

**GREEN & ENVIRONMENT  
AUDIT REPORT**

**for**

**GOVERNMENT SCIENCE  
COLLEGE**

**IDAR, GUJARAT 383430**





PATRON--GRIHA



IGBC--FELLOW



MEMBER--ASHRAE



MEMBER—INTACH



GEM-CP

N. K. Ojha,  
Former I/c Registrar & University Engineer,  
The M. S. University of Baroda

LOKPAL—MGNREGA—Rural Development, Government of Gujarat  
Arbitrator, National High Speed Rail Corporation Limited, Vadodara  
Arbitrator, INFLIBNET Centre, Gandhinagar, Gujarat

Inquiry Officer, Deendayal Port Trust, Gandhidham, Gujarat  
Inquiry Officer, Gujarat State Police Housing Corporation Limited  
Technical Expert---Centre for Entrepreneurship Development, GoG  
Technical Advisor to State Universities, SGGU, BNMU, BAOU, MKB

Green Building Consultant, GDRPL, Vadodara  
Bank of Baroda, Union Bank of India, IOCL, HPCL, ADAMA, Pidilite,  
Nippon, Thal Sena Bhawan, Gati Shakti University, MES, etc.  
Chartered Engineer & Civil Auditor,

Project Management Consultant & TPI,  
IGBC-AP, IGBC-Fellow, GRIHA-Patron

**Date: 20-06-24**

---

## ***WHOMSOEVER IT MAY CONCERN***

This is to Certify that **Government Science College, IDAR**, have undertaken the process of Green & Environment Audit with Action Plan and have also undertaken Green Initiatives in the field of Energy & Water Conservation with proactive action in Post Occupancy Waste Management.

The College has further taken steps for mobilizing Green Awareness programme on Campus.

I wish College Good Luck in their future endeavor in the field of Sustainability and Appreciate the Green Initiatives taken up.

  
N. K. Ojha

**GOVERNMENT  
SCIENCE COLLEGE  
IDAR—SABARKANTHA  
GUJARAT-383430  
Established—2008**

**GREEN & ENVIRONMENT AUDIT REPORT  
WITH  
ACTION PLAN  
2019 - 2024**



**Prepared by**

**Universal Consultancy, Vadodara  
GUJ\VDD\17959 dated 17-10-2007  
IGBC-AP, GRIHA-PATRON, IGBC-FELLOW  
MIE, Member-INTACH, Member-IGBC,  
Chartered Engineer (India)**



GRIHA--PATRON

IGBC--FELLOW

ASHRAE—MEMBER

INTACH—MEMBER

GEM--CP

# *COPYRIGHT*

This Green & Environment Audit Report 2019-24 with Action Plan for **Government Science College, Idar, Sabarkantha, Gujarat** is a copyright of N. K. Ojha of Universal Consultancy. He has a right over the original as well as the derivative work done on this report. It prevents one and all from producing, using, selling or distributing any of its invention and research work. No part of it shall be copied, reproduced or separated from the body of its contents. If extra copies are required, the concerned may be requested to do the needful and copies officially obtained from them alone. Violating above said shall be liable for prosecution under Copyright Regulation, 2017.

**N. K. Ojha**  
Universal Consultancy  
Vadodara  
9825821684  
navinojha13@gmail.com  
20<sup>th</sup> of June, 2024

## *PREFACE*

The National Assessment and Accreditation Council, (NAAC) assessment is mandatory for all the recognized Higher Educational Institutions of this country. Criterion VII in the name of Institutional Values & Best Practices is a part of NAAC Manual and all Higher Education Institutions are supposed to comply to this Criterion too at the time of applying for the assessment.

This criterion carries 100 credits and various measures adopted by the Institution regarding Environment Friendly approach such as Water Efficiency, Rain Water Harvesting, Ground Water Recharge, Reduce-Reuse-Recharge strategies for Water, Energy Efficiency, Energy Performance Index of the building, Hybrid Energy, Indoor Environmental Quality, Eco-friendly building material, Low ODP & VOC material, Post Occupancy Waste Management, Energy Audit, Water Audit, Green Policy of the campus, Green measures beyond the fence are considered. Barrier free environment is also the part of this criterion.

Higher Education Institutions are required to submit compliance to above said measures adopted in Environment friendly approach adopted on their campus. This can be concluded in Green & Environment along with the Water & Energy Audit. The Institution has also to spell out the Green Policy for their campus development and operation.

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.

*Hon'ble Prime Minister Narendra Modi on 02-11-2021 gave a five-pronged target for India and finally committed to a Net Zero emission target by 2070, joining the likes of the US, the UK and China.*

This will be possible only and only if we inculcate Environment friendly approach and importance of Water, Energy, Air, Space and Earth to coming generation.

Government Science College, Idar, Sabarkantha is applying for NAAC accreditation and hence the College Management has decided to conduct an external Green Evaluation by a competent Green Auditor along with a Green Audit Assessment Team headed by **Dr. Deepen S Gandhi**, and assisted by **N. K. Ojha, of Universal Consultancy, Vadodara.**

Green Audit or Environment Audit has also focussed on the Carbon Footprint reduction measures being implemented by the College Management. The auditing was done for the period extending from **2019-2024**

***The concept, structure, objectives, methodology, tools of analysis, time frame and cross-cutting themes of the audit are discussed in this report.***

**N. K. Ojha**  
**20-06-2024**

# *ACKNOWLEDGMENT*

Universal Consultancy Team thanks Government Science College, Idar, Sabarkantha assigning this important work of Green & Environment Audit.

We appreciate the cooperation extended to our team during the entire process. Our special thanks are due to **Prof. Dr. Mahesh B Bhatt & Team IQAC** with his colleagues for giving us necessary inputs to carry out this very vital exercise of Green & Environment Audit. We are also thankful to the members of Green & Environment Audit Committee, who were actively involved while collecting the data and conducting field measurements

Efforts have been made to prepare the Report useful for the College Teachers, Staff and the Students, as well as all Professionals to study and learn the Concept, Management and the Technical Feasibility of implementing the Report in the College. This is the unique activity jointly performed by a Team.

I congratulate **Principal Dr. Pragna A Vadher**, and her entire team of the College, staff and other professionals for undertaking this very vital exercise of Green & Environment Audit.

A word of thanks again to **Prof. Dr. Mahesh B Bhatt**, for co-ordinating the entire exercise of Green & Environment Audit and making available required documents promptly without which this Audit was difficult.

**N. K. Ojha**  
**20-06-2024**

# TABLE OF CONTENTS

<b>Chapter 1 – Context.....</b>	<b>8 - 12</b>
1.1	NAAC Requirements for Institutional Values & Best Practices
1.2	NAAC Criterion VII
<b>Chapter 2–Profile &amp; Features of College</b>	<b>13 – 18</b>
2.1	Brief History
2.2	Milestones
2.3	Administration & Management
2.4	Students, Faculty & Staff Strength—2021-2022
2.5	Physical Structure & Features
<b>Chapter 3 – Concept.....</b>	<b>19</b>
<b>Chapter 4 – Objectives of Green Auditing.....</b>	<b>20 - 23</b>
4.1	Green Audit Assessment Team
<b>Chapter 5 – Methodology Adopted.....</b>	<b>24 - 25</b>
5.1	Onsite Visit
5.2	Focus Group Discussion & Seminars
<b>Chapter 6- Carbon Footprint Reduction.....</b>	<b>26 - 37</b>
6.1	Office / Building Survey
6.2	Carbon Footprint
6.3	Carbon Audit Tools & Analysis
6.4	Flora & Carbon Footprint Reduction
6.5	Carbon Absorption by Flora
6.6	Oxygen Emission by Flora
6.7	Carbon Footprint Reduction Table
<b>Chapter 7 – Energy Efficiency .....</b>	<b>38 - 49</b>
7.1	Implementation of ECBC / ASHRAE / LPD / EPD Norms
7.2	Total Energy Consumption & Equivalent CO <sub>2</sub> Emission
7.3	Solar Panels On-Grid
7.4	Energy Efficiency & Conservation
7.5	Outdoor Light Pollution Reduction
7.6	Energy Performance Index
<b>Chapter 8 – Eco-Friendly Commuting Practices-----</b>	<b>50 – 54</b>
8.1	Vehicles on the Campus & it’s Carbon Emission
8.2	Parking Facility & Regulations



**Chapter 9 – Sustainable Development.....55 - 68**

- 9.1 Green Policy
- 9.2 Best Practices & Initiatives
- 9.3 Heat Island Reduction --- Roof & Non-Roof
- 9.4 Building Operation & Maintenance
- 9.5 Design for Differently Abled
- 9.6 Sustainable Development---Awards & Appreciation

**Chapter 10 – Water Efficiency.....69 - 73**

- 10.1 Present Scenario
- 10.2 Water Efficient Fixtures
- 10.3 Rain Water Harvesting & Ground Water Recharge
- 10.4 Landscape Design & Management of Irrigation System
- 10.5 Water Metering
- 10.6 Water Audit---- Objectives & Benefits

**Chapter 11 – Post Occupancy Waste Management System..... 74 – 78**

**Chapter 12 – Indoor Environmental Quality, Health & Comfort..... 79 - 89**

- 12.1 Tobacco Smoke Control
- 12.2 Fresh Air Ventilation & Daylighting
- 12.3 Well-Being Facilities/Health & Comfort
- 12.4 Community Friendly Campus
- 12.5 Material Resources & Green Material

**Chapter 13 – Environmental Consciousness & Institutional Distinctiveness ..... 90- 91**

**Chapter 14 – Suggestions & Recommendations.....92 - 101**

## **GREEN & ENVIRONMENT AUDIT REPORT**

**WITH ACTION PLAN (2019 – 2024)**

**FOR**

**GOVERNMENT SCIENCE COLLEGE, IDAR**

### **1. Context**

#### **1.1 NAAC requirements for Institutional Values & Best Practices**

**Criterion VII** under Manual for Self-Study Report refers to:  
***Institutional Values and Best Practices***

An Educational Institution operates in the context of the larger education system in the country. In order to be relevant in changing national and global contexts an Educational Institution has to be responsive to the emerging challenges and pressing issues. It has a social responsibility to be proactive in the efforts towards development in the larger contexts. This role of the institution is reflected in terms of the kinds of programmes, activities and preferences (values) that it incorporates within its regular functioning. The extent to which an institution is impactful in this is a sure reflection of its quality.

Every Institution has a mandate to be responsive to at least a few pressing issues such as gender equity, environmental consciousness and sustainability, inclusiveness and professional ethics, but the way it addresses these and evolves practices will always be unique.

Every Institution faces and resolves various kinds of internal pressures and situations while doing this. Some meaningful practices pertinent to such situations are evolved within the institution and this helps smooth functioning and also lead to enhanced impact.

Such practices which are evolved internally by the institution leading to improvements in any one aspect of its functioning – academic, administrative or organizational, - are recognized as a “**Best Practices**”. Over a period of time, due to such unique ways of functioning each institution develops distinct characteristic which becomes its recognizable attribute. A few of **Best Practices** proposed are as below.

- ***Fostering Social responsibility in young minds through community engagement***
- ***Adaptive success strategies for holistic and multidisciplinary education.***
- ***Promoting Academic Excellence Through Enriched Knowledge***
- ***Making students as leaders in all walks of life***
- ***Strategic Footprints of Growth and Development***
- ***Moulding Men and Women for Service to the Nation***
- ***Promoting Health & Wellness through Physical Education***

***The focus of Criterion VII is captured in the following Key Indicators:***

***1. Institutional Values and Social Responsibilities***

***2. Best Practices***

***3. Institutional Distinctiveness***

1. ***Institutional Values and Social Responsibilities*** The Institution organizes gender equity promotion programmes. The Institution displays sensitivity to issues like climate change and environmental issues. It adopts environment friendly practices and takes necessary actions such as – Energy Conservation, Rain Water Harvesting, Waste Recycling (solid/liquid waste management, e-waste management), Carbon Neutral, Green Practices etc.

The Institution facilitates the differently abled (Divyangjan friendliness), effective dealing of location advantages and disadvantages (situatedness), explicit concern for human values and professional ethics etc. In other words, the concerns for social responsibilities as well as the values held by the institution are explicit in its regular activities.

2. ***Best Practices*** Any practice or practices that the Institution has internally evolved and used during the last few years leading to positive impact on the regular functioning of the institution can be identified as “Best Practice/s”. These are not any activity prescribed by some authority. At some point in time the Institution evolves some innovation or a change in some aspect of functioning. This practice is relevant mainly within the Institution at a given point in time.

It could be in respect of teaching learning, office practices, maintenance and up keep of things or dealing with human beings or money matters. But adopting that practice has resolved the difficulty or has brought in greater ease in working in that aspect.

In brief, these “Best Practices” are relevant within the Institutional context and may pertain to either academic or administrative or organizational aspects of institutional functioning.

The Government Science College, Idar has taken care and worked in depth towards “Best Practices”, which will be dealt in detail in later part of this Report.

***Institutional Distinctiveness*** Every Institution would like to be recognized for certain of its attributes which make it “Distinct”, or, one of its kinds. Such attributes characterize the Institution and are reflected in all its activities in focus and practice. The Government Science College, Idar has excelled in this area too, which will be dealt in detail in later part of this Report.

## **1.2 NAAC Criterion VII**

This Green & Environment Audit Report for the College incorporates all the key indicators of Criterion VII and has also voluntarily incorporated many Green Building norms and a few innovative approaches for Green and Sustainable development of the College infrastructure.

The Green & Environment Audit Report is based on IGBC / GRIHA / ECBC / NBC /ASHRAE norms. All baseline case is considered as per above given provisions as stated by National and International standards.

Then design case is worked out to conserve water and energy. Also, indoor environmental quality and post occupancy waste management system is studied and guided to convert existing campus into zero discharge campus.

*The Innovative approach such as Zero Discharge Campus, Net Zero Building, Zero Emission Campus and Water Positive Campus is studied and discussed in detail with College Authorities to explore possibilities in these fields too and make the College as **Case Study** for all the Students, Staff, Visitors and Students/Staff of adjoining Colleges/Universities.*

***The College to Act and Project itself as Motivator in Sustainable Development field.***

## **2. Profile of GOVERNMENT SCIENCE COLLEGE, IDAR**

### **2.1 Brief History:**

Government Science College, Idar affiliated to Hemchandracharya North Gujarat University, Patan was established in 2008 and stands as one of the premier educational institutions in Idar. It holds the unique distinction of being the only state government institute in the Sabarkantha district that offers a Bachelor of Science (B.Sc.) degree in fundamental sciences, including Physics, Mathematics, Chemistry and Botany. This diverse academic offering makes it a vital educational hub for aspiring scientists and scholars in the region. The college offers a dynamic platform for students, encouraging their participation in a wide array of curricular, co-curricular and extra-curricular activities, thereby fostering a holistic educational environment. The infrastructure of the institute is designed to support advanced learning and research. It features well-equipped laboratories, IT enabled smart classrooms, a modern computer laboratory and a library equipped with automation and e-corner facilities. The entire campus is WiFi-enabled and monitored through comprehensive CCTV surveillance, ensuring a safe and conducive learning environment. The blend of quality education and the vibrant cultural backdrop makes Government Science College, Idar a unique and enriching place for academic pursuit.

## **2.2 Milestones:**

- To inculcate moral values and reverence for constitutional values with a sense of nationalism preserving the glorious heritage of the Nation to make better citizens for tomorrow.
- To provide access to excellence in academics and scientific research to all strata of society with special attention to underprivileged and personal attention to differently-able students.
- To promote academic exchange and academia-industry interfacing, taking advantage of the latest technology.
- To build up young men and women of proficiency, perseverance, principles and philanthropy.
- To create opportunities for self-learning, employability, entrepreneurial capacities, creativity, Start Up and innovation by implementing various initiatives of the Government.
- To encourage students for gender sensitivity and equality. To foster an experience of urban and rural extension work so that students are inspired to look for better opportunities for all.
- To disseminate the concern for environmental and ecological protection as well as sustainable development

## **2.3 Administration & Management:**

The entire administration is managed by the Principal of the College, who is assisted by the Vice-Principal and several committees to assist in his functioning.



The power of administration is diffused among different constituents of administration. The College believes in democratic functioning of administration within the framework provided by the University and Government of Gujarat. The basic structure of administration of organization is decentralized.

The success of the institution depends on its decision-making process, strategic planning and teamwork. The Principal, Vice-Principal, members of the various committees and Heads of various Departments play a vital role in the entire administrative process. The vital decisions concerning academic and administrative issues are generally unanimous and collective. Each body or units of the College are involved in the decision making process.

### **COURSES OFFERED AT COLLEGE**

The College offers Graduate programme in with following Departments.

B.Sc. Botany	B.Sc. Mathematics
B.Sc. Chemistry	B.Sc. Physics

#### **2.4 Students, Faculty & Staff Strength**

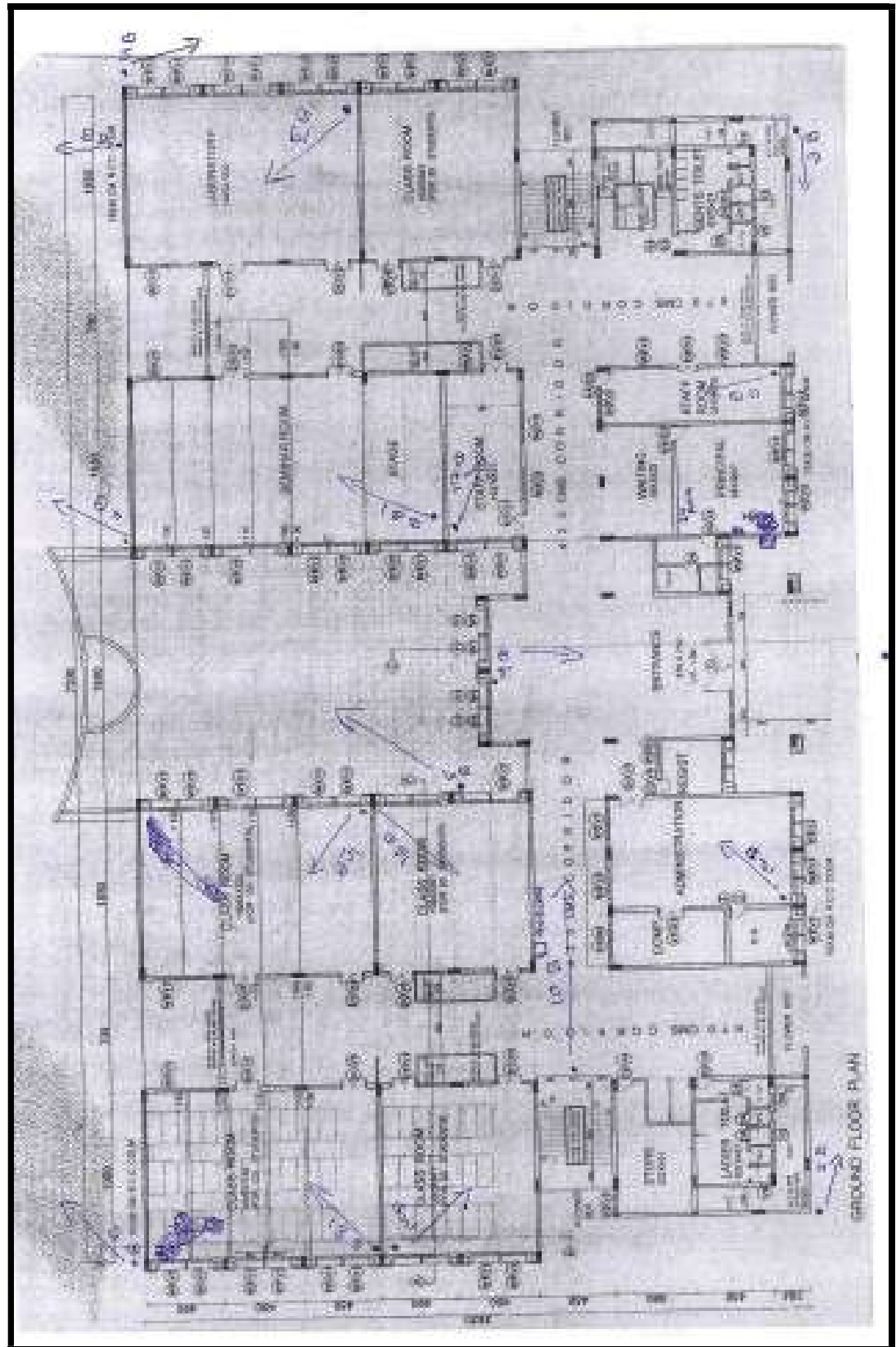
Sr. No.	Programme	No. of Students		No. of Teaching / Admin. Staff including temporary	
		Boys	Girls	Male	Female
1	B. Sc.	210	170	15	5
		<b>TOTAL-----400</b>			

This occupancy is required to calculate the potable water required and the likely waste generated on campus.

## **2.5 Physical Structure & Features**

1. The College Campus is spread over 5.49 acres of land i.e 22,252 sq. mt. i.e 2,39,518.53 sq. ft.
2. The total building footprint i.e Ground floor built up area on campus including main college building is 2,242 sq.mt. i.e. 24,132.69 sq. ft.
3. **Ground coverage is only 6.80 % against 60% allowable ground coverage as per DCR.**
4. **The total built up area** on the campus is 5,521 sq.mt. i.e. 59,427.55 sq. ft.
5. **The open play ground area** in form of football/cricket ground and other outdoor games 8,330 sq. mt. i.e 89,663.37 sq. ft.
6. **The total road, parking, walkway and paved area** in the campus is 2,341 sq.mt. i.e 25,198.31 sq. ft. including paved area for parking
7. **The total open space retaining natural topography** is 17,736 sq.mt. i.e 1,90,908.72 sq. ft
8. **The landscape, flower bed, shrubs, tree plantation area** is 3,194 sq. mt. i.e 34,379.93 sq. ft.
9. **There are about 27 number of two wheelers** of students and staff parked on the campus during working days.
10. **There are about 1 number of bicycles** of students and staff parked on the campus during working days.

11. **There are about 6 numbers of four wheelers** of students and staff parked on the campus during working days.
12. There are about **350 number of trees** (300 fully grown trees and 50 semi-grown trees) on the campus with about **56 kind of species**.
13. The College has one LT connection of 54 Kw and it consume on an average 15,000 units per month for interior/exterior lighting and electric equipment system in the college building.
14. The College has installed **45 KW of solar roof top** panels, which generates  $45 \times 5 \times 30 =$  approx. 6750 units /month and reduces energy bill by proportionately.
15. The College has a facility for continuous **water supply** system. The college meets with its water demand through water bores in the campus.
16. **The College has following facilities and Infrastructure.**
  1. College Building
  2. Outdoor Games and Playground
  3. Parking
  4. Library



**COLLEGE CAMPUS LAYOUT**

### **3. Concept**

The term ‘*Environmental Audit*’ or ‘*Green Audit*’ means differently to different people. Terms like ‘*assessment*’, ‘*survey*’ and ‘*review*’ are also used to describe similar activities. Furthermore, some organizations believe that an ‘*Environmental Audit*’ addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters.

Although there is no universal definition of Green Audit, many leading companies/institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989). The ICC defines Environmental Auditing as:

***A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environmental and natural resources in its operations/projects.***

However, the outcome of Green Audit should be established with concrete evidence that the measures undertaken and facilities in the institution under Green Auditing lead to the reduction of Carbon Footprint, which has been historically defines as the total set of greenhouse gas emissions caused by an individual, event or organization and expressed as ‘***carbon dioxide equivalent***’.

#### **4. Objectives of Green Auditing**

The objective of Green Auditing is its most imperative component. A well-defined objective enables the Green Auditor as well as his Team to conduct the auditing without deviating from the focus. Achievement in terms of Carbon Footprint reduction needs to be assessed in both quantitative and qualitative terms.

- To assess whether the measures implemented by the College have helped to reduce the Carbon Footprint.
- To assess whether investments made in increasing awareness among students regarding electricity, biodiversity and environment have helped the College to achieve the required carbon dioxide emission and absorption in the campus.
- To assess whether non-academic activities of the College support the collection, recovery, reuse and recycling of solid waste that harm the environment.
- To identify gaps and suggest recommendations to improve the Green Campus status of the institution.
- A 'Green Audit' was conducted by the College which also included a detailed report of waste generated, methods of management and suggestions for improvement.
- Subsequently, Green Protocol was framed and the principles of scientific waste management, namely the '3 R's: Reduce, Reuse, and Recycle' were adopted.

- Green Protocol framed by the College emphasizes prevention/reduction of waste at its source. A number of unique initiatives have been implemented to promote reduction of plastic waste on campus which earned special felicitation from social organizations.
- Replacement of single use plastic in College campus and in canteen counters with reusable steel glasses, promotion of cloth college bags instead of non-biodegradable rexene bags, encourage the use of steel water bottles and lunch boxes in place of plastic, avoidance of flex boards, plastic files and use of digital display boards during Seminars/Conferences, banning of plastic covering on student projects, encouragement of steel food containers, promotion of green protocol through messages in the campus display board are some of the plastic waste reduction initiatives.
- To promote the principles of 'reuse' and 'recycle', competitions of "Best out of Waste" organized in which the students of the college upcycled into beautiful works of art out of waste materials.
- To identify the usefulness and correct implementation of all the pro-active measures taken by College Administration in various fields including transportation, landscaping, indoor environmental quality, rain water harvesting, ground water recharge, post occupancy waste management system, energy and water conservation/efficiency etc.
- Undertake Water Audit & Energy Audit. Implement corrective measures for Energy and Water Efficiency.

- Introduce innovative approach in form of Zero Discharge Campus, Net Zero Building, and Water Positive Building.
- Develop College campus as a Case Study for students/staff and visitors.
- Finally contribute to the Prime Minister's call for Zero Emission by 2070.
- Recently, Hon'ble Governor of Gujarat State has also emphasized on cleanliness drive and the Higher Education Department of Gujarat State has issued notification for Post Occupancy Waste Management System functioning effectively in all University and college campuses of Gujarat state.
- The Green and Environment Audit has also incorporated above para in its Report and suggestions and recommendations to be implemented as said.

#### **4.1 Green & Environment Audit Assessment Team**

- The College Administration formed a "**Green & Environment Audit Assessment Team**" to look into the documentation of Green & Environment Audit Report and also to look into the implementation as narrated in the Report and take corrective measures.
- Also, to implement Suggestions/Recommendations of the Report in letter and spirit.



- The formation of Green & Environment Audit Assessment Team is as below.

<b>Sr. No.</b>	<b>Name</b>	<b>Designation</b>
<b>1</b>	Dr. Pragna A. Vadher	Convenor
<b>2</b>	Dr. Amita K. Tatu	Member
<b>3</b>	Dr. Smriti Singh	Member
<b>4</b>	Mr. N. K Ojha	Member

***Green & Environment Audit Assessment Team***

 **Government Science College, Idar**   
At & Post: Sapavada, Idar, Sabarkantha

Ref.: No. :GSC/MKM/2021/367 Date: 21/12/2021

**CIRCULAR**

**Subject: Green & Environment Audit Assessment Team**

Principal of Government Science College, Idar has formed a Green Audit Assessment Team of following members under the Convenorship of **Prin. Dr. Pragna A. Vadher** to prepare Green Audit Report for the College.

The Green & Environment Audit Assessment Team is requested to submit draft Green Audit Report for approval.

1. Dr. Pragna A. Vadher – Convenor
2. Dr. Amita K. Tatu - Member
3. Dr. Smriti Singh - Member
4. Mr. N. K. Ojha - Member

   
Principal  
Government Science College  
IDAR

## **5. Methodology Adopted**

The methodology adopted to conduct the Green and Environment Audit of the College campus has the following components.

### **5.1 Onsite Visit**

The Green & Environment Audit Assessment Team started the audit at the College during the month of **June, 2019** which extended for about 6 weeks and coming years. Greenhouse gas emission and carbon footprint reduction through adoption of green energy and energy-efficient measures were assessed.

The key focus was on Sustainable Development including Assessing the status of the green cover of the College campus, Water Efficiency, Water Conservation, Rain Water Harvesting, Ground Water Recharge, Energy Efficiency, Energy Efficient lighting fixtures and Equipment Day lighting, Wellbeing of occupants, Indoor Environmental Quality and Post Occupancy Waste Management System.

### **5.2 Focus Group Discussion & Seminar**

The Focus Group included the Green Audit Team assessment members, staff members and officials from management. The discussion was focused in identifying the attitudes and awareness towards environmental issues at the institutional, district, national and global level. The discussion resolved around following key questions:

- (i) Do the members of the group consider themselves eco-conscious?
- (ii) Do they consider the Institution to be eco-friendly?
- (iii) What do they think are the issues that need to be given top priority?
- (iv) How to develop the campus as Case Study?
- (v) How to motivate and encourage students and staff for Water & Energy Conservation and use it efficiently?
- (vi) How to create awareness amongst students and staff for above said para (v)
- (vii) Can we be the first College in State to introduce “*Green Building*” six months part time *Certificate programme*?**
- (viii) How to develop the campus into “***Zero Emission***” campus and be the beginner to fulfil the commitment given by Hon’ble Prime Minister to the world.

## 6. Carbon Footprint Reduction

### 6.1 Office / Building Survey

Information on Office-based environmental impacts like built-up area, utility bills, energy-saving devices and IT equipments was collected. This information added to the carbon footprint data, generating a fairly clearer picture of the College's annual greenhouse gas emissions and impact of the reduction measures undertaken.

### 6.2 Carbon Footprint

- **Carbon footprints** is historically defined as *the total set of greenhouse gas emissions caused by an individual, event, organization or product, expressed as **carbon dioxide equivalent**.*
- **Carbon Footprint is measured in tCO<sub>2</sub>. tCO<sub>2</sub>eq stands for “Tones of CO<sub>2</sub> equivalent”**
- Our '**Carbon Footprint**' is a measurement of all GHG we individually produce to live. The amount of GHG produced depends on our lifestyle and consumption pattern.
- It also depends on how a product is made which we are consuming. If GHG production is more, then we say our carbon footprint is more. If it is less then we say our carbon footprint is small. We should strive to achieve a carbon footprint as small as possible.

- The largest amount of greenhouse gas emission-almost 80%- comes from the energy sector.
- Oil, coal and natural gas- all fossil fuels- supply most of the energy to run vehicles, & generate electricity for industries.
- This sector is responsible for about three-fourth of CO<sub>2</sub> emissions, one-fifth of CH<sub>4</sub> emissions, & large qty. N<sub>2</sub>O.
- There are many other sectors such as Agriculture and Animal Husbandry, Deforestation, Waste & Waste water, Residential & Commercial buildings etc. leading to carbon footprint.
- In this report we have concentrated to carbon footprint because of vehicles and electricity consumed and carbon handprint considering landscape, flora and fauna.
- Data collected from the following sources were taken into consideration to calculate carbon footprint emission and reduction. The floristic richness of the campus – total number of plants, trees, shrubs – was estimated. The impact of alternate green energy production and consumption to reduce fossil fuel-based energy was assessed, e.g the number of CFL, LED, tube lights and electronic chokes was counted. The Carbon Footprint Calculator was used to arrive at conclusions.
- Carbon Footprint Calculator enables the measurement of carbon emission by the College. Besides, by Breaking down the value to key ‘carbon drivers’, the College can know how much of carbon footprint comes from which type of

behaviour (high power-consuming incandescent bulbs vs. LED lights, solid waste management, etc.).

### **6.3 Carbon Audit Tools & Analysis**

The Carbon Audit tools and analysis methodology were developed collectively by the Green Audit Assessment Team and based on that the audit was conducted in ten major thematic areas.

1. Flora & Carbon Footprint Reduction
2. Sustainable Site
3. Water Efficiency & Water Audit
4. Energy Efficiency & Energy Audit
5. Indoor Environmental Quality
6. Eco-friendly Commuting Practices --Green Transportation
7. Green Construction Material
8. Health & Comfort
9. Post Occupancy Waste Management System

### **6.4 Flora & Carbon Footprint Reduction**

The large area of the College goes live with its green policy. The manifestation of the "Go Green" tree campaign truly finds expression in every nook and corner of the College to a great extent. For example, it is worthy to mention that despite the region being an arid region the College through its efforts towards environmental protection has ensured the plantation and successful maintenance of more than 1550 number of trees

ensuring a pristine green cover for the students, faculties, and also for the wildlife that includes animals, birds and reptiles. Hence also as part of the pedagogy a Botanical Garden has been established which serves as a centre for ecological consciousness and learning. For the students and for the community at large, a beautiful Garden has also been developed to help the people appreciate the gift of nature, especially during the months of summer. Further, regularly, the campus conducts plantation drive with various stakeholders including the alumni and public representatives. The biodiversity surveys conducted by various departments has documented following flora fauna in campus;

**Carbon footprints** is historically defined as *the total set of greenhouse gas emissions caused by an individual, event, organization or product, expressed as **carbon dioxide equivalent**.*

### ***Floristic status of the College***

After deducting the built-up area along with playgrounds, the projected area available to develop various types of flora is 3,194 sq.mt.

There are 12 families, 25 genera and 56 species of trees, shrubs, herbs (including potted plants) and climbers in the campus.

- 56 species of trees
- 10 species of shrubs
- 20 species of herbs
- 9 species of climbers (including creepers)

About 560 to 700 fully grown trees shall be raised in 1 acre of land. This depends on the type of soil, the species/family of the tree and the spacing. However, with the normal spacing of 6 x 10 feet, the total number of trees shall be taken up as 600/acre. This is a theoretical consumption. The Green & Environment Audit Team of the College counted the number of plants: full-grown trees (above 10 years), semi-grown trees (below 10 years), shrubs and lawn (sq.ft. area).

The following table will illustrate these figures

<b>Sr. No.</b>	<b>Particular of Flora</b>	<b>Designation</b>
<b>1</b>	Full –grown trees	300
<b>2</b>	Semi –grown trees	50
<b>3</b>	Bushes (including floriculture plants)	50
<b>4</b>	Lawn	14,025 sq. ft.

### *Tool to Measure Carbon absorption by flora in the campus*

#### **Assumptions**

1. Number of mature trees in 1 acre = 700
2. Carbon absorption capacity of 700 trees is equivalent to carbon emitted by a speeding car for 26,000 miles
3. 26,000 miles = 41,843 km
4. Average kilometres covered by a car per litre of petrol is 20 km
5. Total quantity of petrol consumed by the car (41,843/20) = 2092 litres



The carbon emitted by a car due to consumption of 1 litre of petrol is 2.3 kg CO<sub>2</sub>. At this rate the total quantity of carbon emitted by 2092 litres of petrol (2092 x 2.3 kg) = 4812 kg CO<sub>2</sub> or 4.8 tonnes of CO<sub>2</sub>.

*Therefore, the carbon absorption of one full-grown tree is 4812/700 = 6.8 kg CO<sub>2</sub>.*

*The footprint calculation is based on the standard unit of 1 litre petrol = 2.3 kg CO<sub>2</sub>.*

### **6.5 Carbon Absorption by Flora**

Carbon absorption capacity of one full-grown tree = 6.8 kg CO<sub>2</sub>.

- 1) Therefore, the carbon absorption capacity of 300 full-grown trees in the campus of the College (300 x 6.8 kg CO<sub>2</sub>.) = **2040 kg or 2.04 tonnes of CO<sub>2</sub>.**
- 2) The carbon absorption capacity of 50 semi-grown trees is 50 % of that of full-grown trees. Hence, the carbon absorption (50 x 3.4 kg CO<sub>2</sub>.) = **170 kg or 0.17 tonnes of CO<sub>2</sub>.**
- 3) There are 50 bushes of various species being raised in the gardens of the College. Carbon absorption of bush plants varies widely according to the species. Certain bushes absorb as high as 49,000 g CO<sub>2</sub>. per plant, whereas some others absorb as low as 150 g CO<sub>2</sub> per plant. In the absence of a detailed scientific study and botanical survey, the per-plant carbon absorption was assumed to be 200 g (in consultation with environment scientists). Based on this, the total carbon absorption

of 50 plants was calculated to be  $50 \times 200\text{g} = 10,000\text{ g}$  or **10 kg or 0.01 tonnes of CO<sub>2</sub>**.

- 4) The Green & Environment Audit Assessment team looks after the maintenance of landscape on the campus. Buffalo variegated grass, Mexican grass and indigenous grass species are being raised and maintained in the lawn. The total area of the lawn is 14,025 sq. ft. The carbon absorption capacity of 10-sq.ft. area of lawn is 1 g CO<sub>2</sub>. Hence, 14,025 sq. ft. of lawn absorbs **1402 g or 1.402 kg CO<sub>2</sub> per day**. At this rate, the total carbon absorption per year ( $1.402\text{ kg} \times 365$ ) = 511.73 kg or **0.5 tonnes** per year.

*The grand total of carbon absorption by the flora in the College Campus is (1+2+3+4) = 2.72 tonnes.*

*This is the sink effect of the flora in the campus.*

### ***Tool to measure oxygen emission by flora in campus***

According to the Arbor Day Foundation, 'a mature leafy tree produces as much oxygen in a season as 10 people inhale in a year'.

A person breathes 7 or 8 litres air per minute. Air is about 20% oxygen. But the exhaled air has about 15% oxygen, and hence the net consumption is about 5 %. Therefore, a person uses about 550 litres of pure oxygen each day.

## 6.6 Oxygen Emission by Flora

The number of litres in 1 kilogram depends on the density of the substance being measured. Litre is a unit of volume, and kilogram a unit of mass. Litres and kilograms are approximately equivalent when the substance measured has a density of close to 1 kilogram per litre.

On an average, one full-grown tree produces nearly 260 pounds or 117.6 kg of oxygen each year. Two mature trees can provide enough oxygen for a family of four.

- 1) Total oxygen emitted by 300 full -grown trees per year  $(117.6 \text{ kg} \times 300) = 35,280\text{kg}$  or **35.28 tonnes**.
- 2) Total oxygen emitted by semi- grown trees  $(58.8 \text{ kg} \times 50) = 2,940 \text{ kg}$  or **2.94 tonnes** (oxygen emission in 50 % of that of the fully grown trees).
- 3) Total oxygen emitted by 50 bushes is calculated based on the following oxygen -inhaling requirement per person per day. A normal human being requires 550 litres of oxygen per day. 400 bushes produce enough oxygen per day to enable a person to breathe adequate quantity of oxygen of 550 litres. Total quantum of oxygen produced by 400 plants per day is 550 litres of oxygen.

Taking 400 plants as one unit, the number of units of bushes in the campus  $(50/400) = 0.125$

Total quantity of oxygen produced by 0.125 units  $(0.125 \times 550 \text{ litres}) = 68.75 \text{ litres}$  of oxygen per day.

The annual production of oxygen at this rate ( $68.75 \times 365$ ) = 25,094 litres or kg of oxygen, which is approximately **25.09 tonnes of oxygen.**

Lawn is an incredible oxygen –making machine. A 25-sq.ft. area will supply enough oxygen to support one person for a day. Quantitatively speaking, this area of grass produces 550 litres of oxygen per day.

The total area of lawn in the campus is 14,025 sq. ft. In units, the value ( $14,025/25$ ) = 561 units, which produce ( $561 \times 550$  litres of oxygen) = 3,08,550 litres of oxygen per day. Total quantity of oxygen produced by the 10,828 sq. ft of lawn per year ( $3,08,550$  litres/day  $\times$  365) = 11,26,20,750 litres or approximately **1,12,620 tonnes.**

## **6.7 Carbon Footprint Reduction Table**

### ➤ **Carbon dioxide absorption**

<b>Sr. No.</b>	<b>Flora</b>	<b>Quantity of CO<sub>2</sub> (tonnes)</b>
<b>1</b>	300 Full –grown trees	2.04
<b>2</b>	50 Semi –grown trees	0.17
<b>3</b>	50 Bushes	0.01
<b>4</b>	14,025 sq. ft. Lawn	0.50
	<b>Total</b>	<b>2.72 say 3</b>

➤ **Oxygen emission by flora**

Sr. No.	Flora	Quantity of O <sub>2</sub> (tonnes)
1	300 Full –grown trees	35.28
2	50 Semi –grown trees	2.94
3	50 Bushes	25.09
4	14,025 sq. ft. Lawn	1,12,620
	<b>Total</b>	<b>1,12,683.31</b> <b>Say 1,12,600</b>



**GREEN COVER ON THE CAMPUS**



**GREEN COVER ON THE CAMPUS**





**GREEN COVER ON THE CAMPUS**



## **7. Energy Efficiency**

Energy conservation is the utmost important in Green & Environment Audit. Entire Nation and all States of our country are canvassing and encouraging people of India to save energy. We are falling short of energy as compared to its generation and usage.

Ministry of New and Renewable Energy, Government of India of India is promoting use of Green and Hybrid Energy. Government of India has come up with ECBC code-2005 revised in 2017 with amendment in 2022. All Public buildings, Institutions, Commercial complexes, Factory buildings Residential complexes have to follow ECBC-2017 norms.

***College has taken a pro-active step of procuring LED lighting fixtures and BEE star rated electrical equipment and ceiling fans for all its spaces including notification to use the same at the time of replacement and for new construction. This has been done even before the Green & Environment Audit could take place. College has a good practice to purchase and install only LED lighting fixtures and purchase all equipments of BEE star rated.***



## **7.1 Implementation of ECBC/ASHRAE/LPD Norms**

The College has yet to undertaken Energy Audit for its campus Building, which should be taken up soon.

Even then College Administration has taken up series of steps to reduce the energy consumption on the campus. College has taken a policy decision to install LED lighting fixtures only and purchase all electric equipment with minimum BEE 3 Star Rating.

The College has further taken a decision to retrofit its buildings as energy efficient / green buildings and construct all its new buildings as energy efficient / green buildings.


The College designs the building to comply with Energy Conservation Building Code (Revised Version May, 2017) (or) ASHRAE Standard 90.1-2010 (without amendments) through one of the following approaches:

Performance based approach (Whole building simulation) OR Prescriptive approach. Energy Efficient Buildings have savings over more than 40% in electric consumption over ECBC norms or ASHRAE norms. The College confirms that the total annual energy consumption of the building should not exceed the total base case energy consumption computed, as per ECBC (or) ASHRAE Standard 90.1-2010.


The Lighting Power Density (LPD) in the building interior, exterior and parking areas are reduced by minimum 10% over ECBC base case.

Compliance for the lighting power density is shown either through 'Building Area Method' or 'Space Function Method'. Exterior areas illuminated by lighting only is considered for lighting power density calculations. The LPD includes power consumption of complete fixture, including lamps and ballasts

**COLLEGE GREEN POLICY NOTIFICATION**



**Government Science College, Idar**  
At & Post: Sapavada, Idar, Sabarkantha



---

Ref.: No. :GSC/MKM/2022/78

Date: 26/02/2022

**CIRCULAR**

**Subject:- Green Policy of the College**

Hon'ble Prime Minister Narendra has made the pledge to cut its emissions to net zero by 2070, the first time India has set a net zero target, at the Glasgow summit during during November, 2021.

The University has formed it's Green Policy in view of the above said pledge by our Hon'ble Prime Minister.


All departments are requested to implement this "**Green Policy**" of the college strictly in letter and spirit. The Green Policy of the College is also mandatory form NAAC point of view.

Implementing this Green Policy will not incur an expenditure of single rupee but will set an exsample before students, society and staff regarding our concern for the "Climate Change" and Environmental Conscious Life Style. What is needed today is Mindful and Deliberate Utilization, instead of Mindless and Destructive Consumption.

**GREEN POLICY OF THE COLLEGE**

**1. Energy Efficiency Measures**

- (i) Motivate and Encourage "Save Energy" measures on campus by requesting all concerned to switch off lights, fans and Air-Conditioners when room and class room is not occupied.
- (ii) Place Sinages in each room and class room to "Switch Off" lights, fans and AC when not is use.
- (iii) Purchase/Replace ceiling fans with BEE 5 star rating.
- (iv) Purchase/Replace energy efficient lighting fixtures in form of LED
- (v) Purchase/Replace electrical equipments such as AC, water coolers, refrigerators, microwave, etc with only BEE 5 star rating.
- (vi) Energy Audit



## **7.2 Total Energy Consumption & Equivalent CO<sub>2</sub> Emission**

The data based on electrical bills collected from College reveals that the total Electrical energy units consumed on Campus per month is approx. **15,000 (KWh)**. This includes **air conditioners**, which consumes about **50%** of electricity

Hence total annual energy consumption is  $15,000 \times 12 = 1,80,000$  units per annum.

One Unit equals 1000 watts (1KWhr.) It requires 0.538 Kg or approximately  $\frac{1}{2}$  Kg of coal to produce 1 unit of electricity.

Total quantity of coal required to produce **1,80,000** units of electricity is  $(1,80,000 \times 0.538 \text{ Kg coal}) = 96,840 \text{ Kg}$  or 96.84 tons of coal.

### **Co<sub>2</sub> emission by coal**

One Kilogram of coal emits 2.86 Kg. of CO<sub>2</sub> thereby increasing the carbon footprint which in turn contributes to global warming.

Therefore 96.84 tons of coal consumed indirectly by the College through consumption of 1,80,000 units of electricity led to the emission of  $(96,840 \text{ Kg of coal} \times 2.86 \text{ Kg CO}_2) = 2,76,962.4 \text{ Kg}$  or **276.96 tons of CO<sub>2</sub> the atmosphere.**

### **7.3 Solar Panels on Grid**

***The College has installed 45.00 KW solar panels and this has offsets entire energy consumption on the campus.***

These Solar panels are connected to Grid through Net Metering and hence the cost of batteries to store solar energy generated is saved. Furthermore, these batteries are harmful to environment.

These solar panels generate 45 Kw per hour, however the panel will function effectively only for about 5 hours per day. Hence total solar energy generated per day will be  $45 \times 5 = 225$  Kw/day

***Total solar energy generated per year will be  $225 \text{ Kw} \times 365 = 82,125 \text{ Kw}$ .***

***The coal equivalent  $82,125 \times 0.538 = 44,183.25 \text{ Kg. coal}$ .***

***The CO<sub>2</sub> equivalent is  $44,183.25 \times 2.86 = 1,26,364.095$***

***$1,26,364.095 \text{ Kg} = 126.36 \text{ tons}$***

***Hence Co<sub>2</sub> reduction because of proposed solar panels on the campus is 126.36 tons.***

***Hence the College has contributed towards reduction of 25% emission due to consumption of energy & also contributed towards Zero Emission Policy of Nation.***



***SOLAR PANELS OF 45 KW ON-GRID i.e. NET METERING***



## 7.4 Energy Efficiency & Conservation

College building has air-conditioners, which confirms and considers unitary air-conditioners with BEE 1-star rating.

College verifies and ensure that the building's equipment & systems are commissioned to achieve performance as envisaged during the design stage. College is also proposing to submit measurement & verification plan for yearly reporting.

***All Lighting fixtures are LED. All electrical equipment are minimum BEE 3 Star Rated. All ceiling fans are BEE star rated. Proper signages are placed Save Energy and Put Off lights when not in use.***

The College has installed energy efficient pumps. The building design is such so as to attract maximum daylighting, which reduces artificial lighting load during daytime.

The College has placed signages to **“Save Energy”** and other similar kind of signages at all class rooms and wash rooms to motivate and create awareness amongst students and staff to save water.



***SIGNAGES & ENERGY CONSERVATION***



***ENERGY EFFICIENT LED LIGHTING FIXTURES & CEILING FANS***



***ENERGY EFFICIENT SPLIT AC OF BEE 1 STAR RATING &  
REFRIGATOR OF BEE 5 STAR RATING***





## **7.5 Outdoor Light Pollution Reduction**

Light pollution on the campus is reduced to increase night sky access and enhance the nocturnal environment. Exterior lighting are designed such that no external light fixture emits more than 5% of the total initial designed fixture Lumens, at an angle of 90 degrees or higher from nadir (straight down). LED lights are not used for exterior lighting system, which is the improper way of energy efficient steps.

The center-to-center distance between exterior lighting electric poles and their height is calculated so as to avoid any overlap of night light and also to lit only drive way. The bracket and the angle of bracket also play an important role for the same. Finally, the lighting fixture is selected so as to illuminate only drive way.



**REDUCE NIGHT LIGHT POLLUTION BY PLACING LED**



***REDUCE NIGHT LIGHT POLLUTION BY PLACING LED***



## 7.6 Energy Performance Index

Energy performance index (EPI) is total energy consumed in a building over a year divided by total built up area in kWh/sq m/year and is considered as the simplest and most relevant indicator for qualifying a building as energy efficient or not.

EPC ratings are given to properties and are represented on a scale from A (most efficient) to E (least efficient). The EPC contains information about a property's energy use and typical energy costs, as well as recommendations about what you can do to save energy at home and make your property cheaper to run.

Enhance energy efficiency of the building to reduce environmental impacts from excessive energy use

***EPI range for buildings having less than 50% occupied area as air conditioned (kWh/m<sup>2</sup>/year) IS 75-65 for Hot & Dry climate zone. This value is applicable only for day use office buildings which operate for 260 to 300 days in a year.***

Electricity consumption details including utility power, captive generation and renewable energy of preceding 1 year

The total annual energy consumption is 1,80,000 kW

The total Built up area is 5,521 sq.mt.

***Hence EPI = 1,80,000/5521 = 32.60 kWh/m<sup>2</sup>/year, which is far below the given limit.***

## **8. Eco-friendly Commuting Practices**

*Eco-friendly commuting practices can also be termed as Green Transportation.*

Emission of CO<sub>2</sub> through transport system – both public and private – is very high in India as India is credited with the third rank in carbon emission in this regard. It is estimated that in India, 9% of the total carbon is emitted by the transport system.

Idar being a small town, there is no city bus available to reach up to the College. Hence students can even walk down to College. Most of the students attend Idar college from adjoining villages and towns. The frequency of State Transport Bus is good enough to rely upon this system. This prevents students and staff to use their own private vehicle to reach up to the College. This prevents the emission because of transportation. This is considering the fact that the College building is located besides the main road.

The College Management has taken a principle stand right from the beginning to encourage students to use the public transport system or walking or use bicycle to reduce carbon emissions.

Unfortunately, after globalization, there has been a continuous increase in the income of the 100 million plus middle class families along with the automobile boom. As a result, the student community and teaching faculty members of the College are using two wheelers and four wheelers in large numbers and the trend has been on the increase. This is inspite of creating

awareness to use public transportation or bicycle or walking. Hence it is appropriate, in this context, to analyze the carbon dioxide emissions from the fleet of four wheelers and two wheelers owned by the individuals even though the College does not pollute the atmosphere directly.

The College Management has been successful to convince students and staff to commute in public transportation and hence it is a great achievement for the College that not more than about 27 numbers of two wheelers and not more than 6 numbers of four wheelers reach College daily and this figure includes vehicles used by teachers and administrative staff along with the visitors.

### **8.1 Vehicles on the campus & it's carbon emission**

The following data indicate the quality of diesel consumed by the vehicles during the last year. There are 6 numbers of four wheelers, and 27 two wheelers used by students and staff. It is appropriate to calculate the petrol consumption separately for four wheelers and two wheelers. The survey conducted among students / staff who own two wheelers reveals that they use the vehicles not only for visiting the College, but for moving after college hours and holidays. It is estimated that the average mileage covered by each staff / student is about 30 km/day. The total mileage covered by the 27 two wheelers per year ( $27 \times 30 \times 365$ ) = **2,95,650 km.**

Apart from that 6 numbers of four wheelers are used by the students / faculty members and the average mileage covered is

also the same, 30 km per day. Hence the total mileage covered by 6 numbers of four wheelers per year is  $(6 \times 30 \times 365) = \mathbf{65,700}$  **km.**

The total mileage covered by two and four wheelers per year  $(2,95,650 + 65,700) = \mathbf{3,61,350}$  **km.**

The fuel consumption by vehicle is determined by the type of vehicle, year of manufacturing, maintenance status, traffic system of the particular area, etc. High-end and medium- range bikes consume different quantities of petrol. However, for the sake of convenience, 35 km per litre is taken as the standard to calculate the carbon emission of two wheelers. Based on this, the total quantity of petrol consumed for covering 2,95,650 km is  $(2,95,650/35) = \mathbf{8,447.14}$  **litres say 8,447 litres**

A medium-range four wheelers covers 16 km per litre of diesel. Based on this the total quantity of diesel consumed by 6 four wheelers per year  $(65,700/16) = \mathbf{4,106.25}$  **litres say 4,106**

***Thus, the total fuel consumption per year (8,447 + 4,106) = 12,553 litres (both petrol and diesel).***

Conversion table to calculate carbon emission by vehicle per litre is very complicated in view of the local variable to be taken for calculation.

Instead, a simple but universally accepted calculation calendar for various types of fuels and their CO<sub>2</sub> conversion rate was adopted.

As per this calculation calendar, combustion of 1 litre of diesel/petrol leads to the emission of 2.68 kg of CO<sub>2</sub>. At this rate,

the total quantity of CO<sub>2</sub> emitted by 12,553 litres of fuel (12,553 x 2.68) = **33,642.04 kg = 33.64 tonnes.**

***The carbon emission into the atmosphere is 33.64 tons because of vehicles moving on the campus and for education purpose out side the campus.***

Considering this emission of the CO<sub>2</sub>, the Institution has intensified green awareness among the students and through green education on the one hand and plans to mitigate carbon emission from vehicles on the other.

The College management has motivated and encouraged all students and staff is to use public transportation, cycle, walking, and further discard use of personal vehicle in order to reduce CO<sub>2</sub> emission and fuel consumption and convert the campus into ***Zero Carbon Campus.***

The College has also encouraged green transportation i.e. encourage students and staff to pool car and two wheelers. Discard use of even public transportation and reach walking if the college premise is within 2 to 3 Km radius.

## ***8.2 Parking Facility & Regulations***

***The College campus has a parking shed for limited vehicles only. This is in order to discourage bringing vehicles on the campus. The parking shed adds to heat island effect roof. The trees are used as shading devise to park vehicles. This also saves the cost of parking shade and***

***further reduce heat island effect roof. The trees act as evaporative type of cooling system for the campus.***

***All the vehicles are parked in orderly manner within the campus.***

Green Transportation is also the need of the hour considering rapidly depleting oil reservoirs and India is dependent on overseas to meet with its oil demand and in return lose valuable foreign currency reservoir.

Implementation of Green Transportation on the campus can reduce number of vehicles on the campus and also eased down parking issues. The College proposes to prevent movement of vehicles on the campus and erect bicycle stand. Students /staff may visit campus on their vehicle and park it on entry / exit point, pick up the bicycle and move on the campus.



***PARKING FACILITY ON THE CAMPUS***



## **9. Sustainable Development**

### **9.1 Green Policy**

The Green Policy on campus is in existence. Actions are taken to encourage and motivate students and staff to adopt eco-friendly approach and save electricity, save or conserve water, save paper and use dust bins. Students and staff are informed and warned against smoking and chewing tobacco. The best way of doing it is through signages and official circular/notification and this has been done by College by issuing official notification.

***College Management has placed signages in this regard but more signages are to be placed to make the policy more effective and convey the message to each and every student at each and every corner of the College campus.***

College has a policy to implement Green Building norms by retrofitting all existing buildings as Green / Energy Efficient buildings. Constructing all buildings with green building norms incorporated in its design.

College Management has informed all concerned to act accordingly and implement Green Policy on campus.



**Government Science College, Idar**

At & Post: Sapavada, Idar, Sabarkantha



Ref.: No. :GSC/MKM/2022/78

Date: 26/02/2022

**CIRCULAR**

**Subject:- Green Policy of the College**

Hon'ble Prime Minister Narendra has made the pledge to cut its emissions to net zero by 2070, the first time India has set a net zero target, at the Glasgow summit during during November, 2021.

The University has formed it's Green Policy in view of the above said pledge by our Hon'ble Prime Minister.

All departments are requested to implement this "**Green Policy**" of the college strictly in letter and spirit. The Green Policy of the College is also mandatory form NAAC point of view.

Implementing this Green Policy will not incur an expenditure of single rupee but will set an exampale before students, society and staff regarding our concern for the "Climate Change" and Environmental Conscious Life Style. What is needed today is Mindful and Deliberate Utilization, instead of Mindless and Destructive Consumption.

**GREEN POLICY OF THE COLLEGE**

**1. Energy Efficiency Measures**

- (i) Motivate and Encourage "Save Energy" measures on campus by requesting all concerned to switch off lights, fans and Air-Conditioners when room and class room is not occupied.
- (ii) Place Sinages in each room and class room to "Switch Off" lights, fans and AC when not is use.
- (iii) Purchase/Replace ceiling fans with BEE 5 star rating.
- (iv) Purchase/Replace energy efficient lighting fixtures in form of LED
- (v) Purchase/Replace electrical equipments such as AC, water coolers, refrigerators, microwave, etc with only BEE 5 star rating.
- (vi) Energy Audit



**GREEN POLICY OF THE CAMPUS**

## **9.2 Best Practices & Initiatives**

The College Administration & Management always believes in taking proactive steps and initiatives not only from Green & Environment Audit point of view but also in view of sustainable development and also imparting ease, comfort and healthier environment for the staff and students.

The College Administration has issued circulars/notifications to ban use of “Single Use Plastic” and another circular/notification to use Water and Energy Efficiently, Ban Chewing Tobacco and Smoking on campus and many more...

The College has implemented Green Protocol wherein number of green initiatives in various forms are introduced for the staff and the students to implement.

***The College Administration has banned the use of single use plastic on the campus***



**Government Science College, Idar**

At & Post: Sapavada, Idar, Sabarkantha



Ref.: No. :GSC/MKM/2022/79

Date: 26/02/2022

**CIRCULAR**

**Subject:- Ban on Single use Plastic**  
**Reference:-** Central Pollution Control Board Notification No. B-17011/7/PWM/2022 dated 4-2-22

The College Administration has taken a decision to BAN Single use plastic on the campus.

This decision is taken considering directives of Central Pollution Control Board to implement a blanket ban on certain single-use plastic items from 1<sup>st</sup> of July, 2022. Copy is attached for ready reference

Plastic pollution harms our health, wildlife and the environment and attracts significant clean-up costs. Many single-use plastic items are difficult and economically unviable to recycle. Often, they end up contaminating our recycling.

Hence disposable water bottles, soft drink bottles, plastic carry bags, single-use plastic straws, stirrers, cotton buds.

Let us take steps to reduce plastic use by promoting the use of biodegradable alternatives that are relatively less harmful to the environment. Let us involve all students, Teachers and Staff for promoting this initiative to protect Environment, Human-beings, Birds and Animals.

Please paste signage at various places on the campus to promote ban of "Single use Plastic"



  
Principal  
Government Science College  
IDAR

**BAN ON SINGLE USE PLASTIC CIRCULAR**



**Government Science College, Idar**

At & Post: Sapavada, Idar, Sabarkantha



Ref.: No. :GSC/MKM/2021/223

Date: 12/08/2021

**COLLEGE CIRCULAR**

**Subject:-** Tobacco Free Campus  
**Reference:-** Government of Gujarat General Administration  
Department Notification No. PRCH/102012-546246-2 dated  
4-9-2012 (Copy is attached )

The College Administration has taken a decision to strictly implement and follow the directives of Government of Gujarat to BAN "Smoking & Chewing Tobacco" on the campus. All members of the college are requested to implement this policy of Government strictly in letter and spirit. Copy of Government Notification under reference is attached for ready reference. A tobacco-free policy limits or eliminates the use of any tobacco product, including, but not limited to, cigarettes, cigars, cigarillos, mini-cigars, hookah, spit tobacco, snus, and other smokeless products.

This decision is considering the lenient follow up on Government Policy to make all educational campus as "Tobacco Free" campus.

Tobacco is known to be harmful to the health of smokers, bystanders, and the environment.

Let us come together and make our campus "Tobacco Free"

Let us involve all students, Teachers and Staff for promoting this initiative to protect good health of all those using Tobacco.

Please paste signages at various places on the campus to promote "Tobacco Free" The Workshop, Seminars and Debate can be organized with a subject of "Tobacco Free Campus"

Let us involve all students, Teachers and Staff for promoting this initiative to protect good health of all those using Tobacco.

Please paste signages at various places on the campus to promote "Tobacco Free" The Workshop, Seminars and Debate can be organized with a subject of "Tobacco Free Campus"



Principal  
Government Science College  
IDAR

**TOBACCO FREE CAMPUS CIRCULAR**



**Government Science College, Idar**

At & Post: Sapavada, Idar, Sabarkantha



Ref.: No. :GSC/MKM/2021/368

Date: 23/12/2021

**CIRCULAR**

**Subject: Greener and Cleaner Environment Initiatives**

**Government Science College, Idar** has initiated measures for a greener and cleaner environment. The Staff and the students of the College are requested to do the needful for the following measures:

- Please do not waste water
- Please put off water taps after use
- Please switch off lights and fans when not in use and when moving out of class / office
- Please use dustbins
- Please avoid using mobile phones on campus ( for students )
- Energy Saved is Energy Generated
- Please use required light and fans only, in class rooms and offices. Please do not put on all the fans and lights when it is not required.
- Please park your vehicles in parking place only
- The Purchase Department is requested to undertake purchases of BEE minimum 3 Star rated lighting fixtures and Electric equipments or equivalent to BEE 3 Star rated.



Principal  
Government Science College  
IDAR

***GREENER & CLEANER INITIATIVE***

### **9.3 Heat Island Reduction---Roof & Non-Roof**

The elevated temperature in urban areas as compared to rural, less developed areas is referred to as the urban heat island effect. As cities grow and develop, more buildings and people are added. The process of urban development leads to this phenomenon. Heat Island Effect is the **“Thermal Gradient Between Developed & Undeveloped Spaces”**

When urban and suburban areas lose land surface and naturally occurring vegetation, heat can no longer easily escape. Tall buildings, concrete, and asphalt trap heat and contribute to the warming effect. Waste heat from energy use is another source of additional heat. Other contributing factors include local weather, seasonal changes, time of day, and geographic location.

There are three basic types of heat islands: canopy layer, boundary layer, and surface. Both canopy layer and boundary layer heat islands refer to atmospheric heating (warmer air temperatures). Surface heat islands refer to the actual temperature of surfaces in a specific heat island. Although the timing and intensity of these types may vary, they can all be harmful to urban and suburban environments.

Roof top is the major source of solar heat ingress inside the building. About more than 45% to total solar heat ingress inside the building is through roof top. Hence College has approach to minimize heat island effect so as to reduce negative impact on

micro-climate. College makes use of material with a high solar reflective index or china mosaic on roof top to cover exposed roof area, including parking under the shading of trees.

College has policy to lay only china mosaic tiles on the roof top. This has also reduced Heat Island Effect-Roof. Photographs are enclosed.

The solar panels on roof top further prevents solar heat ingress inside the building.



***HEAT ISLAND EFFECT ROOF--CHINA MOSAIC ON ROOF TOP***

***Heat Island Reduction—Non-roof***

All attempts are made to minimize heat island non-roof effect so as to reduce negative impact on micro-climate. College has building footprint of less than 10% and a small area is paved for road, walkways and parking. Hence more than 70% of plot area is retained undisturbed and a large part is with thick



vegetation and more than 1300 numbers of trees, bushes, creepers etc. assisting to create comfortable micro climate.

The surrounding open space around the College buildings has been laid with open jointed paver block/ stone tiles. Even well grown trees are preserved or saplings planted surrounding the building to act as shading device.



***HEAT ISLAND EFFECT NON-ROOF-----  
ROADS SHADED BY TREES***



***HEAT ISLAND EFFECT NON-ROOF-----  
ROADS SHADED BY TREES***



## **9.4 Building Operation & Maintenance**

The College undertakes regular maintenance of building and also cleanliness with the cleanliness drive.

**The College Authority has entered into Annual Maintenance Contract for Air Conditioners, Water coolers, ceiling fans, printers, water pumps, water fixtures, energy equipment, DG set etc. This is required to keep these electric equipments to operate efficiently consuming optimum energy for which they are designed and prevent leaking water supply fixtures and cocks.**

**This also falls under the Maintenance Policy of the College**

## **9.5 Designed for Differently Abled**

The College has ensured that the building/ campus design caters to differently abled people. Circular has been issued to all concerned to follow Government directives to make building use friendly for Divyang.

College follows design manual for a barrier free built environment i.e Universal design Design for differently abled people in accordance with the guidelines of National Building Code (NBC) of India and “Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1996 enacted by the Government of India on January 1, 1996 to create barrier free environment for persons with disabilities and to make special provisions for the integration of persons with disabilities into the social mainstream.

College has identified all probable facilities required to cater to differently abled people. College has also ensured that certain basic minimum provisions for differently abled people are **PROPOSED** which are as below.

- Easy access to the main entrance of the building.
- Non-slippery ramps with hand rails on at least one side.
- Main entrance door with adequate width.
- Uniformity in floor level for hindrance-free movement.
- Preferred parking for differently abled persons
- Lift
- Wash rooms for Divyangs

**Facilities available for Divyangj**

	<b>Facility of Wheel chair for Divyangja</b>
	<b>Special Open Source Software For Reading And Writing</b>
	<b>Accessible Toilet Blocks</b>



***RAMPS WITH RAILINGS & WHEEL CHAIR***

## **9.6 SUSTAINABLE DEVELOPMENT AWARDS & APPRECIATION**

The College is recently established and has already started working on various following subject matters pertaining to Sustainable Development.

- Net Zero Building
- Zero Emission Campus
- Zero Discharge campus
- Green Building Certification from IGBC or GRIHA
- Green Transportation
- Improving microclimate of the campus
- Improving Energy Performance of the Buildings
- Strengthening facilities for Divyangjan
- Improving Indoor Environmental Quality

After achieving desired results on the above said development, College will apply for the Awards & appreciation alongwith Reorganization so that the students and staff of the college get motivated to do still better in the field of Sustainable Development.

## **10. Water Efficiency**

### **10.1 PRESENT SCENERIO**

The College campus meets with its water supply requirement through existing ground water bores. There is no municipal water supply.

The main source of water supply in this region is ground water only and this ground water has low TDS. Hence this ground water can be consumed for portable purpose directly and is used for flushing, irrigation and washing purpose to.

The bore water is used through RO system for potable purpose.

The College consumes 600 litres daily for potable use & 7000 litres per day for landscape purpose.



**WATER COLLER WITH FILTRATION FACILITY**

## **10.2 WATER EFFICIENT FIXTURES**

The plumbing fixtures installed are not water efficient. Water efficient plumbing fixtures need to be installed to enhance water use efficiency and minimise the use of potable water on campus. No leakages are observed in installed fixtures. No wastage of water is observed. No leaking conduits are observed. No wastage of water in landscape is observed.

The College has placed signages to **“Save Water”** but need to install at many more places to motivate and create awareness amongst students and staff to save water.

Saving of water also leads to saving of energy because the less water we use, lesser energy is required to pump lesser water. Ground water table do not deplete fast and hence we require lesser HP motor to pump water requiring lesser energy.

## **10.3 RAIN WATER HARVESTING & GROUND WATER RECHARGE**

The College has 1 ground water recharge bore

College has a large campus with open grounds, gardens and rooftop area. Following methods are adopted by the college for ground water recharge;

- The large open space of the college campus acts as percolation tank and most of the rain water gets percolated through this open spaces.

***Rain Water Harvesting Practice need to be developed***



Government is also creating awareness for ground water recharge. Well, this region has ample of ground water that too good quality water but why to allow rain water go waste that too from educational institute.

#### **10.4**      *Landscape Design & Management of Irrigation System*

*The College campus has not installed any water efficient irrigation system.* Conventional type of stand posts exists which lead to wastage of water and un-necessary flooding. The water efficient irrigation system in form of sprinklers, drip irrigation, root zone treatment, moisture sensor, each type of bedding areas are segregated into independent zones based on watering needs etc can reduce potable water demand on the campus.

#### **10.5**      *Water metering*

The College has not installed any water meter at any place. The water meters are to be installed soon to measure consumption of water at various locations such as irrigation, potable, flushing etc.

#### **10.6**      *Water Audit*

The word Audit is a term related to accounting system. Off late Energy got scarce and costlier commodity. Hence Energy Audit was introduced. The water was in abundant and one never thought it to be scarce but then we have reached to a stage where auditing of water is also required.

### **Water Audit---Objectives & Benefits**

Water Audit is Qualitative & quantitative analysis of water consumption to identify means for Reducing, Reusing & recycling of Water. It provides the information of water wasted and offers ways to conserve it.

#### **“WHAT GETS MEASURED GETS MANAGED!”**

A water audit is an accounting procedure. The purpose of water audit is to accurately determine the amount of unaccounted-for water (UAW) in a water distribution system. UAW is calculated from verified supply and consumption records, factoring in various estimated usage figures. Water audits helps us to identify usage habits, as well as pinpointing leaks and other waste so that one can conserve and save. It helps us to know about detail profile of distribution system & water users. It also works on for the implementation of water loss reduction plans and important steps towards water conservation. There are various types of water audit and the present water audit falls under the category of Institutional and Domestic type.

#### **(a) Objectives of water Audit**

- (i) To utilize water resources more effectively and efficiently.
- (ii) To keep check on unwanted excess usage of water.
- (iii) Helpful in planning develop a water storage structures like ESR, sumps, dams, ponds, bunds, etc.
- (iv) For cost-benefit study for optimum recovery of water loss.
- (v) To identify thefts, meter inaccuracies, record inaccuracies and unauthorized water use.
- (vi) To determine losses both physical & non-physical.

- (vii) To identify priorities area which need immediate attention for control & maintenance
- (viii) Estimation of waste water generated
- (ix) Estimation of water pollution load

***(b) Benefits***

- (i) Reduced water losses
- (ii) Improved financial performance
- (iii) Improved reliability of supply system
- (iv) Enhanced knowledge of the distribution system
- (v) Efficient use of existing supplies
- (vi) Better safeguard to public health and property
- (vii) Improved public relations
- (viii) Reduced legal liability
- (ix) Reduced disruption, thereby improving level of service to users.

## **11. Post Occupancy Waste Management System**

People think trash goes away when they get it out of their house---out of sight, out of mind. But they don't realise that it's adding to the load of Earth by going into landfills. Management of solid waste is an important driver in Green Audit. Solid waste not properly managed leads to the degradation of the environment which, in turn, affects the flora and fauna. Keeping this in mind, the college has been strictly implementing scientific solid waste management to maintain the green status of the campus.

Segregate building waste at source and facilitate proper disposal for recycling, thereby avoiding such waste being sent to landfills. It was observed that Post occupancy waste Management system still needs lot of improvement. College has deployed agency to look after waste management on the campus and appointed supervisory staff to look after the working of this agency. Dustbins are placed at various places on the campus but effective steps are required for the segregation of waste.

### ***Solid Waste Management***

Institute emphasis on paperless office and reduce the use of plastic on campus. Each classroom, hall, lobby, office, canteen, library is provided with dustbin which is regularly emptied. Waste is segregated as biodegradable and non-biodegradable at different collection points by the housekeeping staff and accumulated at a central collection point, where separate three

colour-coded dust bins are placed. Segregated wastes are dumped in the particular dustbins of green, blue and red. Green coloured dustbin are meant for liquid and biodegradable waste. Red dustbins are meant for disposal of non-biodegradable waste. Blue dustbins are used for papers and glass materials.

The College efforts to decrease the waste production and works strongly on the policy with IQAC and open discussions.

The College possesses a vibrant and ecologically conscious campus community as a result of which the campus is deemed as a Zero Waste generator campus. The modus operandi consists of a systematic segregation of waste owing to its characteristic feature of bio degradable and non-degradable. Further the campus also plans to install Bio-composting machine and also undertakes vermicomposting for waste management. A major contribution in ensuring a waste free campus is of the house keeping staff which regularly engages in the cleaning of the campus and as part of *Swachh Bharat Abhiyan*, the campus community also conducts cleanliness drive for the campus.

1. **Segregation of waste and Dustbins:** The waste generated in the college is segregated in biodegradable and non-biodegradable waste in the waste pits. The biodegradable waste in converted into fertilizer and used in the campus garden.

2. Waste disposal sites & Bio-composting

### **Waste collection and Segregation:**

Segregation of waste and Dustbins: The College building corridor has dustbins placed at several places. The campus has a dedicated area for waste disposal and segregation. Waste is collected from college complex by the cleaning staff and transferred to waste segregation centre. The waste generated in the college is segregated in biodegradable and non-biodegradable waste in the waste pits. The biodegradable waste is converted into fertilizer and used in the campus garden. The non-biodegradable waste is sent to recyclable industry.



**DUSTBINS TO COLLECT WASTE**



## ***BIO-COMPOSTING***

### ***Reduction of waste at point:***

***Adopting Digital mechanism:*** The College is in line with green initiatives has moved to digital governance. Use of emails, website and WhatsApp groups for student and staff notices and correspondence are promoted to ensure low use of papers.

***Dedicated computer laboratory:*** Moreover, the College proposes for dedicated computer laboratory moved to online internal exams. This has reduced large amount of paper use.

***Circular issued by the College Administration to conserve and harvest water, energy and implement Swachh Bharat Abiyan***

***E Waste:***

The consumption of electronic goods and equipment are put to optimum use by proper upgradation and regular maintenance. For the professional and regular maintenance and disposal of e-waste, college has collaborated with local service provider. Periodic checking ensures that nonworking and defective equipment are disposed-off properly as per the directives of Government.

E-waste are sold to vendors, two times in a year.

***Hence the College has properly segregated the waste by properly and effectively placing different dust bins for different waste and sending this waste to recyclable industry instead of sending it to landfill sites.***

***This has earned some financial benefit for the College and has also prevented landfill site from over burdened and also saved transportation cost and Co2 emission through transportation.***

***College is a zero discharge campus from solid waste point of view.***

***The College has also taken a lead role in “Swachh Bharat Abhiyan”***



## **12. Indoor Environmental Quality, Health & Comfort**

### **12.1 Tobacco Smoke Control**

It is proposed to minimize exposure of non-smokers to the adverse health impacts arising due to passive smoking in the building.

***Well, the smoking is prohibited in educational institutions even then College has to place signage at various places on the campus to convey that Smoking / tobacco chewing is prohibited and injurious to health. Well, there is Government ban on Smoking in public places but this has to be displayed prominently.***

### **12.2 Fresh Air Ventilation & Daylighting**

The College building is designed to provide adequate outdoor air ventilation so as to avoid pollutants affecting indoor air quality. The building is constructed with a view point of ratio of openable area to the carpet area which is at least 6% in each regularly occupied zone. It is observed that window to wall ratio is more than 40% and entire one side of passage is open. The class rooms are designed to have adequate ventilation and cross ventilation and even enhanced ventilation.

The rows of window in class room gives abundant ventilation and cross ventilation and the occupants feel more comfortable, which is extremely important feature of Indoor Environmental quality.

It is also advised to all concerned to keep all the windows open during conducting class to have ventilation, cross ventilation and even enhanced cross ventilation. This will improve Indoor Environmental Quality of the building. This will lead to more comfort and increase efficiency of teacher to deliver the best and students to accept the most with an ease.

Building design ensures connectivity between the interior and the exterior environment, by providing adequate daylighting. The buildings are designed to achieve minimum glazing factors as below in at least 50% of the regularly occupied spaces.

It is ensured that daylighting is considered at the design stage only by appropriate orientation. The orientation of the buildings is kept such that maximum daylighting to all the spaces is achieved during most part of the day.

While designing for daylight, care is taken to control glare which causes discomfort. Strategies include building orientation towards the north, appropriately designed windows to ensure adequate daylighting, double height roof, etc. The College has ample of open space and hence the college can afford to orient new proposed buildings in desired side easily.

***College is advised to keep window shutters open and this will allow good amount of daylighting inside the room Good amount of daylight will prevent active lighting during day time and we can also save upon energy part.***



**DAY LIGHTING**



### **12.3 Well-being facilities / Health & Comfort**

Facilities are to be provided so as to enhance physical, emotional & spiritual wellbeing of building occupants. Common room for ladies and gents is provided

Indoor games facilities are also provided along with out-door games facilities.

Such activities will divert students to waste their time in other unfruitful activities during leisure time.

Meditation / Prayer is mandatory at start of the day in many Corporate Offices. Employees go for mediation to ease down their stress and pressure of work.

### **WELL-BEING FACILITIES**



**PLAY GROUND AVAILABLE ON THE CAMPUS**



### ***PLAY GROUND AND INDOOR GAMES***

#### ***STUDENTS WELL-BEING***

At College, student care and well being is the core focus. College has a non-compromising outlook towards their security and health that is evident through on-campus clinic, intensive security measures and comfortable accommodation facilities.

#### ***MEDICAL FACILITY***

The College invites consulting doctors at regular interval for any health-related problems. The doctors are available on the campus during given time and also online consultation can be availed.

#### ***HOSTEL ACCOMODATION***

This is the Government owned College and the college is dependent on Government funds for creating hostel facilities, which are presently not required considering hardly any

applicant for the same because all the students are from nearby villages and towns.

### **SECURITY**

The College has a very vigilant and professional security arrangement and all students and staff feel to be in safe hands.



**CLEANING CAMPUS ACTIVITIES**



*The College needs still regulate and strengthen NSS & promote NCC activities on the campus. Most of the NSS activities are part and parcel of Green Initiatives and Criterion VII of NAAC.*



***TREE PLANTATION UNDER NSS ACTIVITIES***



### **12.4 Community Friendly campus**

The college is located in the centre of the Idar town, and hence remains an ideal location frequented by citizenry of Idar. That includes fitness and sports enthusiasts, nature lovers, senior citizens and children. As per the survey conducted, these facilities and green campus attract about many visitors from all age groups to the campus especially during winter.

As a Academic community responsibility college tries to make the campus more vibrant and a healthy place for surrounding community

#### ***Facilities which College Campus includes;***

1. Eco-friendly green campus
2. Walking track and ground for walkers and trainers
3. Space for students preparing for physical training of competitive exams
4. Pond and Garden
7. Common washroom for campus utilizers
8. Drinking water facility

***Therefore, the College is the citadel of Integral education in Idar town and remains it's pride.***

***The College actively involves is extra curricular activities in the interest of students and staff of the college.***

### **12.5 Material Resources & Green Material**

The College takes strict actions to minimize **construction waste** being sent to landfills, whenever any construction or



renovation activities takes place on campus. College has avoided at least 20% of the waste generated (by either weight or volume) during construction from being sent to landfills. Provision is made to collect all construction debris generated on-site. This waste is segregated based on their utility. Means are examined of sending such waste to manufacturing units which would use them as raw materials. Typical construction debris include broken bricks, steel bars, broken tiles, glass, wood waste, paint cans, cement bags, packing materials, etc., even paper waste generated in office buildings and paper waste generated in form of exam supplementary is sent to recyclable industry through vendor.

The college encourages to use material with **Recycled content** i.e. **Material with recycled content** such as PPC cement, tiles with recycled content and high performance glazing whenever undertake addition alteration and special repairs to college building. Use of materials which contain recycled content helps to reduce environmental impacts associated with the use of virgin materials. It is planned to use materials with recycled content such that the total recycled content constitutes at least 15% of the total cost of the materials used in the building(s)/ campus

Market survey is carried out for the materials with recycled content and locate such local suppliers. Materials with recycled content include Fly ash blocks, Tiles, Steel, Glass, Cement, False Ceiling, Aluminum and Composite Wood.

College has released building material during routine maintenance / addition and alterations. It is encouraged the use

of salvaged building materials and products to reduce the demand for virgin materials thereby, minimizing the impacts associated with extraction and processing of virgin materials. It is ensured that at least 2.5% (or) 1% of the total building materials (by cost), used in the building(s)/ campus, are salvaged, refurbished and reused.

Opportunities are identified to incorporate salvaged materials into building design and provide opportunity for research potential material suppliers. Consider using salvaged materials such as flooring, paneling, doors, frames, furniture, brick, etc.

The College emphasis on use of building materials available locally thereby minimizing the associated environmental impacts resulting from transportation. This also helps to boost local economy and provide employment to local labours and personals. It is ensured that at least 50% of the total building materials (by cost), used in the building(s)/ campus, are manufactured within a distance of 400 km. Survey is conducted to identify building materials which are in the specified radius, in early stages of project design. While selecting local materials, it is ensured that they perform better in terms of strength, maintenance and durability.

Last but not the least, College has made an attempt to minimize use of virgin wood thereby encouraging responsible forest management and maximize use of materials which are rapidly renewable. A survey is undertaken to identify all wood based applications in the building. Then the types of products needed (e.g., doors, windows, furniture, flooring etc.) is

determined. The possibility is explored of using FSC (Forest Stewardship Council) / Forest Department certified wood (and/or) rapidly renewable materials for all such wood based applications. Local dealers are identified who supply FSC/ local forest department certified wood/ rapidly renewable materials. Also while sourcing wood for various applications, the quality or grade of wood required is specified. Survey different types of rapidly renewable materials those are available in the market is done. Local suppliers are located so as to reduce additional costs and environmental impacts caused during transportation.

The College always prefers to use low VOC paints and varnishes with following limits, during painting works in College.

### **VOC Limits for Materials**

<b>Type of material</b>	<b>VOC Limit(g/L less water)</b>
-------------------------	----------------------------------

---

#### **Paints:**

Non-flat (Glossy) paints	150
Flat (Mat) paints	50
Anti-corrosive/ anti-rust paints	250
Varnish	350

#### **Adhesives:**

Glazing adhesive	100
Tile adhesives	65
Wood adhesive	30
Wood flooring adhesive	100

### **13. Environment Consciousness & Institutional Distinctiveness**

Environment has become a popular subject in the last three decades. Some of the problems faced by humankind directly or indirectly are due to ozone depletion, greenhouse effect, acid rain, global warming, air – water pollution and fossil fuel combustion. Chemicals and allied processes are the most important among these. Noticing the bad effects of chemicals and traditional energy sources on environment and human life, the College has been trying to find solutions for a better life. For this, creating awareness about environmental issues and conservation of the ecosystem have become increasingly important in the life skill education in the College.

The rationale behind the environmental education is based on three factors:

- a) If people are aware of the need and the ways of protecting the environment, they will act to preserve it,
- b) The student community should assume responsibility for educating others about the need for environmental protection and
- c) Environmental education can be effective as part of a college curriculum. Hence the College should prioritise it.

It is now mandatory for all the Educational Institutions to conduct Green Auditing not only to discharge their Corporate Social Responsibility but also to retain their registration

Certificate. However, in India, not many Green Auditors are available to green audit all the educational Institutions.

Hence, it is felt that it is the need of the hour to train at least 6 Green Auditors a year through a Diploma Course on Green Auditing / Green Buildings.

The duration of the course shall be 6 months and in one course 30 students of the Institution shall be enrolled and trained in all aspects of environment protection which includes biodiversity promotions, carbon reduction measures, energy auditing, water auditing and individual responsibility to reduce carbon Footprint.

The Diploma course will be affiliated to the MSME of the Govt. of India and the students who completed the course shall get government certificates that will help them to be professional Green Auditors.

## **14. Suggestions & Recommendations**

There exists vast scope to improve upon the above said for the College with respect to Green campus, Green Initiatives, and Green & Environment Audit of the campus.

*1. It is recommended to organize Seminars, Conferences and Workshops in the College to make all stakeholders of College aware of the Criterion VII of NAAC regarding Institutional Values & Best Practices, focussing on Green Buildings, Water Audit, Energy Audit, Energy & Water Efficiency, Post Occupancy Waste Management System, Rain Water Harvesting, Indoor Environmental Quality, Green Energy, Carbon Footprint & Handprint, Zero Emission, Net Zero Campus, Water Positive Campus and other Environmental related topics to create awareness amongst the students, staff and people of Gandhinagar City and adjoining areas regarding above said topics. This will help to successfully implement Green Policy on campus. College Administration is also advised to take actions to pass on this message to Students Elected Wing and campaign for the same during the College functions and programmes.*

*2. The entire exercise of Green & Environment Audit is not only for Academic purpose but it has to be implemented in Letter and Spirit.*

- 3. It is suggested and recommended to the College Administration to replace all old tube lights consuming 55 watts of energy with energy efficient LED lighting fixtures and and replace all old ceiling fans consuming more than 60 watts with BLDC ceiling fans consuming only 24 watts with no capacitor and hence not contributing to equipment heat. It is also recommended to replace all old non-energy efficient unitary air-conditioners with latest BEE 5 star rated air-conditioners, which are energy efficient. All the other electrical appliances used in the College must be minimum BEE 3 Star Rated*
- 4. It is also recommended to place more numbers of signages in each class rooms and wash rooms requesting to put off lights, fans and exhaust fans when not in use. Signage to Save energy, Save Water, Waste collection, No Smoking, Anti-Ragging, No Tobacco, etc. has also to be placed in more numbers. College Management has placed signages in this regard but more signages are to be placed to make the policy more effective and convey the message to each and every student at each and every corner of the College campus.*
- 5. There can be one master switch in all class rooms connecting all lights and fans so as to have proper control over the operation of all lighting fixtures and fans.*

**6. Motion sensors can be installed in wash room areas and lobbies to prevent wastage of energy.**

**7. College also to prepare post-occupancy survey to verify occupant comfort (lighting levels, temperature, relative humidity, noise levels, etc.). Report on building performance of the equipment & systems listed. The report for each of the equipment & systems covers the following:**

- **Equipment specifications**
- **Test results with specific comments.**
- **Key monitoring aspects to sustain performance**
- **Estimated energy & water consumption**
- **Scope for performance enhancing in future, and savings thereof**

**8. It is suggested to arrange a talk on **Green Transportation** wherein students and staff are educated for adopting Green Transportation and also save money and preserve their health. The figures clearly show that the bicycles are hardly used by students and staff. The college need to encourage and motivate students and staff to use bicycles or walk down if the distance is small.**

**9. Students and staff are to be further informed and motivated to use battery operated two wheelers, which will reduce CO2 emission and also save fossil fuel. It is**



**further recommended to provide battery charging facility i.e electric plug points in parking place.**

- 10. College to provide preferred parking for two and 4 wheelers if they enter in pooling or using E-vehicle.**
  
- 11. The College has to install water efficient plumbing fixtures to enhance water use efficiency and minimise the use of potable water on campus. The plumbing fixtures must meet the baseline criteria, individually or in aggregate. The total annual water consumption of the campus can be controlled and not to exceed the total base case water consumption computed. The base case is considered as per NBC/IGBC/GRIHA**

Baseline Flow Rates / Capacity as per Uniform Plumbing Code of India (UPCI)

Fixture Type	Maximum Flow Rate / Capacity	Duration	Daily Uses per Person/ Day
Water Closets	6 LPF (High flush)	1 Flush	1
	3 LPF (Low flush)	1 Flush	1
Health Faucet/ Bidet, Hand-held spray*	6 LPM	15 Seconds	1
Faucet/ taps*	6 LPM	15 Seconds	8
Kitchen Sink*	6 LPM	15 Seconds	6
Urinal*	4 LPF	1 flush	2
Showerhead* / Hand-held Spray*	10 LPM	8 Minutes	1

Source: Uniform Plumbing Code – India, 2016

\* At a design pressure of 4 bar

- 12. *It is suggested to undertake landscape design to ensure minimum water consumption. College has a large open space but not properly developed. A detailed landscape plan has to be prepared with Green mapping. Landscape area to be planted with drought tolerant/native/adaptive species. The landscape here refers to soft landscaping, which includes only pervious vegetation and landscape shall not be designed with monoculture plant species, since such species would not promote habitat and biodiversity.***
  
- 13. *When college is undergoing Green & Environment Audit then the management must install proper water efficient irrigation facility in form of sprinklers, shut off valves, moisture sensors, drip irrigation, root zone system etc. Use of organic manure will lead to mucus and increase in void ratio with increase in water carrying capacity of soil***
  
- 14. *The college may undertake Green Mapping so that College is able to know the exact quantum of Green treasure within in form of trees, bushes, creepers and landscape. College can also plan for future planting of saplings so that the open space can be properly utilized.***

- 15. *It is further suggested to install water meter to improve water performance of the building, and thereby save potable water. Presently there is no water meter installed to calculate the consumption of water for irrigation, flushing, potable and other usages. Hence it is proposed to install water meter to know the actual consumption of water in a building. It is proposed to ensure continuous monitoring of water consumption, both on supply and demand side, to identify improvement opportunities in potable water efficiency.***
  
- 16. *The TDS in ground water can be improved by careful Ground water recharge strategies. College has already made arrangements for Ground water recharge. But this ground water recharge system is not in proper shape and has to be maintained properly for proper and effective functioning of the system. Let this entire system be a Case Study not only for college but this region. Let students and teachers from various colleges/schools and public at large visit this rain water recharge system and implement at their places. We need to market our expertise.***
  
- 17. *College is advised to undertake detailed Water audit exercise. National water policy has also insisted to undertake water audit, which is the***

*first step towards water efficiency and water conservation so that concrete and perfect measures can be taken for water conservation and efficiency. Even Reduce, Recharge and Reuse strategies in field of water can be further strengthen on campus and better implemented and the College campus can move towards zero discharge campus from stormwater point of view.*

- 18. College to undertake detailed Energy Audit so that perfect measures can be taken for energy conservation and efficiency. College to implement ECBC and ASHRAE norms strictly and even install movement sensors and daylighting sensors for better energy efficiency. Even College may undertake exercise daylighting simulation for designing weather sheds, projections, pargolas etc.*
- 19. College is must improve Post occupancy waste management system. Dustbins to be placed in college building corridors to collect various kind of waste such as paper water, glass waste, organic waste etc. Then mark a place on campus to collect all this waste separately and then send it to recyclable industry. Organic waste in form of landscape waste and kitchen waste to be treated through composting. This will result in organic*

*manure for landscape. It can be further improved upon and focus on earnings from the waste.*

- 20. College may Retrofit existing building into Green Building. It will be desirable to get Green Building Certification from IGBC/GRIHA or USGBC under Existing Green Building Certification. The certification process will make sure that all the buildings of the College buildings under takes all eoc-friendly measures strictly as per the guidelines of Green Buildings and let the building become model where others may visit the building to study the measures adopted to make it a Green/ Energy Efficient Building*
- 21. The College also needs to have separate preferred parking space near ramp at main entrance for Divyangs.*
- 22. College may explore the possibility for installation of one large Bio-gas and Bio-mass plants. College has a large potential for the raw material of both these plants.*
- 23. Environment Education may be imparted to all the students thorough 1-hr life-skill classes once a week. This will create wide-level environment consciousness among the student community. They will be sensitized to encourage pillion riding*

*with their peers or use public transport instead of two wheelers. Moreover, they will also motivate their parents, colleagues and relatives for water and energy efficiency approach.*

**24. College may Prepare questionnaire related to the environment and then place it before the staff and students to assess their understanding of environment –related issues.**

*The questions can be focused on four concerns:*

- Whether they consider themselves eco-conscious?*
- Do they consider the Institution to be eco-friendly?*
- What do they think are the top priorities that should be tackled to improve the green campus status of the College?*
- Whether the students and teachers who own vehicles are aware of the quantity of CO<sub>2</sub> emission by their vehicles?*
- What do they think to save water and electricity on campus?*

**25. Students who own two wheelers / four wheelers are to be sensitized of the carbon emission by their vehicles and educate them on this regard. They are also to be motivated to share their vehicles on**

*alternative days with their peers. For example, 50 % of the students who own two wheelers are to be advised to share their ride with their fellow students/neighbours. Thus, the carbon emission can be reduced by 50 % in the coming years. Students to be use bicycle or walk down if the house is nearby.*

- 26. Finally, College may form a Cell to facilitate Other Colleges / Universities for Green & Environment Audit. This would help College to know strength and innovative ideas of other Colleges and would also make it popular for extending this helping hand.*
  
- 27. The college has to involve students more in NSS & NCC activities and most of the activities of NSS are part and parcel of of Green Initiatives and Ec-friendly development*

## ABOUT COLLEGE MOTTO, VISION & MISSION

### ***Motto:***

The motto "ज्ञानम सर्वोत्तम संपदा" or "Knowledge is the greatest wealth" means that knowledge is an invaluable asset in terms of intellectual development surpassing physical or monetary wealth in importance and utility. This perspective encourages lifelong learning and values intellectual and personal growth as the ultimate forms of wealth and the society at by and large.

### ***Vision:***

To strive for excellence in education, the college envisions to impart value based knowledge, nurturing professional skills in the areas of Science, to create sensitivity for the underprivileged in the rural area sustaining the environment, to implement the initiatives of the government for employment and promotion of research.

### ***Mission:***

- To inculcate moral values and reverence for constitutional values with a sense of nationalism preserving the glorious heritage of the Nation to make better citizens for tomorrow.
- To provide access to excellence in academics and scientific research to all strata of society with special attention to underprivileged and personal attention to differently-able students.
- To promote academic exchange and academia-industry interfacing, taking advantage of the latest technology.
- To build up young men and women of proficiency, perseverance, principles and philanthropy.
- To create opportunities for self-learning, employability, entrepreneurial capacities, creativity, Start Up and innovation by implementing various initiatives of the Government.
- To encourage students for gender sensitivity and equality. To foster an experience of urban and rural extension work so that students are inspired to look for better opportunities for all.

To disseminate the concern for environmental and ecological protection as well as sustainable development.

To strive for excellence in education, the college envisions to impart value based knowledge, nurturing



