ENVIRONMENT, GREEN & ENERGY AUDIT REPORT

2020-21

SHRI BALDEV RAM MIRDHA GOVT COLLEGE NAGAUR(RAJ)

CONDUCTED BY:

SOCIAL ENVIRONMENTAL SERVICES
CF-107 JDA COMPLEX, NEAR VAISHALI CIRCLE,
VAISHALI NAGAR, JAIPUR, RAJASTHAN (302021)
Mobile: 91+8112203350

Contents

Disclaimer

This report has been produced for SBRM Government Collage, Nagaur Raj. The information in the report is prepared based on the information obtained from various sources, the data available to us, parameters observed at the site, and discussions held with the relevant officials at the campus.

The detailed Information and analysis presented in this report are valid as on the date of visit and period of study at the site. The work presented represents our best efforts and judgments based on the information available at the time this report was prepared.

The consultancy makes no assurances as to the accuracy of any such information or any conclusions based thereon. The observations made in this report are only an indication of the performance of the facility based on our assessment and should not be considered as the comment on the functioning of the facility. The observation is purely based on the data recorded at that point of time.

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Executive Summary

A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with the environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions nowadays are becoming more sensitive to environmental factors as more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems, such as promotion of energy savings measures, usage of recycled water, water-use reduction, rainwater harvesting etc. The activities pursued by colleges and universities can create a variety of adverse environmental impacts.

The aim of the report is to identify scope for improvement and recommend implementable and economically viable solutions in achieving the most optimized utilization of energy and water in the campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Therefore, it is imperative that the college evaluate its own contributions toward a sustainable future.

In SBRM Government Collage, Nagaur the audit process involved initial interviews of management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures.

This was followed by staff interviews, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the college.

The baseline data prepared for the SBRM Government Collage, Nagaur will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the Collage. Existing data will allow the Collage to compare its programs and operations with those of peer institutions, identify areas in need of improvement and prioritize the implementation of future projects. We expect that the management will be committed to implement the green audit recommendations.

CHAPTER- 1

INTRODUCTION

Sri Baldev Ram Mirdha Government College, Nagaur is situated at district headquarter Nagaur which is a place of great historically significant located in the North-west part of the Thar Desert of Rajasthan. The college was established on August 8, 1969. It was initially named as Government College, Nagaur, but later renamed on January 28, 1986, by the Government of Rajasthan in the honour of renowned regional farmer-leader, Sri Baldev Ram Mirdha, who campaigned against the exploitation of farmers by the contemporary rulers. The College is affiliated with Maharshi Dayanand Saraswati University, Ajmer, and recognized by the UGC under 2(f) and 12(b). The college is accredited with B+ grade by NAAC in the second cycle accreditation in the year 2016.
The college works under the administration of the Department of Higher Education, Government of Rajasthan. The college is not only prestigeous college of Nagaur district but has recognization across the Marwar region. The college offers 16 academic departments running different U.G. and P.G. programmes. There are 3900 students enrolled in the college with 27 faculty members. The institute has a total campus area of 30 acres, out of which about 27,360 sq. meters is constructed and The College is equipped with ICT - enabled facilities and being progressed in all areas whether it is curricular or co-curricular activities. Thousands of students who completed their education from this college are serving in the different fields with honesty and due dedication. The institute didn't leave any stone unturned to get the academic height. Furthermore, college is strictly adhered to enhance the rest of the activities, like N.S.S., N.C.C., Rovers, Ranger, and, Sports activities. The main aim of this college is to prepare an all-round complete person who is free from cast, creed & community. Overall personality development is the motif of this institute.

Pic:- Arial View of SBRM Collage

Academic Courses

The institute currently offers comprehensive facilities, cultural activities, wide range of academic courses and industry interface. SBRM Government Collage, offers multi-disciplinary study programs under its following institutes:

- Faculty of Arts, B.A.
- Additional in Arts Faculty, Urdu and Geography
- Faculty of Science, B.Sc.
- Faculty of Commerce, B.Com.
- Faculty of Science, M.Sc.
- Faculty of Arts, M.A.
- Faculty of Commerce, M. Com

Land Distribution

The college has a total campus area of 30 acres, out of which about 27,360 sq. meters is constructed of buildings and roads and remaining area is used for plantation and cropping purpose.

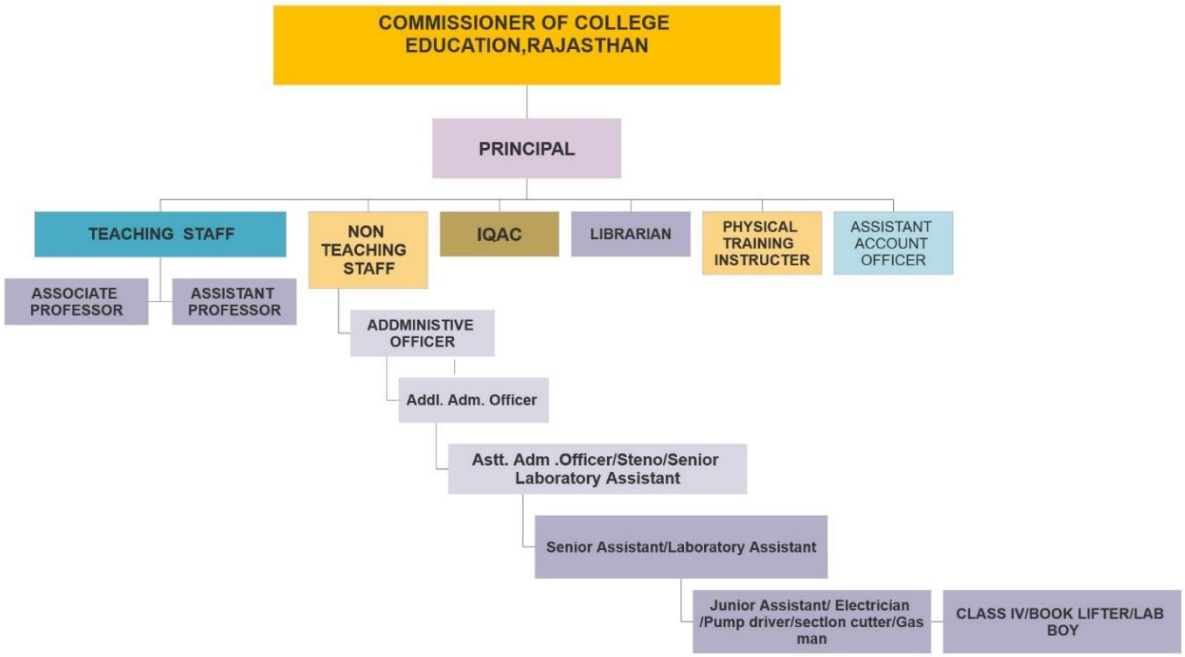
Sr. No.	**Particulars**	**Land Area (Acres)**
1.	Main Building/Hostels (Boys & Girls) (Constructed area)	6.84
2.	Playground & Open Area	18.30
3.	Green area and other amenities	4.53
	Total	**30.00**

Infrastructure Facilities

Laboratories
Libraries
Conference halls
Auditorium
Canteens
Class rooms
Boys & Girls Hostels
Sports Facilities
Green area

Organogram of the Institution

The College is governed and administered by the College Education Rajasthan, Jaipur headed by the Commissioner who manages and administers the all-government colleges of the state. the principal is in charge at the college level who looks after and manage by redistributing all responsibilities. all faculty members are allocated to the Establishment, Accounting and Academic sections to execute administrative functions and the management of collage level. The faculty members are associated with several committees such as Admission committee, Examination committee, Sports committee, and so many other committees related to co-curricular activities like NSS, NCC, RANGERS-ROVERS etc. All departments are headed by a in charge in order of their seniority and are authorized and responsible for the functionality of respective department.



CHAPTER -2

ENVIRONMENTAL & GREEN AUDIT

NEED OF ENVIRONMENT AND GREEN AUDIT

Buildings in the education sector contribute to over 230 million tons of CO_2 emissions per annum approximately in India. The need for water, land and resources are growing enormously as more educational and institutional developments are underway to accommodate the ever-burgeoning population of India. There is growing interest in many up-and-coming universities today, to frame practical strategies for resource savings, conservation and waste reduction to make centers of learning deliver excellence in terms of sustainable green campuses and sustainable communities, at large.

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. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economic, financial, social and environmental factor. It is necessary to conduct green audit in college campuses because students become aware of the green audit, its advantages to save the planet and they become good citizens of our country. Thus, green auditing becomes necessary at the college level.

As a first step, SBRM Government Collage is undertaking a comprehensive Green and Environmental Auditing of campus to understand the energy and water use patterns and identify opportunities for improvement. The main objective of this appraisal report is to provide a technical assessment of energy, water and resource conservation opportunities and their projected savings.

Ultimately, the audit report should ensure that the agreed-upon conservation measures, when implemented, would enable the campus to minimize energy, water and resource consumption and adhere to statute requirements such as the National Building Code 2016.

Green and Environmental Auditing is **NOT a fault-finding exercise**, but an approach to identify energy, water and resource saving opportunities and scope for performance improvement.

Before initiating Green and Environmental Auditing process, it is necessary to understand the scope of the audit and number of efforts required to complete the desired activity. The type of energy audit mainly depends on the category of building, the depth to which final audit is needed,

and the potential and magnitude of cost reduction desired.

SCOPE AND GOALS OF ENVIRONMENTAL GREEN AUDITING

A clean and healthy environment aids in effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is an efficient and ecological way to manage environmental problems.

The audit scope covers Water (consumption, conservation & disposal), Solid waste (generation, segregation and disposal), Carbon foot print and steps to reduce, Energy (consumption, generation & conservation) and green campus (greenery, techniques & bio diversity)

It is necessary to conduct green audit in college campuses in order to make the management aware of its current status with respect to the environmental aspects as well as update on the latest developments and requirements in terms of environmental compliances and best practices. Apart from this, the involvement of students in the environmental activities and programs of the college along with the audit, aids in shaping them into responsible citizens of the world.

OBJECTIVES OF ENVIRONMENT AUDIT

The main objective of green audit is to assess the environmental quality and the management strategies being implemented. The specific objectives are:

- To assess the quantity and quality of the water consumed in the college campus
- To check the measures taken for water conservation
- To monitor the energy consumption pattern of the college& steps taken for Energy conservation
- To quantify the liquid and solid waste generation and management plans in the campus
- To study the implementation of source segregation of waste generated and disposal methods
- To assess the carbon foot print of the college
- To assess the measures implemented to reduce Carbon Footprint
- To survey and verify the campus greenery and gardening techniques

- To identify the gaps and suggest recommendations to improve all aspects

BENEFITS OF GREEN AUDIT

- Empower the organizations to frame a better environmental performance
- More efficient resource management
- To provide basis for improved sustainability
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing & managing
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and improving environmental standards
- Financial savings through a reduction in resource use
- To create a green campus & Enhancement of college profile
- Developing an environmental ethic and value systems in youngsters
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college

TARGET AREAS OF AUDIT

- Environment Auditing - Water Management, Solid waste Management and Carbon Foot Print
- Energy Management Auditing – Energy (Electricity, Diesel Generator, Solar Power plant and Other Energy equipment)
- Green Campus Auditing - Green Campus (Green cover, Bio-Diversity)

METHODOLOGY OF ENVIRONMENT & GREEN AUDIT

- The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Environment Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks.

- The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documents, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three-step process comprising of:

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DATA COLLECTION

In data collection phase, exhaustive data collection was performed using different tools such as observation, survey, communicating with responsible persons and measurements. Data collection was done from the primary sources (see Questionnaire in Annexure A)

Following steps were taken for data collection:

- The team visited each Building, Department, Library, Canteen, Gardens, and Campus etc. Data on the general information was collected by questionnaire, observation and interview.
- Water usage and conservation data
- Energy consumption meter readings, connected loads
- Identification of Plants and listing
- Waste generated and segregation at source, measurement methods and disposal

DATA ANALYSIS

Detailed analysis of data collected included:

Water usage, quality & treatment; Quantities of solid waste& disposal; computation of energy consumption, analysis of latest electricity bill of the campus, utilization of Solar power generated; Carbon emissions due to vehicular pollution, diesel generator, LPG and any other sources

RECOMMENDATION

On the basis of results of data analysis and observations, recommendations have been provided against each section on

- Water conservation & treatment
- Energy conservation & optimum utilization
- E-waste disposal
- Bio-diversity

CHAPTER-3

ENVIRONMENT AUDIT REPORTS

A. WATER MANAGEMENT AUDIT REPORTS

Introduction

Water which is precious natural resource available with fixed quantum. The availability of water is decreasing due to increasing population of nation, as per capita availability of utilizable water is going down. Due to the ever-rising standard of living of people, industrialization, urbanization, demand of fresh water is increasing day by day. The unabated discharge of industrial effluent in the available water bodies is reducing the quality of the sample sources of water continuously. Hence, the national mission on water conservation was declared by the then Hon. Prime Minister appealed to all citizens to collectively address the problem of water shortage, by conserving every drop of water and suggested for conducting water audit for all sectors of water use. A water audit is an onsite survey & assessment to determine and improve efficiency of water use.

Parameters

Following are the key parameters used in water management audit:

- Sources of water
- Measurement & Consumption
- Waste water disposal
- Best Practices
- Suggestions/ Recommendations

Observation and Inferences

- **Measurement (Source, Storage & Usage)**

Source	Nos	Measurement
Borewell	1	400 feet
Storage		

Underground Water Tank for borewell water storage	1	15000 Gallon
Rain water Storage Tank	2	14000*2=28,000 Gallon
Uses per Day		6000 Gallon/day

The utilities for water are 2 Hostels, Mess, Canteen, Gardening and RO plant. The Mess & canteen are located inside the college campus.

- **Measurement and Consumption**

S. No.	Water Consumption pattern	In Gallon
a)	Hostels (Boys and Girls)	1100
b)	Mess, Canteen (Cooking & Washing)	1200
c)	Utilities & drinking	1800
d)	Gardening	1000
e)	Laboratory	900
	Total Water Consumption/day	6000

- **Water Conservation**

S. No	Most conservation methods	Observation
I.	Rain water Harvesting (RWH)	2 RWH Structures Available
II.	Water level indicators/ controllers	Provided
III.	Water Flow meters	Available
IV.	Re-cycling of waste water	Implementation required
V.	No leaky taps/ pipes/ joints	Maintained
VI.	Drip irrigation	Provided
VII.	Re-use of RO reject water	Implemented

- **Waste water disposal**

Waste water dispose through Septic tank & soak pit in college campus.

- **Best Practices**

- Rain Water Harvesting (RWH) properly implemented
- Implemented RO Plant and treated water is re-cycled

- **Suggestions & Recommendations**

- Waste water Treatment facility requirement
- To avoid overflowing / wastages from Over Head Tanks, sensor system to be installed
- Automatic taps & urinals system to be installed

Photographs: Rain water Storage Tank & Bole well

B. SOLID WASTE MANAGEMENT

Introduction

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Solid waste management reduces or eliminates the adverse impact on the environment and human health. A number of processes are involved in efficiently managing waste for an organization. It is necessary to manage the solid waste properly to reduce the load on waste management system.

The solid waste audit focused on volume, type and current management practice of solid waste generated in SBRM Govt. College campus. The solid waste collected was paper waste, plastic, bio-degradable waste, construction waste, glass waste, electronic (e-waste) and other miscellaneous waste. Solid waste disposal management audit is an on-site survey & assessment to determine and improve efficiency and effective waste disposal system.

Parameters

Following are the key parameters used in waste management audit:

a) Sources of waste generation
b) Types / volume of waste generated & Disposal Mechanism
c) Segregation of waste
d) Best Practices
e) Suggestions/ Recommendations

1. Sources of waste generation

S. No.	Source	Types of Waste
i.	Students	Paper, Pen, Refill, Plastic water bottles, food waste, paper plates. other plastic materials, washings, Urinals and Electronic parts, Paper plates, Food wastes, sanitary napkins
ii.	Administration (Staff and Teachers)	Paper, Pen, Refill, Plastic & other plastic materials, Washings, Urinals, broken furniture & glass, E-waste
iii.	Natural accumulation (Garden, Playground & parking area)	Dry leaves, Paper waste, Paper plates, Food wastes
iv.	Others (Visitors and construction)	Paper, plastic and construction material wastes

2. Types / volume of waste generated

S. No.	Category	Types of Waste	Quantity Generated (Day)	Disposing method
1.	Solid Waste	Damaged furniture/glass, pen, paper, cardboard, metal	1-5 Kg	Sold to recycler or Municipal facility
2.	Wet Waste	Food waste (canteen/mess)	1-5 Kg	Municipal facility
3.	E-Waste	Computer/Computer parts, Electrical/ Electronic appliances	There is No E waste Management System in the college	--
4.	Other waste	Sanitary Napkins	1-2 Kg	Municipal facility

3. Segregation of waste
   - Bins kept at few places for collection & segregation: Bio-degradable, Plastics, E-waste and Bio-medical waste
   - The segregated dry waste is accumulated and handed over to a Municipality hooker daily basis
   - Wet waste is handed over to the municipal body for taking to the compost yard for converting into compost
   - E-waste, however, is sold to a local scrap dealer, who may reuse most of the items but also may not safely dispose the rejects

4. Best Practices
   - Properly segregation bins provided
5. Suggestions/ Recommendations
   - E-waste to be disposed through an Approved recycler
   - Awareness programs to be imitated for students and teaching staffs

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C. CARBON FOOT PRINT

Introduction

Carbon Footprint is a measure of total quantity of greenhouse gases being emitted by an individual or an institution as a result of its daily activities. Carbon Footprints tell the impact on the environment due to various activities inside the campus quantifies the same in the form of total gases being emitted. The most common greenhouse gases are carbon dioxide, water vapor, methane, nitrous oxide and ozone. All the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into earth atmosphere through human activities is commonly known as carbon emissions. The question is what should be done to reduce carbon emissions. Many colleges want to reduce their carbon dioxide (CO2) emission but it is a difficult task, given a range of factors determine carbon emissions, including mobility, waste, and energy consumption. So, gaining insight into CO2 emissions is extremely important. An important aspect of doing a carbon foot print audit is to account the carbon foot print of the campus by determining the net amount of greenhouse gas emitted from various activities in the campus so that the Institution can adopt better ways to reduce its carbon foot print. One aspect is to consider the distance travelled and mode of travel used to commute between home and institution every day by the students and staffs. So, the carbon foot print auditing determines the total carbon foot print of the campus and analyzes whether the campus is eco-friendly and follows environmentally sustainable practices. It is therefore essential that any environmentally responsive Institution shall examine its carbon footprint.

Parameters

Following are the key parameters used in carbon emissions audit:

1. Sources, Measurement of carbon foot print
2. Awareness and communication
3. Best Practices
4. Suggestion and Recommendations

Feasible emission inventories were selected to analyze the carbon footprint of the campus. The inventory survey was done for one academic year. The selected inventories are Human Factor, Transportation, Electricity, Solid Waste, Production and Consumption of Food, LPG & Natural Gas.

a) Human Aspect

Carbon dioxide emitted by person per day is not negligible. It is equivalent to the emission of a car in a 5km stretch. Humans emit 26 giga tons of carbon dioxide per year while CO2 in the atmosphere is rising by only 15 giga tones per year. Just for breathing, humans emit per person each day 1140 grams of CO2, assuming that they eat normally and follow a mean diet of 2800kcal.

b) Transportation

Fossil fuels are used for transportation. The carbon dioxide emitted by different fuels is in different amounts. The engine of the vehicle burns fuel and creates a certain amount of CO2, depending upon its fuel type, fuel consumption and the driving distances. One liter of petrol and diesel emits 2.3kg and 2.7kg of carbon dioxide, respectively. Travelling by car for1000km can produce about 200-230 kg of carbon dioxide into the atmosphere. If a person travels by a bus for 1000 km, it can add 1075 kg of CO2 to his/her Carbon foot print. Worldwide, the fossil fuels used for transportation contribute over 13% of GHC emission.

The transportation details for the institution campus like the type of vehicle, No. of vehicles and the fuel used were collected. The Carbon dioxide emitted from petrol is less compared to that of diesel. The Carbon footprint by the emission inventory transportation will be quite high.

c) Electricity

Electricity is one emission inventory which contributes much to the Carbon footprint of the Institution. On an average, electricity sources emit 1.297lbs CO2 per kWh i.e. 0.0005883 metric tons of CO2 per kWh. The emission factor given by GRID 2010 version 1.1 for hydroelectricity is 6.8956 x10-4 metric tons CO2 /kWH, 50 grams of CO2 is emitted from1 unit of solar power. The details of the consumption of electricity and the use of generators in different zones were surveyed. If the number of classrooms and labs are more in a zone, consumption of electricity in that zone is more.

It was noted that the institution uses a renewal solar energy 15 KW as a supplement to conventional power there by reducing emission of GHC to the atmosphere also contributing to the INDC commitment pledged by Government of India.

d) Solid waste

Generally, 1kg of solid waste is generated per capita per day. For high income countries, the solid waste generation is 1.1-5kg per capita per day. For middle income countries, it is 0.52-1kg and for low-income countries the value is 0.45-0.89 kg per capita per day. One kilogram of solid waste can emit about 0.125kg of carbon. The details regarding the solid waste generated in each zone is collected including the waste produced in canteen and hostels.

The solid waste generated in the canteen and hostel which is taken ou of the campus comes under other indirect emissions. Solid waste emits less amount of carbon dioxide compared to other emission inventories considered.

e) LPG And Natural Gas

The consumption of 1L of LPG can release 1.5kg of CO2 to the atmosphere. Also, burning of wood (250kg) can add 33kg of CO_2 to the Carbon footprint. The consumption details of LPG and Natural Gas in canteen and hostels were surveyed.

Carbon Footprint Analysis

Carbon footprint analysis can be done by suitably combining data collected with respective emission factor of the selected emission inventories. Table represents emission factors of the selected inventories.

Table: Emission Inventory

S. No.	Emission Description	CO_2 Emitted kg/Day
1.	Human Aspect	1.14 Kg per person per day
2.	Petrol	2.3 kg per litter
3.	Diesel	2.7 kg per litter
4.	Electricity	0.93 kg per kWh
5.	Solid waste	0.125 kg per kilogram
6.	LPG	1.5 kg per kilogram

Fig: Standard Daily CO_2 Emission

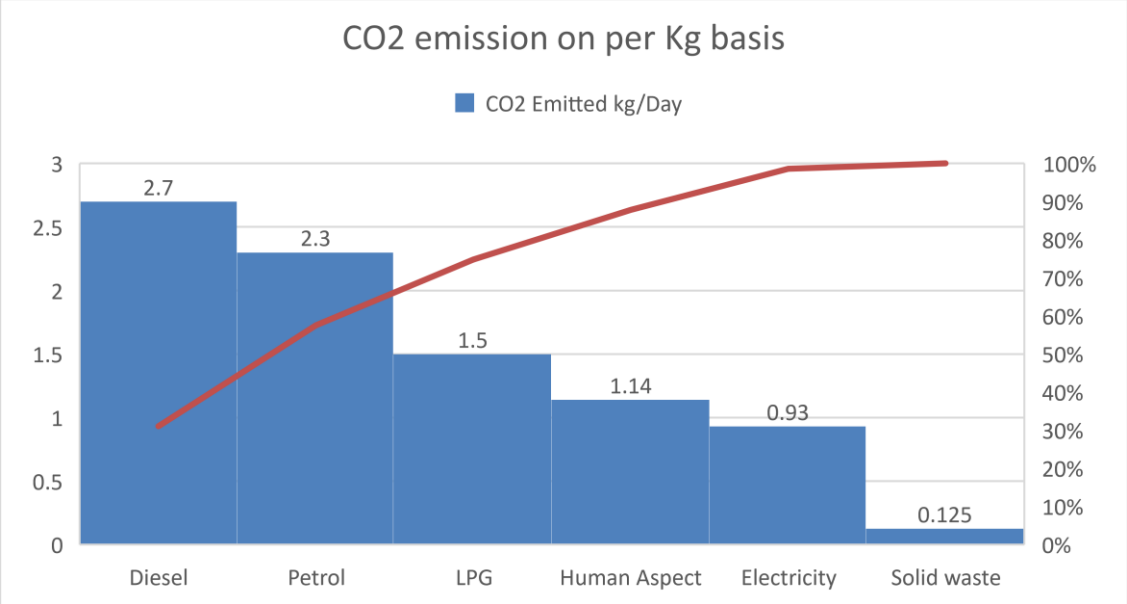

Table: Details for Carbon foot print auditing

S. No.	Details	Data year 2020-2021
1.	Total number of Students	❖ (Covid-19)
2.	Total number of Faculty Members	28
3.	Total number of Non-teaching Staff	13
4.	Total number of Four wheelers	14
5.	Total number of Two wheelers	60
6.	Total number of Generators used	01
7.	Total number of LPG cylinders	1(monthly)

Table: Total CO_2 Emission from the Institution Campus

S. No.	Emission Description	Total (Kg of CO2/Month) (2020-2021)
1.	Human Aspect	46.74
2.	Transportation	6735.45
3.	Electricity	1925.1
4.	Solid Waste	147.78
5.	LPG	28.5
	Total	8883.57 Kg/Month

Total CO2 emitted from the whole campus was estimated to be 8.8 Tons/Month during the year 2020-2021.

Carbon footprint audit- Evaluation and recommendations

Carbon Footprint Audit was done to measure the total quantity of greenhouse gases being emitted by the institution as a result of its daily activities. Carbon footprint was done to analyze the impact of various activities on the environment and it was quantified in the from of total greenhouse gases being emitted. Hence carbon footprint audit was able to identify areas wherein intervention can be done to reduce the impact and optimize the usage of resources.

Best Practices Observed in the Institution – Carbon Footprint Reduction

- The campus generates 75 kWh units per day through solar Energy and reduce 25.45 ton carbon emission annually.
- Area under green covers approximate 15000 SQM

Suggestions & Recommendations

- Try to go Digital and reduce the use of paper, decreasing the CO_2 That comes from paper production
- Use ENERGY STAR certified products the environment through superior energy efficiency.
- Encourage electric vehicle and bicycles.

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CHAPTER- 4
GREEN AUDIT

Introduction

Green Campus is an environment which improves energy efficiency, conserves resources and enhances environmental quality by educating about sustainability and creating healthy, living and learning environments. Achieving an Eco-friendly Green Campus is long term commitment to continuous environmental improvement from the campus community. Green collage makes a point to account for sustainable living when designing and operating their buildings. Green college makes a point to account for sustainable living when designing and operating their buildings. Many of their facilities incorporate natural lighting, improve air quality, and reduce energy and water use. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. Trees in a college yard improve air quality and can reduce temperatures with their cool shade. They are a small environmental investment that will pay dividends for decades to come. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. So, while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well. Studies have shown that tree greatly reduce stress, which is a huge deal considering that many students are under some amount of stress. In this note, every educational Institution must conduct green audit as a form of self-assessment to reflect the role the institution has been playing in mitigating the environmental impacts caused by its various activities.

Key parameters

1. Green cover
2. Identification and classification of vegetation
3. Best practices
4. Suggestions and recommendation

Observation and Inferences

- Total college campus area is 30 acres
- Green cover with trees, flowering plants area
- Bio-diversity greenery with 15% is covered with trees, herbs.
- Full-time gardeners are engaged in maintenance of garden

Best Practices

- Especially green area developed for desert plants
- Excellent & well-maintained Garden in desert with varieties of trees and plants
- Manure obtained from compost yard which is in turn fed by the organic waste

Suggestions & Recommendations

- Conduct competitions among departments for making students more interested in making the Campus green
- Install vermicomposting facility, the output of which can be used as manure for planation purpose.

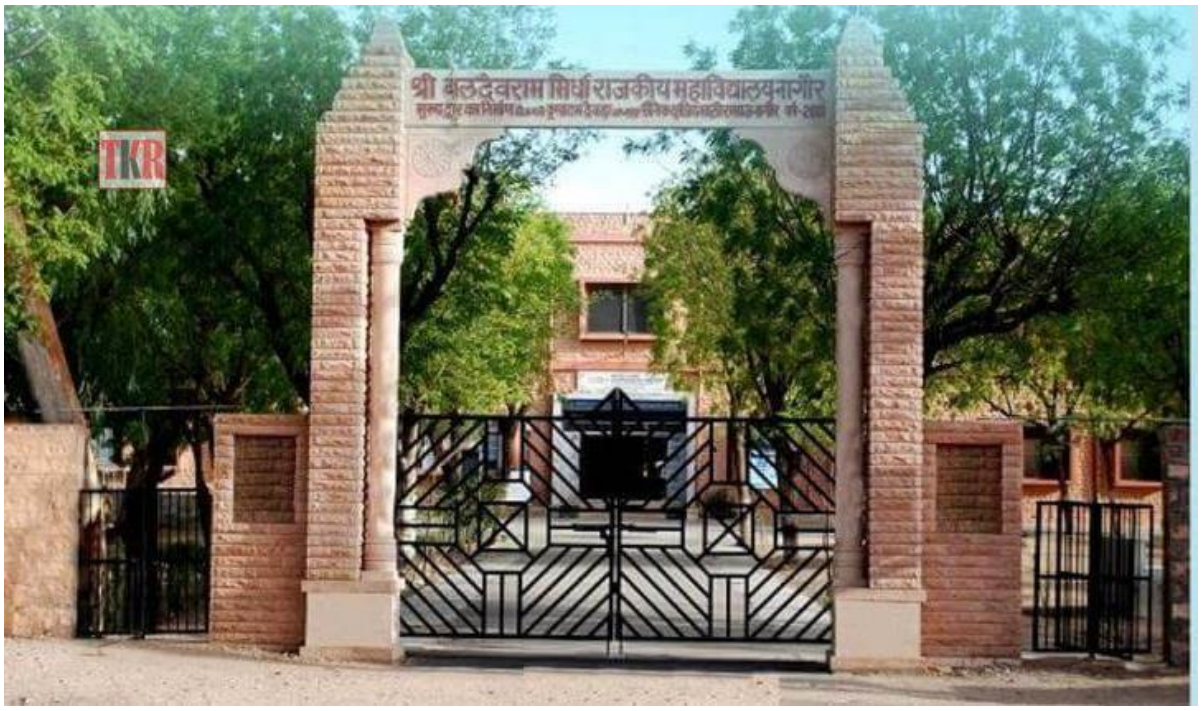
Bio diversity

- Due to the large volume of greenery in the campus, it attracts birds and other species.
- It is recommended that the institution identify the flora / fauna and record it.

The following table provides the details of the audited plant species in the campus.

S. No.	Common Name	Scientific Name/Botanical name	Herb/Shrub/Tree
1.	Neem	*Azadirachta indica*	Tree
2.	Khair	*Acacia catechu*	Shrub
3.	Bil patara	*Aegle marmelos*	Tree
4.	Gwar Patha	*Aloe vera*	Herb
5.	Pipal	*Ficus religiosa*	Tree
6.	Aam	*Mangifera indica*	Tree
7.	Khejri	*Prosopis cineraria*	Tree
8.	Rohida	*Tecomela undulate*	Tree
9.	Gokhru	*Tribulus species (rajasthanensis)*	Herb
10.	Sisham	*Dalbegia sissoo*	Tree
11.	Safeda	*Eucalyptus*	Tree
12.	Bhurat	*Cenchrus biflorus*	herb
13.	Ashoka	*Polyalthia longifolia*	Tree

Green area Photographs: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एन.सी.सी. अधिकारी
-- उद्यान के भामाशाह --
श्री भोजराज सारस्वत
श्री परमाराम जाखड़
श्री कानसिंह बुगासरा
श्री अरविन्द खाण्डा
Latitude: 27.189936
Longitude: 73.734383
Elevation: 291.77±8 m
Accuracy: 8.4 m
Time: 23-12-2021 14:38
Note: Rohida udyan
Powered by NoteCam


Latitude: 27.189352
Longitude: 73.735057
Elevation: 305.3±10 m
Accuracy: 8.0 m
Time: 03-01-2022 13:41
Note: Botanical park
Powered by NoteCam


Latitude: 27.189929
Longitude: 73.735443
Elevation: 297.69±2 m
Accuracy: 8.8 m
Time: 23-12-2021 14:51
Note: NSS park
Powered by NoteCam

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CHAPTER- 5
ENERGY AUDIT

Requirement of Audit

As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

Electricity is the main source of energy to run an educational institution like SBRM. It takes care of all requirements like lighting, fans, ACs, water motors, RO plants etc.

The scope of audit covers the entire electrical energy requirements of the college, the sources, measurement, consumption, conservation techniques, use of renewable energy and awareness among staff and students. The scope also includes cost benefit analysis of projects done, identification of areas for improvement and recommendations to move towards higher energy efficiency.

The main Purpose of energy audit are:

- Reducing energy consumption in a systematic manner by:
  - Constant monitoring and measurement
  - Identifying leakages / wastages
  - Alternate energy efficient methods / products
  - Creating awareness
- Becoming self-sufficient in energy generation through sustainable methods like renewable energy
- Saving environment through efficient energy usage as well as saving energy costs for the institution

Audit Parameters

Following are the key parameters used in Energy audit:

- Energy sources
- Measurement and Consumption
- Best Practices
- Suggestions/ Recommendations

Observation and Inferences

I. Energy sources

S. No.	Electricity Source	Capacity in KW
1.	Grid Power supply from AVVNL	18 KW
2.	Solar on Grid connection	15 KW
3.	Diesel Generator set	5 KW

II. Measurement and Consumption

Analysis of Electrical Load

Connected load & Consumption Estimates

Load Equipment	Wattage for Each One	Total Quantity	Total KW	Average usage in Hrs / day	KWH per/day
Motor	746	6	4.5	1	4.5
LED Light	18	60	1.08	6	6.48
Fans	60	210	12.6	8	100.8
AC	1500	03	4.5	8	36.0
Computer	200	46	9.2	4	36.8
Photocopiers	300	03	0.9	3	2.7
Refrigerator	300	03	0.9	24	21.6
Street Light	60	03	0.18	10	1.8
Other Lab Equipments	200	65	13.0	0.25	3.25
			46.86		213.93

Power Consumption as Per electricity bill

Meter 1 last no.-444	Month	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 21	Fab 21	Total Units
	Units	400	2327	690	630	260	110	240	4657
	Amount	--	--	--	--	--	1358.23	2141.32	
Meter 2 last no.-443	Month	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 21	Fab 21	
	Units	2116	2116	2013	1100	1520	1010	2070	11945
	Amount	--	--	--	--	--	--	17089.70	
Meter 3 last no.-141	Month	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 21	Fab 21	
	Units	308	300	649	600	150	180	300	2487
	Amount	--	--	--	--	--	2028	2747	19089

Total units for the study time 19089 units
Per person consumption is 4.84 units

III. Best Practices

- The campus uses 15 KW solar plant on grid system
- Periodic maintenance of electrical/electronic equipment is done to optimize the power uses
- The campus uses only 3 Air conditioners

- Energy saving through the replacement of incandescent bulbs, CFL lamps and tube lights to LED light

IV. Suggestion & Recommendations:

- Usage of Star rated Electric/Electronic Appliances
- Tube lights to be replaced with LED lights in a phased manner
- One electric bill has high fixed charges to be analyzed and corrected

Consolidation of Energy Audit Findings

The Energy audit was conducted in Shri Baldev Ram Mirdha Govt College, Nagaur Rajasthan. Based on the above observation and analysis it was found that the total energy utilization of the Institution for different purpose was approximately 19089 kWh/Year. The main source of power is the electricity purchased from Ajmer Vidut Vitran Nigam Limited.

The institution has already implemented many measures to decrease the dependence on conventional power, few initiatives taken in this direction are solar powered lights along the campus as a replacement to conventional street light. The institution has installed 15 KW solar plant connected with on grid system.

This solar plant saves every year 27, 375 kWh/year to reduce carbon 25.45 Ton carbon footprint every year.

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