Emissions from Lighting + CO₂ Emissions from Electronic Equipment
- Total CO₂ Emissions ≈ 48 kgCO₂ + 18.7 kgCO₂
- Total CO₂ Emissions ≈ 66.7 kgCO₂

Conclusion

Based on the provided energy consumption data and an assumed carbon intensity of 0.5 kgCO₂/kWh, the estimated total CO₂ emissions from energy usage at Jai Shriram College are approximately 66.7 kgCO₂. Efforts to reduce these emissions through energy efficiency measures and the integration of renewable energy sources can significantly contribute to a more sustainable environment.

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The various projects already implemented for Environmental Conservation:

- Usage of Energy Efficient BEE STAR Rated AC
- Usage of Natural Day light in corridor
- Usage of Eco friendly Vehicle

Notes & Assumptions:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere
2. 1 kWp Solar PV plant generates 5 kWh/day Electrical Energy for 300 days in an year.




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Abbreviations

AC	: Air conditioner
PES	: Progressive Education Society
CFL	: Compact Fluorescent Lamp
FTL	: Fluorescent Tube Light
LED	: Light Emitting Diode
kWh	: kilo-Watt Hour
Qty	: Quantity
W	: Watt
kW	: Kilo Watt
PF	: Power Factor
MD	: Maximum Demand
PC	: Personal Computer
MSEDCL	: Maharashtra State Electricity Distribution Company Ltd




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Introduction

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are complied with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"

1.1.3. Environmental Pollutant:

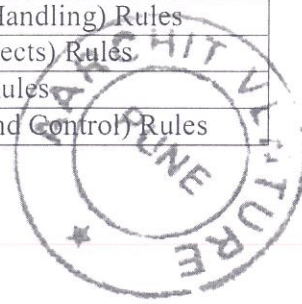
Means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules



2011	E-waste (Management and Handling) Rules
2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

Objectives

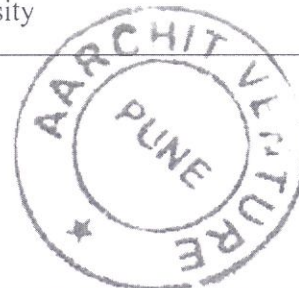
1. To study present usage of Natural resources the College is consuming
2. To Study the present pollution sources
3. To study various measures to make the campus Self sustainable in respect of Natural resources
4. To suggest the various measures to reduce the pollution: Air, Water, Noise

Audit Methodology:

1. Study of College as System
2. Study of Electrical Energy Consumption
3. Study of CO2 emissions
4. Suggestions on usage of Renewable Energy

General Details of College

No	Head	Particulars
1	Name of Institution	Tikaram Jagannath Art, Commerce & Science College,
2	Address	491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411003
3	Affiliation	Savitribai Phule Pune University



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Tikaram Jagannath Arts Commerce & Science College, Khadki, Pune-411003.



Study of Consumption of Various Resources

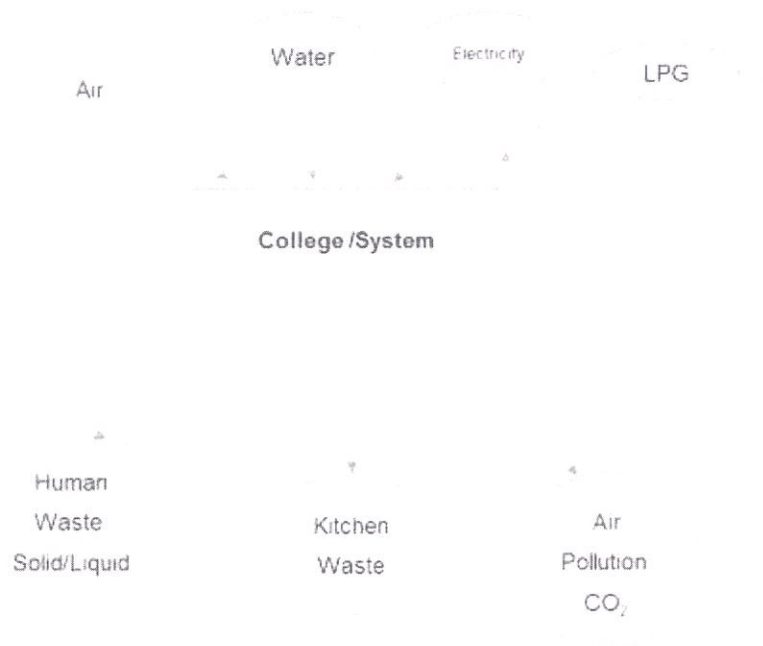
The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy
4. Liquefied Petroleum Gas

Also, college emits following pollutants to environment

1. Human Waste: Solid/ Liquid
2. Kitchen waste
3. Air pollution

We try to draw a schematic diagram for the College System & Environment as under.



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy & LPG as under.

The calculation of electrical energy consumption by college can be given as,



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Table 2.1: Electrical Energy Consumption

No	Month	Energy (kWh)
1	Jun-22	20,521
2	May-22	17,499
3	Apr-22	20,976
4	Mar-22	25,433
5	Feb-22	22,635
6	Jan-22	22,185
7	Dec-21	23,893
8	Nov-21	14,360
9	Oct-21	19,078
10	Sep-21	9,953
11	Aug-21	9,694
12	Jul-21	9,382
	Total	215,609
	Maximum	25,433
	Minimum	9,382
	Average	17,967

Variation of Monthly Electrical Energy Consumption

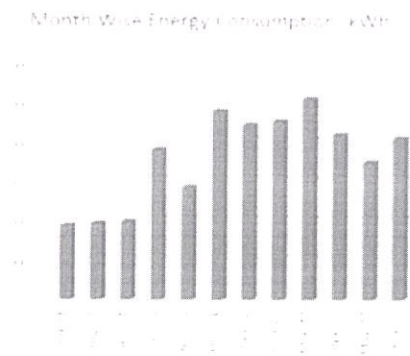
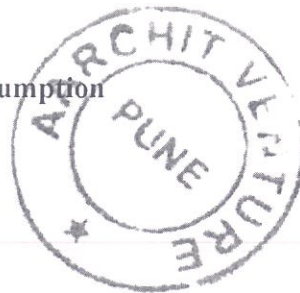


Figure 2.1 : Monthly Electrical Energy Consumption



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Key Inference drawn

From the above analysis, we present following important parameters:

Table 2.2: Variation in Important Parameters

No	Parameter/ Value	Energy Consumed, kWh
1	Maximum	25,433
2	Minimum	9,382
3	Average	17,967
4	Total	215,609



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Study of Environmental Pollution

In this Chapter, we present the various types of Pollution as under:

Air Pollution

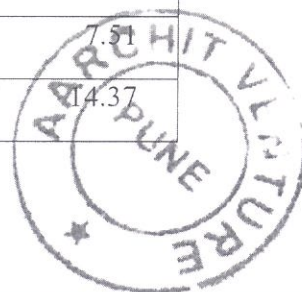
The College is using two forms of Energies, namely: Thermal in the form of LPG and Electrical Energy used for day to day operations of the College. The major pollutant on account of above Energy forms is the Carbon Di Oxide.

- 1 unit (kWh) of Electrical Energy emits 0.8 Kg of CO₂ in the atmosphere
- 1 Kg of LPG emits 3 Kg of CO₂ in the atmosphere

In the following Table, we present the CO₂ emissions.

Month wise Consumption of Electrical Energy & CO₂ Emissions:

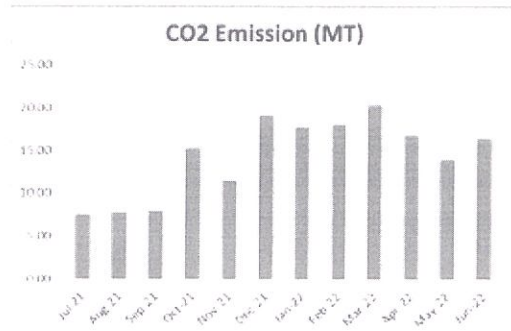
No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Jun-22	20,521	16.42
2	May-22	17,499	14.00
3	Apr-22	20,976	16.78
4	Mar-22	25,433	20.35
5	Feb-22	22,635	18.11
6	Jan-22	22,185	17.75
7	Dec-21	23,893	19.11
8	Nov-21	14,360	11.49
9	Oct-21	19,078	15.26
10	Sep-21	9,953	7.96
11	Aug-21	9,694	7.76
12	Jul-21	9,382	7.51
	Total	215,609	172.49
	Maximum	25,433	20.35
	Minimum	9,382	7.51
	Average	17,967	14.37



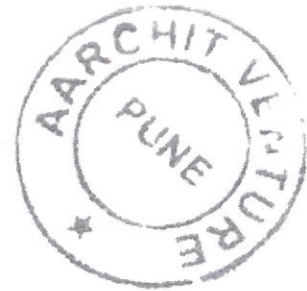
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In the following Chart we present the CO2 emissions due to usage of Electrical Energy.



CO2 emission due to usage of electrical energy.




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Study of Waste Management

T J College Waste Management System:

1. Separate Waste Bins:

- T J College has implemented a waste segregation system with separate bins for dry and wet waste. This proactive approach is crucial for effective waste management.

2. Dry and Wet Waste Bins:

- The college has designated bins for dry waste, which typically includes items like paper, plastics, glass, and metal. Wet waste bins are meant for organic waste, such as food scraps and other biodegradable materials.

3. Daily Collection by KCB:

- The waste management system involves the daily collection of all types of waste by the local municipal body, in this case, the KCB (presumably the municipal waste management authority).

4. Efficient Waste Disposal:

- By segregating waste at the source (T J College), the institution is contributing to a more efficient waste disposal process. This practice minimizes environmental impact and allows for the proper treatment or recycling of different types of waste.

5. Compliance with Environmental Regulations:

- T J College's waste management system aligns with environmental regulations and best practices. Proper waste disposal is not only a civic responsibility but also a legal requirement in many regions.

6. Environmental Awareness:

- Implementing separate waste bins indicates a level of environmental awareness within the college community. It educates students, staff, and visitors about the importance of responsible waste disposal and the impact it has on the environment.

7. Collaboration with Local Authorities:

- The collaboration with KCB reflects a community effort to manage waste collectively. The college is working hand-in-hand with local authorities to ensure a cleaner and more sustainable environment.

8. Potential for Recycling and Reuse:

- Waste segregation at the source opens up opportunities for recycling and reusing materials. Dry waste, when separated properly, can be sent for recycling processes, contributing to a circular economy.

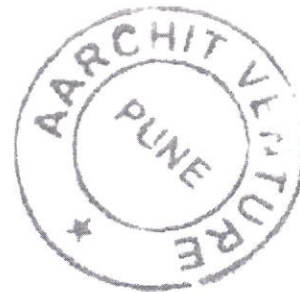
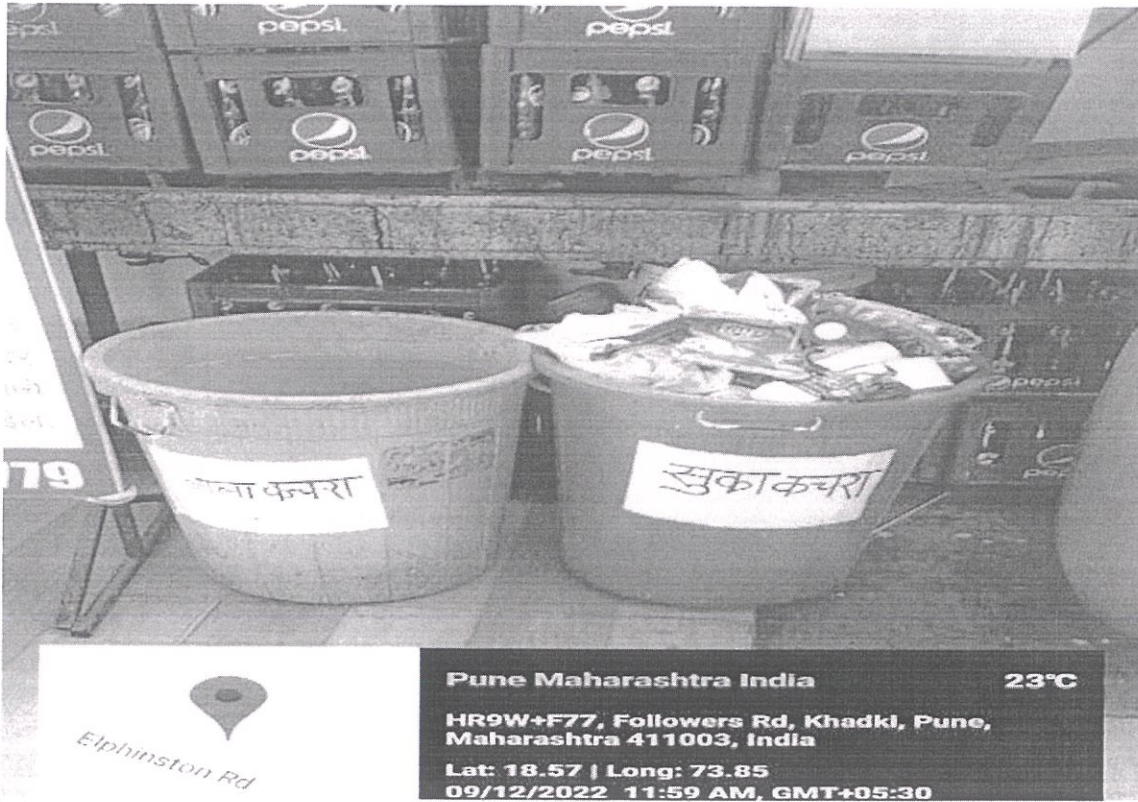
In conclusion, T J College's initiative to implement separate waste bins and collaborate with KCB for daily waste collection demonstrates a commitment to environmental sustainability and responsible waste


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management practices.

Photograph of waste Management




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Elphinston Rd

Pune Maharashtra India 22°C

Mangalya Apartment, Elphinston Rd, Khadki, Pune, Maharashtra 411003, India

Lat: 18.57 | Long: 73.85
10/12/2022 11:01 AM, GMT+05:30




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Study of Water Management

TJ College Water Supply System:

1. Separate Water Connections:

- TJ College has established a water supply system that includes separate connections from different sources. These sources include the KCB (presumably a local water supply authority) and a borewell.

2. Connection from KCB:

- The college has a dedicated water connection from the local municipal authority, KCB. This connection is likely to provide a reliable and regulated water supply that meets the standards set by the municipal water authority.

3. Borewell Water Source:

- In addition to the municipal water supply, TJ College has its own borewell as a water source. Borewells tap into groundwater resources and can provide an alternative or supplementary water source, especially during times of scarcity or as a backup.

4. Diverse Water Sources for Reliability:

- By having separate water connections from KCB and a borewell, the college ensures a more reliable and diversified water supply. This is important for mitigating risks related to water shortages, interruptions, or other issues that might affect a single water source.

5. Water Quality Considerations:

- The water from different sources may have varying qualities. Municipal water is typically treated and regulated, while borewell water quality depends on the local groundwater conditions. TJ College may implement water testing and treatment measures to ensure the water meets safety and quality standards.

6. Sustainability and Self-Sufficiency:

- Having a borewell as a water source contributes to the college's sustainability efforts. It allows the institution to partially or fully meet its water needs independently, reducing dependence on external water suppliers and promoting self-sufficiency.

7. Water Conservation Practices:

- TJ College may implement water conservation practices and technologies to optimize water usage from both sources. This can include efficient irrigation systems, water recycling, and awareness campaigns to promote responsible water use within the college community.

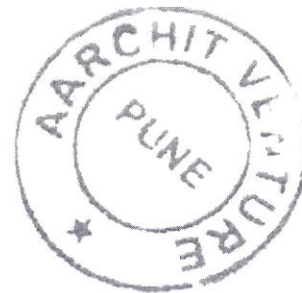
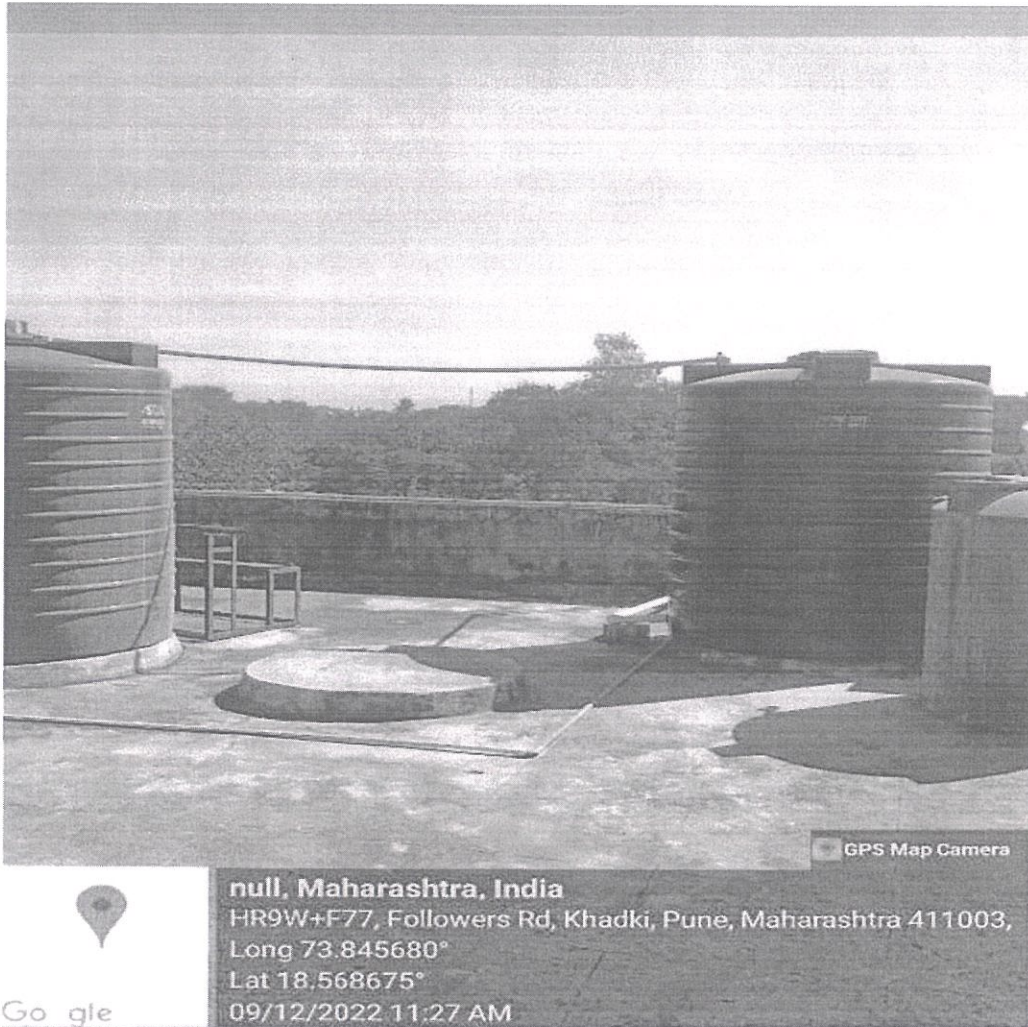
8. Emergency Preparedness:

- The presence of multiple water sources enhances the college's preparedness for

emergencies such as water supply disruptions or maintenance issues. Having backup sources ensures that essential water needs can be met even in unforeseen circumstances.

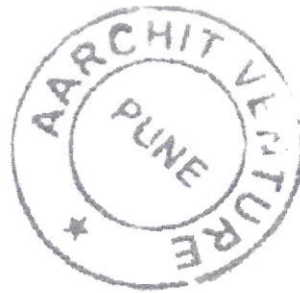
In summary, TJ College's decision to have separate water connections from KCB and a borewell reflects a strategic approach to water management, aiming for reliability, sustainability, and preparedness for various scenarios.


Water Management Photograph



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Study of e-Waste Management:

The internal communication is through emails and there is hardly any generation of e-Waste in the premises.

Transportation patterns of TJ College students and staff

Students' Commuting Preferences:

1. Public Transportation (70%):

- A significant majority (70%) of TJ College students opt for public transportation. This could include buses, trains, or other forms of shared transportation, reflecting a reliance on the existing public transit infrastructure.

2. Bikes or E-Bikes (10%):

- A notable portion (10%) of students prefers using bikes or e-bikes for commuting. This choice may be influenced by factors such as convenience, environmental considerations, and personal preference.

3. Walking or Cycling (20%):

- Another group of students (20%) chooses more sustainable and active modes of transportation, such as walking or cycling. This reflects an emphasis on physical activity, environmental consciousness, and possibly shorter commuting distances.

Transportation Impact on Students:

- The distribution of transportation preferences among students suggests a diverse set of commuting behaviors. It also indicates a relatively eco-conscious and active student body, with a significant portion choosing sustainable modes of transportation.

Staff Commuting Preferences:

1. Carpooling and Improved Traditional Transport (30%):

- Carpooling is encouraged, leading to an improvement in traditional transport methods. This could involve multiple staff members sharing rides, contributing to reduced traffic congestion and environmental impact.

2. Cars (30%):

- A portion of the staff (30%) uses cars for commuting. This mode of transportation provides flexibility and convenience, especially for those with longer commutes or specific scheduling needs.

3. Two-Wheelers (35%):

- A significant percentage (35%) of staff members opts for two-wheelers, such as motorcycles or scooters. This choice may be influenced by factors like fuel efficiency and maneuverability, particularly in areas with traffic congestion.

4. Walking or Cycling (10%):

- A portion of the staff (10%) prefers sustainable modes like walking or cycling, contributing to a healthier and more environmentally friendly commuting culture among the college staff.

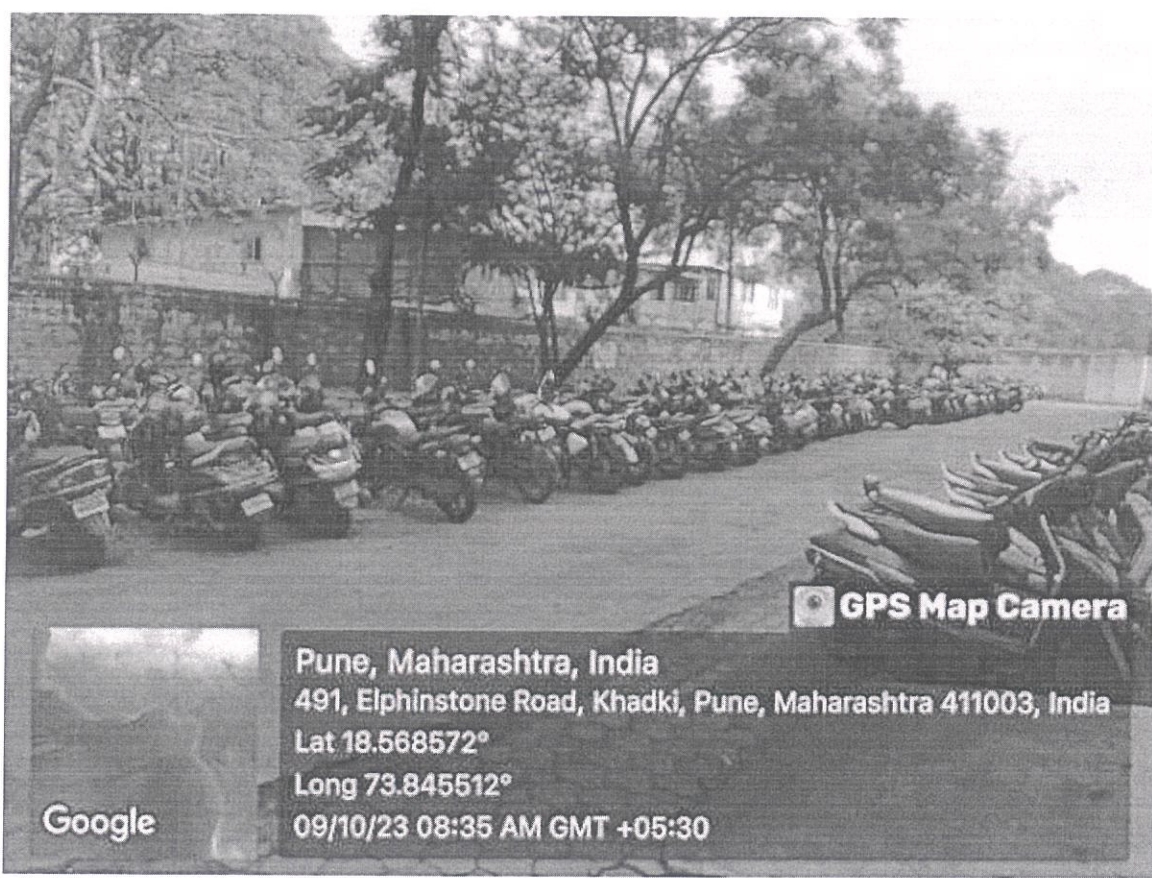
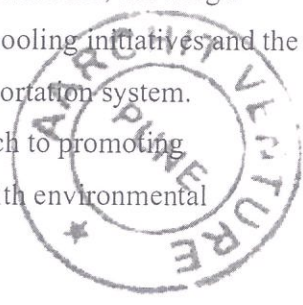
5. Public Transportation (25%):

- A quarter of the staff (25%) uses public transportation for commuting. This may include buses, trains, or other shared modes of transport, providing an alternative for those who prefer not to use personal vehicles.

Transportation Impact on Staff:

- The staff's transportation preferences reflect a mix of individual and shared modes, showing a balance between convenience, sustainability, and cost-effectiveness. Carpooling initiatives and the use of two-wheelers contribute to a more efficient and eco-friendly transportation system.

In summary, the transportation patterns at TJ College suggest a proactive approach to promoting sustainable and varied commuting options for both students and staff, aligning with environmental considerations and individual preferences.






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PRINCIPAL

Tikaram Jagannath Arts Commerce &
Science College, Khadki, Pune-411003.



Energy Certificate No: AV/EA/11-09-2018/259

Energy Audit Certificate

This is to certify that

**KHADKI EDUCATION SOCIETY'S TIKARAM JAGANNATH ARTS,
COMMERCE AND SCIENCE COLLEGE**

491, Elphinston Road Khadki

DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for scrutiny for
Energy Audits in the institutional premises.*

*The audit in which the study of energy flow for the purpose of conservation
is examined & verified at the institute. Our team checked out all efforts
taken by the institute towards conservation of energy. It is highly
appreciated and commendable.*

This certificate is valid upto 10th September 2019

UDYAM Regd. # UDYAM-MH-26-0018234



MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम



Auditor (Manish Maheshwari)

Date: 11th September 2018



Aarochit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Energy Certificate No: AV/EA/25-09-2019/164

Energy Audit Certificate

This is to certify that

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COMMERCE AND SCIENCE COLLEGE**
491, Elphinston Road Khadki

DIST - PUNE- 411003

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appreciated and commendable.*

This certificate is valid upto 24th September 2020

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MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

Auditor (Manish Maheshwari)

Date: 25th September 2019



Aarochit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Energy Certificate No: AV/EA/08-10-2020/298

Energy Audit Certificate

This is to certify that

**KHADKI EDUCATION SOCIETY'S TIKARAM JAGANNATH ARTS,
COMMERCE AND SCIENCE COLLEGE**
491, Elphinston Road Khadki
DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for scrutiny for
Energy Audits in the institutional premises.*

*The audit in which the study of energy flow for the purpose of conservation
is examined & verified at the institute. Our team checked out all efforts
taken by the institute towards conservation of energy. It is highly
appreciated and commendable.*

This certificate is valid upto 7th October 2021

UDYAM Regd. # UDYAM-MH-26-0018234



Auditor (Manish Maheshwari)

Date: 8th October 2020



Aarohit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Energy Certificate No: AV/EA/20-10-2021/149

Energy Audit Certificate

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COMMERCE AND SCIENCE COLLEGE**

491, Elphinston Road Khadki

DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for scrutiny for
Energy Audits in the institutional premises.*

*The audit in which the study of energy flow for the purpose of conservation
is examined & verified at the institute. Our team checked out efforts
taken by the institute towards conservation of energy. It is highly
appreciated and commendable.*

This certificate is valid upto 19th October 2022

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MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

Auditor (Manish Maheshwari)

Date: 20th October 2021



Aarochit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Energy Certificate No: AV/EA/28-10-2022/207

Energy Audit Certificate

This is to certify that

**KHADKI EDUCATION SOCIETY'S TIKARAM JAGANNATH ARTS,
COMMERCE AND SCIENCE COLLEGE**

491, Elphinston Road Khadki

DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for scrutiny for
Energy Audits in the institutional premises.*

*The audit in which the study of energy flow for the purpose of conservation
is examined & verified at the institute. Our team checked out all efforts
taken by the institute towards conservation of energy. It is highly
appreciated and commendable.*

This certificate is valid upto 27th October 2023

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MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

Auditor (Manish Maheshwari)

Date: 28th October 2022



Aarochit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Energy Certificate No: AV/EA/29-11-2023/310

Energy Audit Certificate

This is to certify that

**KHADKI EDUCATION SOCIETY'S TIKARAM JAGANNATH ARTS,
COMMERCE AND SCIENCE COLLEGE**

491, Elphinston Road Khadki

DIST - PUNE- 411003

*has submitted necessary data, evidences and credentials for scrutiny for
Energy Audits in the institutional premises.*

*The audit in which the study of energy flow for the purpose of conservation
is examined & verified at the institute. Our team checked out all efforts
taken by the institute towards conservation of energy. It is highly
appreciated and commendable.*

This certificate is valid upto 28th November 2024

UDYAM Regd. # UDYAM-MH-26-0018234



MSME
MICRO, SMALL & MEDIUM ENTERPRISES
सूक्ष्म, लघु एवं मध्यम उद्यम

Auditor (Manish Maheshwari)

Date: 29th November 2023



Aarchoit Venture

Driven By Trusted Services

GST # 27ACDPL3257B1ZY

Energy Audit Report

Khadi Education's Society

Tikaram Jagannath

Arts, commerce & Science College



Prepared By

Aarchit Venture

Bharekar State Near Nanded City Nanded Goan Pune 411041



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PREFACE

An energy audit is a study of a plant or facility to determine how and where energy is used and to identify methods for energy savings. There is now a universal recognition of the fact that new technologies and much greater use of some that already exist provide the most hopeful prospects for the future. The opportunities lie in the use of existing renewable energy technologies, greater efforts at energy efficiency and the dissemination of these technologies and options. Energy has been identified as a crucial and balancing factor in the indices for sustainable development since the Earth Summit in 1992. Especially in the contemporary scenario, it is acknowledged that the heavy and unbalanced energy consumption adversely affects energy price and economic growth, and most countries now give priority to energy conservation methods. The Energy Conservation Act, 2001, defines Energy auditing as the verification, monitoring analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. It facilitates a systematic approach to the energy management in a system, trying to balance the total energy input with its use. It identifies all the energy streams in a system and quantifies the use of energy according to its discrete functions. The energy audit of **Khadki Education's Society, Tikaram Jagannath Art, Commerce & Science College, 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411003** was carried out by Energy Audit team. This report is our mite in contributing to the larger picture of effective energy management and conservation. As is known, energy auditing is an on-going process, a part of a larger procedure to ensure long-term sustainable development. We have enlisted plausible solutions based on the outcome of our analysis of data, and our recommendations, which can be implemented wholeheartedly in the campus in order to ensure minimizing energy waste and maximizing energy potential. We hope in all earnest that these will be given its due and that the audit will be fruitful in terms of energy conservation



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1. SUMMARY

The objective of the audit was to study the energy consumption pattern of the facility, identify the areas where potential for energy/cost saving exists and prepare proposals for energy/cost saving along with investment and payback periods.

The salient observations and recommendations are given below.

Khadki Education's Society, Tikaram Jagannath Art, Commerce & Science College, 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411003 uses energy in the following forms:

- a. Electricity from MahaVitaran / MahadisCom (Local Discount)-13000 units
- b. Natural light & Ventilation

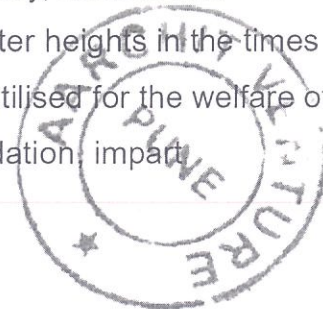
Electrical energy is used majorly for various applications, like

- Computers
- Air-Conditioning
- Lighting
- Fans / airy classrooms

2. INTRODUCTION OF INSTITUTE

Tikaram Jagannath (T.J.) College provide "Gateway of Higher Education" and started its academic journey as a single faculty college with Commerce as the pioneer faculty. Presently, T.J. College is a multi-faculty College, imparting higher education in the fields of Arts, Commerce and Computer Science. T.J. College has already completed three cycles of NAAC Accreditations with a rising graph. Score of the last NAAC cycle was better than the first. As an institute our goals will be to achieve success in the fields of Academics, Cultural Activities, Co-curriculum and Extra Curriculum Activities. T.J. College also has a legacy of providing ace sportsmen at international, national and state levels especially in hockey, football and shooting. We, as a team, will strive to take forward the legacy to greater heights in the times to come. All the resources available at our disposal will be optimally utilised for the welfare of students at large. The entire staff will give the students a strong foundation; impart

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Science College, Khadki, Pune-411003.

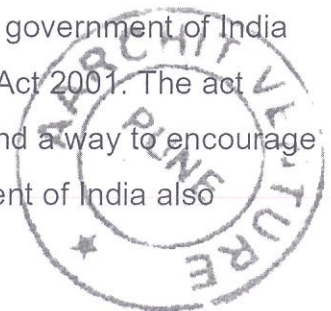


knowledge, righteousness and core values and will be a source of inspiration in the lives of our students.

3. INTRODUCTION OF ENERGY AUDIT

Energy is a primary and most universal measure of all kind of work by human being and nature. It is one of the real contributions to the economic development of any nation. On account of the developing nation, the energy sector shows acceptance up to a significant level to expand energy requirements based on colossal investments to meet them. The aim of this report is to describe the indispensability of Energy in the present time based on the bulk utilization of different forms of energies to cater the demands. An Energy Audit is an investigation of a plant or office to decide how and where energy is utilized and to distinguish diverse strategies for energy saving Identification of the areas consuming major energy need prior attention to look for energy saving potential. The energy audit is the most effective tool for optimizing the efficiency of the plant without affecting the output of the system. Most of the country in the world is focused on the improving energy efficiency in the various sector. According to the present scenario, it is more important to the next generation to get awareness about the efficient use of energy resources, when they are taking education in school. In this respects, advancement of energy proficiency in school is being advanced through the foundation of energy clubs. An improvement in energy efficiency within your organization can potentially bring significant benefits. With this in mind, Aarchit Venture has developed energy audit services to help you find the best information for improvement opportunities. Energy audit services are a key part of our dedicated energy efficiency services and the first step towards your comprehensive energy management strategy. This is the important part of India's effort to improve its energy efficiency, energy quality, and energy intensity. The government of India promoting the energy efficiency in India through Energy Conservation Act 2001. The act instructs the central Government and Bureau of Energy Efficiency to find a way to encourage and advance energy productivity in all area of the economy. Government of India also promoting energy efficiency and awareness at school level by implementing student building Energy Audit is the important part of India's effort to improve its energy efficiency, energy quality, and energy intensity. The government of India promoting the energy efficiency in India through Energy Conservation Act 2001. The act instructs the central Government and Bureau of Energy Efficiency to find a way to encourage and advance energy productivity in all area of the economy. Government of India also

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promoting energy efficiency and awareness at school level by implementing student building capability programmed under Energy Conservation awareness scheme

4. METHODOLOGY

Energy audits are primarily classified into

- Preliminary Audit
- Detailed Audit

Since the Detailed Audit is meant for industry, and because of the limited size and the amount of energy consumption of the institution, the Preliminary Audit method was chosen for this year.

Scope of work and methodology were as per the proposal. While undertaking data collection, field trials and their analysis, due care was always taken to avoid abnormal situations so as to generate normal/representative pattern of energy consumption at the facility.

Inputs and Outputs of Energy audit

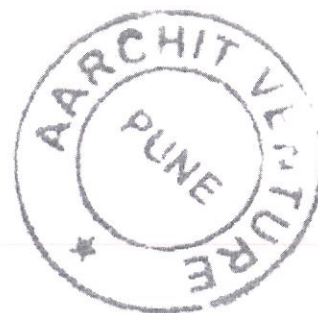
INPUTS

- Plant description
- Utility supply data – electricity, fuel & steam
- Energy consuming system information
- Scorecard responses

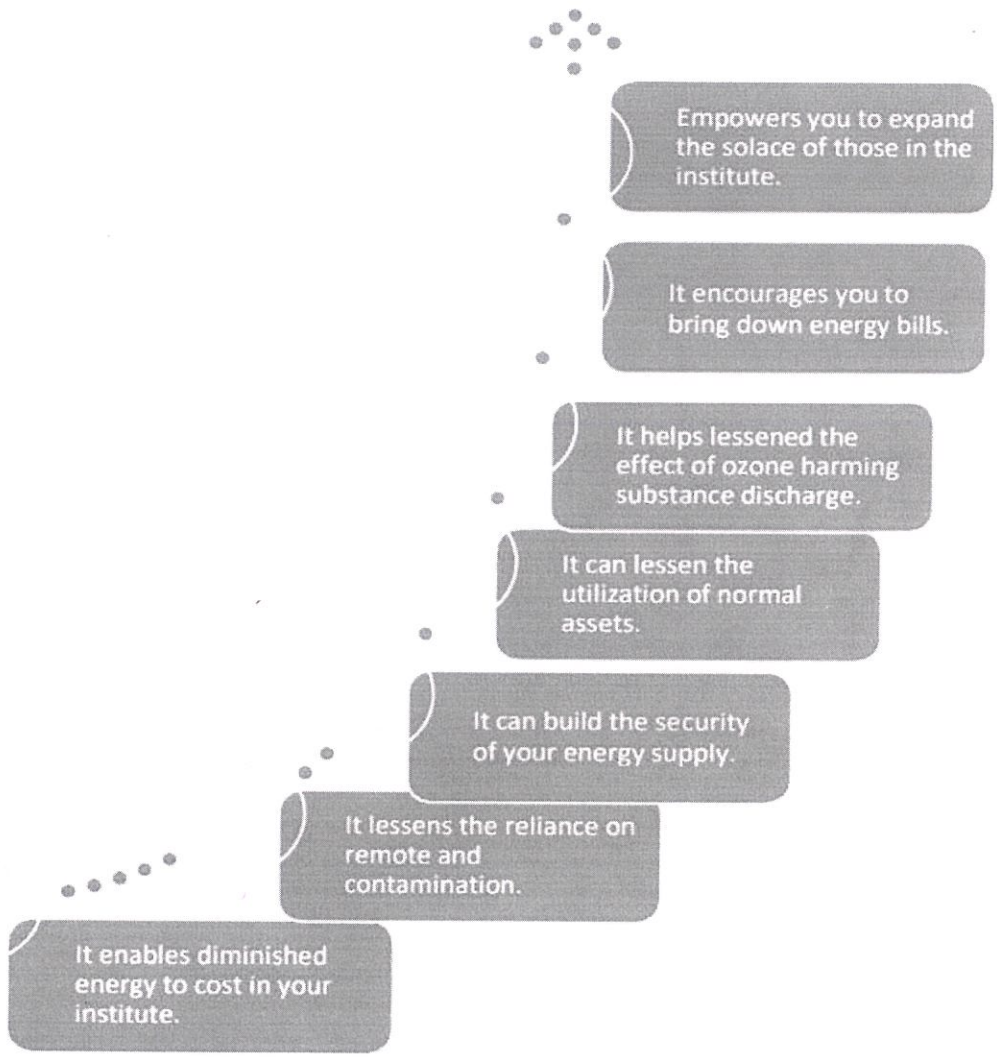
OUTPUTS

- Overall picture of plant energy use
- Summary of energy cost distributions
- Preliminary assessment & comparison
- Areas or energy efficiency improvement
- Energy cost reduction potential

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5. PURPOSE OF ENERGY AUDIT

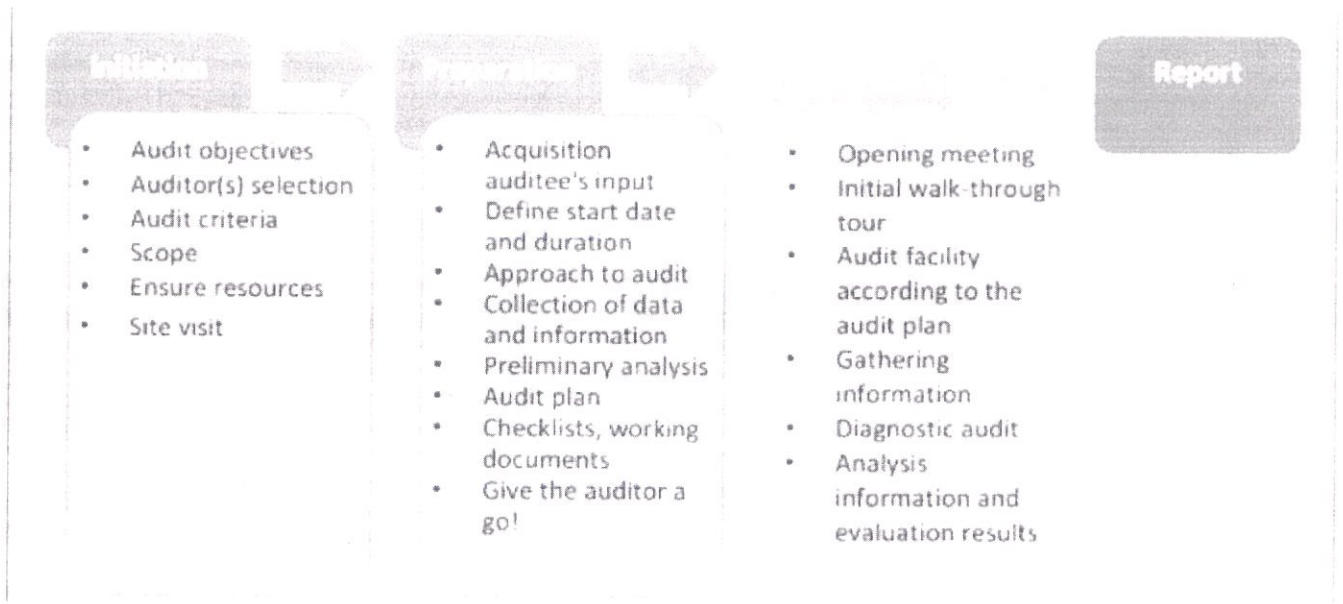


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6. OBJECTIVES

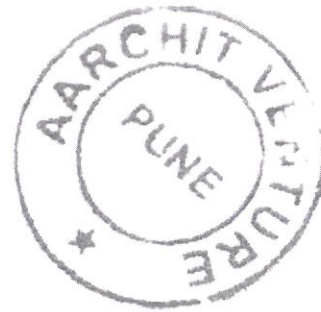
- A. Verify the steps adopted for energy management in the campus.
- B. Spot the inefficient or inadequate practices, if any.
- C. Improve the energy preserving measures and methods.
- D. Identify potential energy saving opportunities.
- E. Formulate feasible steps and measures to be adopted in the campus.



7. SCOPE OF ENERGY AUDIT

The work of energy audit has the objective of finding opportunities of energy conservation, saving and to recommend action plan with calculation of investment option and energy saving. The scope of energy audit is,

1. To study and audit MAHADISCOM / MahaVitaran bills.
2. Study of lighting system and its measurement.
3. Harmonic measurement and its study.
4. Splitting of air conditioner / other high voltage consumption devices.
5. Identification of energy saving opportunity and energy conservation




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8. SYSTEM STUDIED DURING ENERGY AUDIT

CHECK POINTS

Monthly electricity is studied and analysed.

Lighting system in campus is studied and illumination is measured.

UPS load measurement (harmonic measurement at UPS input and main feeder after electrical meter).

Study of energyutilization requirement.

Split air conditioner operation.

Energy saving opportunities is identified.

The identified saving opportunities are summarized for review and implementation.



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9. ENERGY CONSUMPTION

Lighting System Details

Sr No	Room Type	Tube	Bulb	Led
1	Main Gate	0	0	1 Focus
2	Entrance Lobby	0	0	3
3	Campus	6	0	2 Focus
4	Rooms	45	0	28
5	Ground	0	0	10
6	On Road	0	0	1
Total		51	0	45

Equipment List

Sr No	Particular	Quantity
1	Computers	22
2	Printers	4
3	Scanners	1
4	Xerox Machine	2
5	Projector	1
6	Water Pumps	5
7	Water Cooler	2
8	Water Filter	2
9	TV Screen	11




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Analysis :

Lighting System Energy Analysis:

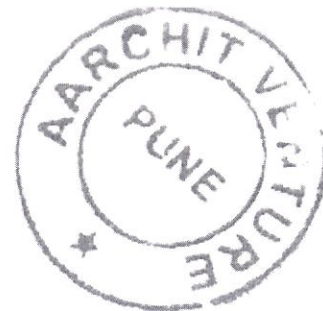
Energy Consumption for Tube Lights, Bulbs, and LEDs:

- wattage for Tube Light: 40W
- wattage for Bulb: 60W
- wattage for LED: 10W

Sr No	Room Type	Tube Light (kWh)	Bulb (kWh)	LED (kWh)
1	Main Gate	4 * 40	0	2 * 10
2	Entrance Lobby	2 * 40	0	1 * 10
3	Boys Hostel	50 * 40	0	10 * 10
4	Girls Hostel	70 * 40	0	20 * 10
5	Ground	5 * 40	0	10 * 10
6	On Road	4 * 40	0	10 * 10
Total -		2700 kWh	0 kWh	530 kWh

Total Energy Consumption for Lighting:

- Total Energy Consumption for Tube Lights: 2700 kWh
- Total Energy Consumption for Bulbs: 0 kWh
- Total Energy Consumption for LEDs: 530 kWh




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Equipment Energy Analysis:

1. Energy Consumption for Equipment:

- Wattages:
 - Computers: 150W each
 - Printers: 500W each
 - Scanners: 200W each
 - Xerox Machine: 1000W each
 - Projector: 300W each
 - Water Pumps: 500W each
 - Water Cooler: 100W each
 - Water Filter: 50W
 - Coffee Machine: 1000W

Sr No	Particular	Quantity	Wattage (W)	Total Energy Consumption (kWh)
1	Computers	70	150	10.5
2	Printers	7	500	3.5
3	Scanners	4	200	0.8
4	Xerox Machine	2	1000	2
5	Projector	6	300	1.8
6	Water Pumps	4	500	2
7	Water Cooler	5	100	0.5
8	Water Filter	1	50	0.05
9	Coffee Machine	1	1000	0.5


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Total Energy Consumption for Equipment:

- Total Energy Consumption for Equipment: 21.15 kWh

Air Conditioner Energy Analysis:

1. Energy Consumption for Air Conditioners:

- wattage for Air Conditioner: 1500W per unit

Sr No	Room Type	Quantity	Assumed Wattage (W)	Total Energy Consumption (kWh)
1	Reception Enquiry	1	1500	1.5
2	Director Office	1	1500	1.5
3	Board Room	1	1500	1.5
4	IQAC	1	1500	1.5
5	Seminar Hall	2	1500	3
6	ED Cell	1	1500	1.5
7	Placement Cell	1	1500	1.5

2. Total Energy Consumption for Air Conditioners:

- Total Energy Consumption for Air Conditioners: 11 kWh

Overall Total Energy Consumption:

- Total Energy Consumption for Lighting: 3230 kWh
- Total Energy Consumption for Equipment: 21.15 kWh
- Total Energy Consumption for Air Conditioners: 11 kWh




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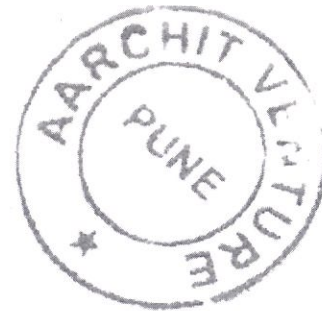


10. BEST PRACTICES FOR ENERGY SAVING

Open Space in front

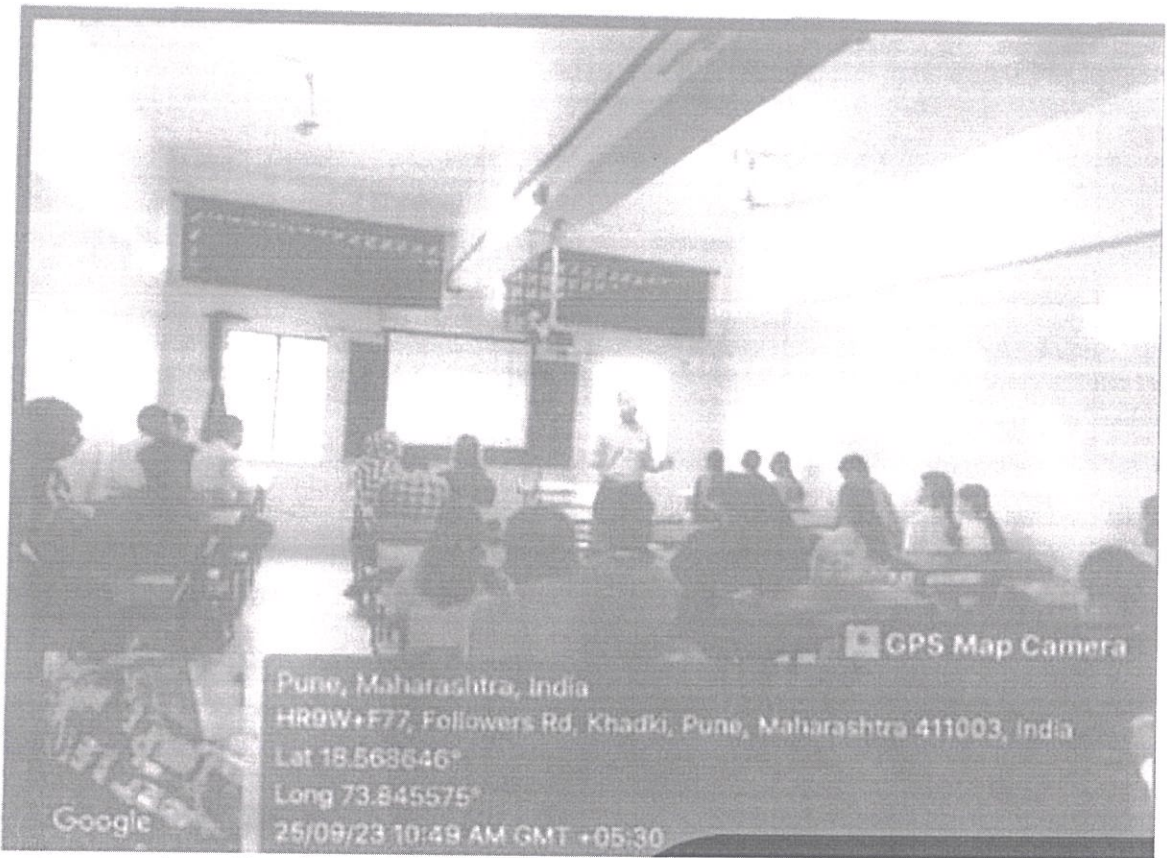


Open area in front of college




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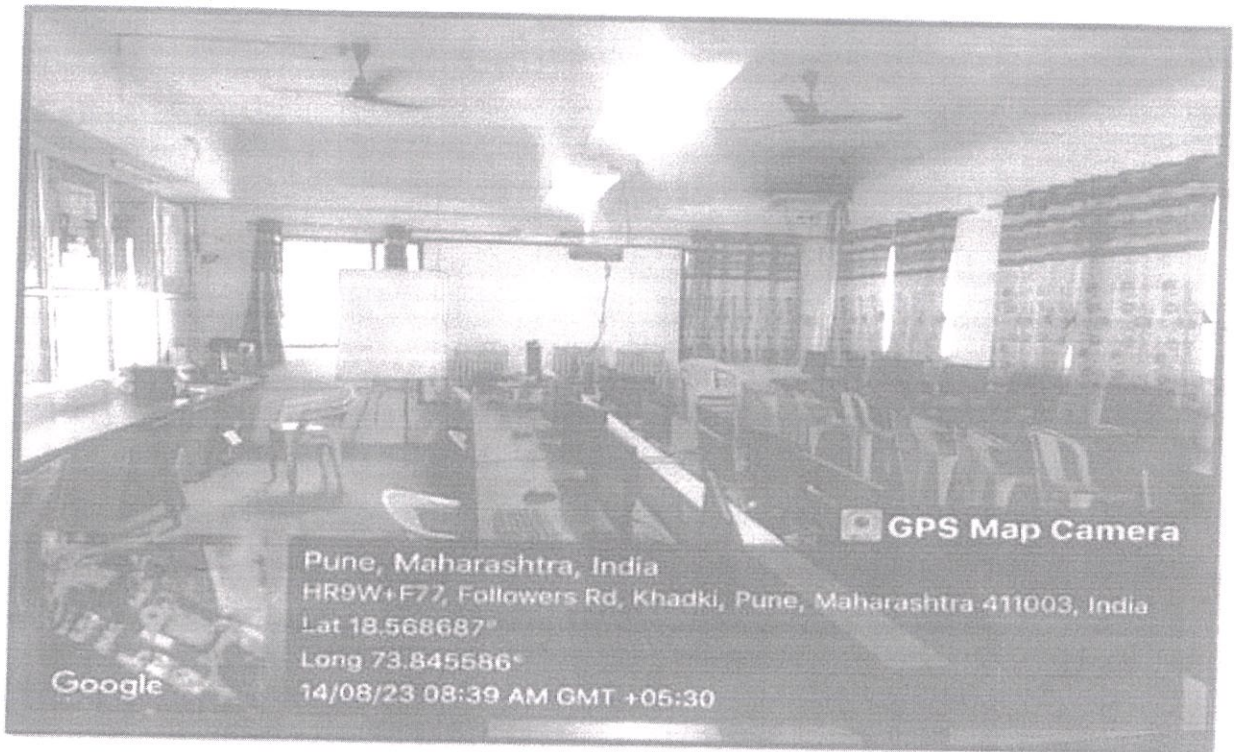


power saving, Airy & Lighted classrooms

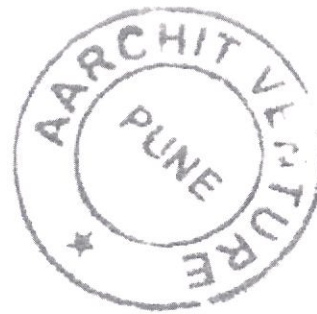



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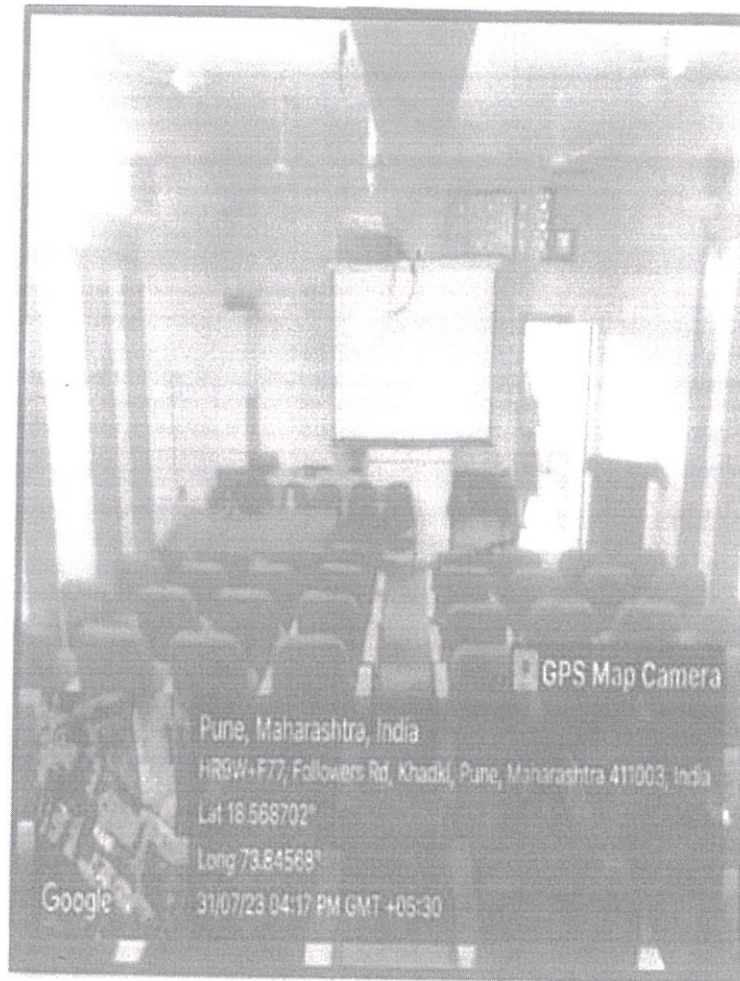


Well lit & Well Ventilated Computer Lab




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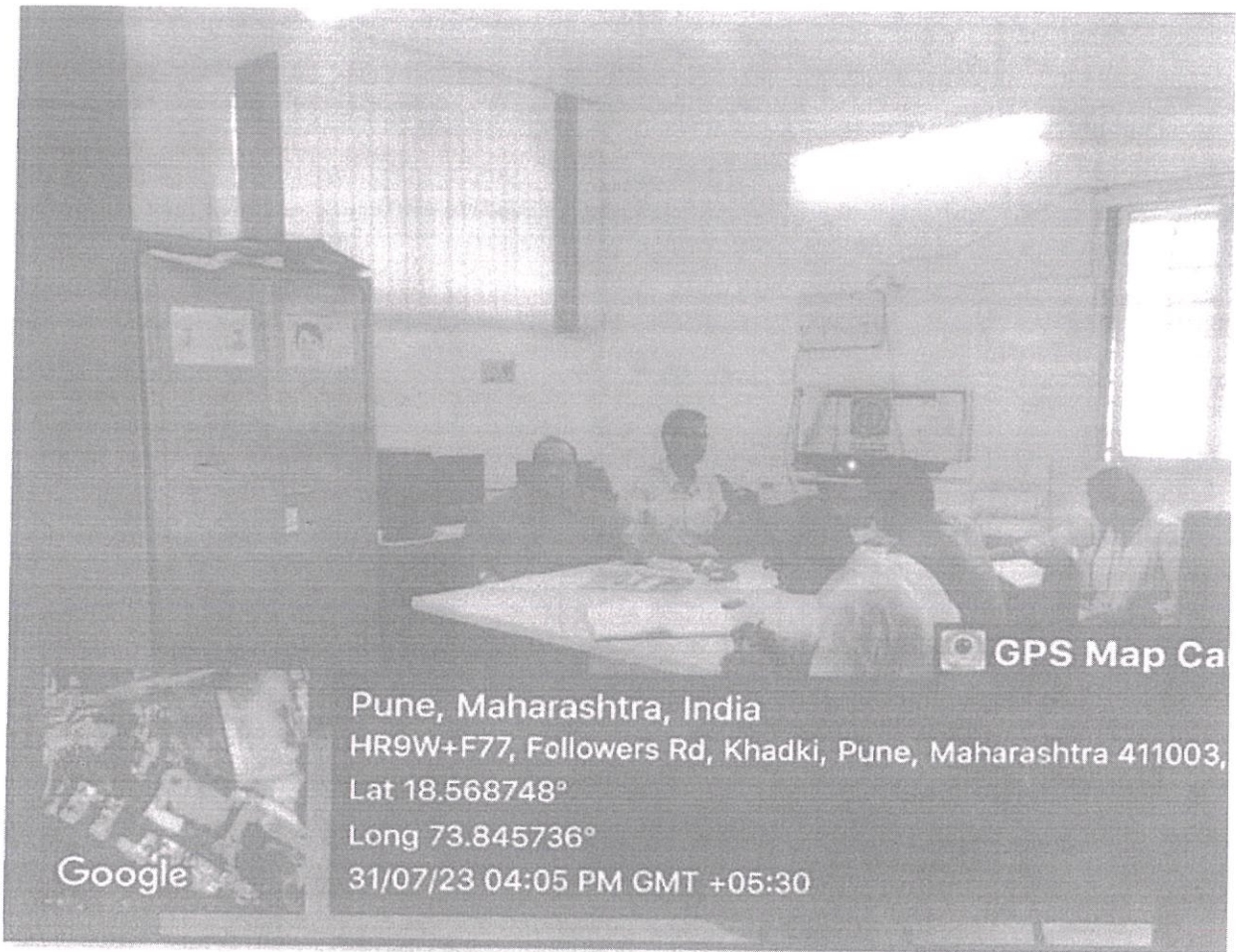


Well lit & Well Ventilated Audio Visual Room

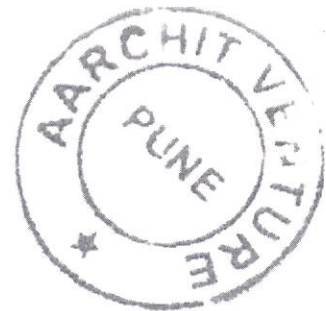



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Well lit & Well Ventilated Staff Room




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11. General Energy Conservation Tips

1. Energy-Efficient Lighting:

- Replace traditional bulbs with energy-efficient LED lights to significantly reduce energy consumption.
- Install occupancy sensors and timers to control lighting in unoccupied areas.

2. Optimize HVAC Systems:

- Regularly maintain and service heating, ventilation, and air conditioning (HVAC) systems to ensure they operate efficiently.
- Set thermostats at energy-saving temperatures, especially during non-operational hours.

3. Manage Computer Labs and IT Equipment:

- Encourage shutting down computers, monitors, and other IT equipment when not in use.
- Enable power-saving settings on computers and monitors to reduce energy consumption during periods of inactivity.

4. Educate and Raise Awareness:

- Conduct energy conservation awareness campaigns to educate students, staff, and faculty about the importance of saving energy and simple practices to achieve it.

5. Promote Natural Daylight:

- Utilize natural daylight by arranging spaces and seating to maximize natural light penetration, reducing the need for artificial lighting.

6. Energy-Efficient Appliances:

- Encourage the use of ENERGY STAR-rated appliances and equipment in common areas and offices to reduce energy usage.

7. Insulation and Weatherproofing:

- Insulate buildings to reduce heat gain in summers and heat loss in winters.
- Seal windows, doors, and other openings to prevent air leaks.

8. Water Conservation:

- Promote water conservation to indirectly save energy required for water heating.
- Install low-flow faucets and shower heads and fix leakages promptly.

9. Utilize Renewable Energy:

- Explore options for solar power generation on rooftops or open areas to supplement the energy needs of the college.


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10. Incorporate Energy Audits:

- Conduct regular energy audits to identify areas for improvement and track energy usage patterns.

11. Green Campus Initiatives:

- Plant trees and maintain green spaces to enhance natural cooling and create a sustainable environment.
- Implement rainwater harvesting systems to reduce dependency on external water sources.

12. Transportation Strategies:

- Encourage carpooling, cycling, and use of public transport among students and staff to reduce fuel consumption and emissions.

13. Waste Reduction and Recycling:

- Promote waste reduction and recycling programs to minimize energy consumption associated with waste management.

14. Engage Students and Faculty:

- Involve students and faculty in energy conservation initiatives through projects, workshops, and competitions.

15. Continuous Monitoring and Feedback:

- Regularly monitor energy consumption and progress towards energy-saving goals, and provide feedback to stakeholders.





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12. CONCLUSION

Energy audit is an effective tool in identifying and perusing a comprehensive energy management program. A careful audit of any type will give the organization a plan with which it can effectively manage the organization energy system at minimum energy cost. In this paper a detailed study has been made to reduce the electrical energy consumption in the campus of **Tikaram Jagannath Art, Commerce & Science College, 491, Dr. Babasaheb Ambedkar Road, Khadki, Pune. 411003**. It highlights the amount of energy savings, thereby reducing the energy crisis considerably. After implementing recommendations energy audit of institute, the electrical energy saving per year can be achieved as 20% to 30% and total cost saving of electrical bill per year can be 20% to 30%




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