

ENVIRONMENT AUDIT – 2022-23



KRISTU JYOTI COLLEGE OF MANAGEMENT & TECHNOLOGY

CHETHIPUZHA, CHANGANACHERRY

KOTTAYAM, KERALA

EXECUTED BY



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PREFACE

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 vision is “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”. The mission of college is “to mould individuals into successful and vibrant professionals facilitating comprehensive and rounded formation, to function as effective and empathetic human beings, grounded with courage of conviction, personal integrity, professional ingenuity and social commitment “and it was we observed by us from the students’ participation during the environmental audit.

This report is compiled by the BEE certified energy auditor 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.



ACKNOWLEDGEMENTS

We express our sincere gratitude to the management of M/s *Kristu Jyothi College of Management and Technology Changanacherry*, Kottayam 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 Environment audit.

Rev. Fr. Joshy Cheeramkuzhy CMI

Rev. Fr. Chacko Manackal CMI

Dr. Anu Antony

Principal

Bursar, Kristu Jyoti Group

IQAC Coordinator

ENVIRONMENT 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. G. Krishnakumar. Lead auditor ISO 50001, Certified energy auditor of BEE

Yours faithfully



Managing Director
Athul Energy Consultants Pvt Ltd



ENVIRONMENT AUDIT SUMMARY

- ❖ College segregated the waste from college, canteen, and hostels and treated in a scientific manner.
- ❖ Separate storage provisions are done for metal and plastics in college.
- ❖ Biodegradable wastes are treated in a biogas plant installed behind the canteen.
- ❖ Non-biodegradable wastes are incinerated which installed near pond

Suggestions for improvement

- ❖ Internal inspection team to be formed which comprises of staff and students for internal auditing of the waste management in the campus
- ❖ Introduce 'refuse plastic' concept in college inventories. This will increase the awareness among students and staffs and will seep into their behaviour.
- ❖ 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.

**GENERAL DETAILS**

The general details of the M/s *Kristu Jyothi College of Management and Technology Changanacherry*, Kottayam are given below in table.

Table 1 General Details

Sl. No:	Particulars	Details
1	Name of the College	Kristu Jyothi College of Management and Technology, Changanacherry
2	Address	Kristu Jyothi College of Management and Technology Chethipuzha, Changanacherry Kottayam
3	Contact Person	Rev.Fr.Joshy Cheeramkuzhy CMI (Principal) 9496101681
4	Contact Number & E mail of the college	0481-2720696/62351011681 kjcmt@kjcmt.ac.in , kjc@kjcmt.ac.in
5	Web site	www.kjcmt.ac.in
6	Type of Building	Educational Institution
7	Annual Working Days	210
8	No: of Shifts	Day Shift (One) (9:00 AM -4:00 PM)
9	No: of students enrolled	1727
10	No: of teaching & non-teaching staff	Teaching - 81 non-teaching - 24
11	No: of departments	06
12	Total Land Area	05 Acres
13	Total Build up area	
14	No: of Programmes	UG – 07 and PG -04
15	Average power consumption per month. (kWh/month)	12771
16	Average electricity charges per month. (Rs. /month)	113544



KRISTU JYOTI COLLEGE OF MANAGEMENT AND TECHNOLOGY

The Kristu Jyoti Group of educational institutions came into fruition with the Monastic Council of CMI Fathers of Chethipuzha led by rev. Fr. James Kozhimattom CMI having setup the Kristu Jyoti School linked to Sacred Heart Monastery in the year 1982. In the month of June 1982 marked the coming into being of KristuJyoti English Medium School as well. In order to cater to the needs of the students and the parents, Placid Vidya Vihar Seniou Secondary School of CBSE mode got formed in 1988. In 2002 Kristu Jyoti College of Management and Technology was put into operation along with the novel institutions such as KristuJyoti Kindergarten and Play School. The ICSE oriented school, the Kristu Jyoti, Vidyaniketan commenced functioning in the academic year 2005-2006 onwards.

Kristu Jyoti College of Management & Technology was established in the year 2002 at Chethipuzha, Changanassery, Kottayam, Kerala, India. Since its inception, it has been affiliated to Mahatma Gandhi University and also does have the approval of All India Council for Technical Education, New Delhi (AICTE). The first course, that was provided by the college was MCA in the year 2002. The college also extended courses such as M.Sc Bioinformatics and B.Com Computer Applications in the year 2004. The year 2010 paved the way for the college inducting into its scheme of things two more courses viz BCA and BBA. In the subsequent year 2011, the college introduced the courses such as BCom (Finance and Taxation) and MCom Finance. The other courses, the college incorporated into its fold are BSc Psychology in 2014, BSc Geology and BA English in 2015, MHRM and MSc Psychology in 2020.

VISION

Empowering students to meet needs of the society by focusing on academic, technological and professional excellence.

MISSION

To provide quality education through an effective teaching –learning process, skill development and integrated personnel progression.



Figure 1 FRONT VIEW OF COLLEGE



Figure 2 Ladies Hostel of College

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, incinerator 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 the college canteen and pushed it to the Biogas plant. The bio-slurry is used as manure to the plantation.

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 (digest ate), 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.



Figure 3 Floating Bio gas plant

The biogas plant converts food wastes into methane gas and usable bio fertilizers which will be used for plants. The methane gas from the biogas plant is used in the canteen for cooking purposes and for



heating drinking water hot water. Approximately 120 kg of LPG /month is saved by using biogas plant. The bio maneuver from the biogas plant is used for gardening, agriculture and for trees. This bio waste is also act as best bio insecticide and thus the college avoided the usage environmentally toxic precipices for environment. Here college is using floating FRP dome Type biogas plant of size 1 M³ for treating bio waste. The slurry coming from the plant is collected in drums and reused after diluting with water for agriculture and for gardens. The methane gas is used in the canteen for hot water generation which is used for drinking and tea making.

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 vermicast. Vermicomposting 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 vermi-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 vermi-compost plants installed near to the scrap yard in the college campus

Benefits of Vermi-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 gibberellic acid.

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 to install a vermin-compost plant in the campus to bio degradable solid waste which we cannot treat by bio gas plant. The compost formed from vermicomposting can be used for our gardening and plants.

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.

I. 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 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 canteen were wood is 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.



Figure 4 Incinerator

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 signed an agreement for disposing the electronic wastes MSH E-Waste management party at Erattupeta Wastes are collected and stored in a fixed space in the college.

FACILITIES PROVIDED BY COLLEGE FOR WASTE MANAGEMENT COLLECTION

- Toilets in every floor of all buildings separately for girls, boys and staff.
- There is separate toilet facility for department heads, staff rooms, administrative department and common facility.
- 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)
- Separate team is maintained by college for maintain the clean campus, collection wastes from bins etc.



Figure 5: Waste segregation and temporary storage




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 Kristu Jyothi College of Management and Technology 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.




ANNEXURE

➤ BEE Accredited energy auditor certificate



BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: **EA- 7597**
Accreditation Registration No.: **AEA-0275**



Certificate of Accreditation

This is to certify that Mr./Ms. **Santhosh. A** having its trade/registered office at **Kerala** has been given accreditation as accredited energy auditor. The certificate shall be effective from **2nd** day of **November, 2017**.


The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

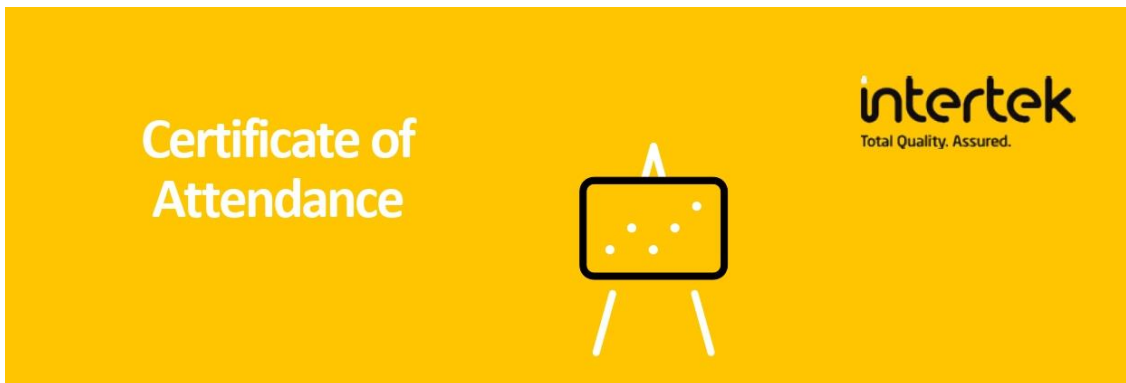
Your name has been entered at AEA No. **0275** in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this **12th** day of **February, 2018**


Secretary,
Bureau of Energy Efficiency
New Delhi



➤ **EnMs Certified Professional**



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
2020260507

TRAINING DATE:
25th & 26th May, 2020

Authorising Signature:



Intertek India Private Limited