



ENVIRONMENT AND ENERGY AUDIT

September 2022



▶ Prepared by

MALNAD GREEN TECH INDUSTRIES, SHIVAMOGGA

ENVIRONMENT AND ENERGY AUDIT

Report of

**J N N College of Engineering
Shivamogga-Karnataka State**

September -2022



**Prepared by
MALNAD GREEN TECH INDUSTRIES, SHIVAMOGGA**

TABLE OF CONTENTS

SECTION	TOPICS	PAGE NO.
1	SUMMARY	1
2	ABOUT THE INSTITUTION	2
3	JNNCE GREEN POLICY DOCUMENT	6
4	ABOUT ENERGY AND ENVIRONMENT AUDIT	10
5	ENERGY AUDIT	11
6	WATER AUDIT	20
7	SOLID AND LIQUID WASTE AUDIT	24
8	GREENERY AUDIT	29
9	GREEN INITIATIVES OF THE INSTITUTE	31
10	OVER ALL OBSERVATIONS AND RECOMMENDATIONS	36



Dr. Jalesh Kumar
B.E., M.TECH., PH.D.
IQAC Coordinator
J.N.N. College of Engineering
Shivamogga-577 204.



Principal
Jawaharlal Nehru New
College of Engineering (JNNCE)
Shivamogga



**ENVIRONMENT AND ENERGY AUDIT CERTIFICATE**

This is to certify that, green auditing of JNN COLLEGE OF ENGINEERING, SHIMOGA has been carried out successfully from 19-08-2022 to 20-09-2022. All the provided data pertaining to Energy, Water, Waste and Greenery are analyzed and the observations are listed. The suggestions to improve the green campus status are also given in the report.

Date: 20-09-2022


For MALNAD GREENTECH INDUSTRIES



8. Greenery Audit

Greenery inside the campus keeps the air fresh and cool. It adds to the aesthetics also. Table gives the list of plants found in the campus. The trees are tall and give good shade. Students sit under the tree for reading and discussion activities. Fig.6 shows photos of green cover of the campus. Table 13 lists the varieties of plants grown in the campus.



Fig.6 Photos of Green cover of the campus

Table 13. List of Major Trees found in JNNCE Campus

Sl.No.	Local name	Scientific name	Number of plants
1	Ashoka	Saraca ascoca	30
2	Jamoon	Eugenia jambolanacam	4
4	Pongamia	Pongamia pinnata	200
5	Pethudia	Petonia axillaris	10
6	Silver Oak	Gravillea robusta	10
7	Jackfruit	Artocarpus heterophyllus	4
8	Holematti	Terminalia arjuna	3
9	Eukalyptus	Eucalyptus globulus	10
10	Mango	Mangifera indica	3
11	Akash Mallige Indian cork tree	Millingtonia hortensis	2
12	Seemetangadi	Casia fistula	20
13	Wild Badam	Terminalia catappa	5

14	Teak	Tectona grandis	115
15	Acasia	Acacia mearnsii	10
16	Flame of the forest	Butea mono sperma	2
17	Coconut	Cocos nucifera	5
18	Cashew nut	Anacardium occidentale	2
19	Rain tree	Samanea saman	30
20	Sapota	Manilkara zapota	2
21	Atti	Ficusra cemoza	3
22	Peepal	Ficus religiosa	2
23	May flower	Crataegus monogyna	3
24	Xmas tree	Araucaria columnaris	3
25	Bamboo	Bambusa vulgaris	100
	Miscellaneous		30
	Total		612

As given Table 1, the green area of the campus is around 25% and the open area is 66%. Lawns and shading trees are grown with proper maintenance. The eastern boundary of the campus is adjacent to a busy highway. To reduce the sound and air pollution due to vehicular traffic, a green belt of around 10 meters may be maintained along the eastern boundary of the campus.



9. Green Initiatives of the Institute

Being a the leading educational institution in the Malnad region, it is a model institution for practices in efficient use of natural resources, to embrace pollution prevention while continually seeking the reduced resources consumption. The institution is committing itself for sustainable development by initiating *green policy*. It has taken many initiatives to full fill it's social responsibility in safe guarding the pristine environment of malnad region. It is the first of it's kind in installing rain water harvesting system, waste management system and solar energy generation system. It has founded two centers to carry out research and demonstration in the area of green technologies. Details of the same are given under.

9.1 Chirantana Green Technology Center.

The center was established in the year 2006. The Objectives of the Center are

- To create awareness about the environmental impact of conventional fuels among the public.
- To create awareness about the usage of renewable energy sources.
- To communicate the importance of energy saving and its methodologies.
- To carry out research and development activities on eco-friendly technologies.

The typical activities that are being carried out in this centre are

1. Offering technical guidance on
 - Solar water heater and solar PV system installation
 - Rain water harvesting
 - Eco friendly house construction
 - Installation of Kitchen waste gas plant
2. Production and marketing of biodiesel and by products.
3. Demonstration of Gasifier system for heating and electricity generation
4. Carrying out awareness programs on various environmental issues and usage of green technologies
5. Carrying out research on green technology devices and systems
6. Guiding and providing facility to students in carrying out research projects



The centre has following system for demonstration

1. Solar cookers
2. Solar street lamp
3. Bio mass gasifier with Gas Engine for power generation..
4. High efficiency chulas
5. Hand operated water Pump
6. Rain water collection pond
7. Biodiesel unit
8. Kitchen waste gas plant
9. Waste plastic to Oil unit
10. Phyto- remediation system
11. Bio compost production unit
12. 400 kW Roof top grid tied solar system

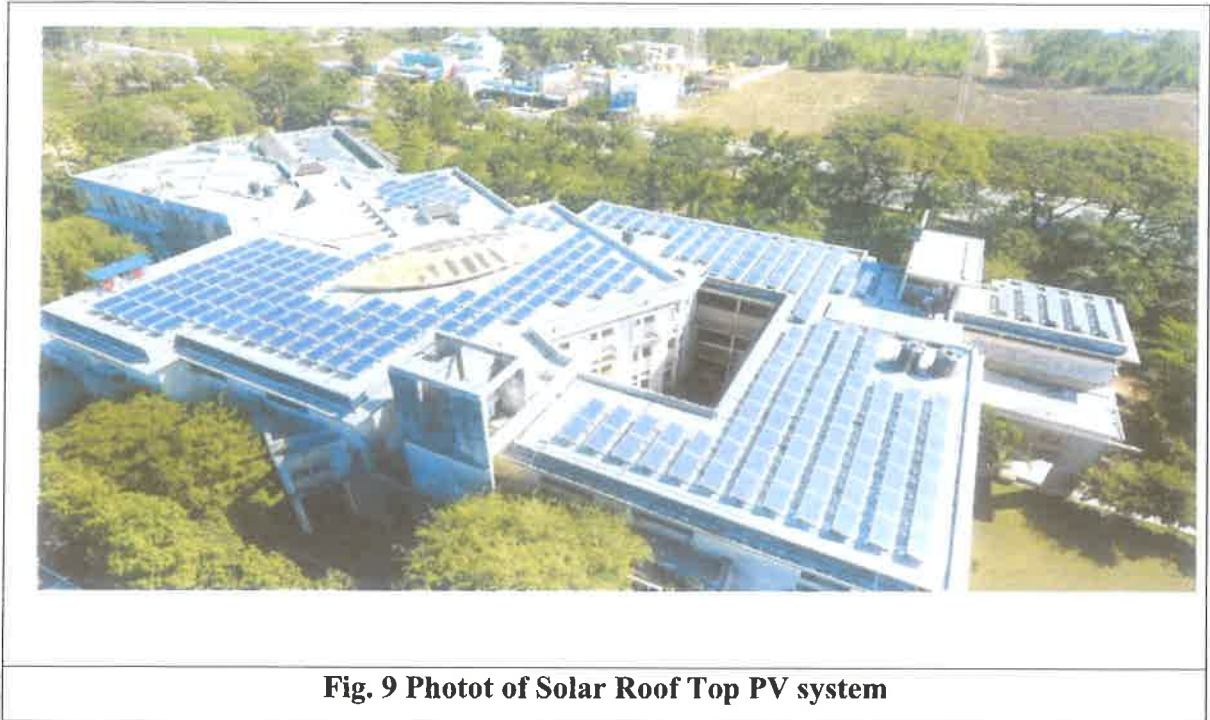
Around 20 awareness and training programs are conducted every year for NGO's, school and college students and farmers. Bio diesel and its by products like cake, hand wash, floor wash are produced and marketed. Bio compost is sold to farmers. The green initiatives of the center are reported in print and visual media extensively. BBC Discovery channel has covered the activities of the center in its Change maker's series. Fig. 7 and Fig.8 show sample photos of programs of Chirantana center. Fig 9. shows a photo of solar pannels installed on the roof top of JNNCE.



Fig.7 An awareness rally by Chirantana



Fig.8 Demonstration of Chula to women



9.2 District Bio Energy Research, Demonstration and Information Center

District Biofuel Research, Information, and Demonstration Center, JNNCE, Shimoga has been established in June 2011 by Karnataka State Bio-Energy Development Board, Govt. of Karnataka, Bangalore. This research and information center has been conceptualized to study, promote & demonstrate all aspects related to bio-fuel. Through this center, it is possible to provide information on Bio energy, identification of various non edible oil seeds, agro practices for these sources, Post-harvest technologies like seed collection, oil expelling, treatment, uses of oils, Trans-esterification process. It also carries out R&D and extension services to purchase oil seeds from Shimoga region and encourage the farmers to take up biofuel activities. Since 10 years, BRID center is actively engaged in fulfilling all objectives listed above by providing information to farmers, entrepreneurs, research students, end users and the general public. Many research and development activities are being carried out at the center. School and college students and teachers visit the center regularly. It has collected around 90 tons of oil seeds and also around 7000 liters of fried cooking oil is collected from various hotels in Shimoga district. The center arranges environmental awareness programs and participate in all the major governmental and other institutional exhibitions. Further, it



provides research facilities for M.Tech., B.E., M.Sc., B.Sc. and B.Ed., Students and encourage them to take up research projects on various aspects of Bio-fuel and environment. Table 14 gives the statistical highlights of the centre since its inception. It is fulfilled its mandate in spreading the awareness about the use of bio fuels in energy sector. While Fig.10 shows the esterification unit used to prepare bio diesel, Fig.11 shows a sample awareness program.

Table 14. Statistical Highlights (From the year 2011 to 2022)

Sl no	Particulars	Details
1	Year of establishment	2011
2	Grant received from KSBDB	Rs. 64 lakhs
3	Special program grants	Rs 3.7 lakhs
4	Seeds purchased	88 tones
5	Seed cake production	57 tones
6	Used oil collection	10000liters
7	Bio diesel production	20500liters
8	Carbon emission prevented	50 Tonnes
9	Bio soap production	8000 number
10	Floor cleaner production	460 liters
11	Awareness programs conducted	230
12	Training programs conducted	60
13	Exhibitions	35
14	Research projects	19





Fig.10 Esterification unit at bio energy center



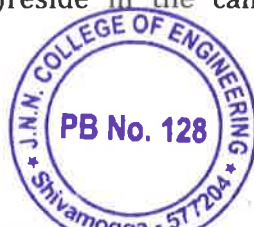
Fig.11 Bio energy awareness program



10. Overall Observations and Recommendations

The energy and environment audit of JNNCE has been carried out based on the data provided and the factual confirmation where ever possible. The overall major observations and recommendations are listed as under.

1. JNNCE has made remarkable achievement in implementing it's green energy policy. It has not only implemented the green technology systems like rain water harvesting, solid and liquid waste management system, solar roof top system but also involved its students and staff to carry out research and demonstrations to create knowledge and awareness about various other green technology systems.
2. Roof top solar system is meeting almost 95 percent of the electrical energy consumption of the institute which is highly commendable.
3. Considering the future increase in demand, there is scope for increasing the solar energy production further by installing the PV modules on vacant roof area. However, economics of the same has to be worked out.
4. Fans consume almost 50% of the total energy. Hence, proper monitoring of correct usage of the same is essential to reduce the power consumption.
5. There is scope for decreasing the transportation energy by encouraging the staff and students to use E-vehicles and bicycles
6. Roof top rain water system has potential to meet more than 75% of pure water requirement of the institution. Separate storage tanks need to be constructed for collecting the roof water.
7. Water supply system consumes 35% of the total energy utilization. Construction three over head tanks at an elevated place and distributing water by gravity to all the buildings would reduce the energy bill and maintenance of water supply system.
8. Roof water and canal water are collected in one reservoir. The quality of canal water appears to be bad. Hence, usage of the same has to be avoided.
9. Dead tube well can be recharged using surface flow water. Further, a lake or water body can be created to collect the surface flow rain water. This water body in addition to meet the gardening water requirement adds to the aesthetics of the campus.
10. Considering that, only about 10% of the total institution strength out of 4100 persons(Staff and students) reside in the campus hostels, per capita water



consumption 50 liters is much higher than the standard value of 20 liter per person per day. It indicates significant wastage of water.

11. Solid waste is not properly segregated into degradable and non degradable waste at the source. Degradable waste is being converted to compost and utilized. Non degradable waste is not properly disposed. No data on E-waste is available.
12. E-waste collection and recycling unit can be installed in the campus
13. Kitchen waste gas plant should be installed to handle mess wet waste.

Date: 20-09-2022



For MALNAD GREENTECH INDUSTRIES



