




National Education Society • Shivamogga
Kamala Nehru Memorial National College for Women
Affiliated to Kuvempu University
Accredited by NAAC with “B” Grade



7.1.6. Quality Audits & Environmental Promotion Activities.

Content

- Reports of Environment, Energy and Green audit.
- Green audit Certificate.


Principal
Kamala Nehru Memorial
National College for Women
Shivamogga-577 201.



MALNAD GREENTECH INDUSTRIES

SHIMOGA-577204

GREEN AUDIT CERTIFICATE

This is to certify that, green auditing of KAMALA NEHRU MEMORIAL NATIONAL COLLEGE FOR WOMEN, SHIMOGA has been carried out successfully from 08-09-2021 to 25-09-2021. All the data pertaining to Energy, Water, Waste and Greenery are analyzed and the observations and recommendations to improve the green campus status are given in the report.

Date: 05/10/2021


MALNAD GREENTECH INDUSTRIES
Proprietor

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We offer : Consultancy on Rainwater Harvesting, Green Auditing, Solar Thermal and PV Systems
We Supply : Biofuel Oil and Non-Edible Oil

GREEN AUDIT REPORT OF
KAMALA NEHRU MEMORIAL NATIONAL COLLEGE FOR WOMEN
SHIMOGA-KARNATAKA STATE

October 2021

PREPARED BY
MALNAD GREEN TECH INDUSTRIES, SHIMOGA-577204

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1. Summary

Green auditing of Kamala Nehru Memorial National College for Women (KNMNC), Shimoga has been carried out in order to assess the sustainability of the college campus. The purpose of carrying out green audit is to analyse the current status and incorporate the green practices and promote “Green campus concept” and become a role model for the educational institutions in particular and society in general. The green auditing is carried out by M/S Malnad Greentech Industries and has identified the major strength and weakness of the institution in achieving the green campus status. The campus has 78% open area which is good enough to offer clean air and light for the campus.

The main electrical loads are lighting, fans and computers. There is scope to reduce the electrical energy consumption by switching over to LED tube lights and energy efficient fans.. Almost all the students commute to college in public transport. Hence, the fossil fuel consumption is low. But, there is scope to improve it further, by encouraging the staff members to use green transport methods. Municipal water usage can be reduced by adopting rain water harvesting systems and using the open well water by cleaning it to required quality. The current usage of water is well below the standard per capita usage quantity. Dead borewell can be used for recharging the surface flow water. Currently, waste is given to municipal waste collection system and there is a proposal to establish in-house waste management system. Liquid waste is sent to open drain. It can be avoided by collecting the same and filter it with phyto-remediation system. The carbon foot print calculations show that, major share(78%) of carbon emission is due to transportation energy.

2. About the college

“If you educate a boy, you educate an individual, but if you educate a girl, you educate a family”.

Kamala Nehru Memorial National College for Women has been the first and the only women’s college in the entire Malnad area, till recently. The foundation stone of the college was laid in 1965 by Sri. Lal Bahadur Shastri, former Prime Minister of India and the building was inaugurated by the poet laureate Rashtra Kavi Kuvempu in 1975. This exclusive women’s college which started with a modest student strength of 32 has now grown to its present position of educating 1100 students. The college offers BA and B.Com degree courses, which are affiliated to Kuvempu University.

National Education Society which governs the college is a registered body, established in 1946 by the freedom fighters and philanthropists of Shimoga District. Their selfless dedication and vision and concern found expression, especially, in the field of education. Their services and contribution in the field of education have earned them a formidable but a well-deserved reputation as educators par excellence.

Academically, the college has been maintaining an excellent record; apart from rewriting records in co-curricular activities like sports, culture, NSS, NCC, Theatre and short films. The college has been designing student centred unique programmes, interactive sessions with achievers, Seminars and workshops for updating both learning and teaching skills. Much sought - after job oriented courses areas an optional subject in 2005 for the Arts students

Vision

To prepare the students to

- cope with the technological and social transformations that are taking place at break-neck speed.
- empower women students with entrepreneurial skills, rational and divergent thinking and creativity in all walks of life.
- be builders of the family and nation on the strong foundations of moral, spiritual, ethical and cultural values.

- make them responsible world citizens with a global outlook.
- make the institution a trend setter in women's education

Mission

- Combine competence and virtue.
- Prepare skilled and intellectually equipped students who are able to contribute solidly to the progress of the nation.
- Provide academic and research environment and extension services in the pursuit of excellence.
- Create a supporting system for a bold and dynamic leadership.
- Inculcate in student's innovativeness, creativity, versatility and team ethics.
- Create awareness and employment opportunities.

Objectives:

- The objectives are communicated by imparting knowledge and skills through traditional, non traditional teaching and students' participation in the learning process.
- By creating opportunities for imbibing lasting values of discipline, leadership, scientific approach through service and questionnaires, human values by sensitizing the students to the special problems through programmes
- By creating a guidance and a placement cell, we organize skill development and personality development programmes by inviting experts in the area to interact with the students. We also invite and associate ourselves with companies and organizations to create awareness, Job interviews and employability.
- Counselling the stakeholders in academic, personal and career matters by organizing programmes that would create dynamism and entrepreneurial initiatives in them.
- Through evaluation and monitoring the quality of the students by assigning a section of stakeholders to the class mentors whose duty it is to observe their performance, attendance, interest in the subjects of their study.
- By organizing programmes that enhance and update the skills of the teachers and the students.

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- To encourage students to actively participate and involve themselves in sports, literary, cultural activities and programmes through NSS, Rotaract NCC.
- To convey the vision and mission of the institution, the stake holders are constantly made aware of them in the following manner.
 - By displaying them prominently at the entrance of the college and in the library.
 - By printing them in prospectus and wall magazine and in the college magazine 'Abhivyakthi'.
 - By giving importance to it by printing it as the handouts or brochure whenever such an occasion arises.
 - Through website.
 - During the orientation programmes and reminding the students through interaction with the stake holders.

Table 1. Salient features of the institution

Name	Kamala Nehru memorial National College for Women
Location	K.T Shamaiah Road, Shimoga, Karnataka-577201 Longitude: 75.6 degree E Latitude: 13.93 degree N
Campus area	3800 Sq.m
Built up area	883 Sq.m
Percentage of open area	77%
Floor space area	3250 Sq.m
Students' strength	1000
Staff strength	
a) Faculty	Male: 22 Female:20
b) Supporting Staff	Male: 11 Female: 6
Number of lecture halls	20
Number of auditoriums	01
Number of Labs	02
Library building	01

4.

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Other utility rooms	07		
Courses offered	Disciplines	BA	B.com
	Streams		
	Common subjects	Kannada, English, Urdu, Sanskrit, Hindi	
	Cross domain subjects	Food and Health, Economics, Political Science	
Extracurricular activities	Cultural, Sports, NSS, Scout, Red cross		
Number of rest room blocks for students	01		
Number of rest room for staff	01		
Canteen facility	Available (01)		
Water source	Municipal and open well		
Energy source	Grid electricity		

The data given in the Table 1. indicate that, the college has sufficient space for academic activities. The infrastructure is sufficient to cater to the needs of the students and staff of the college.

3. About Green Audit

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of resource usage in a premises in order to grade the premises for sustainability.

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric carbon-di-oxide from the environment. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

Objectives of Green Audit:

1. To assess the usage of energy, water and the other resources inside the campus
2. To analyse usage of transportation energy of staff and students of the college
3. To study the waste disposal methodology adopted in the campus
4. To suggest suitable techniques, technologies, practices to improve the green campus standards of the college campus

4 Energy Audit

KNMNC consumes mainly three types of energy resource.

1. Electrical energy
2. Petrol and Diesel for transportation
3. LPG for canteen

Electrical Energy Audit

Electrical Energy consumption vital for the activities of the college. It is just like the blood inside veins of a living organism. All most all the gadgets under use consume electricity. Hence, the current consumption of electricity and scope for reducing the consumption are important components of electrical energy audit. The data given Table 2 show that, indicate that, the major share of electricity consumption is for lights and fans.

Table 2 Electrical Energy Gadgets at KNMNC

Sl. no	Item	Rating (W)	Number	Hours of usage per day
1	Fluorescent Lamps	36	278	6
2	Ceiling Fan	80	107	6
3	Computer	36	77	4
4	Printers	50	08	0.5
5	UPS	22.5KVA, 3205AB battery		-
6	LCD Projector	280	02	0.5
7	Exhaust Fan	80	01	5
8	Water Pump	380	02	1
9	Water Filter	567	03	4
10	Photo Copier	80	02	1
11	Refrigerator	586	01	10

7

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Fig 1. shows the expected reduction in load due to installation of energy efficient gadgets. It is observed that, the total load due to fans and lighting fixtures would decrease by 25 to 30 % if energy efficient LED lighting fixtures and fans are used.

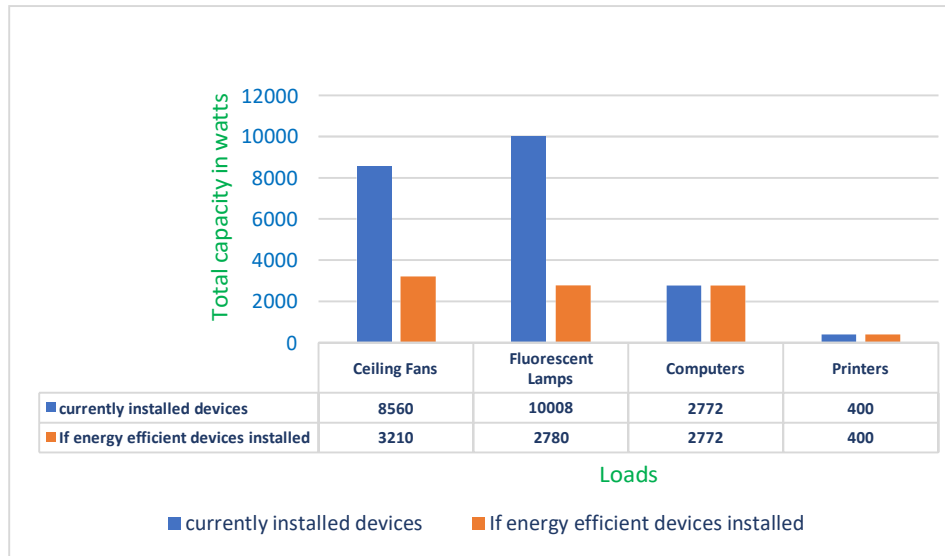


Fig 1. Expected Reduction in Load due to Installation of Proposed Gadgets

Observations and Recommendations based on Electrical Energy

Audit:

1. For the same lumens If **Fluorescent Lamps** of rating 36 Watts are replaced with LED Lams of rating 10 Watts 32.5% of installed capacity reduces which saves **694 Units per month** if lamps are used 4 hours a day.
2. For the same speed, If **Existing standard Fans** of 80 Watts rating are replaced with 30 Watts rating Energy efficient Fans 32.1% of installed capacity reduces which saves **1098 Units per** month if fans turn on 5 hours a day.

3. If **22.5 KW Roof Top solar PV System** is installed at the college in a Roof of area 22,500 Sq. feet with an investment **Rs 11 Lakh@50,000/KW, 35,554 Units** of energy per annum could be generated, which is sufficient for the college.
4. **Sufficient Roof area** is available in the college for placing the RTSPV system, Estimated **Payback period is 5 years**, which reduces **647 Tonnes of CO₂** emission in a span of 25 years.
5. **Additional saving** of electrical energy is ensured by creating awareness among all the staff and students of the institution to turn of loads immediately when not required and by regular maintenance.
6. One 10W solar lighting system is existing in the library building but not in working condition
7. Wet waste from the canteen can be used to generate cooking fuel.

Transportation Energy Audit:

Staff and students of the college use different types of transportation system for commuting to college. Table 3. gives the details of mode of transportation and the corresponding CO₂ emission.

Table 3. Mode of transport and corresponding CO₂ emission of staff and students

Staff					
Mode of Transport	Car	Two wheeler	Bus	Cycle	Walk
Number of persons	06	27	09	01	01
Distance covered per day (km)	90	360	180	08	04
Total fuel usage (Liter)	6	9	1.12	0	0
CO ₂ emission (kg per day)*	15	22.5	3.15	0	0
CO ₂ emission (kg per year)*	4500	6750	945	0	0

Students					
Mode of Transport	Car	Two wheeler	Bus	Cycle	Walk
Number of persons		25	425	02	35
Distance covered per day		250	14000	12	0
Total fuel usage (Liter)		6.25	87.5	0	0
CO2 emission (kg per day)*		15.6	245	0	0
CO2 emission (kg per year)*		4680	73500	0	0

- CO2 emission of petrol= 2.5 kg/liter
- CO2 emission of Diesel= 2.8 kg/liter
- Car milage =15km/liter
- Two wheeler milage 40 km/liter
- Bus milage = 4km/liter
- Average persons per bus = 40
- Number of working days = 300 per year

Cooking fuel energy audit

Number of LPG cylinders used per week: 1

Number of LPG cylinders used per year (Assuming 40 weeks of working period) = 40 =
40X 18 kg = 720 kg

Carbon Foot Print Audit

Carbon foot print of the campus is an important parameter in green auditing of the institution. It is measured in terms of amount of carbon dioxide released to atmosphere due to various energy consumption activities of the institution. To address the climate change impacts, the carbon foot print should be as low as possible and efforts should be made to decrease the same. The Table 4. gives the details of carbon foot print of the campus.

Table 4. Carbon Foot print of the Campus

Sl No	Activity	Fuel usage/year	CO2 emission (Tones/year)
1	Electricity	32000 units	23.6*
2	Transportation	Petrol- 5775 liter Diesel- 26586 liter	90.4
3	LPG usage	720 kg	2.16
	Total		116.16

- Assuming 65% of electrical energy is generated using coal
- CO2 emission per unit of electricity reaching the load is 1.13 kg/kWh

5. Water Audit

Water is a natural resource; all living organisms depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Climate change has added another dimension to water crisis. The monsoon is becoming erratic and increased air temperature sucks up more water from water bodies and soil. Hence it is essential to judiciously use every drop of water. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. Table 5. gives the details of the water management system exists in the institution and Table 5. Gives the results of water quality test.

Table 5. Data on Water Management of KNMNC

Sl No.	Parameter	Data	Remarks
1	Source of water	Municipal supply and ground water	Municipal supply for drinking and canteen
2	Number of wells	01	Well water for sanitization
3	Number of tube wells	01	No water
4	Depth of well	30 feet	
5	Static water level	10 feet from surface	During summer months
6	Water quality	Both type of water sources are tested for quality	Municipal water is potable but open well water is not potable (ref. Table)

6	Over head tank capacity	1000 liter for drinking 3000 liter for sanitization	
7	Quantity of water usage per day	500 liter for drinking 6000 liter for sanitization	Approximately 6 liter per day per person
9	Water usage for gardening	Around 1000 liters once in a week during off rainy season	Insignificant quantity
9	Annual water usage	2000 kilo liter	
10	Rain water harvesting system	Yes Roof water of one building is filtered and sent to open well	Scope for further collection and percolation
11	Roof rain water harvesting potential	630 kilo liter	RWH potential is around 30 percent of annual requirement of water

Table 6. Water Sample Test Report

ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ಸಮಿತಿ(ರ.), ಶಿವಮೊಗ್ಗ
National Education Society(R.), Shivamogga.

Jawaharlal Nehru New College of Engineering, Shivamogga.
ಜವಾಹರ್‌ಲಾಲ್ ನೆಹರು ನ್ಯೂ ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ, ಶಿವಮೊಗ್ಗ.

Approved by A.I.C.T.E.New Delhi, Certified by UGC 2f & 12B, Accredited by NAAC - 'B', Recognised by Govt. of Karnataka and Affiliated to VTU, Belagavi

DEPARTMENT OF CIVIL ENGINEERING
Accredited by NBA

Ref. No.: JNNCE/ CE / 224/ 2021-22 Date:09/02/2022

To,
The Principal,
K N M N College for Women,
Shivamogga.

Sir,
Sub: Testing of water samples.
Ref: Your letter No: KNMNC:694:2021-22 dated 08/02/2022

Sl. No	Parameters	Units	Open Well water	Municipal Water	Limits
1	pH		07.10	07.05	6.5 - 8.5
2	Acidity	mg/L	36.00	10.00	200
3	Alkalinity	mg/L	460.00	50.00	300
4	Hardness	mg/L	480.00	70.00	500
5	Calcium	mg/L	124.00	12.00	75
6	Chloride	mg/L	103.54	21.98	250
7	Dissolved oxygen	mg/L	04.40	05.30	-
8	Color	-	Nil	Nil	-
9	Turbidity	NTU	06.60	03.10	10 NTU
10	Total dissolved solids	mg/L	1432.20	146.32	500-1000
11	Iron	mg/L	0.001	0.001	0.30
	Potable / Non potable		Non potable	Potable	-----

Disclaimer:
1. The test are carried out on the samples as received and supplied by the customer.
2. The scope of the sample test results and reports thereof are limited to ascertain as to which standard the supplied samples confirm to.
3. The results are purely based on the parameters listed above and tested in our laboratory. The results are subjected to vary based upon the other parameters which are not listed here and not tested in our laboratory.
4. The tests carried out and report given does not endorse suitability of the material for the intended purpose.
5. This report cannot be reproduced wholly or in part and cannot be used as evidence in the court of law.
6. Any dispute arising out of this report is subject to Shivamogga jurisdiction only.
7. The college or personnel involved in testing is not responsible for any miss happenings due to usage of the tested material in any form or condition

Raghavendra S
Lab Instructor

Staff in charge

Coordinator

H.O.D

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Observations Regarding Water Management:

1. Open well water quality is not good. Alkalinity, Calcium content and dissolved salt content are higher than the permissible limits. Measures can be taken to improve the quality.
2. One building out of three buildings has rain water harvesting system(RWH). RWH can be extended to the other two buildings also.
3. Dead tube well can be recharged using surface flow water.
4. Per capita water consumption is much lower than the standard (20 liter per person per day).
5. Adequate water supply should be provided to maintain the hygiene of the students and cleanliness of the campus
6. If proper RWH system is installed about 30 % of the total water demand can be met with RWH system.

6. Waste Management Audit

Waste management is important for an eco-friendly campus. In a college different types of wastes are generated, its collection and management are very challenging. The following data provide the details of the waste generated and the disposal method adopted by the college.

It is observed that, KNMNC has no proper waste management policy. The solid waste of canteen and academic area are given to municipal waste handling system without segregating the same into degradable and non-degradable waste. . Canteen waste is collection is around 2.5 kg per day. Greenery waste is dumped into a pit for composting. However, no proper procedure is followed for composting.

Liquid waste is sent to municipal drain which runs along the college fence.

Recommendations:

- Solid waste should be Segregated into wet and dry waste. Dry waste should be further segregated into degradable and non-degradable waste. Waste collection bins should be labelled and placed in each floor of all the buildings.
- Kitchen waste gas plant should be installed to handle wet waste.
- Liquid waste should be collected and treated. Phyto remediation technology may be used for treating the liquid waste. The treated water can be used for watering the plants.

7. Greenery Audit

Greenery inside the campus keep 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 other activities.

Table 7. List of Plants found in KNMNC Campus

Sl no.	Local name	Scientific name	Number of plans
1	Ashoka	Saraca ascoca	24
2	Jamoon	Eugenia jambolanacam	2
3	Guvava	Psidium guajava	1
4	Pongamia	Pongamia pinnata	53
5	Indian Gooseberry	Phyllanthus emblica	1
6	Pethudia	Petonia axillaris	3
7	Silver Oak	Gravillea robusta	10
8	Jackfruit	Artocarpus heterophyllus	1
9	Holematti	Terminalia arjuna	3
10	Eukalyptus	Eucalyptus globulus	1
11	Mango	Mangifera indica	3
12	Casuarina tree	Casuarina equisetifolia	3
13	Akash Mallige Indian cork tree	Millingtonia hortensis	1
14	Seeme tangadi	Casia fistula	3
15	Wild Badam	Terminalia catappa	1
16	Cherry tree	Prunus avium	6

8. Over all Observations and Recommendations

Green auditing of KNMNC show that, there is scope for improving the eco-friendliness of the campus by adopting suitable measures. The energy usage of the campus can be decreased by changing the lighting and fan fixtures. Roof top solar power plant can make the campus **Energy Surplus Campus** and also earns monetary benefits. Currently, potable quality water availability is not assured. Rain water harvesting system can supply clean and safe water for all. Waste management system is currently not existing. Waste segregation at the source level, composting of bio degradable waste and kitchen waste gas plant are to be considered for implementation on top priority. There is sufficient greenery in the campus. More number of local species can be planted. Awareness programs have to be conducted on energy conservation, water management and waste management for students and staff.

Date: 05-10-2021



For MALNAD GREENTECH INDUSTRIES