GREEN AUDIT REPORT 2.0

2019-2020

VIMAL JYOTHI CAMPUS, CHEMPERI.

Prepared By

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ACKNOWLEDGEMENT

First and foremost, we thank the Almighty GOD and Mother Mary, the heavenly Patroness of Vimal Jyothi Institutions for completing these tasks successfully.

This is the second version of the Green audit for the Vimal Jyothi Campus with modifications adopted with specific to the Vimal Jyothi Institute of Management (VJIM) campus. This Green audit document has been prepared with reference to the Vimal Jyothi Institutions Campus Green Audit done during 2016-17 by Mr. Akshay Thomson (B3ENCE5251) of Civil Engineering department with the support of Go Green Club of VJEC. We express our appreciation and thanks to them for providing the base document for this version 2.0 of Green Audit Report.

This Green Audit Report 2.0 is submitted to Dr Thomas Michael, Principal, VJIM, by the faculties of the Campus during the month of April in the academic year 2019–20 as mentioned in this audit.

We are thankful to the management of the Vimal Jyothi Institutions for providing all the facilities and for supporting us to complete this report. Whole heartedly we thank for the support of the office and other administrative staffs.

Green Audit 2.0 Team

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INTRODUCTION

Green Auditing can be understood as the process of systematic identification, quantification, recording, reporting and analysis of components of **environmental** diversity of various establishments. Its aim is to analyse **environmental** practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience.

Scope of Green Audit:

This Green Audit involves identification of energy conservation methods, use of renewable resources, rain water harvesting, efforts of carbon neutrality, Agricultural and Green initiatives, waste management system, solid, sewage and E-waste management.

Figure1: VJIM Campus Entrance

Educational institutions have a broad impact on the world around them, both positive and negative. The activities pursued by them can create a variety of adverse environmental impacts. At the same time, they are in a unique position to be leaders in pursuing environmentally sustainable solutions.

Vimal Jyothi Campus expresses its commitment to sustainability in many ways. It has taken a number of steps to reduce the adverse effects on nature. A Green Audit was conducted in our college campuses in 2017-18 and this updated version 2.0 is to evaluate the green policy of our college

The campus under the MESHAR Educational diocesan Trust has two colleges with full time professional courses in the stream of Engineering (VJEC) and in the stream of Management (VJIM) under the AICTE and with ISO certificate. Both the campuses are situated in a rural area near the Hill Highway side, Chemperi, Kannur, with a total of 41.12 acres of land area under the Trust and out of which only 4.23 acres have covered buildings, 2 acres is devoted for front gardens, 1.15 acres for rain water ponds, and more than 77% of land is under the green cover, which itself is an indicator of its obligation towards environment and carbon neutrality cause.

Figure2: Entrance to the VJIM Campus from Hill Highway- lined with trees

This Green Audit 2.0 report considers the ecosystem maintained under the Trust as a single system called Vimal Jyothi Campus and the MESHAR Educational diocesan Trust allocate the environmental activities, waste management systems, water supply and energy management; a unified system throughout both the campus for better efficiency and optimisation.

Figure3: Vegetable Garden - near VJIM

This Green Audit report is based on the following major points:

1. Solar Power Plant
2. Solar Water Heaters
3. Biogas Plants
4. Rain Water Harvesting
5. Recharge wells and Check dam
6. Rain water harvesting with open ponds
7. Waste Management System
8. Sewage Treatment Plant
9. Oil Waste Management
10. Solid Waste Management
11. E-waste management Process
12. The 'Green Clean Campus' Initiatives

1. SOLAR POWER PLANTS

The Vimal Jyothi Campus equipped with a solar power plant. It is situated at the VJIM campus. It has 200 solar panels of 250 Wp each with established capacity of 50 kWH electricity in an on grid system. This solar power field established, monitored, and maintained by TATA Power Solar systems. The total cost of the solar field is 35 Lakhs with two Inverters for grid feeding to the KSEB, Kerala. As per the documents the solar field produced 47000 kWH in 2019-20. As the installation is on-Grid, no provision provided for storing the energy produced and the excess energy remaining after the usage for the campus, directly fed into the HT lines of KSEB. This not only contributes towards the carbon neutrality but also considerably reduce the electricity bill. The VJIM campus can run completely on solar energy during day timings.

Figure 4: Solar Power Plant Panels near VJIM

Figure 5: Solar Power Plant- on Grid control units

The campus has an off grid standalone solar power unit with 1 kWH established under the roof top solar scheme of the State of Kerala. It is placed near the multipurpose Auditorium, near the Hill Highway. The off-grid power produced from this is used for partially powering street lights and CCTV surveillance systems of its vicinity.

Figure 6: Solar Panel Unit- Rooftop project

2. SOLAR WATER HEATERS

Four solar water heaters are installed near the hostels and mess to tap the solar energy. These solar water heaters provide hot water for the usage of hostellers and for cooking purpose at mess.

These solar water heaters are with a 200-500 Litter capacity with 35 Evacuated Tube Collectors (ETC), inner tank with Single moulded Polymer and an outer tank with Stainless steel (SS 430). These units as per the standard condition can save electric power considerably. For an average use of every 100 liters of hot water the power saving is 4.65 kW/day and in a year, it is 1395 kW/year considering 300 productive days in a year.

Figure 7: Solar Water Heater Units

3. BIOGAS PLANTS

There are well maintained and well-functioning Biogas Plants within the Mess / Hostel campus to process the biodegradable wastes for the biogas production. The bio degradable solid wastes and food remaining from the mess and canteens are the main inputs for the plant. The plant can process sewage waste from various sources also.

The plant adjacent to the Santhome hostel has a capacity of around 5 m^3.The Biogas plant adjacent to the Mess / Sanjose hostel has a capacity of 8 m^3. The Alphonsa hostel has two plants each having a capacity of 3 m^3. Together from all the sources a total of 30 m^3 biogas is produced. The Biogas produced is used for cooking purposes in the canteen. Through these a considerable amount of cooking gas is saved. This contributes to the conservation of non- renewable resources, reduces carbon footprints, helps to process the bio degradable wastes of the campus, and even saves money for the operations of the mess.

Figure 8: Bio Gas feeding end

Figure 9: Bio Gas Stove and units

Figure 10: Bio Gas Cooking

4. RAIN WATER HARVESTING

The Vimal Jyothi Campus is blessed with prolonged monsoon season normally from June to September every year and it is due to its location near to the Western Ghats. The Vimal Jyothi campuses give priority for water conservation systems in an integrated way throughout the campus.

Rain water falling on the roofs during the monsoon season is directed towards filtering systems and stored in a distributed manner. The rainwater harvesting tanks are distributed throughout the campus with well-connected tanks, pipelines and pumping systems. There are four major covered storage tanks in the Campus serving for portable water purpose for academic and residence areas. The storage tanks and rain water harvesting systems designed basically serve to preserve the rainwater for the campus use with reduced pumping cost in natural flow model in monsoon season and act as reserve storage for the summer season.

Figure 11: Rain Water Harvesting Basement Tank

The largest among them is a 26 lakh liters capacity tank under the mechanical block at VJEC campus with a 4-storey building above it. The other 3 covered storage tanks are distributed near the hostel area.

There are three more tanks serving the same function but of a lesser capacity situated adjacent to the hostels. The rain water from Sanjose Mens hostel and PG Hostel are harvested in connected twin tank systems with each having a capacity of 2 lakh litres. The Alphonsa Womens hostel also has a water storing tank with a capacity of 1.5 lakh litres

Figure 12: Rain Water Harvesting Tank- Alphonsa Hostel

The water from these tanks are utilised during the summer after carrying out adequate treatment processes. These are used for various needs of the college, hostels, canteen etc.

Figure 13: Rain Water Harvesting Tank- Near Sanjose and PG Hostels

5. RECHARGE WELLS AND CHECK DAM

The college is aware of the importance of ground water and the need for recharging the ground water sources. The ground water resources are being exploited nowadays on a very alarming rate that the resources are depleting day by day. The responsibility of recharging the ground water sources became the essential duty of the Campus.

Figure 14: Check Dam

Figure 15: Bamboo bordered Check Dam

The Vimal Jyothi Campus is blessed with a small natural stream within its boundaries and is active especially during the monsoon season. The Check Dam constructed with 0.55 acres land aimed for water storage and ground water recharge. The bank of the Check Dam is protected with natural retaining systems of bamboos, which strengthens the banks and facilitate the water recharge.

The Check Dam has a capacity to hold around 45-50 Lakh litters of water. The bamboo bordered Check Dam is maintained properly to ensure the water quality and it serves as for most of the purposes during June to January every year. The availability of quality water in the vicinity reduces the pumping energy also.

Recharge wells and well recharge systems are built at various points within the campus and are well maintained and safety is ensured to prevent accidents by falling into them. Water is directed into these wells from various sources, which are directed to them via. pipelines.

Figure 16: Check Dam Stream

Figure 17: Recharge Well

Figure 18: Rain Water well Recharge Filtering system

6. RAIN WATER HARVESTING WITH OPEN PONDS

The Vimal Jyothi campus has multiple open ponds of different capacity and dimension for rain water harvesting. Many of these open ponds are also used as the eco-friendly fish cultivation points as per the schemes of the fisheries department of the State of Kerala

Figure 19: Rain Water Harvesting Open Pond with Pisciculture

These distributed open ponds serve as the sustainable ecosystems and contribute for stabilizing the atmospheric balances as humidity, beautify the campus and support a little of pisciculture

Figure 20: Rain Water Harvesting - Open Pond with Pisciculture

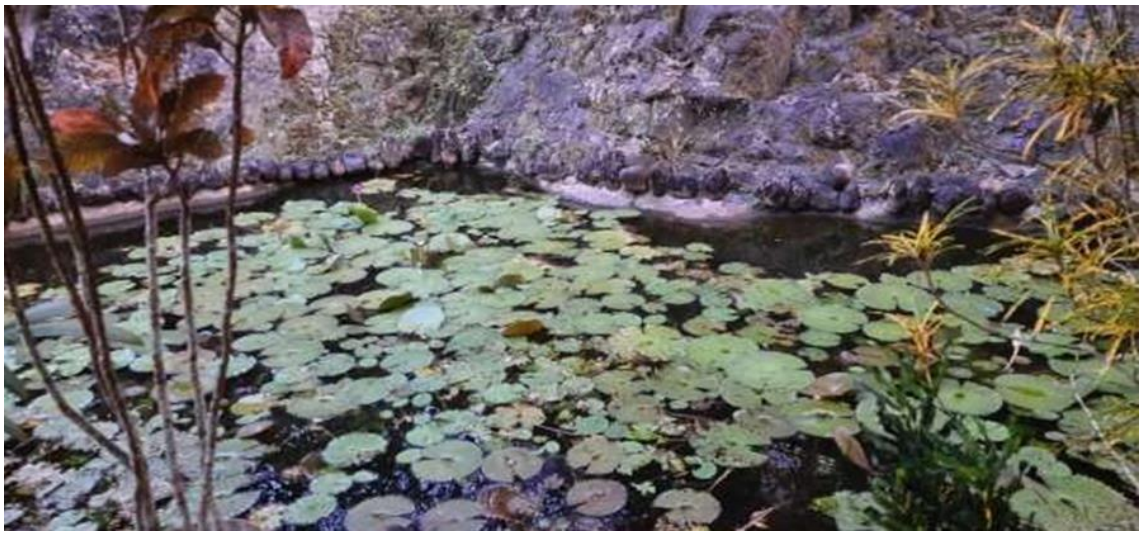

Figure 21: Rain Water Harvesting - Open Pond

7. WASTE MANAGEMENT SYSTEM

The Vimal Jyothi Campus has a clear established waste management system and is displayed in the campus for better awareness to all the stake holders. The effective waste management system implemented with the support of students, staff, cleaning staff, and with defined procedures. The bio degradable waste is treated and used for energy production or agricultural production or sold out through the venders.

The production of plastic waste is rather eliminated with ban of single use plastic in the campus. The cattle farm, agricultural and vegetative are supporting the natural model of waste management in the campus with a motto “Green-Clean Campus”

Figure 22: Vimal Jyothi Campus - Waste Management System Display

8. SEWAGE TREATMENT PLANT

The wastewater and sewage water treatment plant at Vimal Jyothi Campus is of aerobic sewage treatment model. It is located to the rear side of the PG hostel within a space of 0.40 acres. The capacity of the sewage treatment plant is between 50,000 litres to 1,50,000 litres per day. The major waste water reaching the plant is in the form of sullage from the hostels and the mess and canteen as well. The type of treatment practised is aerobic treatment. The aerobic treatment helps in the reduction of foul smell being emitted to a certain level.

Figure 23: Sewage Treatment Plant – Overview

The motor used for pumping water includes 3 irrigation pumps each having a power of 5 Hp. One among the three motors works at a time with an average pumping duration of around 1-8 hours

Figure 24: Sewage Treatment Plant- Motors

Figure 25: Sewage Treatment Plant- Filters

The sullage from the hostels, canteens and mess is carried via pipelines to a tank from where the waste water is directed towards another tank where the aeration is provided. From this tank the water is being pumped into another tank with the help of motors. After the treatment the water is pumped into an open tank. By then the water is free from all solid impurities and odour and water now seems to be clear. From this tank the water is pumped through a layer of sand, gravel and charcoal to a high raised tank having two sections. From this tank water is pumped and is used for gardening purposes.

9. OIL WASTE MANAGEMENT

The oil waste processing is rather critical in the waste management process. The presence of the oil waste in the waste water from the Kitchen and bathrooms considerably reduce the aerobic water treatment process. So, oil traps are used to collect the oil from the waste water before the aerobic treatment. The utmost care is taken to avoid the mixing of cooking oil with the waste water at the sources as mess, kitchen and canteen. The oil collected is sold out through venders.

Figure 26: Waste oil collection barrels

10. SOLID WASTE MANAGEMENT

The solid waste generated inside the college is effectively handled from the origins itself. The sorting process is done from the sources. The bio degradable solid waste is collected separately and food waste disposal restricted to be in the canteen / mess halls. Non bio degradable waste is separated

as plastic, paper items, used books, metals and glass items. The cleaning staffs are trained to handle this task effectively throughout the assigned campus area.

The solid wastes collected are deposited as per the classification at the central waste warehouse. The paper, plastic, metal, glass and books items are sold to the scrap dealers.

Figure 27: Paper waste sorting centre

Figure 28: Solid Waste warehouse

An incinerator installed in the side of the campus away from residence area. It has a loading capacity of 6 m^3 at a time and discharge gaseous form at 17 m height. The dimension of the incinerator is 2 m x 2 m x 2 m. The major solid waste handled in the incinerator is sanitary items and other items discarded by the scrap dealers.

Although the smoke and dust produced is a drawback, the removal of the solid waste accounts to its merit. The use of the incinerator is limited in a controlled manner due to the concern for the environment.

Figure 29: Incinerator

11. E-WASTE MANAGEMENT PORCESS

The e-waste is limited in the campus by maintaining as own repair centre for computer and computer-based items. The computer maintenance and repair is centralized for better coordination and all the repair or non-operating complaints are streamlined through Google forms and the report of the repair service is monitored.

The irreparable systems are discarded and the usable parts are used for the replacements. The discarded parts of the systems and other electronic equipment are sold out to venders for their own recycling process.

12. THE 'GREEN-CLEAN CAMPUS' INITIATIVES

Waste management is better done through the 'Green-Clean Campus' initiatives. The awareness programs on sustainable environmental on practices, waste disposal and management has inculcated an anti-littering habit in the staff and students of this campus. Utmost care is taken to keep the campus clean and green.

A. 'Green-Clean Campus' Waste bins

An effective collection of the waste from the sources is essential element of the waste management system. Heaping the waste in campus and littering are not allowed in the Vimal Jyothi Campus. The devoted clearing staffs take utmost care to keep the buildings and campus clean. The vegetative debris are collected for organic model of farming or allowed for natural decomposition in the areas demarked for agricultural purpose.

Apart from the multiple waste bins in the classrooms and different part of the buildings, a wide array of solid waste collecting boxes under the 'Green-Clean Campus' initiative are distributed throughout the campus. These are well maintained and cleared on a daily basis. The aim is to make our campus a plastic free and waste free zone. The functioning of the dustbins in a proper manner is being ensured by the students themselves.

Figure 30: Green Clean- Waste bin

B. Reduce the Waste and Pollution initiatives

In association with 'Green Clean Campus' initiatives, the whole Vimal Jyothi Campus adopts a green policy to build a sustainable ecosystem. Every waste creation point is identified and controlled. Food waste is reduced with self-serving facility at the mess hall and canteen for the main dishes. The student run mess on dividing system with student-mess-managers form each department controls the menu and other systems in the mess.

The disposable items for food supply are not permitted in campus; full-fledged online communications with G-Suit Education is enabled for staff and students along with virtual social media platforms to reduce the paper usage, the ERP (SPANIOS) solution is fully adopted for the academic and related management works.

The inside traffic of motorised vehicles controlled and students are not permitted to drive beyond their parking lots. Staffs are encouraged to use the pedestrian model of travel, as far as possible to reduce the carbon emission. A sufficient buffer zone is maintained from the Hill Highway to the academic building to create a healthy and pollution free environment.

The diesel Generator set of eco-friendly models is installed for facing the KSEB power failure and star rated equipments are used to promote carbon neutrality protocols.

Figure 31: Eco friendly Generator set at the Power house

The power house is given separate building with additional filtering systems. The underground cable system is used for the power supply and data connectivity throughout the campus.

C. 'Green-Clean Campus' with sustained ecosystems.

The Green-Clean Campus initiatives are maintained with a sustainable eco system throughout the campus. The contour model of farming is adopted for the campus and it supports the rain water recharging in a natural way.

Figure 32: Contour terracing model

The waste management system of the campus intertwined with bio-waste processing through the cattle, sheep and pisciculture process. The water from the sewage treatment plant is essential for the gardening and cattle feed cultivation. The mess and canteen use the milk produced in the campus. The cow dung and animal waste used for the manure for organic cultivation for the mess. The roads of the campus are shaded with trees for better carbon neutrality.

Figure 33: Tree shaded the internal roads of the campus.

CONCLUSION

Green Audit is the most effective, efficient and ecological way to promote the sustainability by solving the environmental problems. It is a kind of professional care which is the responsibility of each and every individual. The Green Audit of Vimal Jyothi Campus was carried out and it was observed that the college management and the students give great importance for nature and for the need for environmental conservation.

Small amount of pollution from kitchens, incinerators and the vehicles running inside the campus was observed, but the massive 77% greenery of the campus overcomes all the demerits. We recommend the electrically powered vehicles for inside campus commutation. We also recommend an additional bio gas plant at the cattle farm to tap the bio gas produced from the cattle farming

As a conclusion, as per the Green Audit conducted and the observations made, we are proud to declare that the Vimal Jyothi Campus is an eco-friendly Green-Clean campus

VIMAL JYOTHI INSTITUTIONS

TEMPLE OF KNOWLEDGE IN A CLEAN GREEN ENVIRONMENT,

WHERE ‘PERFECTION IS THE TRADITION’.