Athul Energy, we stand for Quality, Reliability and Efficiency

No: AEC/GAC/24-06

15-05-2024

Audit Certificate

This is to certify that that **M/s Euphrasia Training College for Women Kattoor, Thrissur** have successfully completed the **Green Audit** of their buildings and campus conducted on 08th & 09th May 2024 for the Academic year 2023-2024. They have submitted all necessary data and credentials for scrutiny.

We, **Athul Energy Consultants Pvt Ltd,** Thrissur congratulate the Management, Executive Director, Principal, staff members and students for the successful completion and participation in the audit report process.

ATHUL ENERGY CONSULTANTS PVT LTD THRISSUR 680 020

Managing Director

Athul Energy Consultants Pvt Ltd

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal

Euphrasia Training College For Women

Kattoor

Athul Energy Consultants Pvt Ltd
CIN: U74999KL2016PTC046898
info@athulenergy.com
www.athulenergy.com

Registered Office:
4/2, Capital Legend Building
Korapath lane, Round-North
Thrissur-680020, Kerala
+91 7356111990

Branch Office:
F-7, James Square
Asian paint Chowkady, GIDC
Ankleshwar-393002, Gujarat
+91 7356111991

GREEN AUDIT– 2024

EUPHRASIA TRAINING COLLEGE FOR WOMEN
KATTOOR, THRISSUR

EXECUTED BY

ATHUL ENERGY CONSULTANTS PVT LTD
4th FLOOR, CAPITAL LEGEND BUILDING,
KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020
Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

May 2024

Principal
Euphrasia Training College For Women
Kattoor

Euphrasia Training College For Women
Kattoor - 680 702

TABLE OF CONTENTS

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

LIST OF TABLES

LIST OF FIGURES

Euphrasia Training College For Women * Kattoor - 680 702 *

Principal
Euphrasia Training College For Women
Kattoor

PREFACE

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability. Hence an evaluation is needed to understand where it stands in the path to be an environment friendly, talent nurturing educational institution. This Green Audit was done with the aim to assess and rate the sustainable nature of the campus. The college vision to mould a new generation in integrity of virtues and in maturity of values and to form them in true wisdom according to their God-given talents for the good of the human beings by means of the noblest activity of study and by way of the most gracious quality of friendship. And in the **social goals**, **"to make the students aware of the pressing global issues and the moral responsibility to handover to the coming generation an eco-friendly life style and an earth free from pollution, filth, bigotry and corruption"**. It was observed by us from the students' participation during the green audit.

This report is compiled by the BEE certified energy auditor and A GRIHA Certificate holder along with the project engineers who are experienced in the field of energy, environment and management. The student volunteers made a mammoth contribution with data collection and preparing an initial skeleton for the report.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ACKNOWLEDGEMENTS

We express our sincere gratitude to the management of M/s Euphrasia Training College for Women Kattoor Thrissur for giving us an opportunity to carry out the project of Green Audit. We are extremely thankful to all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Green audit.

1	Dr. Sr. Vimala	Manager
2	Dr. C Salim Kumar	Principal
3	Sr. Leena C P	IQAC Coordinator

Also congratulating our Green audit team members for successfully completing the assignment in time and making their best efforts to add value.

GREEN AUDIT TEAM

1. **Mr. Santhosh A**
   Registered Energy Auditor of Bureau of Energy Efficiency (BEE – Govt. of India)
   Accredited Energy Auditor No – EA 7597

2. **Mr. Ashok KMP** Registered energy Auditor of BEE and Certified GRIHA Professional

3. **Mr. Harikrishnan**
   Project Engineer , Energy Manager

Yours faithfully

Managing Director
Athul Energy Consultants Pvt Ltd

Euphrasia Training College For Women * Kattoor - 680 732 *

Principal
Euphrasia Training College For Women
Kattoor

GENERAL DETAILS

The general details of the M/s Euphrasiya Training College for Women are given below in table.

Table 1 GENERAL DETAILS

SL. NO	PARTICULARS	DETAILS
1	Name & Address of college	Euphrasia Training College for Women Kattoor , Thrissur Pin:680702
2	Contact person	**Sr. Leena CP** **9400314636,euphrasiyatrg@gmail.com**
3	Location: Latitude & Longitude	
4	No. of students	100
5	No: of teaching staff	10
6	No: of non teaching staff	07
7	Courses in college and No : of departments	05
8	Building area	1600 Sq.m
9	Land area	5.38 acres
10	Average annual working days	210 days
11	Are they conducting outreach programmes	Yes
12	Cross ventilation and natural light penetration into class rooms, labs	Good
13	No: of variety of trees	10
14	No: of trees	30
15	Sports	Cricket and Football ground, court Badminton court

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

EXECUTIVE SUMMARY

- Varieties of living eco systems such as trees of varies varieties, Mashy land and natural fish water ponds ,gardens, are present in the campus along with open spaces
- Staff and student's collaboration of Nature club is held responsible for maintenance of greenery inculcating a sustainable culture among the student's community.
- By recognizing the importance of making healthy youth, management taken initiatives and built a badminton and , food ball ground
- Initiated vegetable garden and tree plantation by the NSS wing of college.

Suggestions for improvement

- Cordoned area to be provided with suitable plants in the herbal garden
- Started to plant Star garden(Nakshthra vanam) in the college
- Water meter to be installed for measuring water consumption per day.
- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation.
- Road map for the tree plantation to be done along with the master plan of the college. Gave importance for the oxygen generating plants and lush green trees.

Euphrasia Training College For Women * Kattoor - 680 702 *

Principal
Euphrasia Training College For Women
Kattoor

ABOUT EUPHRASIYA TRAINING COLLEGE FOR WOMEN

Euphrasia Training College for women, Kattoor is a self-financing college of education for conducting B.Ed course, which is affiliated to the University of Calicut and recognized by the NCTE. It is situated in the Heart of Kattoor Panchayath , Mukundapuram Taluk, in Thrissur Dt. Kerala State. It is organized and managed by CMC Udaya Province Irinjalakuda. College started its functioning on 20th July 2005 and was formally inaugurated 4th March 2006, by Mar James Pazhayattil, Bishop of Irinjalakuda. It was started One year B.Ed course with six Optional subjects in the year 2005 and 2015 onwards college has two year B.Ed course for five optional subjects.

VISION

To uplift women for the betterment of the society; to train them to be responsible teachers of tomorrow, with apt skills and strong ethical values and to kindle the light & life to the younger generation & love to the fellow beings

MISSION

To mould outstanding teachers with high social commitment and radiate moral and spiritual values by providing quality education and systematic training.

Figure 1 EUPHRASIYA TRAINING COLLEGE FOR WOMEN MAIN ENTRANCE

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

GREEN AUDIT

The whole world is on the road to a sustainable development, and the environment conservation is the top priority among the list as every human activity has its effect on their surroundings, which is the environment. Hence be it a house, a commercial building, an industrial building, or any other construction will disturb the balance of the environment. It is very important to do a detailed study about the effects on the environment. This is conducted under the name of *Green Audit*, which can be defined as *the official examination of the effects organization has on the environment, especially the damage that it causes.* The objectives of the green audit can be listed as follows:

- Including participants from every section of the organization in the auditing process..
- Identifying the activities in the premises and listing them.
- Calculating the resource consumption like the land and water.
- Study the energy usage pattern.
- Identify the good practices.
- Suggest the viable solutions to improve the sustainable nature of the organization.
- Compile the report with the above-mentioned details.
- Conduct a walkthrough audit to check the suggestions implemented by the institution and suggest for further improvements
- Verify all the points with actual measurements is it is meeting the performance and gave suggestions for improvement

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

CAMPUS ENVIRONMENT

The environment in and around the college campus plays an important part in maintaining a healthy atmosphere in nurturing talents. Trees are the major source of the oxygen we breathe, and receiver of the carbon dioxide we exhale. The sustainability of an ecosystem depends on the number of plants and trees in and around the surroundings. The open space in the college is used for gardening and maintain, open ground, silent zone etc. Ultimately the campus is maintaining natural equilibrium with nature

FIGURE 2: CAMPUS BUILDINGS VIEW

Scientific studies are proved that the nature can able to cure any diseases and this will reduce the stress among students during their studies and also increase the compassion among them and to nature. Ultimately the campus is maintaining natural equilibrium trees and water bodies with human beings. Gardens and landscape are an aesthetic delight and it promotes attentiveness of students. Persons exposed to plants have higher level of positive feelings (pleasant, calm) as opposed to negative feelings (anger, fear).

Euphrasia Training College For Women * Kattoor - 680 702 *

Principal
Euphrasia Training College For Women
Kattoor

SUSTAINABLE CONSTRUCTION OF BUILDINGS

Energy consuming devices installed to achieve the comfort levels for the occupants of the building gives rise to heat generation which adversely affects the environment within the building and in the surrounding. Buildings are thus the major pollutants that affect the urban air quality and contribute to climate change. Buildings are the major consumers of energy during their construction, operation and maintenance.

Euphrasia Training College management has developed an ecological design in their buildings and adopted minimum negative impact on ecosystem. Their approach to the constructional activities consciously is to conserve energy and ecology and avoid the adverse effects of ecological damage.

Euphrasia Training college management constructed the building to optimum utilisation of land and classrooms and with abundant light and natural ventilation. Maximum day light ingression and natural ventilation increases the indoor air quality and avoid the sick building syndrome. The whole facility and buildings are designed to maximum and optimum utilisation of land without affecting the nature. They give the maximum open spaces in the front areas, sufficiβentn spaces in the class rooms and open verandas. The stair cases provided also have sufficient spaces for easy movement without any congestion.

1. CARBON DIOXIDE LEVELS

Air quality is a major area of concern inside a building. The percentage share of oxygen and carbon dioxide should be such that the occupants are able to perform their tasks without any discomfort. This is generally done through a provision of fresh air duct for the air conditioning systems or by providing windows. Numerous factors need to be considered for the design and fabrication of the fresh air supply system like the number of occupants, weather pattern and air quality of the location, and so on. For the human comfort, production of carbon-dioxide (CO_2) within a building space is the prime area of consideration. This is associated with respiration which produces CO_2. As a result, the carbon-dioxide levels will increase if ventilations are not provided.

As per various standards (like the ASHRAE Standard 62.1-2016), indoor CO_2 concentrations up to 1200 ppm is considered acceptable. For a typical outdoor condition, this value may change from 300 to 500 ppm.

The measurements were recorded along different locations inside the campus and the peak values are given in the following sections. The key concentration was on the study of carbon dioxide levels.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

TABLE 2: CARBON DIOXIDE LEVELS

Sl. No.	AREA	Measured CO2	Standard CO2 level (Range)	Remarks
		Main Block		
1	Administrative Office	550	300-500	Good
2	Principals room	500	300-500	Good
3	Seminar Hall	520	300-500	Good
4	Media room	510	300-500	Good
5	Class room in ground floor	525	300-500	Good
6	Lab	520	300-500	Good
7	Class room in first floor	580	300-500	Good
8	Mathematics lab	640	300-500	Good
9	Library	660	300-500	Good
10	Rest room	650	300-500	Good
11	Sports room	**550**	**300-500**	Good

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

2. HERBAL GARDEN

The literal meaning of Ayurveda is "science of life," because ancient Indian system of health care focused on views of man and his illness. It has been pointed out that the positive health means metabolically well-balanced human beings. Ayurveda is also called the "science of longevity" because it offers a complete system to live a long healthy life. It is an interactive system that is user-friendly and educational. It teaches the patient to become responsible and self-empowered. It is a system for empowerment, a system of freedom, and long life. A significant part of knowledge and tradition is currently being eroded due to modernization, acculturation and availability of alternatives. Therefore, it is urgent to inculcate young minds to realize the fascinating knowledge and tradition associated with these resources, and help them understand the immense potentials the Kerala medicinal plants possess for the future.

The "Promoting Herbal Gardens in Schools and colleges" has been a fun-filled learning activity for the students where they got the opportunity to learn about the medicinal plants by actually planting the medicinal herbs and watching them grow in their gardens, and by exploring information about them from various sources.

The task of making the garden itself has been enriching in terms of making students realize the importance of teamwork such as detailed planning, and allocation of tasks within a team. For the teachers, herbal garden project has been useful in terms of ease with which they could integrate the concept with other subject matter activities, such as writing essays, poems and stories, making posters, drawing and painting, making herbariums, and even preparing food recipe using some of the culinary herbs students have planted in their gardens. Kerala Government is also making lot of initiatives to developing and inculcating the herbal gardens in schools and colleges.

Recommendation

Develop and nurture herbal garden in the college in the open area in the side of college. Maintain the herbal garden in plastic pots due to the slightly consented water and soil . The area is heavy prone for water logging.

3. LEISURE PARK

Open atmosphere will reduce the academic stress developed among the students which will well understand by Euphrasia Training college management and they develop little natural open space in the college. This open ventilated space is useful foe open debate and fruitful discussion and developed an informal education among students.

Euphrasia Training College for Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

Figure 3 LEISURE PARK

4. NAKSHRAVANAM (STAR GARDEN)

In Vedic astrology, the zodiac is divided into 27 Nakshatras or stars. An individual is born under a particular star, known as his or her birth star. From ancient times, particular trees have been associated with birth stars. The concept of Nakshatra Vanam involves the planting of these trees in a nurturing them.. Gardening can provide students with hands-on learning opportunities while increasing environmental awareness and vital experience in problem-solving.

Every student and staff has a birth star which is related to a tree, animal and bird in Nature. Gardens area wonderful way to use the college campus as a classroom, reconnect students with the natural world and the true source of their food, and teach them valuable gardening and agricultural concepts and skills that integrate with several subjects ,such as math, science, art ,health and physical education, and social studies, as well as several educational goals, including personal and social responsibility

Sl No:	Star Name	Tree Name	Botanical Name
1	**Aswathy**	Kanjiram	*Strychnosnux-vomica*)
2	**Bharani**	Nelli	*Emblicaofficinalis*)
3	**Karthika**	Aathi	Ficusracemosa
4	**Rohini**	Njaval	*Syzygiumcumini*)
5	**Makayiram**	Karngali	*Acacia catechu*)
6	**Thiruvathira**	Karimaram	*Diospyrosebenum*)

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

7	**Punartham**	Mula	*Bambusabambos*]
8	**Pooyam**	Arayal	*Ficusreligiosa*]
9	**Ayilyam**	Nangu	*Mesuaferrea*]
10	**Makam**	Plassu	*Butea monosperma*]
11	**Uthram**	Ithi	*Ficustinctoria*]
12	**Atham**	Ambazham	Spondiaspinnata
13	**Chithira**	Koovalam	Aegle marmelos
14	**Chothi**	Nerrmaruthu	Terminalia arjuna
15	**Visakham**	VayamKaitha	Flacourtiajangomas
16	**Anizham**	Elanji	*Mimusopselengi*]
17	**Triketta**	Vetti	Aporusalindleyana
18	**Moolam**	Vella Pine	Vateriaindica
19	**Pooradam**	Vanchi	Salix tetrasperma
20	**Uthradam**	Plavu	Artocarpusheterophyllus
21	**Thiruvonam**	Erukku	Calotropisgigantea
22	**Avittam**	Vanni	Prosopisjuliflora
23	**Chathayam**	Kadambu	Anthocephaluscadamba
24	**Pooruttathy**	Mavu	Mangiferaindica
25	**Uthrattathy**	Karimbana	Borassusflabellifer
26	**Revathi**	Elippa	Madhucalongifolia

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

Figure 4 RECOMMENDED SPACE FOR NAKSHTRAVANAM

Recommendation

The star garden can be structured as in this area. The large trees are can be planted in the open spaces in the college instead of planting in limited space. The NSS and students related their star can be made into custodian of the corresponding there star trees.

Principal
Euphrasia Training College For Women
Kattoor

Euphrasia Training College For Women
Kattoor - 680 702

5. VEGETABLE GARDEN

It is a garden that exists to grow vegetables and other plants useful for human consumption. Gardening can provide students with hands-on learning opportunities while increasing environmental awareness and vital experience in problem-solving. The school gardens are changing the eating habits of the students

Gardens are a wonderful way to use the college campus as a classroom, reconnect students with the natural world and the true source of their food, and teach them valuable gardening and agriculture concepts and skills that integrate with several subjects, such as math, science, art, health and physical education, and social studies, as well as several educational goals, including personal and social responsibility.Theygain self-confidence and a sense of "capableness" along with new skills and knowledge in food growing — soon-to-be-vital for the 21st century students become more fit and healthy as they spend more time active in the outdoors and start choosing healthy foods over junk food.

6. SILENT ZONE

Nowadays, silent zones are getting important in academic institutions. Noise pollution leads to stress and other medical and neurotic problems in children. Besides, creativity and knowledge absorption capacity is also going down. For reduction of academic stress level there is palace for complete relaxation .This is the importance of silence zone. Euphrasia College has have certain silent zones in the college itself. Natural silence zones are also created in the college campus where there is no sound other than natural sound

Figure 5 SILENT ZONE

Euphrasia Training College ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

7. LIST OF TREES IN THE CAMPUS

Trees release oxygen when they use energy from sunlight to make glucose from carbon dioxide and water. Like all plants, trees also use oxygen when they split glucose back down to release energy to power their metabolisms. Averaged over a 24-hour period, they produce more oxygen than they use up; otherwise there would be no net gain in growth.

The college campus is divided into various locations for listing out the trees. The college campus contains 10 various species.

Advantages of trees

1. Maintain the equilibrium of air and food: Humans and animals need food and oxygen and excrete carbon dioxide and water. The plants, algae, etc, in the forest use carbon dioxide and water and release or produce oxygen and food.
2. Filter and store water, and drastically reduce storm-water runoff: Forests filter and regulate the flow of water. The litter over the forest floor acts as a sponge which filters, stores and gradually releases the water to natural channels and ground water.
3. Conserve valuable topsoil and reduce soil erosion: A forest is like a protective green cloth over Mother Earth's fragile body.
4. Conserve biodiversity and balance ecology: In a natural environment, the populations of species are balanced to an optimum minimum level
5. Reduce pollution: Plants can remove and/or Phyto remediate pollutants and contaminants from soil and water.
6. Arrest or reverse global warming: Global warming can cause extinction of species, tropical cyclones, extreme weather, tsunamis, abrupt climatic change, sea level rise, increased human stress resulting in violence, etc. These are just a few of its catastrophic effects. Plants can lock CO2 in their bodies to save our planet and the life on it.

Euphrasia Training College For Women ★ Kattoor - 686 702 ★

Principal
Euphrasia Training College For Women
Kattoor

1. OPEN GROUND

Education is incomplete without sports and games. Sports and games **are beneficial in teaching us punctuality, responsibility, patience, discipline, and dedication towards our goal.** The importance of games and sports in student's life is immense. It has proved to be very therapeutic in nature. Sports help improve stronger social skills, such as dispute management and sport-based interaction. **Sports inculcate the feeling of fairness in a child and it encourages them to be committed, taking defeat in a positive manner.** It teaches us to be joyful, united, and appreciative in life. Students are the youth of our Nation, and they need to be energetic, physically active, and mentally fit. By understanding he responsibility to make its students as healthy Euphrasia Training College management built and maintained football ground, cricket ground in a greenery surroundings.

Figure 6 OPEN GROUNDS

Euphrasia Training College For Women * Kattoor - 680 702 *

Principal
Euphrasia Training College For Women
Kattoor

1. WATER CONSERVATION AND AUDIT

The requirement of water for the college met by supply from one Open wells. And gardening and other outside requirements water from the pond is used. . The water from OPEN well are collected in THREE tanks of capacity of 3 KL synthetic tanks. The water from different wells are checked in an accredited laboratory in time to time to ensure its portability

Figure 7 FISH POND

WATER UTILITIES

The labs have the highest tap points whereas the toilet accounts for the major consumption. The water outlet points in the college campus and hostel are listed in the following table

Table 3 WATER USING TAPS

Location	No: of taps
Washing area taps	12
Toilets	14
Flushes	12
College compound and garden	04
Staff and other rooms	5
Total	47

Euphrasia Training College For Women ★ Kattoor - 680 102 ★

Principal
Euphrasia Training College For Women
Kattoor

GROUND WATER RECHARGING

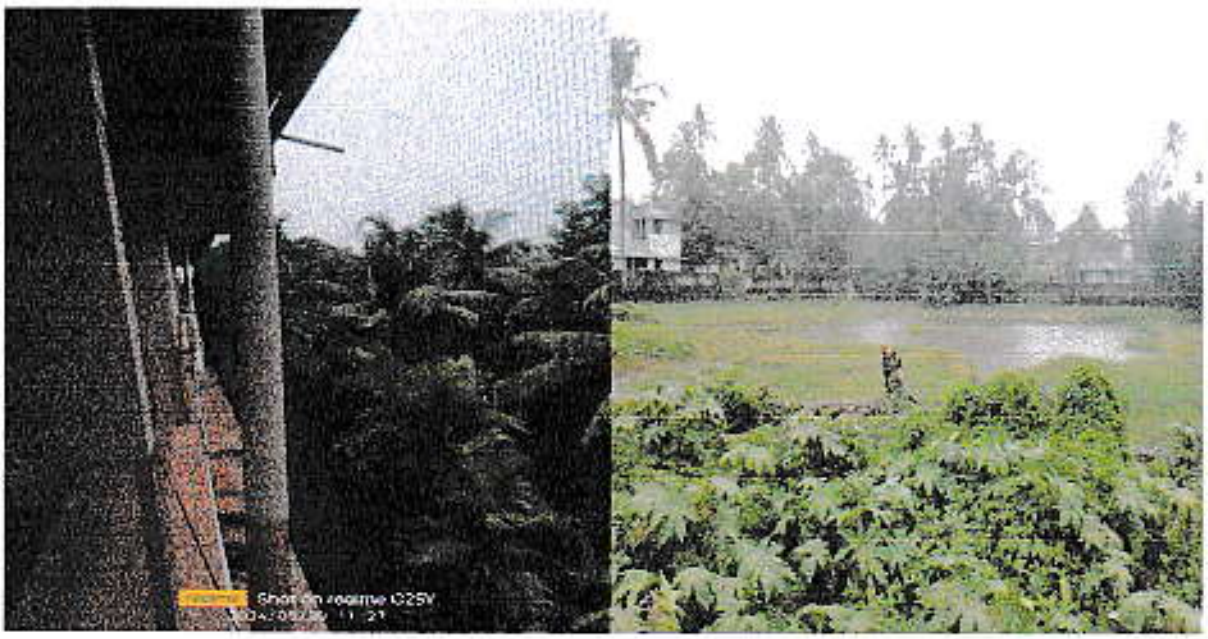
Rainwater harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). One method of rainwater harvesting is rooftop harvesting. With rooftop harvesting, most any surface — tiles, metal sheets, plastics, but not grass or palm leaf can be used to intercept the flow of rainwater and provide a household with high-quality drinking water and year-round storage. Other uses include water for gardens, livestock, and irrigation, etc.

Rainwater harvesting for ground water recharge.

Aim and Objectives:

- Conservation of rainwater for future use
- To use rainwater for gardening Activity: Conservation of rainwater in soil or in a container is known as rainwater harvesting.

The rainwater from entire college campus and roof top of building is collected through PVC pipe s and feed into ground at four locations in the campus and details are given below table The entire rain water is directed two type open pond in the college campus for storing and for natural penetration to the earth.



Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

CONCLUSION:

Green Audit is the most efficient & ecological way to solve such an environmental problem. Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). The green audit reports assist in the process of attaining an eco-friendly approach to the development of the college.

The auditors observed during the campus visit and after the conversation with the staff and students of M/s Euphrasia Training College Management have taken many initiatives for maintaining the over the campus which is being well appreciated by us. There is still opportunity to attain the perfection some of the identified suggestions are listed in the executive summary.

Principal
Euphrasia Training College For Women
Kattoor

Euphrasia Training College For Women
Kattoor - 680 702

ANNEXURE-1

GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT

GRIHA CERTIFIED PROFESSIONAL CERTIFICATE

This is to certify that

Ashok K M P

has qualified as a **GRIHA** Certified Professional For V. 2015

Date of issue: 19th June 2020

Note : This certification is valid only for GRIHA version 2015.

Chief Executive Officer
GRIHA Council

Euphrasia Training College For Women * Kattoor - 680 702 *

Principal
Euphrasia Training College For Women
Kattoor

Athul ENERGY CONSULTANTS

Athul Energy, we stand for Quality, Reliability and Efficiency

No: AEC/GAC/24-04

15-05-2024

Audit Certificate

This is to certify that **M/s Euphrasia Training College for Women Kattoor, Thrissur** have successfully completed the **Energy Audit** of their buildings and campus conducted on 08th & 09th May 2024 for the Academic year 2023-2024. They have submitted all necessary data and credentials for scrutiny.

We, **Athul Energy Consultants Pvt Ltd,** Thrissur congratulate the Management, Executive Director, Principal, staff members and students for the successful completion and participation in the audit report process.

ATHUL ENERGY CONSULTANTS PVT LTD THRISSUR 680 020

Managing Director

Athul Energy Consultants Pvt Ltd

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal

Euphrasia Training College For Women

Kattoor

Athul Energy Consultants Pvt Ltd
CIN: U74999KL2016PTC046898
info@athulenergy.com
www.athulenergy.com

Registered Office:
4/2, Capital Legend Building
Korapath lane, Round-North
Thrissur-680020, Kerala
+91 7356111990

Branch Office:
F-7, James Square
Asian paint Chowkady, GIDC
Ankleshwar-393002, Gujarat
+91 7356111991

ENERGY AUDIT – 2024

EUPHRASIA TRAINING COLLEGE FOR WOMEN

KATTOOR, KERALA

Conducted By

ATHUL ENERGY CONSULTANTS PVT LTD

4th Floor, Capital Legend Building,
Korappath Lane, Round North, Thrissur, Kerala-680020
Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

MAY 2024

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

TABLE OF CONTENTS

Euphrasia Training College for Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

LIST OF TABLES

LIST OF FIGURES

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ACKNOWLEDGEMENTS

We express our sincere gratitude to **Euphrasia Training college for women, Kattoor** for giving us an opportunity to carry out an Energy Audit. We are extremely thankful to the management and staff for their support throughout the audit process. The onsite visit for the energy audit was conducted on 20th May 2024.

College Team

1	Dr. Sr. Vimala	Manager
2	Dr. C Salim Kumar	Principal
3	Sr. Leena C P	IQAC Coordinator

Yours faithfully

ATHUL ENERGY CONSULTANTS PVT LTD THRISSUR 680 020

Authorised signatory
Athul Energy Consultants Pvt Ltd

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

GENERAL DETAILS – COLLEGE

The general details of the college are given in the table below

Sl. No:	Particulars	Details
1	Name of the College	Euphrasia Training College for Women
2	Address	Kattor (P.O), Irinjalakuda - (VIA), Thrissur District, Kerala - 680 702
3	Contact Number & E mail of the college	0480-2877364 euphrasiatrg@gmail.com
4	Web site	euphrasiatrainingcollege.org
5	Type of Building	Educational Institution
6	Annual Working Days	210
7	No: of students enrolled	100
8	No: of teaching & non-teaching staff	17
9	Total Built Up area	1599.99 Sq. m
10	Average power consumption per month. (kWh/month)	254
11	Average electricity charges per month. (Rs. /month)	7883

FIGURE 1: COLLEGE BUILDING

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

EXECUTIVE SUMMARY

1. PRESENT ANNUAL ENERGY CONSUMPTION

The present annual energy consumption has been analysed with the available data from the facility for the period April 2023- March 2024.

TABLE 1: ANNUAL ENERGY CONSUMPTION

Particulars	Unit	Gross calorific value (kCal)	Values	Toe	% of distribution
Electricity	kWh	860	3042	0.26	88.8
Petrol	Kg	11100	30	0.03	11.2
Total				**0.29**	**100.0**

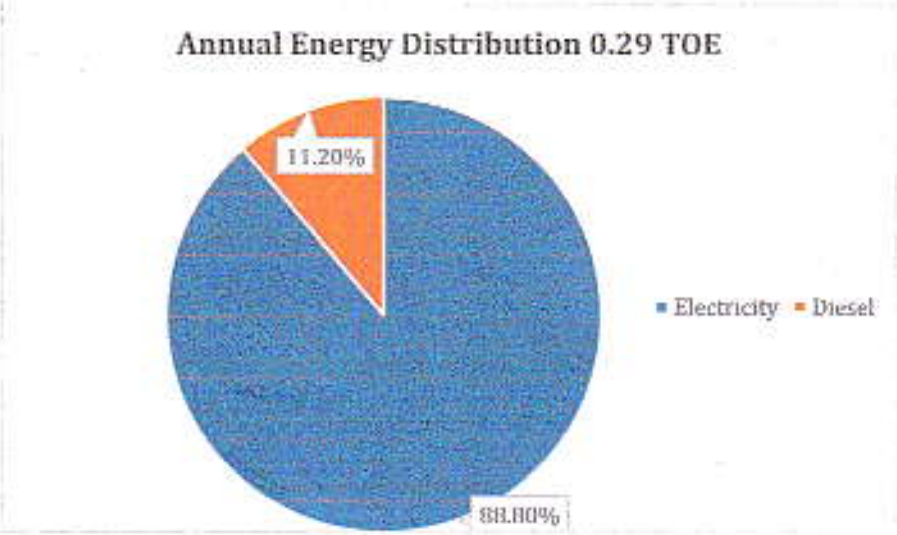


FIGURE 2: ANNUAL ENERGY DISTRIBUTION

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

2. ANNUAL ENERGY COST

Annual cost for energy consumption during April 2023- March 2024 is given in table below.

TABLE 2: ANNUAL ENERGY COST

Particulars	Unit	Rs/unit	Values	Rs in lakhs	% Of distribution
Electricity	kWh	8.97	3042	0.27	88.4
Petrol	litres	105	34	0.04	11.6
Total				0.31	100.0

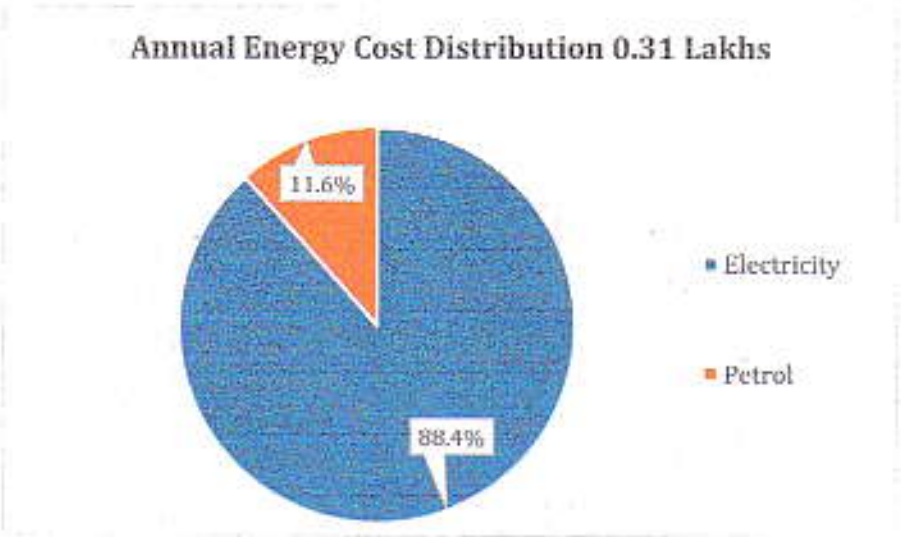


FIGURE 3 : ANNUAL ENERGY COST DISTRIBUTION

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

3. ENERGY CONSERVATION MEASURES

The following table shows the energy conservation measures and renewable energy integration possibility in the college its energy savings, financial savings & the payback period against the investment.

TABLE 3: ENERGY CONSERVATION MEASURES

Sl.	*Energy conservation measures*	*Annual Energy Savings*	*Annual Financial Savings*	*Investment*	*Simple payback period*
		kWh	*Rs*	*Rs*	*Months*
1	*Replacement of old ceiling fans with BLDC fans*	*806*	*7,233*	*42,000*	*70*
Total Savings		*806*	*7,233*	*42,000*	*70*
Sl	*Renewable energy integration*	*Annual Energy Savings*	*Annual Financial Savings*	*Investment*	*Simple payback period*
		kWh	*Rs*	*Rs*	*Year*
1	*Installation of 03kW on- grid solar PV system*		*25,786*	*1,65,000*	*6.40(Years)*

3. AUDIT SUMMARY - ACTIONS

TABLE 4: AUDIT SUMMARY - ACTIONS

Sl No:	Particulars	Location	Action to be taken	Remarks
1	Energy efficiency – Replacement of ceiling fans with BLDC fans	Office, staff rooms, Classrooms	Change the existing old ceiling fans with BLDC fans	Power Consumption will get reduced
2	Installation of 03kW on-grid solar System	Rooftop	Solar plant can be installed	Energy charges would reduce

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

4. ENERGY PERFORMANCE INDEX

Energy performance index (EPI) was based on the energy consumption in the period **Aril 2023-March 2024,** is summarised in the table below.

TABLE 5: ENERGY PERFORMANCE INDEX

Energy Performance and climate impact	Unit	Baseline	Projection
Annual Electricity Consumption	kWh/annum	3042	2,336
	TOE/annum	0.26	0.20
	CO_2 emission (Tons)	2.40	1.85
Annual petrol consumption	kg/annum	30	30
	TOE/annum	0.033	0.033
	CO_2 emission (Tons)	0.069	0.069
Built up area	m2	1,599.99	1,599.99
Specific Electricity consumption	kWh/m²/annum	1.90	1.5
Specific Electricity consumption	TOE/m²/annum	0.0002	0.0001
Specific Fuel consumption	TOE/m²/annum	0.0000	0.0000
Energy performance index	TOE/m²/annum	0.0002	0.0001
Annual energy cost	Rs in Lakhs/annum	0.270	0.198
Carbon footprint – net (all energy input)	CO_2 emission (Tons)	2.47	1.91
Specific carbon footprint	CO_2 emission (Tons)/m²/annum	0.002	0.001

Tonne of oil equivalent (TOE) — *1 TOE = 10 million kCal*

CO_2 conversion

Petrol — *1kg of HSD = 2.31 kg of CO_2 at 11100 kCal/kg of HSD*

Electricity — *0.79 kg CO_2 per unit of electricity at 860 kCal/kWh*

Euphrasia Training College For Women ★ Kattoor - 688 702 ★

Principal
Euphrasia Training College For Women
Kattoor

INTRODUCTION

ABOUT ATHUL ENERGY CONSULTANTS (AEC)

Athul Energy Consultants Pvt Ltd (AEC) is an Accredited Energy Auditing Firm (AEA) recognized by BEE and also empaneled with Energy Management Centre (EMC), Govt of Kerala. Established in 2010 as Athul Engineering Systems and Energy Consultants, (AEC since 2016), is one of the leading consultancy firms concentrating mainly in Energy and safety audits across pan India. The motto of AEC is to deliver services at quality and in time. The basic priority given is for energy conservation and sustainable development.

AEC has wide experience in the energy audit sector and have conducted the same in Chemical, Textile, Steel, petrochemical, ruhber, mines, food and beverages, DISCOM and buildings, hotels, hospitals, air ports, institutions etc. The safety audits are another sector in which the AEC has experience and have conducted more than 3000 safety audits in the banks, industries and buildings such as hotels, hospitals. AEC specialized in finding root cause of chronic issues pertinent in industries.

AEC have conducted various power quality audit in many industries as in industries, IT sector, hotels, hospitals, testing laboratories, solar installations, banking institutions etc. Conducted more than 200 studies in its portfolio

NAME AND DETAILS OF ENERGY AUDIT TEAM MEMBERS

The contact details of energy audit team from AEC are given in the table below.

TABLE 6: CONTACT DETAILS OF ENERGY AUDIT TEAM

Sl	Name	Certification	EM/EA/AEA/ Registration	Phone no	Email
1	Santhosh A	• Accredited Energy Auditor	AEA-0275	7356111990	santhosh@athulenergy.com
2	Harikrishnan K	• Certified Energy Manager	EM-11755/23	7356111996	hari@athulenergy.com

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

BACKGROUND

ENERGY AUDIT

An energy audit is a key to assessing the energy performance of an energy consuming facility and for developing an energy management program. The typical steps of an energy audit are:

- Preparation and planning
- Data collection and review
- Plant surveys and system measurements
- Observation and review of operating practices
- Data documentation and analysis
- Reporting of the results and recommendations

1.1. Definition of energy auditing

In the Indian Energy Conservation Act of 2001 **(BEE 2008)**, an energy audit is defined as: **"The verification, monitoring and analysis of the use of energy and submission of technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption."**

1.2. Objectives of Energy Auditing

The objectives of an energy audit can vary from one plant to another. However, an energy audit is usually conducted to understand how energy issued within the plant and to find opportunities for improvement and energy saving. Sometimes, energy audits are conducted to evaluate the effectiveness of an energy efficiency project or program. In college as per the request from the institution, we have assessed the energy consumption and saving opportunities at present scenario.

Methodology for the study

The methodology adopted for energy audit starts from historical energy data analysis, power quality analysis, monitoring of operational practices, system evaluation, cost benefit analysis of the energy conservation opportunities, and prepare plan for implementation. The proposals given in the report includes economical energy efficiency measures to reduce facilities unnecessary energy consumption and cost. The energy conservation options, recommendations and cost benefit ratio, indicating payback period are included in this report.

Scope of Work

The Scope of Work includes:

1. Historical energy data analysis.
2. Power Quality Analysis.
3. Identification of Energy saving opportunities.
4. Cost Benefit Analysis

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

FACILITY DESCRIPTION

ABOUT EUPHRASIA TRAINING COLLEGE FOR WOMEN

Euphrasia Training College for women, Kattoor is a self-financing college of education for conducting B.Ed course, which is affiliated to the University of Calicut and recognized by the NCTE. It is situated in the Heart of Kattoor Panchayath, Mukundapuram Taluk, in Thrissur Dt. Kerala State. It is organized and managed by CMC Udaya Province Irinjalakuda. College started its functioning on 20th July 2005 and was formally inaugurated 4th March 2006, by Mar James Pazhayattil, Bishop of Irinjalakuda. It was started One year B.Ed course with six Optional subjects in the year 2005 and 2015 onwards college has two year B.Ed course for five optional subjects.

VISION

To uplift women for the betterment of the society; to train them to be responsible teachers of tomorrow, with apt skills and strong ethical values and to kindle the light & life to the younger generation & love to the fellow beings

MISSION

To mould outstanding teachers with high social commitment and radiate moral and spiritual values by providing quality education and systematic training.

MOTO

Light and Life

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

UTILITY FLOW DIAGRAM

This section shows the hasic single line diagram of the major utilities

ELECTRICITY

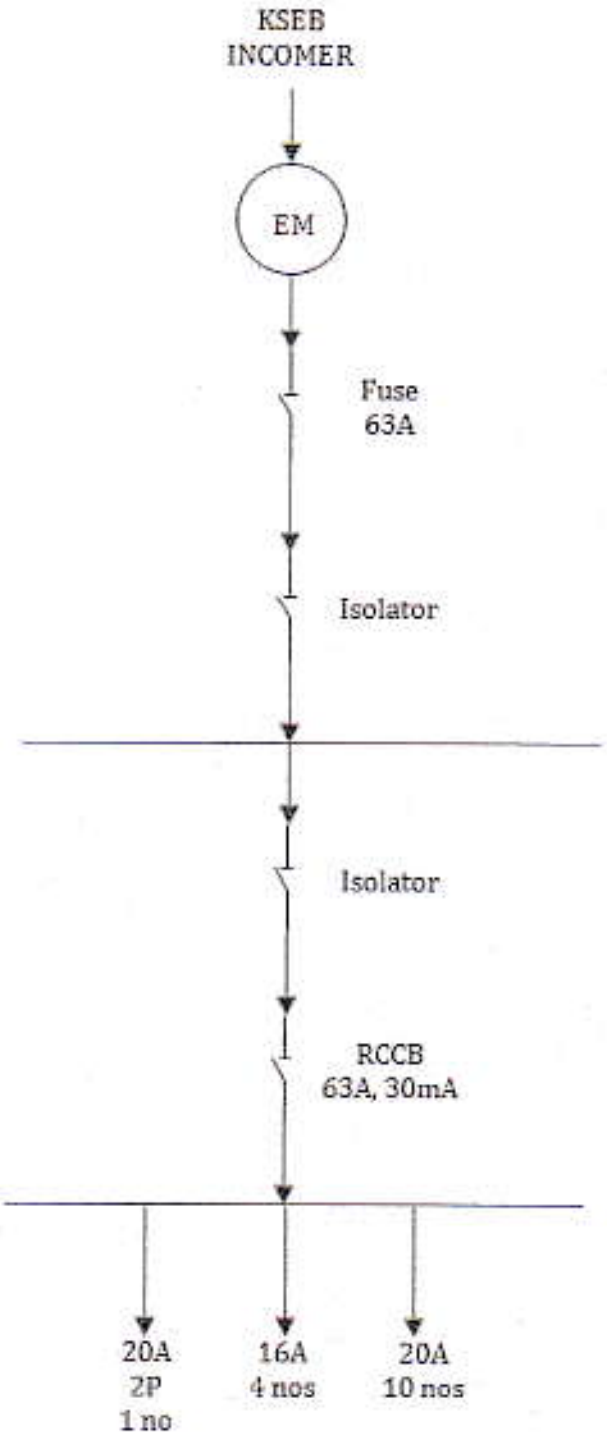


FIGURE 4: SINGLE LINE DIAGRAM

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

WATER FLOW DIAGRAM

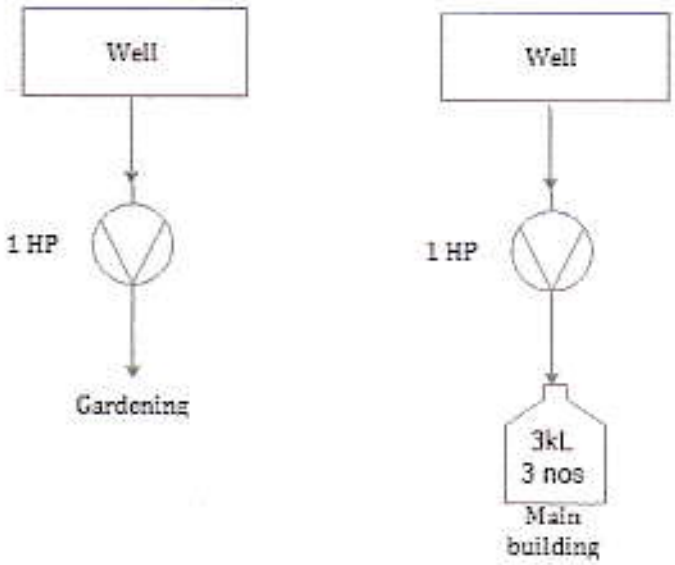


FIGURE 5: WATER FLOW DIAGRAM

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

HISTORICAL ENERGY CONSUMPTION ANALYSIS

The major energy that is presently being used in the college are:

1. Electricity
2. Petrol (Generator)

This section analyses the consumption of each energy in the facility for the period **April 2023 – March 2024**

ELECTRICITY CONSUMPTION ANALYSIS

This section gives the detail analysis of electricity consumption in the building.

BASELINE DATA & CONSUMPTION: 12 MONTHS

The electricity baseline data, based on the bills, and the recorded, is summarized in the table below.

Particulars	
Consumer No	1156430015334
Electrical section	Kattoor
Approved connected Load (Kw)	9.67
Measured connected load	11
Tariff	LT-6F/Three
Average bimonthly consumption (kWh)	507
Average bimonthly electricity charges (Rs)	7883

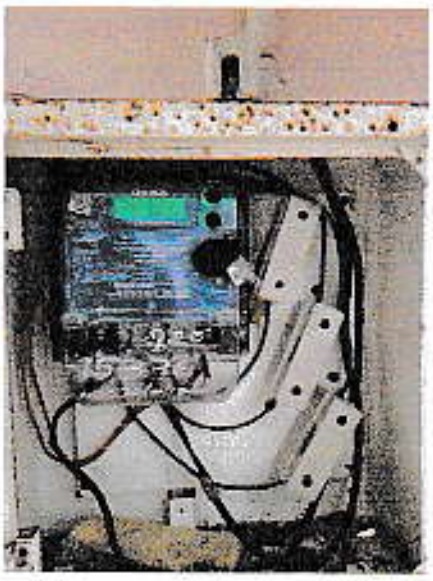


FIGURE 6: ENERGY METER

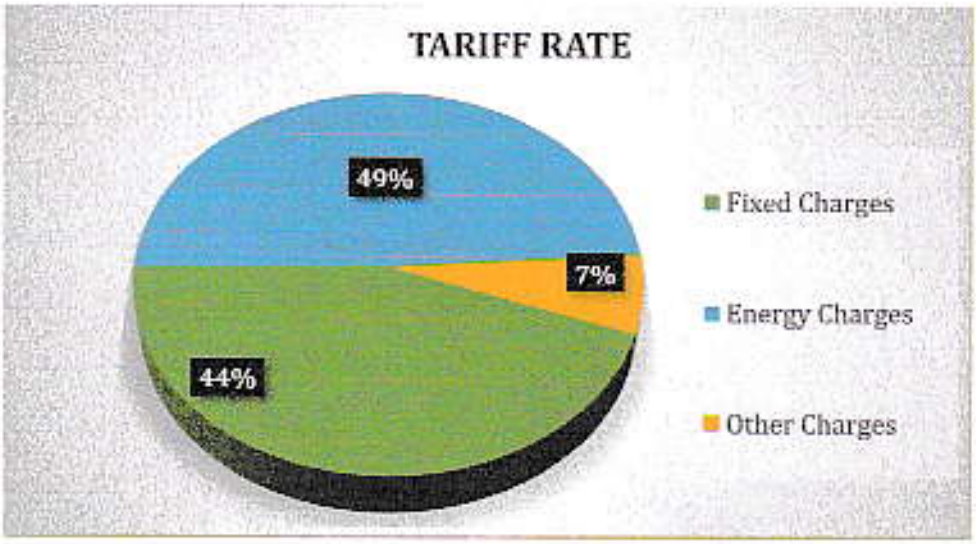
Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal

Euphrasia Training College For Women
Kattoor

TARIFF RATE ANALYSIS

The average monthly energy and Fixed charges for the period Apr 2023 - Mar 2024 is represented in Fig.



SPECIFIC ELECTRICITY CONSUMPTION

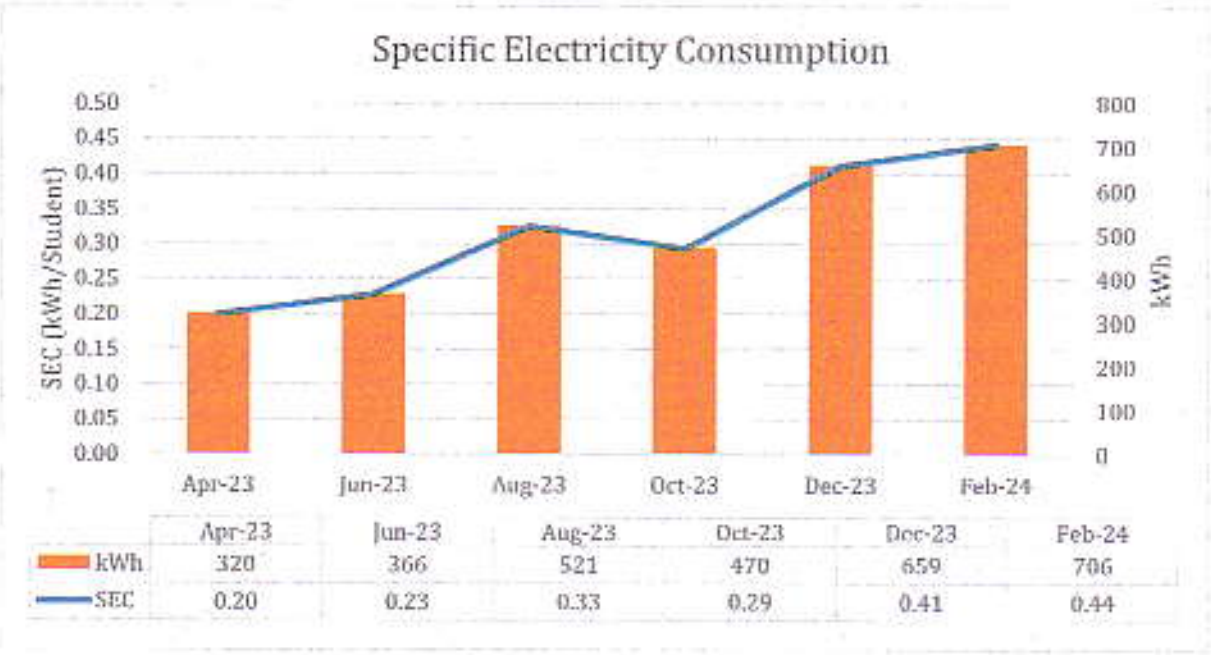
The electricity consumption from April 2023 to March 2024 has been used for benchmarking. The comparison is made based on electricity consumption, the number of students, and the building area. The table below shows the specific electricity consumption of the college.

TABLE 7: SPECIFIC ELECTRICITY CONSUMPTION

Month	Electricity Consumption	Number of Students	Building Area	SEC	SEC
	kWh	Number	m^2	kWh/Student	kWh/ m^2
Apr-23	320	100	1599.99	3.20	0.20
Jun-23	366	100	1599.99	3.66	0.23
Aug-23	521	100	1599.99	5.21	0.33
Oct-23	470	100	1599.99	4.70	0.29
Dec-23	659	100	1599.99	6.59	0.41
Feb-24	706	100	1599.99	7.06	0.44
Average	**507**	**100**	**1600**	**5.07**	**0.32**
Annual Specific Electricity consumption				**30.4**	**1.90**
Annual Electricity Consumption (kWh)				**3042**	

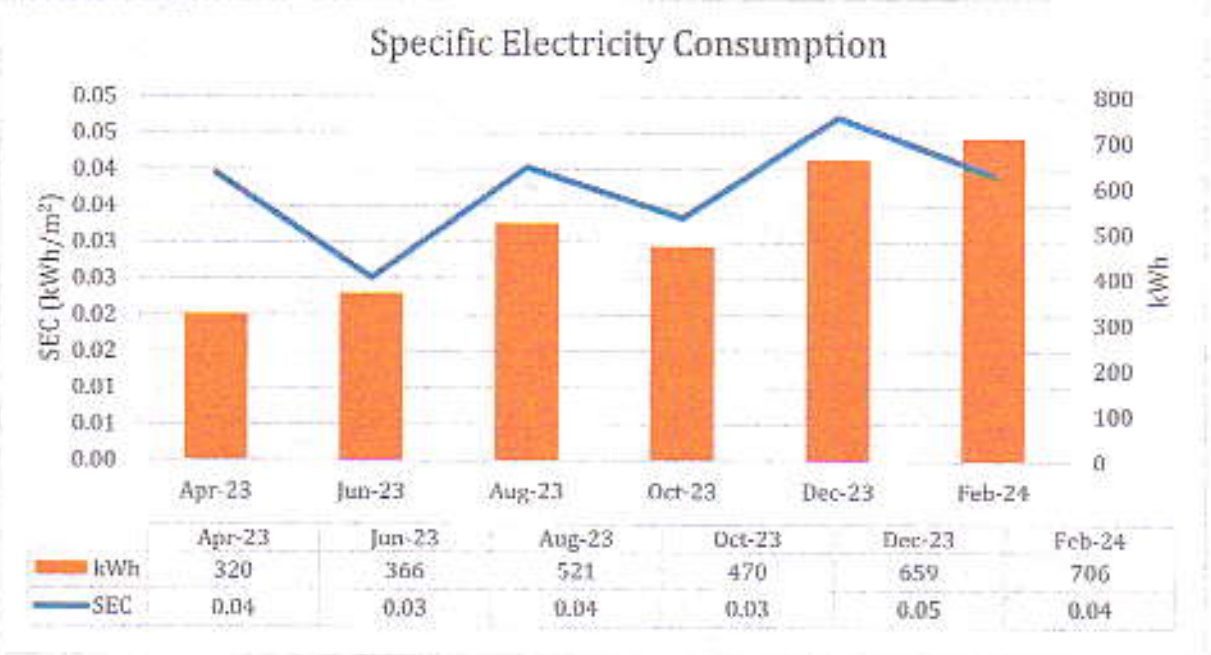
Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor



	Apr-23	Jun-23	Aug-23	Oct-23	Dec-23	Feb-24
kWh	320	366	521	470	659	706
SEC	0.20	0.23	0.33	0.29	0.41	0.44

FIGURE 7: SEC (KWH/STUDENT)



	Apr-23	Jun-23	Aug-23	Oct-23	Dec-23	Feb-24
kWh	320	366	521	470	659	706
SEC	0.04	0.03	0.04	0.03	0.05	0.04

FIGURE 8: SEC (KWH/M²)

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

PETROL CONSUMPTION ANALYSIS

Petrol is utilized as fuel for the generator. The petrol consumption was found to be lower last year. The approximate petrol consumption over the past year is given below.

TABLE 8: DIESEL CONSUMPTION - SUMMARY

Annual consumption (L)	Calorific value (kcal/kg)	Tonne of Oil Equivalent (TOE)
34	11100	0.04

Calorific value of Petrol is 11100 Kcal/kg and 1 TOE means 10000000 Kcal.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ANALYSIS OF MAJOR EQUIPMENT

This section analysis the major equipments in the college

GENERATOR

The college employs a petrol generator with a capacity of 2.1 kVA as a backup power supply. The details about the generator can be found in the table provided below:

TABLE 9: DIESEL GENERATOR

KVA	Fuel	Make
2.1	Petrol	Honda

UNINTERUPPTED POWER SUPPLY

An uninterruptible power supply, UPS is an electrical apparatus that provides emergency power to a load when the input power source fails. The table describes the ups/inverter in the college.

Location	UPS Details		Battery Details	
	Rated KVA	Make	Make/Type/Nos	Volt/Ah
ICT Resource Centre	2	Hi- Power	On & On/Tubular/2	12/100
Terrace	3	-	Tubular/2	12/100

Principal
Euphrasia Training College For Women
Kattoor

Euphrasia Training College For Women
Kattoor - 680 102

LIGHTS AND FANS

The lights and fans are provided in various rooms and areas of the building to improve human comfort conditions. The details of the lights in the college are given below

TABLE 10: LIGHTS

Particulars	Wattage (W)	Total nos	Net kW
LED Tube	20	28	0.56
LED	20	4	0.08
LED	12	1	0.01
LED	9	16	0.14
LED	6	1	0.01
LED	9	5	0.05
Total kW			**0.8**

The installed Fan load details of the facility is as given in table shown below. The types of fans installed in the building include ceiling fans, wall fans, exhaust fans and pedestal fans.

TABLE 11: FANS

Particulars	Wattage (W)	Total nos	Net kW
Ceiling Fan	60	50	3.00
Exhaust Fan	120	1	0.12
Total kW			**3.12**

Inference

I. All the lights are energy efficient LED lights.

II. Continuous working conventional fans can be replaced with energy efficient BLDC fans

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

OFFICE AND OTHER EQUIPMENTS

The other major loads in the facility are as summarized in the table below.

TABLE 12: OFFICE AND OTHER EQUIPMENTS

Particulars	Power (W)	Quantity	Total Power (kW)
RO	60	1	0.06
PC	110	19	2.09
Smart board	120	5	0.60
Induction cooker	1500	1	1.50
Refrigerator	200	1	0.20
Printer	200	3	0.60
Xerox	500	1	0.50
Pump	745	2	1.49
Total Power kW			**7.0**

CONNECTED LOAD SUMMARY

This section provides an idea of the total connected load distribution within the system. The table below illustrates the division of connected loads.

TABLE 13: CONNECTED LOAD SUMMARY

Particulars	Power (kW)	Percentage share
Light Load	0.8	7.7
Fan Load	3.1	28.3
Office and other equipments	5.6	50.4
Water Pumps	1.5	13.5
Total Power (kW)	**11**	**100**

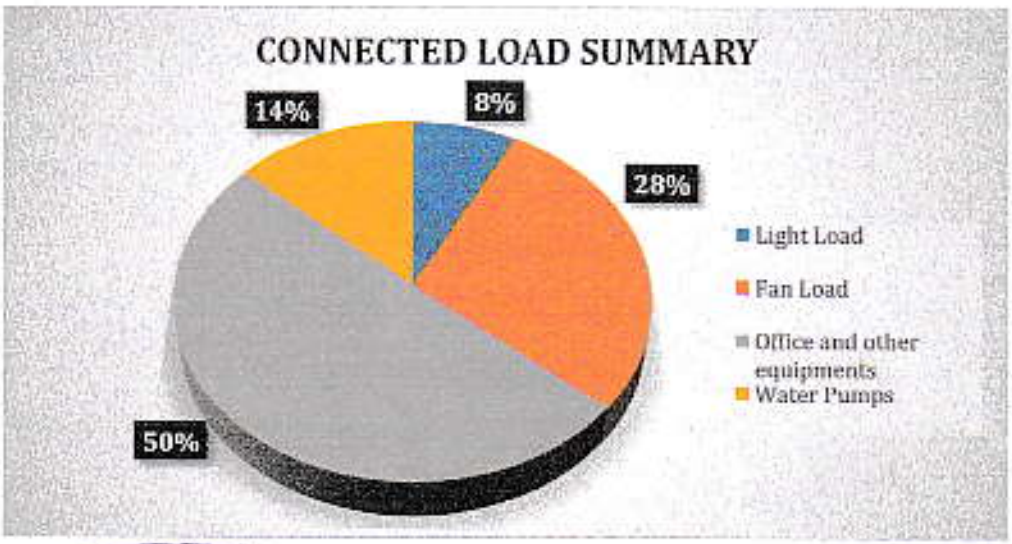


FIGURE 9: CONNECTED LOAD SUMMARY

Euphrasia Training College For Women ★ Kattoor - 680 302 ★

Principal
Euphrasia Training College For Women
Kattoor

ANNEXURE-1

ENERGY CONSERVATION MEASURE - 1

REPLACEMENT OF OLD CEILING FANS WITH BLDC FANS

Background

A BLDC fan takes in AC voltage and internally converts it into DC using SMPS. The main difference between BLDC and ordinary DC fans is the commutation method. All the fans used in the building are ordinary fans.

Proposal

Replace the ceiling fans with BLDC in areas such as staff rooms, principal room, class room etc. Detailed calculation is shown in the table given below.

TABLE 14: ECM 1

Particulars	Unit	Value
Present Power Consumption	Watts	60
Proposed Power Consumption	Watts	28
Reduction in power	Watts	32
Operating hours per day	Hrs/day	8
No: of working Days	days/annum	210
No: of fans operating	Nos	15
Annual energy savings	kWh/annum	806
Cost per kWh	Rs	8.97
Annual Financial Saving	Rs/annum	7,233
Cost of BLDC fan	Rs	2,800
Investment	Rs	42,000
Simple payback period	**Months**	**70**

Replace as and when existing fans reach end of life

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

INSTALLATION OF 3kW On- grid Solar PV System

Background

The college has ample free space at the rooftop with sunlight throughout the day. The solar energy potential in India is immense due to its convenient location near the Equator. India receives nearly 3000 hours of sunshine every year, which is equivalent to 5000 trillion kWh of energy.

Proposal

A 5kW on-grid solar system can be installed atop the building.

Calculations

TABLE 15:RENEWABLE ENERGY INTEGRATION

Particulars	Units	Value
Available insolation in the area - Average	kWh/m²/day	3.15
Rooftop area required for solar installation	m²	30
Approximate generation capability with respect to the area	kWh/day	74
Overall efficiency of the solar power plant- estimate	%	13
Approximate available units for utilisation	kWh/day	10
Approximate annual unit generation @ 300 days per annum	kWh/annum	2,875
Unit cost of electricity - average	Rs/kWh	8.97
Net annual savings	Rs/annum	25,786
Total expenses with GRID tie inverter @ Rs 55000 per kW of SPP (approx. size of the plant = 3 kW)	Rs	1,65,000
Simple Payback period	Years	6.40

Euphrasia Training College For Women ★ Kattoor - 680 782 ★

Principal
Euphrasia Training College For Women
Kattoor

ANNEXURE-2

ELECTRICITY BILL SAMPLE COPY

KERALA STATE ELECTRICITY BOARD LIMITED

DEMAND CUM DISCONNECTION NOTICE

(As per Regulation 122 & 123 of Kerala Electricity Supply Code 2014)

Section	[5643] Electrical Section Kattoor	Phone#	0480-2877306	Customer Care	1912
Consumer#	1156430015334	Reg. Mobil [illegible]	Regular CC: [illegible]	[illegible]	

Name & Mailing Address

PRESIDENT

ROSE COLLEGE - B.ED CENTRE, UDAYA C M C EDUCATIONAL KATTOOR, Irinjalakuda

For redressing complaints/grievance approach the concerned CGRF

South: Chairperson, CGRF(South), KSEBL, Vydyuthi Bhavanam, Kottarakkara [illegible]

Central: Chairperson, CGRF(Central), KSEBL, 220KV Substation, Kalamassery [illegible]

North: Chairperson, CGRF(North), KSEBL, Vydyuthi Bhavanam, Gandhi Rd, Kozhikode [illegible]

State Electricity Ombudsman, [illegible] Near Gandhi Square, Ernakulam [illegible]

Bill#	5643230620094	Bill Area	504/19	DTR	[illegible]
Billing Period	6/2023(Bi-Monthly)	Tariff/Phase	LT-6F/Three	Pole#	[illegible]
Bill Date	19-06-2023	Due Date	30-06-2023	DC Date	22-07-2023
Contract Demand	(Nil) VA [75% - 0kV, 130% - 0kV]	Connected Load	5670 Watts	Security Deposit	Rs.10239.00
Meter#	[illegible]	Average consumption(Monthly)			
Meter Digits	6.0	Power Unit/Zone	CUMULATIVE		
Meter Type/Owner	TOD/KSEB	KWH	231		

Last Billed Rdg. Date	Prev. Rdg. Date	Prev. Meter Rdg. Status	Prst. Rdg. Date	Prst. Meter Rdg. Status
19-04-2023	19-04-2023	Working	19-06-2023	Working

Power Unit	Zone	Trading	Initial Reading(IR)	Final Reading(FR)	OMF	Units*
KWH	Cumulative	Import	10436.00	10756.00	1	320

Remarks :

Fuel Surcharge(FS) @9 Ps./Unit (Vide Order dt. 25-01-2023)

Auto Recovery FS(FSM) @10Ps./Unit

Last Paid Amount - Rs.10103.00

Last Payment Date - 25-04-2024

Payable amt.(excluding ACD) as on 2023-06-21 19:54:54:Rs.5582/-

Bill Details			[INR] Amount(Rs.)
a)	Fixed Charges	Fixed Charge(FC)	3400.00
		Sub Total	3400.00
b)	Energy Charges	Energy Charge(EC)	2176.00
		Fuel Surcharge(FS)	28.80
		Auto Recovery FS(FSM)	32.00
		Sub Total	2236.80
c)	Other Charges	Electricity Duty(ED)	217.60
		Meter Rent(MR)	30.00
		Sub Total	247.60
d)	GST	MR CGST	2.70
		MR SGST	2.70
		Sub Total	5.40
e)	Round Off		0.20
f)	Total Amt. [illegible]		5890.00
g)	Surcharge		0.00
h)	[illegible]		0.00
i)	Interim Bills		0.00
j)	Arrears		0.00
k)	Less paid(adj)		-5890.00
l)	Less Advance		-0.00
	Net Payable(f+g+h+i+j-k-l)		0.00

Demand for 5890.0 (Rupees Five Thousand Eight Hundred and Ninety Only)

Payment Options: Cash/Cheque/DD [illegible] Online: www.kseb.in [illegible] Credit Cards, Net Banking, Other Platforms [illegible]

Senior Superintendent

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal

Euphrasia Training College For Women

Kattoor

CONSOLIDATED KSEBL BILL – ANALYSIS PERIOD

TABLE 16: CONSOLIDATED KSEBL BILL

Name of the Consumer		Euphrasia college, Kattoor							
Tariff - LT6F/Three		Consumer No:				1156430015334			
Connected Load (kW)		10							
Month	Bi Monthly consumption	Fixed charges	Energy charge	Fuel surcharge	Auto recovery	Meter rent	Duty	GST	Total amount
	kWh	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs
Apr-23	320	3400	2176	28.8	32	30	218	5.4	5890
Jun-23	366	3400	2488.8	32.94	36.6	30	249	5.4	6243
Aug-23	521	3400	3907.5	46.89	52.1	30	391	5.4	7833
Oct-23	470	3563.33	3525	42.3	47	30	353	5.4	7566
Dec-23	659	3600	5370.85	59.31	65.9	30	537	5.4	9669
Feb-24	706	3600	5753.9	63.54	70.6	30	575	5.4	10099
Total	**3042**	**20963**	**23222.05**	**273.78**	**304.2**	**180**	**2322.21**	**32.4**	**47297.97**

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ABBREVIATIONS

APFC	:	Automatic Power Factor controller
AVG	:	Average
BDV	:	Breakdown voltage
BEE	:	Bureau of energy efficiency
CEA	:	Central electrical authority
CFL	:	Compact fluorescent lamp
CFM	:	Feet cube per minute
DB	:	Distribution Board
DG Set	:	Diesel Generator Set
EC	:	Energy Conservation
FD	:	Forced draft
FY	:	Financial year
HPSV	:	High-pressure sodium vapour
HT	:	High Tension
ID	:	Induced draft
IEC	:	International electro technical commission
IEEE	:	The Institute of electrical and electronics engineers
IS	:	Indian Standard
KG	:	Kilogram
KSEB	:	Kerala state electricity board
KVA	:	Kilo Volt Ampere
KVAH	:	Kilo volt Ampere Hour
KVAR	:	Kilo volt-ampere
KW	:	Kilo Watts
KWH	:	Kilowatt-hour
LED	:	Light emitting diode
MAX	:	Maximum
MH	:	Metal halide
NEMA	:	National Electrical Manufacturers Association
OLTC	:	On load tap changer
ONAN	:	Oil natural air natural
PCC	:	Point of common coupling
PSI	:	Pound square inch
RMD	:	Registered Maximum demand
SEC	:	Specific electricity consumption
SFU	:	Switch Fuse Unit
SLD	:	Single Line Diagram
TDD	:	Total demand distortion
THD	:	Total harmonics distortion
TOE	:	Tonne of oil equivalent
UPS	:	Uninterruptible power supply
VFD	:	Variable frequency drive

REFERENCES

1. BEE energy audit books
2. CEA regulations of grid connectivity-2007
3. IEEE Std. 519-1992.
4. National lighting code - 2010

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Euphrasia Training College For Women
Kattoor

Athul ENERGY CONSULTANTS

Athul Energy, we stand for Quality, Reliability and Efficiency

No: AEC/GAC/24-05

15-05-2024

Audit Certificate

This is to certify that **M/s Euphrasia Training College for Women Kattoor, Thrissur** have successfully completed the **Environment Audit** of their buildings and campus conducted on 08th & 09th May 2024 for the Academic year 2023-2024. They have submitted all necessary data and credentials for scrutiny.

We, **Athul Energy Consultants Pvt Ltd,** Thrissur congratulate the Management, Executive Director, Principal, staff members and students for the successful completion and participation in the audit report process.

ATHUL ENERGY CONSULTANTS PVT LTD THRISSUR 680 020

Managing Director

Athul Energy Consultants Pvt Ltd

Euphrasia Training College For Women ★ Kattoor - 680 102 ★

Principal

Euphrasia Training College For Women

Kattoor

Athul Energy Consultants Pvt Ltd
CIN: U74999KL2016PTC046898
info@athulenergy.com
www.athulenergy.com

Registered Office:
4/2, Capital Legend Building
Korapath lane, Round-North
Thrissur-680020, Kerala
+91 7356111990

Branch Office:
F-7, James Square
Asian paint Chowkady, GIDC
Ankleshwar-393002, Gujarat
+91 7356111991

ENVIRONMENT AUDIT – 2024

EUPHRASIA TRAINING COLLEGE FOR WOMEN
KATTOOR THRISSUR

EXECUTED BY

ATHUL ENERGY CONSULTANTS PVT LTD
4th FLOOR, CAPITAL LEGEND BUILDING,
KORAPPATH LANE, ROUND NORTH, THRISSUR, KERALA-680020
Ph: +91 735611199/0-6 Web: www.athulenergy.com E-Mail: info@athulenergy.com

May 2024

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

BRIEF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Euphrasia Training College For Women

Principal

Euphrasia Training College For Women

PREFACE

The phenomenal growth of population and industrial development exploits the environment in different ways. By this greenhouse effect and other allied problems are threatening the mankind world over. Protection and up gradation of environment is our prime concern for regaining of its original nature required for sustainable development. This context institutions have a major role to play.

Every institution should be imparting knowledge about the campus environment and its surroundings through activities that follows the principles of sustainability and waste management. Hence an evaluation is needed to understand where it stands in the path to be an environment friendly, and in talent nurturing educational institution.

This Environment Audit was done with the aim to assess mainly on waste management of the campus. The college envisages students are to become a centre par excellence of learning, where the best in humans is unveiled, based on human values, focused on life enhancement and constructive in adapting to the needs of the world. This will indicate through the management and students participation in the environment activities

This report is compiled by the BEE certified energy auditor and Environment management (ISO 140001) Consultants along with the project engineers who are experienced in the field of energy, environment and management. The student volunteers made a mammoth contribution with data collection and in preparing an initial skeleton for the report.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ACKNOWLEDGEMENTS

We express our sincere gratitude to the M/s Euphrasia Training College for Women Kattoor Thrissur for giving us an opportunity to carry out the project of Environment Audit. We are extremely thankful to all the staffs for their support to carry out the studies and for input data, and measurements related to the project of Environment audit.

1	Dr. Sr. Vimala	Manager
2	Dr. C Salim Kumar	Principal
3	Sr. Leena C P	IQAC Coordinator

Also congratulating our Environment audit team members for successfully completing the assignment in time and making their best efforts to add value.

ENVIRONMENT AUDIT TEAM

1. **Mr. Santhosh A**
   Registered Energy Auditor of Bureau of Energy Efficiency (BEE – Govt. of India)
   Accredited Energy Auditor No – EA 0275

2. **Mr.Krishnakumar G.**
   Lead Auditor, ISO 140001, Environment Management and Certified energy auditor.

Yours faithfully

Managing Director
Athul Energy Consultants Pvt Ltd

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ENVIRONMENT AUDITSUMMARY

- College segregated the waste from college, treated in a scientific manner.
- Separate storage provisions are done for metal and plastics in college.
- Incinerator is installed in the college for incinerating sanitary napkin

Suggestions for improvement

- Vermin compost plant to be installed in the college to treating plant leafs etc.
- Display the weight of segregated wastes that collected from the canteen, hostels and college in prominent locations which will be an eye-opener for all and it will help in reduce the waste generation.
- Monthly Records should be kept for segregated wastes which will give the administration to pinpoint the source and can take necessary steps to reduce it.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

GENERAL DETAILS

The general details of the M/s Euphrasia Training College for Women are given below in table.

TABLE 1: GENERAL DETAILS

Sl. No	Particulars	Details
1	Name of the College	Euphrasia Training College for Women
2	Address	Kattoor , Thrissur Pin:680702
3	Contact Person	**Sr. Leena CP** **9400314636,**
4	Contact Phone numbers & Fax	0480-2877364
5	E-mail ID	**euphrasiyatrg@gmail.com**
6	Type of Building	Educational Institution
7	Annual Working Days	210
8	No: of Shifts	Day Shift (One) (9AM -4PM)
9	No: of students enrolled	100
10	No: of Teachers	10
11	No: of non-teaching staff	7
12	Total campus area	5.38 Acre
13	Total Built Up area	1600 m2
14	No of class rooms,	30
15	No of labs	04
16	No: of departments	07
17	Incinerator	Yes
18	Segregation of waste	Yes

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ABOUT EUPHRASIYA TRAINING COLLEGE FOR WOMEN

Euphrasia Training College for women, Kattoor is a self-financing college of education for conducting B.Ed course, which is affiliated to the University of Calicut and recognized by the NCTE. It is situated in the Heart of Kattoor Panchayath ,Mukundapuram Taluk,in Thrissur Dt.Kerala State. It is organized and managed by CMC Udaya Province Irinjalakuda. College started its functioning on 20th July 2005 and was formally inaugurated 4th March 2006, by Mar James Pazhayattil, Bishop of Irinjalakuda. It was started One year B.Ed course with six Optional subjects in the year 2005 and 2015 onwards college has two year B.Ed course for five optional subjects.

Vision

To uplift women for the betterment of the society; to train them to be responsible teachers of tomorrow, with apt skills and strong ethical values and to kindle the light & life to the younger generation & love to the fellow beings

Mission

To mould outstanding teachers with high social commitment and radiate moral and spiritual values by providing quality education and systematic training.

FIGURE 1: EUPHRASIYA TRAINING COLLEGE FOR WOMEN CAMPUS

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ABOUT ENVIRONMENT AUDIT

The ICC defines Environmental Auditing as: **"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Environmental conditions may be monitored from angles that are relevant to Indian requirements, without stress on legal issues or compliance. This innovative scheme is user friendly and totally voluntary. The environmental awareness helps the institution to set environmental examples for the community and to educate young learners.

Here we can mainly divide this report waste management initiatives and installations of systems such as bio gas plant, vermin compost, and incinerator. E-Wastes and collection and segregation of waste in the campus etc and students initiates in waste management as a social cause.

WASTE MANAGEMENT

Waste is generally termed as 'a resource at the wrong place'. The college authorities are aware of the possible methods and have installed waste management measures like biogas systems. The waste clearance measures associated with different types of wastes are briefly given below. In this college normally three types of wastes are generated and we can divide the same as,

1. Bio degradable
2. Non bio degradable and
3. E-waste

1. BIODEGRADABLE WASTES

Biodegradable waste includes any organic matter in waste which can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things by composting, aerobic digestion, anaerobic digestion or similar processes also includes some inorganic materials which can be decomposed by bacteria. These materials are non-toxic to the environment and mainly include the natural substances like plants and animals waste, even the dead plants and animals, fruits, paper, vegetables, etc. get convert into the simpler units, which further get into the soil and are used as manures, biogas, fertilizers, compost, etc.

The biodegradable wastes are mainly from student's food. Now these food wastes are collected by piggery farm and used as secondary food chain for pigs by maintaining quality manner.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

I. BIO GAS PLANT

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (anaerobically), primarily consisting of methane and carbon dioxide. Biogas is a renewable energy source Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials. This closed system is called an anaerobic digester, bio digester or a bioreactor.

Biogas is a renewable, as well as a clean, source of energy. Gas generated through bio digestion is non-polluting; it actually reduces greenhouse emissions. No combustion takes place in the process, meaning there is zero emission of greenhouse gasses to the atmosphere; therefore, using gas from waste as a form of energy is actually a great way to combat global warming. Another biogas advantage is that, unlike other types of renewable energies, the process is natural, not requiring energy for the generation process. In addition, the raw materials used in the production of biogas are renewable.

Bio gas plant reduces soil and water pollution. Consequently, yet another advantage of biogas is that biogas generation may improve water quality. Moreover, anaerobic digestion deactivates pathogens and parasites; thus, it's also quite effective in reducing the incidence of waterborne diseases.

Bio gas generation produces organic fertiliser. The by-product of the biogas generation process is enriched organic (digestive), which is a perfect supplement to, or substitute for, chemical fertilizers. The fertilizer discharge from the digester can accelerate plant growth and resilience to diseases, whereas commercial fertilizers contain chemicals that have toxic effects and can cause food poisoning, among other things.

Recommendation

1. Maintain a register for the food waste collection and inspection of secondary food chain up to the piggery farm such as to ensure the quality of food wastes to pig .or Install portable bio gas plant to cater the food wastes and generate bio gas (methane) for cooking in the canteen and slurry as manure for garden.

II. VERMI-COMPOST

It is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermin cast. Vermin compost contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner.[3] It is used in farming and small scale sustainable, organic farming.

The major source of raw material for vermin-compost is the leaves in the college campus and also the wastes generated which are not fed into biogas such as Chicken bones etc. The vermin-compost plants installed near to the scrap yard in the college campus

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

Benefits of Vermin-compost

a. **For Soil**

- Improves soil aeration
- Enriches soil with micro-organisms (adding enzymes such as phosphatase and cellulose)
- Microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests
- Attracts deep-burrowing earthworms already present in the soil
- Improves water holding capacity

b. **For Plant growth**

- Enhances germination, plant growth, and crop yield.
- Improves root growth, Enriches soil with micro-organisms, adding plant hormones such as auxins and gibberellins.

c. **For Economic**

- Bio wastes conversion reduces waste dumping in landfills.
- Elimination of bio wastes from the waste stream reduces contamination of other recyclables collected in a single bin (a common problem in communities practicing is single-stream recycling)
- Creates low-skill jobs at local level.
- Low capital investment and relatively simple technologies make vermicomposting practical for less-developed agricultural regions.

d. **For Environmental**

- Helps to close the "metabolic gap" through recycling waste on-site.
- Large systems often use temperature control and mechanized harvesting, however other equipment is relatively simple and does not wear out quickly
- Production reduces greenhouse gas emissions such as methane and nitric oxide (produced in landfills or incinerators when not composted).

Recommendation

We recommend install one vermin compost plants in the college due to its wise area tree coverage and for easiness for maintenance of vermin compost plant. Manure requirements are divided into two area for gardens and plantation.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women

2. NON-BIODEGRADABLE WASTE

Materials that remain for a long time in the environment, without getting decompose by any natural agents, also causing harm to the environment are called non-biodegradable substances. These materials are metals, plastics, bottles, glass, poly bags, chemicals, batteries, etc. But as these are readily available, convenient to use, and are of low cost, the non-biodegradable substances are more often used. But instead of returning to the environment, they become solid waste which cannot be broken down and become hazardous to the health and the environment. Hence are regarded as toxic, pollution causing and are not considered as eco-friendly.

Many measures are taken these days, concerning the use of non-biodegradable materials. The **three 'R'** concept which says **Reduce-Recycle -Reuse** is in trend, which explains the use of the non-biodegradable materials. As we already discuss that these substances do not decompose, or dissolve easily so can be recycled and reuse. And one can help in reducing this waste by instead of throwing the plastics and poly bags in the garbage; it can be put in the recycling bags to use again.

Non-recyclable wastes are collected and burned once in a month using incinerator places inside the campus itself. The recyclable wastes are sorted out into categories and supplied it to the collecting units.

INCINERATOR

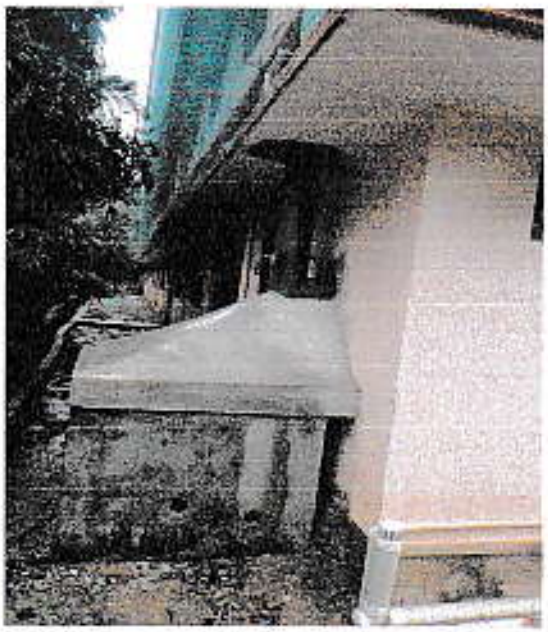


Figure 2 INCINERATOR

The objective of waste incineration, in common with most waste treatments, is to treat waste to reduce its volume and hazard, whilst capturing (and thus concentrating) or destroying potentially harmful substances. Incineration processes can also provide a means to enable recovery of the energy, mineral and/or chemical content from waste. Basically, waste incineration is the oxidation of the

Euphrasia Training College for Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

combustible materials contained in the waste. Waste is generally a highly heterogeneous material, consisting essentially of organic substances, minerals, metals and water. During incineration, flue-gases are created that will contain most of the available fuel energy as heat. The organic substances in the waste will burn when they have reached the necessary ignition temperature and come into contact with oxygen. The actual combustion process takes place in the gas phase in fractions of seconds and simultaneously releases energy. Where the calorific value of the waste and oxygen supply is enough, this can lead to a thermal chain reaction and self-supporting combustion, i.e. there is no need for the addition of other fuels.

The incinerator is used for incinerating non-biodegradable waste such as paper, plastic, sanitary napkins etc. The ash generated are as for manoeuvre after mixing with cow dung for plants. The ash generated from plastic will be treated separately.

The ash generated from incinerator were used as a fuel is used as manoeuvre for plants. The college campus promoting biodegradable packaging and reducing the consumption of plastic to a large extent.

3. ELECTRONIC WASTE

Electronic waste or e-waste describes discarded electrical or electronic devices. E-waste or electronic waste is created when an electronic product is discarded after the end of its useful life. The rapid expansion of technology and the consumption driven society results in the creation of a very large amount of e-waste in every minute. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environment pollution. Certain components of some electronic products contain materials that render them hazardous, depending on their condition and density.

College collecting all old computers, and other electronic wastes and stored in a separate room

Recommendation

We recommend to dispose the E wastes through KSPCB OR CPCB (Kerala state or central pollution control boards) approved agencies in a regular manner or kept all E-wastes in a separate place till the disposing of these items through approved agencies.

Euphrasia Training College for Women * Kattoor - 680 702 *

Principal
Euphrasia Training College For Women
Kattoor

FACILITIES PROVIDED BY COLLEGE FOR WASTEMANAGEMENT COLLECTION

- Toilets in every floor of all buildings separately for girls and staff.
- Certain toilets are facilitated for disable friendly with suitable hand rails and support mechanisms.
- Bins are provided in various areas of Campus for segregated collection of bio degradable (food,) and non-bio degradable wastes (Plastic, bottles)
- Every day cleaning and sanitisation is done at each and every toilet by cleaning personnel which used to check by housekeeping supervisor.
- Separate team is maintained by college for maintain the clean campus, removal of wastes from pets, collection wastes from bins, which is supervised by maintenance supervisor.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

CONCLUSION

Environment audit is the best way to analyse and solving the critical issues of waste management. Environment audit can add value to management approach being taken by college for identifying, collecting, segregating and processing of waste generated in the college campus. By analysing the waste generation in each segment such as biodegradable, non-degradable, R waste etc. gave an indication of waste generation and thus put control for the same to reduce the environmental impacts in due course.

The findings in the report shows that college perform fairly well in waste management issues and taken considerable efforts in a responsible manner. During audit and the conversations with the college team, we observed that M/s Euphrasia Training College for women Kattoor done various approaches in the past few years to performing well to sustainable environment. Even though there is space for further improvement that mentioned in the executive summary, the college is a good example for the minimisation of environment issues in the existing conditions.

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women
Kattoor

ANNEXURE

➢ **EnMs Certified Professional**

Certificate of Attendance

intertek
Total Quality Assured

G KRISHNAKUMAR

has attended the following live virtual classroom course:

Transition training for Environment Management System as per ISO 14001:2015

Course is designed to explain:

- Requirements of ISO 14001:2015 in context of audit.
- Key changes from ISO 14001: 2004 to 14001:2015

Session Duration: 16 Hours

CERTIFICATE NUMBER
2020050507

TRAINING DATE:
25th & 26th May, 2020

Authorising Signature:

Intertek India Private Limited

Euphrasia Training College For Women ★ Kattoor - 680 702 ★

Principal
Euphrasia Training College For Women