



Criterion VII

Institutional Values and Best Practices

7.3.1 : Institutional distinctiveness:

Sinhgad Institute of Technology is located in lush green Sahyadri Range near Lonavala. Lush green campus and green cover of the campus, developed through continuous efforts make it stand tall among other institutes. Continuous efforts through various activities to increase Oxygen emission and reduce greenhouse gases made this campus Oxygen Park. The detailed efforts are mentioned in this document.

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SINHGAD TECHNICAL EDUCATION SOCIETY'S SINHGAD INSTITUTE OF TECHNOLOGY

Sinhgad Institutes (Affiliated to Savitribai Phule Pune University, Pune & Approved by AICTE)

Gat No. 309/310, off Mumbai Pune Expressway Kusgaon (Bk), Lonavala Pune -410401
website: sit.sinhgad.edu

1. Green Campus Initiatives

The Sinhgad Institute of Technology acknowledge the importance of; Eco-friendly campus, in order to protect the environment by making use of the available resources in a sustainable and responsible manner. The institute has plan to plant 10% more trees every year which resulted in availability of more over 7500 well grown tree cover in campus. Institute has constituted green policy and implementation of it is strictly observed.

1. Implementation of Tree Plantation:

SIT Lonavala is well known for its greenery. We received the green campus award by AICTE. Today this campus has more over 7500 well grown trees of various species. This count is increasing day by day. We conduct tree plantation activities on various occasions like,

- Independence day
- Republic day
- World environment day
- Foundation day of society
- Birthday Celebrations
- NSS day etc.

We have dedicated gardening team of campus to look after these activities of plantation and further nurturing of plants. At the end of every year, CO₂ absorption capacity is analyzed.



Sinhgad Institute Lush Green Campus



2. Green Audit

While transforming ourselves from regional campus to national level campus it is the responsibility of such campus to face the global future challenges and try to find out possible solutions for them. It is social and environmental responsibility of Institutes, Universities, National and International Organizations to respond positively for various global issues at local level and should percolate the generated knowledge in to the society. Global warming and climate change are current environmental issues need to be addressed scientifically and efficiently. As SIT campus is provided with skillful human resource supported by analytical infrastructure, it is our duty to bring such ideas in practice. While understanding the call of time our team has decided to enumerate the green cover of campus and quantify the carbon sequestration of existing tree population.

1. Objectives

1. To study woody green cover of the campus.
2. To study species diversity of woody vegetation in the campus.
3. To understand biomass and carbon stock accumulated by woody vegetation in the campus.
4. To explore carbon sequestration potential of woody vegetation in the campus.
5. To explore potential of woody vegetation of the campus as an oxygen source.
6. To measure canopy cover of the trees on the campus.

2. Study Area

SIT Lonavala campus is situated on hills of Sahyadri range east of Lonavala city Maharashtra, at 18.734103 latitude, 73.427735 longitudes. SIT Lonavala covers an area of about 200 acres. The major area of the campus is covered with vegetation.

3. Data Analysis

All the collected data is tabulated and analyzed with the help of MS- Excel spreadsheets and the findings are extracted by using various factors given by Intergovernmental Panel on Climate Change (IPCC). Following parameters are measured for analysis purpose.

- MEASUREMENT OF CIRCUMFERENCE OF THE TREE:
- HEIGHT MEASUREMENT:
- ABOVE GROUND BIOMASS (ABG) OF TREE:
- ESTIMATION OF CARBON:
- DETERMINATION OF WEIGHT OF CARBON DIOXIDE (CO₂) SEQUESTERED IN THE TREE:
- CANOPY COVER:

4. Findings

Following are the findings of green audit:-

• Carbon Sequestration:

Carbon sequestration is long-term storage of carbon dioxide or other forms of carbon to avoid climate change. It has been considered as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Pentagram = billion ton) of carbon storage globally. In the current study the focus is given on the assessment of existing carbon stock stored in SIT Lonavala campus in the form of woody vegetation by



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enumerating every tree species. A single tree consumes 0.0218 tons of CO₂ approximately annually, consequently, as the campus possesses 7500 mature woody plants, 138.78 tons of CO₂ is consumed yearly by all woody vegetation on the campus.

- **Oxygen released**

Woody vegetation in SIT Lonavala campus release 416.34 tons of oxygen in a year. Thus, it is supposed to release 416.34 tons of oxygen annually.

A single tree supports oxygen demand of two people for their life. Thus, 7500 woody trees on the SIT Lonavala campus are supporting 15000 people on and around the campus.

- **Canopy cover**

The vertical projection of plant foliage onto a horizontal surface is called as Canopy cover. In the other word, the canopy cover is the per cent forest area occupied by the vertical projection of tree crowns. Furthermore the measure of forest cover is useful to analyse the plant growth and survival. Hence, for determining the nature of the vegetation it is an important ecological parameter of forest ecosystem for its relationship with species richness, wildlife habitat and behavior. Forest canopy structure regulates radiation interception through the canopy, affects the canopy microclimate, and consequently influences the energy, water, and carbon fluxes between soil, vegetation and atmosphere through interactions with leaf photosynthesis. The total canopy area calculated around the campus is 78 acres. The total canopy cover area on the campus is 39 % and is more i. e. 33% forest cover decided for country or state.



3. Carbon foot prints:

As the SIT Lonavala campus considered as institutional organization, the various energy resources like electricity, fuels, Liquefied petroleum gas (LPG) are used. It is necessary to calculate the carbon footprint of the campus to upgrade the Clean Developmental Mechanism (CDM) in various processes. All the data from the various sources is collected from all the sectors where energy resources are used. The collected data is calculated by using standard emission factors.

- **Electricity carbon footprint:**

In the campus, electricity is used for various purposes like residential, office use and in the laboratories. The total electricity used in the campus is around 4000 MWh/annum which (approximately) liberates 12240000 kg of CO₂ per year.

The solar panels are installed on the roof of SIT building 2, produces 12 MWh electricity per year. The electricity produced from solar panels saves 18615 kg of CO₂ per year.

- **Liquefied petroleum gas (LPG) footprint:**

The Liquefied petroleum gas (LPGs) is used in the Science laboratories, Hostels, Guesthouse and staff quarters on the campus. The total LPGs consumed is 3,200 kg/annum and is responsible for the liberation of 9600 kg of CO₂.

- **Vehicle footprint:**

The vehicles are the source of CO₂ and other greenhouse gases. The number of vehicles passed through the campus daily, which emits the CO₂ in the atmosphere which add tons of CO₂ as vehicle footprint. The vehicle footprint of Campus is 20500 kg of CO₂ per year approximately.

First Friday of every month is observed as 'No Vehicle Day'. The vehicles are not allowed in the campus to reduce the emission of CO₂. On this 'No Vehicle Day', campus reduces the 72.20 kg of CO₂ per year of four wheelers and 34.27 kg of CO₂ per year of two wheeler footprint. The total 106.47 kg of CO₂ per year footprint reduced during No Vehicle Days.

- **Paper footprint:**

The papers are used in the institution for various purposes like examination answer sheets, circulars, notices, office work etc. The papers are responsible for the emission of CO₂. The Campus uses 1,650 reams of A4 papers which emits the 3.43 tons of CO₂. In the campus various departments follow paperless methods of communication to reduce the paper footprint. The various sections on the campus save around 13,48,914 papers per year i.e. 2,697 reams. The paperless work reduces approximately 5.61 tons of CO₂ approximately. The total 2.80 tons of biomass is saved by paperless communication i.e. green computing.

- **Total footprint of the campus:**

The total footprint is the addition of all the footprints and it is expressed as tons of CO₂ per year. The total footprint of the campus is 12282.53 tons of CO₂ per year approximately.

As SIT is following the Clean Developmental Mechanism to reduce the emission of CO₂ and greenhouse emission by using solar panels for electricity generation, paperless work and No Vehicle Day, it reduces of 22.51 tons of CO₂ per year approximately.

- **Conclusion:**

India's CO₂ emission is increased by an estimated 4.6 % in 2017, despite a turbulent year for its

economy. The carbon footprint of nation is measured per person; India's emissions are still very low – at only 1.8 tons of CO₂ per capita- which is much lower than the world average of 4.2 tons. But those emissions have been increasing steadily, with an average growth rate of 6% over the past decade. The educational institutes are the organizations which are having large areas that consume high quantities of electricity and LPGs for many purposes. The SIT Lonavala Campus emits 12282.53 tons of CO₂ per year approximately. The present Clean Development Mechanism (CDM) or practices reduce the 22.51 tons CO₂ per year approximately. The SIT campus covers total 200 acres area which is having the green cover of 75000 mature woody trees which capture 138.78 tons of CO₂ per year.



Efforts to reduce carbon foot prints



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4. Energy Audit

Electrical Energy requirement for all the buildings in the campus is satisfied from two sources. The main source is a 22kV express feeder of Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL). The support of solar plant of 10 kW capacity is supplying load of SIT Building no. 2. Major components of electricity use are Institutes, mess and canteens, Hostels, Staff quarters and miscellaneous. Electricity load in the institutes includes bulbs of 14 kW, tube lights of 175 kW, fans of 138 kW, computer machines 269 kW, printers of 168 kW, projectors of 22kW, aqua-guards 1 kW, coolers 17 kW, television sets of 11.6 kW, AC of 114 kW, Mixers of 1.5 kW, oven 30 kW, refrigeration 10 kW etc. Total connected load is around 1080 kW. Active load is 562 kW. There are total of 27 buildings of hostels. The connected load of these buildings is around 2974 kW. For staff quarters connected load counted as 1810 kW whereas for mess, canteens, pumps together form load of 366 kW. It is observed that out of total connected load 53% load is actively using the electricity. Monthly consumption of the campus is varying from 2.5 lakhs to 5 lakhs units throughout the year.

Energy conservation practices implemented at STES Lonavala campus:

The administration of STES Lonavala is very keen on saving electricity and fuel which is been used on the campus. The campus has implemented some unique ideas like “No Vehicle Day”, electrical vehicle, use of LED lights and installation of Solar panels in college and campus. The various departments have conducted energy conservation awareness programs, motivation of students, staff and faculty to use public vehicles and awareness programs like pollution control is conducted by NSS.

Following are some of the practices followed by SIT on the campus to conserve energy and fuel.

- **No Vehicle Day:**

The concept of “No Vehicle Day” is to reduce emission of CO₂ by minimum use of vehicles on the campus. On the first Friday of every month “No Vehicle Day” is observed on the campus since 2015. During this No vehicle Day the vehicles of student, staff, faculty and visitors are not allowed to move in the institute and on the campus. Only essential service vehicles are allowed.

- **Use of Electrical vehicle:**

This is another initiative taken by institute to save fuel as well as save campus environment. The institute has electric vehicle which is used for internal use.

- **Solar electricity generation-**

SIT has purchased and installed 10 KW solar power plants for generation of electricity on the terrace of SIT 2 building. There is ample scope to generate solar electricity on the campus.

- **Use of LED lights**

With the time SIT has taken a policy decision to replace all florescent, CFL bulbs, sodium bulbs, and tubes by LED bulbs and tubes. These LED bulbs and tube lights will reduce consumption of electricity.

- **Energy Conservation Programs**

The energy conservation programs are conducted in SIT through bodies like NSS, IEE, ISHRAE, CCC, etc. The electricity week is also observed in the institute.

Alternate sources of energy and energy conservation measures



10 kW Solar Plant



Wheeling to the Grid



Use of LED



Solar Thermal



Sensor based Lights



Use of LED



Wheeling to the Grid



Sensor based class room



5. Waste Management

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The solid waste audit focused on volume, type and current management practice of solid waste generated in the campus. The solid waste collected was paper waste, plastic, biodegradable waste, biomedical waste, construction waste, glass waste and other miscellaneous waste. The total solid waste collected in the campus is 33580 kg/month and 402960 kg/year. Paper waste is a major solid waste generated by all the departments. Old answer sheets, old bills etc. are sold to the authorized vendors. Plastic waste generated by all departments, administrative sections as well as support services is categorized at point source and sent for recycling. Metal waste is collected, stored and sold to authorized vendors for further processing. Few glass bottles are reused in the laboratories. Biodegradable waste is given to municipal corporation of Lonavala for disposal.

Preventive Measures:

- All departments generate paper trash. Building Block A, in particular, is employing more one-sided sheets for printing and writing, which is a desirable practice.
- After their preservation term has expired, outdated answer sheets, reports, etc. are sent for shredding, pulping, and recycling.
- Institute has banned single use plastic for any administrative as well as other purpose and therefore very less amount of plastic waste is generated.
- Metal scrap is segregated separately by workshop of the institute and sent for recycling.
- Biodegradable garbage is a major source of solid waste on campus, originating primarily from canteens, messes, hostels, and guest houses. Canteen garbage is collected and delivered to the Lonavala Municipal Corporation.
- Glass waste is generated from laboratory mainly in the form of bottles; Many times bottles are reused for storing of other chemicals.
- Through paperless convocation applications, photocopies of answer sheets, circulars, and online interactions with colleges, the institute and campus save around 1,348,914 paper sheets each year, which is quite beneficial. It saves a number of trees each year and cuts CO₂ emissions by 5.6168 tonnes.
- Building Block A have maximum e-waste due to Computer laboratory. E-waste generated at SIT and campus sent to recycle and reuse.
- Hazardous waste generated in solid and liquid state during experiments in laboratory at Building Block A is disposed properly.



Waste Management



6. Water Conservation

Campus various practices to effectively use the available water

- **Rainwaterharvesting**

Rain water is collected and saved for general use in campus like gardening, sports ground watering etc. Various water paths are constructed throughout the campus.

Some of the prime locations are:

- a) Football Ground
- b) Cricket Ground
- c) Estate office

- **Borewell/Openwellrecharge**

Apart from rain water harvesting, 6 numbers of borewell are provided in the campus at following locations:

- a) Corporate Taring Centre
- b) STES Main Canteen
- c) Sajjangad Hostel Entrance
- d) Kalyan Shoppe
- e) Football Ground

- **Constructionoftanksandbunds**

There are 3 main tanks constructed in the campus worth capacity of storing 20 lakhs litre of water. Two tanks are constructed near estate office. They have capacity of 14 lakh litre and 5 lakh litre. One tank of 1 lakh litre capacity is constructed underground at Security office. Apart from these main tanks, few storage tanks are also built for water management.

- **Waste Water Recycling:**

When the buildings were few, the effluent from bathroom & kitchens and sewage from WC was being disposed off through septic tanks and soakage pits. Later on mini compact sewage plants were used. However, due to increase in load, a sewage treatment plant of capacity 3.5 lakh liter/ day was installed. In due course with further increased in the load, 10 lakh liter/day capacity sewage treatment plant has been erected. Treated water from this STP is being used for gardening and constructions purposes.

Plant of Equipment:

| | |
|-----------------------------|----------------------------|
| Sewage collection tank | : 2.31 lakh liters - U. G. |
| FAB Reactor | : 3.52 lakh liters U. G. |
| Secondary Tube Settler tank | : 0.77 lakh liters U,G, |
| Sludge digester tank | : 1.485 lakh liters U.G. |
| Chlorine contact tank | : 1.485 lac litres - U.G. |
| Pressure sand filter | : 10 lakh liters/day. |
| Activated Carbon Filter | : 10 lakh liters / day |
| Air Blower | : 3 OHP (2 Nos) |
| Centrifugal pumps | : 5 HP 2 Nos |
| | : 3 HP (2 Nos) |
| | : 10 HP (2 Nos) |



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Hypo dozing tank with dozing pump: 0-10liter/Hour cap. - 1 No.

Submersible pump to lift the treated water for Gardening: 15 HP – 1 No

- **Maintenance of water bodies and distribution system in the campus**

Establishing water treatment plant for this scheme.

This water supply scheme comprises of lifting of raw water from Valvan dam to water treatment plants of MJP in our campus, where it is filtrated and chlorinated and supplied to Kusgaon, Dongargaon and to our campus. MJP has a sump and pump house to lift water at the down stream of Valvan dam.

At present this scheme is operated and maintained by Maharashtra Jeevan Pradhikaran (MJP) and we have to pay to them for water supplied to us as per their charges.

Present requirement is 18 lakh liter/day which is sanctioned by MJP and they are supplying the same.

Source

Valvan dam through MJP.

Present requirement: 18 lakh liters/ day

Availability: 18 lakh litters/day

Storage Capacity

UG Sump :1 lakh Litres

UG Sump :5 lakh Litres

UG Sump: 14 lakh Litres

Ground Sump: 1 lakh Litres to utilize back wash water of filters for gardening/ construction.

Plant and Equipment:

1 No 33 HP submersible pump at Valvan dam sump of MJP

6 Nos 25 HP pumps in campus

3 Nos 5 HP pumps in the campus

3 Nos 5 HP pumps in Tube well

6 Nos 3 HP pumps in campus

Water Conservation Facilities in Campus



1) Rain Water Harvesting



2) Rooftop Rain Water Collection



3) Borewell



4) Constructed Tanks



5) Recycling Plant



6) Water Filtering



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7. Activities and Outreach programs

Institute conducts various activities to promote Tree plantation, green energy, etc in society through various clubs like NSS, IEE, MESA, etc.

• **Tree Plantation**

Tree plantation is promoted in society through NSS special camp and Activities year around. Tree plantation is one of the part of NSS special camp where NSS unit stays in a village and plants trees in front of homes of villagers. Then students asks the villagers to look after trees and also visit frequently to check the growth of trees. Through Lokjagar activity conducted every day in special camp, students create awareness about tree plantation, Organic Farming and many social issues

• **Energy Audit**

Every NSS special camp, students conduct energy audits of villagers homes and Farm. In this activity we form a group of four students. Students along with energy meter, tester, safety gloves, etc visit to homes of villagers and check the faulty connections, losses in transmission, power consumption of various electrical and electronic appliance and suggest the proper remedy.

• **Renewable energy**

People look towards renewable energy source as costly affair and usually don't prefer because of lack of awareness. Through NSS special camp we undertake projects which also involve development of wind and solar hybrid power plant for school or Gram Panchayat. This will benefit in

- Students development
- Awareness about green energy sources
- Hybrid research
- Students knowledge enrichment

This effort is also recognised by AICTE and one of the student group SAHYADRI got selected for AICTE CHATR VISHWKARMA Awards National Convention.