



**GREEN AUDIT REPORT**  
of  
**श्री सोमनाथ संस्कृत युनिवर्सिटी, वेरावल**



*Prepared by*  
**N. K. Ojha**  
**Green Building & Project Management Consultant**  
**Vadodara.**

# श्री सोमनाथ संस्कृत युनिवर्सिटी, वेरावल

## GREEN AUDIT REPORT WITH ACTION PLAN 2019 - 2020



### Prepared by

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Former—I/c Registrar & University Engineer

The M.S.University of Baroda

Vadodara-9825821684



PATRON--GRIHA



MEMBER--IGBC



MEMBER--ASHRAE



MEMBER--INTACH

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**N.K.Ojha**  
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9825821684  
15<sup>th</sup> of February, 2020

*N.K.Ojha*  
15/2/20

## PREFACE

The National Assessment and Accreditation Council, (NAAC) has made it mandatory from the academic year 2016-17 onwards that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

In view of the NAAC circular regarding Green Auditing, the University Management decided to conduct an external Green Evaluation by a competent Green Auditor along with a Green Audit Assessment Team headed by N.K.Ojha, Green Building & Project Management Consultant & Former I/c Registrar & University Engineer of The Maharaja Sayajirao University of Baroda, Vadodara.

Green Audit or Environment Audit focuses on the Carbon Footprint reduction measures being implemented by the University Management. The auditing was done for the period extending from 01/04/2019

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

*A.O.*  
*N.K.Ojha*  
*15/2/20*

**N.K.Ojha**

## SPECIAL THANKS

It is a matter of great pride and honour to have got an opportunity to work in co-ordination with **Hon'ble Vice Chancellor, Dr. Gopabandhu Mishra**. I am very grateful to him for his guidance, encouragement and support in bringing up this Report. Working with him has been worthwhile experience for me and the time spent with him was very productive and fruitful to my life.

He is inexplicably hardworking and challenging person who gives prime importance to help others. His working style, abilities, capacities and intelligence is a wonderful example to me and others who have worked under/with him. I have learned more from him than from any other teacher I have ever had. He always is being committed, prompt and enthusiastic to meet each deadline with high quality. I truly devote the credit of bringing up this Report to **Dr. Gopabandhu Mishra**, Hon'ble Vice Chancellor of the Shree Somnath Sanskrit University, Veraval.

*"पूर्णता गौरवाय" इति ध्येयवाक्यं पुरस्कृत्य भगवतः श्रीसोमनाथस्यानुज्ञया*

Quote---Dr. Gopabandhu Mishra

*Ah.  
N. K. Ojha  
15/2/20*

**N. K. Ojha**

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**GREEN AUDIT REPORT WITH ACTION PLAN (2019 – 2020)**

**FOR**

**SHREE SOMNATH SANSKRIT UNIVERSITY**

**VERAVAL, GUJARAT--INDIA**

## **1. Context**

### **1.1. NAAC requirements for Green Practices**

Refer **Criterion VII** under Manual for Self Study Report for Sanskrit Universities. It refer 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 these help 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.

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.

3. ***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.

***Creterion VII indicating Institutional Values & Best Practices has 100 credits/weightage in NAAC grading system.***

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

The Green 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.

## 2. Profile of Shri Somnath Sanskrit University

The Sanskrit literature is one of the richest in the world. Recent studies have shown that it is the most computer friendly. Sanskrit is more scientific and phonetic language. Today, the scientific literature in Sanskrit available to us is vast and varied, covering subjects as diverse as Alchemy and Mathematics - Metallurgy, Germology and Zoology and many more. Sanskrit language, with an incomparable store of knowledge and Science carries with itself a legacy of Indian tradition, is at the genesis of our well-developed nation.

Today the quest for learning Sanskrit world over witnesses a revival. Assessing the inevitability of Sanskrit education and promoting Vedic studies on traditional lines in Gujarat state. Former Chief Minister **Shri Narendra Modi** decided to establish Sanskrit University in Gujarat. His visionary leadership committed to provide the facility of imparting knowledge of Sanskrit and therefore, established **Shree Somnath Sanskrit University** at Veraval, District - Gir Somnath, Gujarat.

Shree Somnath Sanskrit University, Veraval was established by Government of Gujarat through an Act of Legislative Assembly passed on April 1, 2005. University Grants Commission gave approval under section 2 (f) and included it in the list of recognized Universities on February 17, 2006. Academic Sessions of Colleges began from June 2006 and Post Graduate Sahitya Department was established on July 20, 2006. It is the State University with Sanskrit as its medium of instruction, having 7 Faculties, 1 Constituent College, wherein more than 283 students on campus are pursuing higher studies under the care and supervision of 21 teaching (16 Permanent) and 32 (21 Permanent) supporting staff members. More than 4141 students are registered in the University affiliated Colleges / Institutes / Centers in the academic year 2014-15.

Until date, University has given academic affiliation to 35 Colleges/Institutions including University Sanskrit College and one B.Ed. College across Gujarat. At present, 25 Diploma Centers and 38 P.G.D.C.A. Study Centers are functioning presently. Further, University has given approval to the world famous 'ARSH' - Akshardham Research Institute for Social Harmony, Gandhinagar and Tattvajnan Mandir Research Institute, Modasa as Research Institutes.

It is the only special Sanskrit University of Gujarat as it offers a wide range of courses in Sāhitya, Jyotiṣa, Vāstuśāstra, Veda, Vyākaraṇa, Navya Vyākaraṇa, Rāmānuja Vedānta, Swāminārāyaṇa Vedānta, Sarva Darśana, Navya Nyāya, Dharmaśāstra, Purāṇaśāstra, Paurohityam and Yoga. It gives an opportunity for education starting from Certificate Course to Ph.D. In addition to this, English, Computer Applications, Gujarati, Hindi and Sociology are also offered at affiliated Colleges across Gujarat. University conducts its academic programmes under C.B.C.S. (Choice Based Credit System) and Semester System from the academic year 2011-12.

*Śāradā Bhavana*, the University Library contains around 7,000 volumes. Pujya Shri Morari Bapu has made a generous donation of rupees 3 lacs for procuring reference books in Sanskrit and he has inaugurated it on October 17, 2013. It was named as 'Triveni Reference Library' in the pious memory of Shri K.K. Shastri, Pujya Dongare Maharaj and Pujya Virag Muni. It gives the facility of reading room, issue & return, reference and referral services, book bank, old question papers, selling of University publications as well as University Granth Nirman Board publications etc. at its outset. Efforts have been made to keep sufficient number of text books for students and basic reference books for the faculty and scholars.

University has state of art Computer Lab with more than 25 PCs. All the departments of the University are accessible through intercom facility. University is ICT enabled.

**FEATURES OF THE UNIVERSITY**

- (i) In keeping with the Vedic tradition, *Yajña* is performed daily in the *Yajñaśālā* prepared by the University.
- (ii) A University Sanskrit College was established at Veraval in the academic year 2007-08. A Shiksha Shastri (B.Ed.) college was also established at Bhagwat Vidyapith, Sola in the same academic year.
- (iii) Apart from Shastri (B.A.), Shiksha Shastri (B.Ed.) and Acharya (M.A.) courses the University has set up its centres all over Gujarat for conducting various Diploma and Certificate courses on Temple Management, Paurohitya (Karmakanda), Jyotisha, Vastushastra, Yoga, Spoken Sanskrit and PGDCA.
- (iv) The University runs two self-finance research centres at Modasa and ARSH – Akshardham, Gandhinagar.
- (v) Along with the already existing Post-Graduate Sahitya Department, the Veda Department was started at the main centre of the University from the academic year 2007-08. Post-Graduate Vyakarana, Darshana, Jyotisha and Purana Departments were also started at the University main centre in the academic year 2014-15. University approved colleges have various Under-Graduate and Post-Graduate Departments like Sāhitya, Jyotiṣa, Vāstuśāstra, Veda, Vyākaraṇa, Navya Vyākaraṇa, Rāmānuja Vedānta, Swāminārāyaṇa Vedānta, Sarva Darśana, Navya Nyāya, Dharmaśāstra, Purāṇaśāstra, Paurohityam. Subjects like English, Computers, Hindi, Gujarati, Economics, History, Sociology and Psychology are taught at Under-Graduate level as complementary and compulsory subjects.

- (vi) In the examinations of various Diploma courses, Certificate courses and in the first two years of the Shastri course, the medium of answering is Hindi, Sanskrit, Gujarati or English. However, in the third year exams of the Shastri course, Acharya course, M.Phil. and Ph.D. courses, the medium of answering is Sanskrit only.
- (vii) The University has collaborated with various technical institutions for facilitating research oriented courses in Jyotiṣa, Vāstuśāstra and Temple Management.
- (viii) The University organizes *Yuvaka Mahotsava* (Youth Festival) every year. Various literary, cultural and sports competitions are organized as a part of the *Yuvaka Mahotsava*.
- (ix) The University also organizes various Conferences, Seminars, Workshops & Training Programs of State, National and International Level.
- (x) There is also a provision for external examinations at the University.
- (xi) Student who have passed XII<sup>th</sup> standard or *Madhyamā* exam or any other equivalent exam are eligible for admission in Shastri first year at any of the Colleges affiliated to the University. The students who have passed 12<sup>th</sup> standard in Science or Commerce stream, or those who did not opt for Sanskrit subject in their 12<sup>th</sup> standard are also eligible for admission in Shastri first year. Necessary guidance regarding the bridge course (Conversational Sanskrit) for such students is available at the University.
- (xii) Students who have completed B. A. with Sanskrit as their main subject or Graduated with Shastri (Graduated with 10+2+3 years of education) pattern are eligible for admission in Acharya first year on merit basis.

- (xiii) The courses offered by Shree Somnath Sanskrit University like Shastri (B.A.), Acharya (M.A.), Shiksha Shastri (B.Ed.), Tattvacharya (M.Phil.), Vidyavaridhi (Ph.D.), Diploma and Certificate course are designed to empower the students build their career in various fields. Students become capable enough to develop their own models of earning their livelihood. The knowledge of English and Computer imparted at the University prepares the students to tap into opportunities to work abroad. The University Graduates join as teachers in schools and colleges. They are also eligible for writing various competitive exams and serving on various posts in Government Offices, Police and Defence Institutions. They can also acquire Administrative posts by attempting GPSC and UPSC examinations. They can also enter into the Academics by writing NET and SLET exams.
- (xiv) Girl students can excel as professionals by mastering subjects like Jyotiṣa, Vāstu, Karmakāṇḍa and Conversational Sanskrit. These subjects may also be pursued as hobbies. Women also have an option of studying these courses from home or by joining any of the Sanskrit Colleges spread across Gujarat. Students studying in other Universities are eligible to join any of the Diploma and Certificate courses offered by Shree Somnath Sanskrit University. Admission for these courses are accepted in the months of January and June of every year.
- (xv) Revival and propagation of Indian culture, creation of cultured citizens, propagation of Sanskrit language, cultivation of moral values, strengthening our traditions and correlating them with modern wisdom are among the most important objectives of the University.

- (xvi) University intends to start M.Ed. Department, a College of Ayurveda and courses on VāstuŚāstra and Architecture in collaboration with other Technical Institutions.
- (xvii) Comparative research on Vāstu and Engineering, Paurohityam and Chemistry, Jyotiṣa and Mathematics-Astronomy will be undertaken at the University in collaboration with Institutions in the field of respective modern sciences.

The University campus is spread over 17.47 acres of land admeasuring about 71, 153 sq.mt.

**2.1 The student and faculty strength of the University is listed below for the year 2019-2020**

Sr. No.	Department	Number of Students		Number of Teaching & Administrative Staff	
		Boys	Girls	Male	Female
1	University Sanchalit Sanskrit College	120	08	05	---
2	Post Graduate Department	33	23	14	06
3	Diploma Courses	----	-----	-----	-----
4	Certificate courses	----	-----	-----	-----
5	Administrative Department	-----	-----	24	03
	<b>TOTAL</b>	<b>153</b>	<b>31</b>	<b>43</b>	<b>09</b>

## **2.2 Physical Structure**

1. The University campus area is 17.58 acres i.e. 71,151.00 sq.mt. i.e. 7,65,584.76 sq.ft.
2. The total building footprint i.e. Ground floor built up area is 10,352.73 sq.mt. i.e. 1,11,395.37 sq.ft. This includes under construction buildings of ladies hostel, Guest house, Registrar's bungalow and Yog Pradarshani Bhawan
3. Ground coverage is only 15.55 % against 60% allowable ground coverage as per DCR.
4. The total built up area is 19,607.01 sq.mt. i.e. 2,10,971.42 sq.ft. This includes under construction buildings of ladies hostel, Guest house, Registrar's bungalow and Yog Pradarshani Bhawan
5. FSI consumed is only 19,607.01 sq.mt. against available FSI of 1,42,302 sq.mt. 2.0 is the FSI considered.
6. The total open terrace area including sloping roof area is 10,352.73 sq.mt. i.e. 1,11,395.37 sq.ft.
7. Para 6 is required in order to calculate roof rain water discharge and install solar roof top panels.
8. The total open space retaining natural topography and landscape, flower bed, shrubs, tree plantation area is 57,335.74 sq.mt. i.e. 6,16,932.56 sq.ft.
9. The total road area is 3100 sq.mt. including paved area
10. The total parking area provided is 362.53 sq.mt. i.e. 3,900.82 sq.ft.
11. There are about 44 two wheelers and 8 numbers of four wheelers parked on the campus during working days.

12. There are about **710 number of trees** on the campus with about **70 kind of species**.
13. University has proposed to install **50 KW of solar roof top** panels. The work will start soon shortly
14. The University consumes on an average around **8000 KWh** Electrical energy units per month for interior/exterior lighting and electric equipment system in all the buildings on the campus and University pays **Rs. 80,000 / month** to WGVCL for the same.
15. University has a facility for **24 hours water supply** i.e. continuous water supply system and University consumes **3,000 litres of water per day** for potable use and **8,00,000 litres of water per day** for washing, flushing and irrigation purpose.
16. There are two main source of water. One is Municipality and another is University's own under ground water.
17. **The University has following facilities and Infrastructure.**
  1. University Head Office—Prabhasjyoti Shaikshanik Bhawan Building
  2. Triveni Prashashanik Bhawan
  3. Vice Chancellor's Bunglow
  4. Chandramauli Chhtravas—Boys Hostel
  5. Central Library Building--- Under Construction
  6. Girls Hostel----- Under Construction
  7. Yog Pradarshani Bhawan--- Under Construction
  8. Registrar's Bunglow--- Under Construction
  9. Guest House Building--- Under Construction



**LADIES HOSTEL—UNDER CONSTRUCTION**



**BOYS HOSTEL**

*Green Audit for the year 2019-2020*

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**BIRD'S VIEW OF THE CAMPUS**



***VICE-CHANCELLOR'S BUNGLOW & GUEST HOUSE UNDER CONSTRUCTION***



***Prabhasjyoti Shaikshanik Bhawan Building***

### 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.*

The European Commission, in its proposed regulation on Environmental Auditing, has also adopted the ICC definition of Environmental Audit. 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 University 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 University achieve the required carbon dioxide emission and absorption in the campus.
- To assess whether non-academic activities of the University 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.

## **5. Methodology Adopted**

The methodology adopted to conduct the Green Audit of the University has the following components.

### **5.1 Onsite Visit**

The Green Audit Assessment Team started the audit at the Institution on 6<sup>th</sup> of January, 2019 which extended for about 2 days. Greenhouse gas emission and carbon footprint reduction through adoption of green energy and energy-efficient measures were assessed. The key focus was on assessing the status of the green cover of the Institution including Water Efficiency, Water Conservation, Indoor Environmental Quality and Post Occupancy Waste Management System.

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

The Focus Group included the Green Audit Team members, staff members and management people. 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 three 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?

***It is recommended to organize Seminars, Conferences and Workshops on Green Buildings and other Environmental related topics to create awareness amongst the students, staff and people of Veraval city and adjoining areas regarding Green Buildings and Green Audit.***

### **5.3 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 University's annual greenhouse gas emissions and impact of the reduction measures undertaken.

### **5.4 Carbon Footprint**

- 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 University. Besides, by Breaking down the value to key 'carbon drivers', the University 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.).

### 5.5 Green Audit Assessment Team

The University Management formed a Green Audit Assessment Team consisting of four members under the convenorship of Dr. Pankajkumar S Raval.

The Following are the members of the Green Audit Team.

Sr. No.	Name	Designation
1	Dr. Pankajkumar S Raval--Convenor	Assistant Professor, Shri Somnath Sanskrit University sanchalit Sanskrit College, Veraval.
2	Dr. Narendrakumar L Pandya--Member	Principal, Shri Somnath Sanskrit University sanchalit Sanskrit College, Veraval.
3	Dr. Jayeshkumar D Mungra—Member	Assistant Professor, PG Department, Shri Somnath Sanskrit University, Veraval
4	N. K. Ojha - Green Auditor--Member	Registrar (I/c), The M. S. University of Baroda, Vadodara



**Shree Somnath Sanskrit University**  
(Estd. by Government of Gujarat)

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Date : 06/07/2019

**CIRCULAR**

**Subject: Greener and Cleaner Environment Initiatives**

Hon'ble Vice Chancellor of Shree Somnath Sanskrit University, Veraval has formed a Green Audit Assessment Team of following members under the Convenorship of Dr. Lalitkumar A. Patel (Head of PG Department, Shree Somnath Sanskrit University, Veraval) to prepare Green Audit Report for Shree Somnath Sanskrit University, Veraval

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

1. Dr. Pankajkumar S. Rawal  
(Asst. Professor, Shree Somnath Sanskrit University  
Sanchalit Sanskrit College, Veraval) - Convenor
2. Dr. Narendrakumar L. Pandya  
(Principal, Shree Somnath Sanskrit University  
Sanchalit Sanskrit College, Veraval) - Member
3. Dr. Jayeshkumar D. Mungra  
(Asst. Professor, PG Department,  
Shree Somnath Sanskrit University, Veraval) - Member
4. Mr. N.K. Ojha,  
(I/c Registrar & University Engineer,  
The M.S. University of Baroda,  
Technical Advisor to Govt. Institutions, B.E. (Civil), M.I.E., - Member

21/07/19  
MSA



*all the best*  
REGISTRAR  
Shree Somnath Sanskrit University  
Veraval

## 5.6 Carbon Audit Tools & Analysis

The Carbon Audit tools and analysis methodology were developed collectively by the Green Audit 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

## 5.7 Flora & Carbon Footprint Reduction

**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 University**

After deducting the built-up area along with playgrounds, the projected area available to develop various types of flora is 47,335.74 sq.mt.

There are 12 families, 25 genera and 70 species of trees, shrubs, herbs (including potted plants) and climbers in the campus.

- 70 species of trees
- 10 species of shrubs
- 30 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 Audit Team of the University 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	450
<b>2</b>	Semi –grown trees	250
<b>3</b>	Bushes (including floriculture plants)	142
<b>4</b>	Lawn	14,687.40 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 liter of petrol is 20 km
5. Total quantity of petrol consumed by the car (41,843/20) = 2092 liters

The carbon emitted by a car due to consumption of 1 liter of petrol is 2.3 kg CO<sub>2</sub>. At this rate the total quantity of carbon emitted by 2092 liters 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 liter petrol = 2.3 kg CO<sub>2</sub>.***

***5.8 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 450 full-grown trees in the campus of the University (450 x 6.8 kg CO<sub>2</sub>.) = **3060 kg or 3.06 tonnes of CO<sub>2</sub>.**

- 2) The carbon absorption capacity of 250 semi-grown trees is 50 % of that of full- grown trees. Hence, the carbon absorption (250 x 3.4 kg CO<sub>2</sub>.) = **850 kg or 0.85 tonnes of CO<sub>2</sub>.**
- 3) There are 142 bushes of various species being raised in the gardens of the University. 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 142 plants was calculated to be 142 x 200g = 28,400 g or **28.40 kg or 0.028 tonnes of CO<sub>2</sub>.**
- 4) The Green Audit team looks after the lawn of the University. Buffalo variegated grass, Mexican grass and indigenous grass species are being raised and maintained in the lawn. The total area of the lawn is 14,687.40 sq. ft. The carbon absorption capacity of 10-sq.ft. area of lawn is 1 g CO<sub>2</sub>. Hence, 14,687.40 sq. ft. of lawn absorbs **1468 g or 1.468 kg CO<sub>2</sub>. per day.** At this rate, the total carbon absorption per year (1.468 kg x 365) = 535.83 kg or **0.54 tonnes** per year.

**The grand total of carbon absorption by the flora in the campus of University is (1+2+3+4) = 4.47 tonnes.**

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

### ***Tool to measure oxygen emission by flora in the 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 liters of pure oxygen each day.

### ***5.9 Oxygen Emission by Flora***

The number of liters 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 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 450 full –grown trees per year (117.6 kg x 450 ) = 52,920 kg or **52.92 tonnes**.
- 2) Total oxygen emitted by semi- grown trees (58.8 kg x 250 ) = 14,700 kg or **14.70 tonnes** (oxygen emission in 50 % of that of the full grown trees).
- 3) Total oxygen emitted by 142 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  $(142/400) = 0.355$

Total quantity of oxygen produced by 0.355 units  $(0.355 \times 550 \text{ litres}) = 195.250$  litres of oxygen per day.

The annual production of oxygen at this rate  $(195.250 \times 365) = 71,266.25$  litres or kg of oxygen, which is approximately **71.26 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 14,687.40 sq.ft. In units, the value  $(14,687.40/25) = 587.49$  units, which produce  $(587.49 \times 550 \text{ litres of oxygen}) = 3,23,122.80$  litres of oxygen per day. Total quantity of oxygen produces by the 14,687.40 sq.ft of lawn per year  $(3,23,122.80 \text{ litres/day} \times 365) = 117,939,822$  litres or approximately **1,17,939.82 tonnes.**

## 5.10 Carbon Footprint Reduction Table

### ➤ Carbon dioxide absorption

Sr. No.	Flora	Quantity of CO <sub>2</sub> (tonnes)
1	450 Full –grown trees	3.06
2	250 Semi –grown trees	0.85
3	142 Bushes	0.028
4	14,687.40 sq. ft. Lawn	0.54
	<b>Total</b>	<b>4.47 say 4.50</b>

### ➤ Oxygen emission by flora

Sr. No.	Flora	Quantity of O <sub>2</sub> (tonnes)
1	450 Full –grown trees	52.92
2	250 Semi –grown trees	14.70
3	142 Bushes	71.26
4	14,687.40 sq. ft. Lawn	1,17,939.82
	<b>Total</b>	<b>1,18,078.70</b>

**GREEN COVER ON THE CAMPUS**





**GREEN COVER ON THE CAMPUS**

**Green Audit for the year 2019-2020**

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**GREEN COVER ON THE CAMPUS**

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२) ता- ०४-०८-२०१८ के दिन ६८मे वन महोत्सव के अन्तर्गत युनिवर्सिटी के एन.एस.एस. विभाग के द्वारा वृक्षोका रोपण किया गया था।



**TREE PLANTATION ON THE CAMPUS**

- ६) ता- ०८-०८-२०१९, ता- १६-०८-२०१९ एवं ता- ०४-०८-२०१८ के दिन ७००मे वन महोत्सव के अन्तर्गत युनिवर्सिटी के एन.एस.एस. विभाग एवं वन विभाग- गीर सोमनाथ जिल्ला के द्वारा वृक्षारोपण का कार्यक्रम किया गया था।



**TREE PLANTATION ON THE CAMPUS**

४) ता- २५-०६-२०१९, ता- १०-०७-२०१९, ता- १३-०७-२०१९ एवं ता-१९-०७-२०१९ के दिन वृक्षारोपण का कार्यक्रम किया गया था एवं वृक्षों को पानी पिलाने का काम एन.एस.एस. के स्वयंसेवकों ने किया था।



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**TREEN PLANTATION ON THE CAMPUS**



**TREEN PLANTATION ON THE CAMPUS**



**CELEBRATING VAN MAHOTSAV ON THE CAMPUS**

## **6. Energy Efficiency & Energy Audit**

Energy conservation is the utmost important in Green 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 it's generation and usage.

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

University has taken a pro-active step of installing all its lighting fixtures of LED and most of the equipments are BEE star rated. This has been done even before the Green Audit could take palce. University has a good practice to purchase and install only LED lighting fixtures and purchase all equipments of BEE star rated.

Hence this has played a vital role to reduce energy consumption on the campus.

University has further taken a decision to retrofit all it's building as energy efficient / green buildings and construct all it's new buildings as energy efficient / green buildings. University 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 University conforms 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

University buildings having air-conditioners confirms and considers unitary air-conditioners with BEE 3-star rating (or) air-conditioners with a COP equivalent to 3.1 (EER of 10.58), or more.

Ceiling fans installed in the building shall have an efficiency equivalent to BEE 3-star rating or more. Pumps & Motors installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

University verifies and ensure that the building's equipment & systems are commissioned to achieve performance as envisaged during the design stage. Submit measurement & verification plan for yearly reporting. University also prepares post-occupancy survey to verify occupant comfort (lighting levels, temperature, relative humidity, noise levels, etc.). Report on green building performance of the equipment & systems listed in commissioning plan. 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

The Energy Audit Report of the University for the year 2019-2020 revealed that the total Electrical energy units consumed on Campus per month is approx. **8000 ( KWh)**

One Unite equals 1000 watts (1KWhr.) It required 0.538 Kg or approximately ½ Kg of coal to produce 1 unit of electricity.

Total quantity of coal required to produce **8000** units of electricity is ( 8000 x 0.538 Kg coal ) = 4304 Kg or 4.30 tonnes 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 4.30 tonnes of coal consumed indirectly by the University through consumption of 8000 units of electricity led to the emission of ( 4304 Kg of coal x 2.86 Kg CO<sub>2</sub> ) = 12,309.44 Kg or **12.30 tonnes of CO<sub>2</sub> the atmosphere.**

***University has proposed to install 50.00 KW solar panels shortly.***

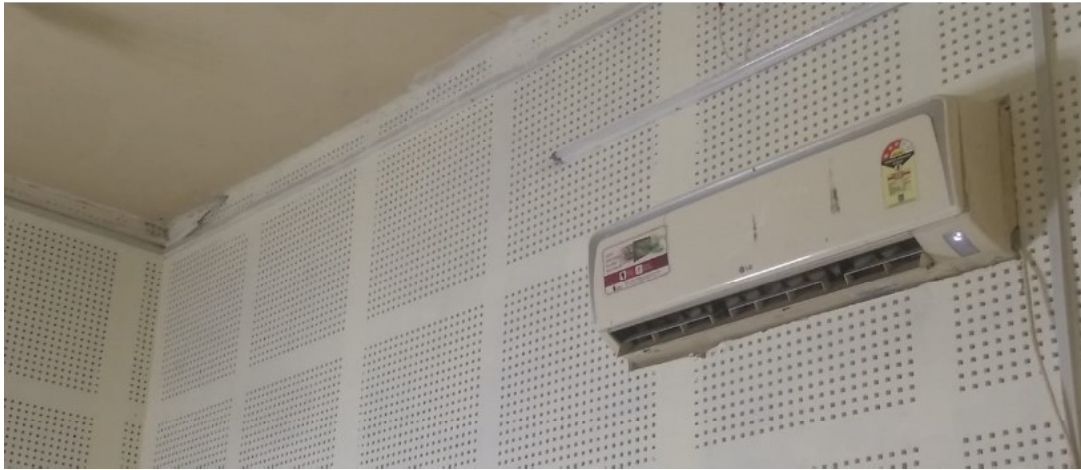
These solar panels generates 50 Kw per hour, however the panel will function effectively only for about 5 hours per day. Hence total solar energy generated per day will be 50 x 5 = 250 Kw

***Total solar energy generated per year will be 250 Kw x 365 = 92,250 KW.***

*The coal equivalent 92,250 x 0.538 = 49,630.50 Kg. coal.*

*The CO<sub>2</sub> equivalent is 49,630.50 x 2.86 = 1,44,943.23 Kg.*

***Hence Co<sub>2</sub> reduction because of proposed solar panels on the campus is 141.94 tonnes.***



**ENERGY EFFICIENT ELECTRIC EQUIPMENTS & LED LIGHTING FIXTURED**



***LED LIGHTING FIXTURES & BEE STAR RATED EQUIPMENTS  
ON THE CAMPUS***

***Outdoor Light Pollution Reduction***

Light pollution 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 used for exterior lighting system, which is the perfect way of energy efficient steps.

## **7. Eco-friendly Commuting Practices & 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 regards. It is estimated that in India, 9% of the total carbon is emitted by the transport system.

The positive factor in this regards is that the University does not own any transport vehicles to arrange conveyance for students. Considering the fact that the University is located besides the main road and adjoining to Railway Station and Central Bus Stand. Furthermore all the campuses are located besides city bus stands and rickshaw stands.

The University has cars for it's officers and staff to move outside city and that too is used very judiciously

The University Management has taken a principle stand right from the beginning to encourage students to use the public transport system 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 University are using two wheelers and four wheelers in large numbers and the trend has been on the increase. 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 University does not pollute the atmosphere directly.

The University management has been successful to convince students and staff to commute in public transportation and hence it is a great achievement for University that not more than 44 numbers of two wheelers and not more than 8 numbers of four wheelers reach University daily and this figure includes vehicles used by teachers and administrative staff alongwith visitors.

The following data indicate the quality of diesel consumed by the vehicles during the last year. There are 8 four wheelers and 44 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 2 km. in the campus. The total mileage covered by the 44 two wheelers per year  $(44 \times 2 \times 365) = \mathbf{32,120 \text{ km.}}$

Apart from that 8 four wheelers are used by the students / faculty members and the average mileage covered is also the same, 2 km per day in the campus. Hence the total mileage covered by 8 four wheelers per year  $(8 \times 2 \times 365) = \mathbf{5840 \text{ km.}}$

The total mileage covered by two and four wheelers per year  $(32,120 + 5840) = 37,960 \text{ km.}$

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 convenience sake, 35 km per litre was taken as the standard to calculate the carbon emission of two wheelers. Based on this, the total quantity of petrol consumed for covering 32,120 km is  $(32,120 / 35) = \mathbf{917.71 \text{ litres say } 920 \text{ litres}}$

A medium-range four Wheeler covers 16 km per litre of diesel. Based on this the total quantity of diesel consumed by 8 four wheelers per year  $(5840/16) = \mathbf{36.50 \text{ litres}}$ .

Thus the total fuel consumption per year  $(920 + 36.50) = \mathbf{956.50 \text{ say } 960 \text{ litres}}$  (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 6415 litres of fuel  $(960 \times 2.68) = \mathbf{2,572.80 \text{ kg say } 2570 \text{ Kg} = \mathbf{2.50 \text{ tonnes}}$ .

***The carbon emission into the atmosphere is 2.50 tonnes because of vehicles moving on 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.

University management has motivated and encouraged all students and staff is to use Public transportation 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 University 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 3 to 5 KM radius. Students and staff are also encouraged to use bicycle.

***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.***

Students and staff are further informed 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.***

***It is suggested to discourage erecting any more parking shades because it adds to more heat island effect roof. The shading of trees on the campus can be very well utilized as parking shade, which further reduces heat island effect roof.***

Green Transportation is also the need of the hour considering rapidly depleting oil reservoirs and India is dependent on overseas to meet with it's 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 University 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. University also proposes to provide e-rickshaw for aged persons and differently abled people.



**PARKING ON THE CAMPUS**



## 8. Sustainable Development

### 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 sinages and official circular and this has been done by University by issuing official circulars and placing sinages on different places of the University.

University 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 it's design.

University Management has informed all concerned to act accordingly and implement Green Policy on campus. ***It is suggested to conduct seminar and conferences to educate staff and students regarding Green Audit, Green Buildings and Eco-friendly approach.***

### ***Objectives & Suggestions to University for Implementation:***

1. To estimate the physical conditions of the already existing infrastructure in the University.
2. To maintain the quality of water and follow sustainable use of water in the campus and use of water as per norms minimizing wastage of water including rain water harvesting and ground water recharge..
3. To fix energy efficient alternatives for existing electric installations.

4. To encourage green transportation within the campus to prevent noise pollution, reduce carbon footprint and encouraging good health practices.
5. To suggest and implement waste management practices considering “Swachh Bharat Abhiyan” and encouraging best practices for post occupancy waste management system including segregation of waste and preventing waste going to landfill sites.
6. Creating Green landscapes and minimizing hard landscape
7. Creating Green Interiors
8. Creating Better Indoor Environmental Quality
9. Minimizing Building Footprint
10. Minimizing Water Footprint
11. Minimizing Heat Island Effect—Roof & Non-roof
12. Storm water Quality & Quantity
13. Prevention of Night light pollution
14. Construction of new buildings and Retrofitting of existing buildings as Green Buildings under IGBC / GRIHA & USGBC Rating system.
15. To create awareness amongst students regarding Green buildings / Eco-friendly buildings through Green Building Certification course of short duration of six months.
16. To create “Zero Discharge Campus”, Net zero Buildings on the campus and Water Positive Buildings with Green Building certification.
17. Encourage integrated design approach to construct a high performance building, thereby reducing negative environmental impacts.
18. Encourage retaining the site features to minimise site damage and associated negative environmental impacts.

19. Adopt passive architectural design features to minimise negative environmental impacts resulting in at least 2% energy savings of total annual energy consumption (through whole building simulation approach), Climate-responsive concepts and design features Passive cooling / heating technologies and at least 80% of the exterior openings (fenestration) have a Projection Factor of 0.5 or more.
20. 50% of the regularly occupied spaces with daylight illuminance levels for a minimum of 110 Lux (and a maximum of 1,100 Lux) in a clear sky condition on 21st September at 12 noon, at working plane (through simulation or measurement approach)
21. University to ensure that the building complies with necessary statutory and regulatory codes.
22. Soil erosion control measures are to be taken before construction and during construction and must conform to the best management practices highlighted in the National Building Code (NBC) of India 2005, Part 10, Section 1, Chapter 4 - Protection of Landscape during Construction and Chapter 5 - Soil and Water Conservation.
23. Basic amenities to be provided at walking distance to staff and students, so as to reduce negative impacts caused from automobile use.
24. Minimise disturbances or restore the site so as to reduce long-term negative environmental impacts, thereby promoting habitat and biodiversity.
25. Preserve existing fully grown trees and plant new tree saplings, so as to promote habitat and biodiversity.



**Shree Somnath Sanskrit University**  
(Estd. by Government of Gujarat)

Rajendra Bhuvan Road, Veraval - 362 266. District : Gir-Somnath (Gujarat)  
Phone : 02876 - 244532 Fax : 02876 - 244417, E-mail : sssu.veraval@gmail.com  
Website : www.sssu.ac.in

Ref. No. SSSU/681-1/2019

Date : 08-07-2019

**CIRCULAR**

**Subject: Greener and Cleaner Environment Initiatives**

Shree Somnath Sanskrit University, Veraval has initiated measures for a greener and cleaner environment. The Staff and the students of the University / 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 tobacco or paan masala on campus
- 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.

27/07/19  
msd



  
**REGISTRAR**  
Shree Somnath Sanskrit University  
Veraval



**Shree Somnath Sanskrit University**  
(Estd. by Government of Gujarat)

Rajendra Bhuvan Road, Veraval - 362 266, District : Gir-Somnath (Gujarat)  
Phone : 02876 - 244532 Fax : 02876 - 244417, E-mail : sssu.veraval@gmail.com  
Website : www.sssu.ac.in

Ref. No. SSSU/690-1/2019

Date : 08-07-2019

**CIRCULAR**

**Subject: Greener and Cleaner Environment Initiatives**

Hon'ble Vice Chancellor of Shree Somnath Sanskrit University ,Veraval has banned use of single use plastic on campus with immediate effect.

Single use plastic in case on inevitable and unforeseen circumstances can be used with the permission of undersigned.

*Handwritten signature*



*Handwritten signature*  
**REGISTRAR**  
Shree Somnath Sanskrit University  
Veraval

Green Audit for the year 2019-2020



SINGAGES

## Green Audit for the year 2019-2020



### Shree Somnath Sanskrit University

(Estd. by Government of Gujarat)

Rajendra Bhuvan Road, Veraval - 362 266, District : Gir -Somnath. (Gujarat)  
Ph. : 02876-244532 Fax : 02876-244417, E-mail : sssu.veraval@gmail.com  
Website : www.sssu.ac.in

Ref No.  
SSSU/Anti Ragging/Committee/2739/18

Date :  
12/10/18

#### Notification of Anti Ragging Committee

With the approval of Honourable Vice-Chancellor of this University on its concerned file, Shree Somnath Sanskrit University hereby constitutes Anti Ragging consisting of the following members for a period of two years from the date of issue of this notification with immediate effect:

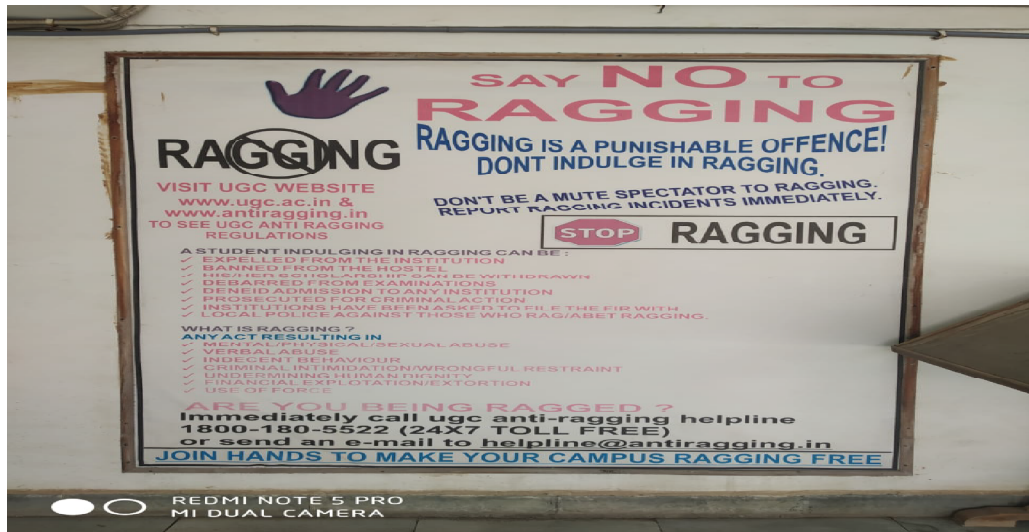
1.	The Vice-Chancellor, Shree Somnath Sanskrit University, Veraval	Chairperson
2.	Prof. Devendra Nath Pandeya Professor, Shree Somnath Sanskrit University, Veraval	Member
3.	Prof. Archana Dubey Professor, Shree Somnath Sanskrit University, Veraval	Member
4.	Prin <sup>o</sup> Dr. Narendrakumar L. Pandya Principal, Shree Somnath Sanskrit University Constituent Sanskrit College, Veraval	Member
5.	The Registrar Shree Somnath Sanskrit University, Veraval	Member Secretary



*(Signature)*  
(Prof. Mahendrakumar Dave)  
Registrar (I/c.)

Copy to for kind information:

1. The Vice-Chancellor's Office
2. The Registrar's Office
3. All Members
4. Concerned file.....



### ***Heat Island Reduction—Roof***

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 University has approach to minimize heat island effect so as to reduce negative impact on micro-climate. University makes use of material with a high solar reflective index to cover exposed roof area, including covered parking.

University has policy to lay only china mosaic tiles on the roof top except heritage structures and where there is weak roof top where tar-felt is laid but that too with silver colour reflective paint with high SRI value. This has also reduced Heat Island Effect-Roof. Photographs are enclosed.

### ***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. University has covered only 20% of the open space and hence large area of space is retained undisturbed with thick vegetation and more than 700 trees, bushes, creepers etc. assisting to create comfortable micro climate.

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



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



***HEAT ISLAND EFFECT NON-ROOF--MORE THAN 80% OPEN  
SPACE***

### ***Building Operation & Maintenance***

The University has entered into Annual Maintenance Contract for Air Conditioners, Water coolers, ceiling fans, printers, water pumps, water fixtures, ball cock of water tanks, energy equipments, lifts, 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.

### ***Designed for Differently Abled***

University 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. University 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.

University has identified all probable facilities required to cater to differently abled people. Buildings are designed to ensure that certain basic minimum provisions for differently abled people are incorporated, 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



***PREFERRED PARKING WITH RAMP FOR DIVYANGS***

***University has only provided ramps and preferred parking place for Divyangs. It is recommended to University to provide all above said facilities for Divyangs at the earliest.***

## 9. Water Efficiency & Water Audit

**University is requested to undertake Water Audit exercise. National water policy has also insisted to undertake water audit, which is the first step towards water efficiency and water conservation.**

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 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.
- (x) Improved public relations
- (xi) Reduced legal liability
- (xii) Reduced disruption, thereby improving level of service to users.

***It is recommended to take steps for Rain water harvesting and ground water recharge. This will also help to reduce TDS of ground water and also raise ground water table and roof rain water harvesting will lead to reduce the consumption of potable water and the rain water which is the potable water can be used for potable purpose.***

### ***Water Efficient Fixtures***

***To enhance water use efficiency and minimise the use of potable water on campus, it is suggested to fix water efficient plumbing fixtures whose flow rates 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***

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.

### ***Waste water treatment***

Veraval area has scanty potable water availability because of higher TDS of ground water and non-availability of surface water too. Hence University is proposing to install STP so that the treated water can be used for irrigation and washing purpose and hence potable water demand can be reduced. The slurry from STP can be used as fertilizer

### ***Water metering***

***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. 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.***

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

***It is suggested to undertake landscape design to ensure minimum water consumption. University has limited turf area to conserve water and/ensure that landscape area is 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.***

Potable water demand on the campus for irrigation is reduced through water efficient management systems and techniques such as central shut off valves, sprinklers, Turf and each type of bedding areas are segregated into independent zones based on watering needs. Drip irrigation is not feasible considering high TDS but planning to install moisture sensors.

२) ता - २६-०६-२०१९ के दिन जल संचय के अंतर्गत डॉ. जे. डी. मुंगरा के द्वारा "जल संचय एवं जल एज जीवन" विषय पर व्याख्यान रखा गया था।



## 10. 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 University 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. University 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.

***It is suggested to segregate waste by placing different dust bins for different waste and send this waste to recyclable industry instead of sending it to landfill sites through Nagarpalika. This will earn some amount for University and will also save landfill site from over burdened and also save transportation cost and Co2 emission through transportation.***

University has a large landscape area with more than 700 numbers of trees, large number of bushes and large area of lawns. Hence University can make use of composting pits to make use of garden waste.

***University may aim at zero discharge campus from solid waste point of view.***

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

ब) ता- २४-०८-२०१८ के दिन स्वच्छता अभियान एन.एस.एस. विभाग के द्वारा निबंध स्पर्धा का आयोजन किया गया।



८) ता- १८-०९-२०१८ के दिन संस्कृत कोलेज एवं पी.जी. डीपार्टमेंट में थेलेसेमिया टेस्ट केम्प का आयोजन किया गया था।



## Green Audit for the year 2019-2020

१२) ता- २४-०९-२०१९ **NSS Day** अंतर्गत युनिवर्सिटी एन.एस.एस. विभाग एवं बी.वी.जी. इन्डिया लीमिटेड के सहयोग से पुरे केम्पस मे स्वच्छता अभियान एवं रेली का कार्यक्रम किया गया था।



१६) ता- २२-०१-२०१९ क दिन स्वच्छता आभयान कया गया था।



**Green Audit for the year 2019-2020**

१९) ता - ०२-०२-२०१९ के दिन स्वच्छता अभियान अन्तर्गत युनिवर्सिटी केम्पस मे स्वच्छता का कार्यक्रम किया गया था।



## 11. Indoor Environmental Quality, Health & Comfort

### 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. Sinages are placed 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.



## **2. Fresh Air Ventilation**

University buildings provide adequate outdoor air ventilation so as to avoid pollutants affecting indoor air quality. There are various buildings on the campus but it is always constructed with a view point to of ratio of openable area to the carpet area is at least 6% in each regularly occupied zone. It is observed that window to wall ratio is more than 30% 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 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.

University proposes to install CO<sub>2</sub> sensors and a control system to maintain a differential CO<sub>2</sub> level of 530 ppm in all regularly occupied conditioned areas with seating capacity of more than 50 persons to continuously monitor and control carbon dioxide level in the building to provide occupant comfort and well being.

For densely occupied areas, have in place CO<sub>2</sub> sensors at the breathing zone levels with monitoring systems.

### **3. Daylighting**

University 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. University has ample of open space and hence University can afford to orient buildings in desired side easily.



**DAY LIGHTING WITH VENTILATION & CROSS VENTILATION**



**DAY LIGHTING WITH VENTILATION & CROSS VENTILATION**



**DAY LIGHTING WITH VENTILATION & CROSS VENTILATION**





**DAY LIGHTING WITH VENTILATION & CROSS  
VENTILATION**

**4. Occupant Well-being facilities**

Facilities are to be provided so as to enhance physical, emotional & spiritual wellbeing of building occupants. All office buildings, department buildings and hostel buildings has marked spaces for common room for ladies and gents.

At some places even Mediation room is provided. Gymnasium facilities are provided in some buildings. The gymnasium facility, indoor games, out games facility is also provided, centrally.

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. University campus has more then 4 worship places on the campus.



**WELL-BEING FACILITIES ON THE CAMPUS**





**WELL-BEING FACILITIES ON THE CAMPUS**



**WELL-BEING FACILITIES ON THE CAMPUS**



१३) ता-०२-१०-२०१९ के दिन गांधीजीकी १५०वीं जन्म जयंती के अंतर्गत "FIT INDIA PLOG RUN" का आयोजन किया गया था उसमे स्वस्थ रहे के लिए दौड़, कसरते एवं योग का आयोजन किया गया था ओर प्लास्टिक मुक्त परीसर बनाने के लिये स्वच्छता अभियान एन.एस.एस. विभाग के द्वारा किया गया।



### **5. Material Resources & Green Construction Material**

University takes strict actions to minimize **construction waste** being sent to landfills. We avoid 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 University 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. 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.

University 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 University 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, University 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 University always prefers to use low VOC paints and varnishes with following limits, whenever undertake painting works in the building.

***VOC Limits for Materials***

<b>Type of material</b>	<b>VOC Limit(g/L less water)</b>
<b>Paints:</b>	
Non-flat (Glossy) paints	150
Flat (Mat) paints	50
Anti-corrosive/ anti-rust paints	250
Varnish	350
<b>Adhesives:</b>	
Glazing adhesive	100
Tile adhesives	65
Wood adhesive	30
Wood flooring adhesive	100

## **12. Environment Consciousness**

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 University 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 University.

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 University curriculum. Hence the University prioritizes 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.

### 13. Suggestions & Recommendations

There exists vast scope to improve upon the above said for the University with respect to Green campus and Green Audit of the campus.

1. University to undertake **Water Audit** 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 better implemented and the University campus can move towards zero discharge campus from stormwater point of view.
2. University to undertake **Energy Audit** so that concrete and perfect measures can be taken for energy conservation and efficiency. University to implement ECBC and ASHRAE norms strictly and even install movement sensors and daylighting sensors for better energy efficiency. Even University may undertake exercise daylighting simulation for designing weather sheds, projections, pargolas etc.
3. University may undertake the exercise of **Green Mapping** so that University is able to know the exact quantum of Green treasure within in form of trees, bushes, creepers and landscape. University can also plan for future planting of saplings so that the open space can be properly utilized.
4. University has to make an attempt for better **Post occupancy waste management system**. It needs lot of improvement. Students and staff to motivate and encourage to segregate waste at initial point itself and send recyclable waste to recycle industry to save virgin material for manufacturing of material.

5. University may **Retrofit all existing buildings 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 University undertakes 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
6. University may explore possibility for installation of one large **Bio-gas and Bio-mass plants**. University has a large potential for the raw material of both these plants.
7. The ground water of the University has **higher TDS** rate. University is dependent on this water for about 75% of the total water requirement of University. The TDS in ground water can be improved by careful **Ground water recharge strategies**. Water quality testing laboratory will be installed in one part of the laboratory to test the potability of the drinking water to ensure the students are free from water-borne diseases. All the water taps shall be fitted with high-efficiency aerator taps to reduce wastage of water.
8. **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 to replace all the incandescent or fluorescent bulbs with energy-efficient LED bulbs.

9. University 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:

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

Students who own two 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.

10. Finally University may form a Cell to **facilitate other Universities and Colleges for Green Audit**. This would help University to know strength and innovative ideas of other Universities and Colleges and would also make it popular for extending this helping hand.

### About the University

*“The Sanskrit literature is one of the richest in the world. Recent studies have shown that it is the most computers friendly. Sanskrit is more scientific and phonetic language. Today, the scientific literature in Sanskrit available to us is vast and varied, covering subjects as diverse as Alchemy and Mathematics - Metallurgy, Gemmology and Zoology and many more. Sanskrit language, with an incomparable store of knowledge and Science carries with itself a legacy of Indian tradition, is at the genesis of our well-developed nation.*

*Today the quest for learning Sanskrit world over witnesses a revival. Assessing the inevitability of Sanskrit education and promoting Vedic studies on traditional lines in Gujarat state, our Former Chief Minister Shri Narendra Modi decided to establish Sanskrit University in Gujarat. Our visionary leadership committed to provide the facility of imparting knowledge of Sanskrit and therefore, established Shree Somnath Sanskrit University at Veraval, District - Gir Somnath, Gujarat.*

### Motto

#### *Pūrṇatā Gauravāya*

*The motto of the University is chosen from Sanskrit poet Kālidāsa's famous work Meghadūtam. It explicitly focuses on the attainment of completeness and excellence. It also speaks of the vision and idealism for which the University is established. Building mutually enriching linkages with the society and its institutions.*

### Mission

*Excellence in quality is the need of any organization and Shree Somnath Sanskrit University is no exception. To survive in the competitive world of today and tomorrow, we focus on quality. Quality is a journey not the destination.*

