Preliminary Energy, Environment & Green Audit

for

SANJIVANI RURAL EDUCATION SOCIETY CAMPUS

At - Sahajanandnagar, post - Shinganapur,

Tal-Kopargaon - 423603, Dist. Ahemadnagar

Prepared by

Practical Vision Consultants, Auranagabad

Audit Date: 02-11-2023



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1 Introduction

1.0 Walk through energy audit :

Organisation Name:	SANJIVANI RURAL EDUCATION SOCIETY CAMPUS
Site Name & Address:	At - Sahajanandnagar,
	Post - Shinganapur,
	Tal - Kopargaon-423603,
	Dist - Ahemadnagar
Buildings included:	Campus area of Sanjivani ACS college
	Pharmacy college
	College of Engineering campus area
Date of Audit :	Online Document Audit : During 25 Oct to 30 Oct 2023
	On site Visit : 2 Nov 2023
Walk through	Mr. Vivekanand Koranglekar
energy auditors	Mr. Shirish Loya
	Practical Vision Consultants,
	Aurangabad
Visit Co-ordinated and Hosted by:	Prof : Dr. Jadhav and Prof. Hajare

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1.1 Objective

This preliminary energy audit, also known as a "walk through audit," aims to evaluate the institute's efforts to raise student awareness of environmental issues and support environmental education on college campuses. It also evaluates the institute's performance in comparison to the previous year.

The following steps will be taken to accomplish this goal:

• Selecting an appropriate energy performance indicator to measure the potential for energy savings for both current and target energy use. This serves as a sense-check for computations and aids in evaluating how the energy-saving initiatives affect reaching this potential.

• Determining a set of actions, such as cost reductions and implementation budget, that when taken as a whole are large enough and have enough cumulative payback to make the project financially feasible and appropriate for execution as energy cost saving and conservation of natural resources and prevention of polluting it.

· Determining any additional requirements for metering and recording, as well as any environmental conditions that could be needed for a baseline in the event that measuring and verifying savings is required. The budget for the related installation will be estimated, allocated and utilised for implementation of necessary facilities. · Determining the dates on the calendar each year for educating people about environmental consciousness and organizing events by coinciding those weeks with environmental conservation topics./ setting up professional talks and seminars on college campuses where students attend. This preliminary energy audit was finished quickly by utilizing easily available site information, sector performance indicators, and common sense. It is not an investment grade audit. It is a succinct, walkthrough survey that was put together as quickly as possible using every conceivable level of skill, care, and diligence.

1.2 Description of Site & Scope of Assessment

The Site within the campus of Sanjivani Rural education society forms the scope of Assessment.

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This assessment includes the following aspects:

- Electricity
- Thermal Energy
- Fossil fuel
- Reusable energy resources
- Water Conservation
- Waste management



<u>1.3 Brief account of site visit as follow.</u>

Sr No	Site name	Excellent Initiatives for conservation natural resources and energy	РНОТО
01	Solar Panel installation	Use of Solar Energy for generating electricity will help to reduce grid supplied electricity. This is now fully functional and reduction in electric bills will be reflected in next month onwards.	
02	Solar panel supporting shed	 The specially created shed to support solar panel serves dual purpose : 1) Firm support to panels at optimum level from ground; i.e. direct access to sunlight and ease of maintenance. 2) Creation of covered assembly area for various college functions 	
03	Laboratory	Abundant natural light coming through broad and wide windows acroos laboratory and lecture hall will significuntly reduce the need to use flurocent tubes, lights.	
04	Lecture hall	Excellent natural air ventilation*ensures fresh air circulation in lecture hall and reduces the use of electricity for fans	



05	Building walls with drain water pipes	Water Harvesting to capture all water on the science building roof is excellent initiative. The proper sloping arrangements on roof at different locations ensures the rain water is carried through pipelines to soak pit.	
06	Soak Pit	Rain water soak pit is created for charging ground by rain water. The soak pit can further be developed as water storage pond.	
07	Passages	Progressive replacement of fluorescent tubes by LED bulbs is resulting in reduced electricity consumption for illumination. The institute had made a resolve to replace every fluorescent tube by LED bulb whenever it stops working.	
08	Laboratory	Enthusiastic members are planning to use the exhaust fan working on natural air current to generate electricitymay be enough to charge cell phone batteries.	
09	Exit point	All the lecture halls, labs and offices are having one central switch at exit point to switch off all appliance in the hall.	
10	Display Boards	The quality policy, environmental policy boards are displayed at prominent locations to make every member and especially new entrants, aware of institute's commitment to conserve natural resources.	Image:
11	Biodigester	 Biogas is Eco-Friendly. Biogas Generation Reduces Soil and Water Pollution. Biogas Generation Produces Organic Fertilizer. It's A Simple and Low-Cost Technology That Encourages A Circular Economy. Healthy Cooking Alternative For Developing Areas. 	

Table No 1 : Site visit and Observation



2 Energy Consumption

2.1 Annual Energy Consumption

The data regarding electricity consumption was available for the entire capus of Sanjivani Rural Education Society. On similar lines data to be captured for all college buildings for annual energy consumption by installing sub meters for all the institutes in the campus.

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Month	Units Consumed	Solar Credits	Bill Amount in Rs
Oct-22	60158	24413	997675
Nov-22	56903	21206	954214
Dec-22	64862	24694	1065219
Jan-23	56606	28498	949565
Feb-23	61067	27741	1015126
Mar-23	73962	29285	1186209
Apr-23	89812	31574	1432997
May-23	100653	33621	1608103
Jun-23	102317	13474	1608103
Jul-23	75604	12106	1223590
Aug-23	77258	28296	1239877
Sep-23	96089	21504	1530718

Table 2 : Annual Electrical Energy Consumption & Electrical Energy Costs (from Oct2022 to Sept 2023) As per the MSEDL Monthly billing to the institute.

The Total electric units consumed during Oct 2022 to Sep 2023 are 915291 with average of 76275 units per month and solar credit contribution per month is 24701 units @ 32 % of the total electric energy requirement.



2.2 Main Energy Consumers

The main energy consumers at the site that have been quantified for this assessment are summarised in Tables 3 below.

Electric Instrument wise connecting load						
Electric appliances	Total Instruments	Energy consume/ unit	Total Connected load			
Led	94	18	1692			
Tube light	2071	18	37278			
Fans	1543	100	154300			
Wallmo-unt fans	1	80	80			
Exhaust fans	62	80	4960			
Wireless routers	13	600	7800			
Computers	1100	233	256300			
Projectors	57	600	34200			
Printers	99	233.33	23099.67			
AC	31	3517	109027			
Freeze	13	1800	23400			
Water Coolar	14	1800	25200			
Totals	5098		677336.7			

Table 3: Equipment wise Summary of Primary	Electrical Energy Consumers
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College wise Distribution of Electric Appliance						
College -→	B. Pharmacy	D. Pharmacy	Jr. college	Engg. college	Total	
Led	15	2	7	70	94	
Tube light	139	40	114	1778	2071	
Fans	110	40	82	1311	1543	
Wallmount fans	1	0	0	0	1	
Exhaust fans	27	18	1	16	62	
Wirelessrouters	1	0	0	12	13	
Computers	52	7	9	1032	1100	
Projectors	4	2	1	50	57	
Printers	8	4	2	85	99	
AC	8	0	0	23	31	
Freeze	6	3		4	13	
Water Cooler	1	0	1	12	14	
Totals	372	116	217	4393	5098	

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Month Wise Electrical Energy Consumption Trend

Energy Equipment Share As Per Connected Load



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2.3 Energy Performance

The objective of this subsection is to establish how the facility is performing. The monitoring of energy performance indicator by institute will reflect the effectiveness of energy saving initiatives.

2.3.1 Energy Performance Indicators

As suggested in previous audit the following "Energy Performance Indicator" at the site is being monitored and shows good improvement as summarised in Tables 4 below :

Sr No	SRES CAMPUS Year	Average monthly Elec. Energy Consumption in Units	Population (Student + Staff)	Performance Indicators Units/ Student
1	2017-2018	68047	7043	9.66
2	2018-2019	47246	7400	6.38
3	2020-2021	22836	3618	6.31
4	2022-2023	76275	7600	10.04

Table 4: Energy Performance Indicators : SRES CAMPUS

2.3.2 <u>Benchmarks</u>

This Benchmarks gives an indication of existing performance, the potential for further savings and a sense check for the overall savings that this audit has identified.

Table 5: Energy Benchmarks	Table	5:	Energy	Benchmarks
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Monthly Running Average Usage	Electricity KWH	Average Solar Energy (KWH/ Mon)	Remark
2017-18	68047	10000 Expected	Solar panel of 480 KW Installed
2018-19	47246	10013	@10013 solar units credited
2020 -21	22836	11674	@11674 solar units/ month credited
2022 -23	76275	24701	@24701 solar units/ month credited

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3 Scope of Natural Resources Conservation

3.1 <u>Recent / Existing Energy-Saving & Environment protection Initiatives</u>

Table 6 : List Of Energy Saving & Environment Projects

<u>Sr</u> <u>No</u>	Project	Category	Status	Impact
1	Solar Water Heater	Renewable Energy	Implemented	Fuel and Electricity billing↓
2	Solar panel 480 KWH for electricity	Renewable Energy	Implemented	Electricity billing ↓
3	Rain Water Harvesting	Water	Implemented	Water consumption ↓
4	RO reject water circulation	Water	Implemented	Water consumption
5	Strom water, Waste water collection and recycling	Water	Implemented	Water consumption
6	Water Sprinklers	Water	Implemented	Water consumption
7	Street light timers	Electricity	Implemented	•
8	No vehicle movement in campus	Fossil Fuel	Implemented	Electricity billing↓ Air & Noise pollution↓
9	Provision of bus for commuting to reduce individual vehicle usage	Fossil Fuel	Implemented	Air Pollution ↓
10	Curriculum projects undertaken by Final Year students for Energy savings	Electricity, Renewable energy usage, Fossil fuels, Water conservation, GHG reduction, Waste management	Implemented	As academic initiative for environment consciousness among budding engineers.
11	Biodigester	Waste Managements	Implemented	Dirt volume↓
12	Sewage Treatment plant capacity 100 KLD	Waste water management	Implemented	Water polution \downarrow
13	Composting pit 15*15*8 mtrs	Garden waste	Implemented	Soil erosion↓
14	E waste management through repair, reuse, recycle	E waste	Implemented	Soil crosion ↓

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GREEN FIELD SURVEY

GREEN FIELD Survey					
Sr. NO.	FRUIT TREE	Tall	Medium	Small	
1.	COCONUT	65	55	32	
2.	MONGO	5	11	20	
3.	LEMON	6	-	-	
4.	BOR(JIJUPAS)	8	2	10	
5.	DRUM STIK	20	-	-	
6.	ALMOND	20	5	5	
7.	VILAYTI CHINCH	8	-	-	
8.	Chinch	15	07	-	
9.	Karanj	30	40	50	
10.	Bottle Brush	12	10	4	
11.	Bottle Palm	130	90	30	
12.	Suru Shrubs/ Bush	825	-		
13.	Chafa	06	- 06	-	
14.	Rubber Tree	01	-	05	
15.	Crotton	01	03	-	
16.	Gava (Peru Tree)	25	-	03	
17.	Sappota Chikku	15	60	-	
18.	Jamun	5	12	5	
19.	Custared Apple (Sitaphal)	-	22		
20.	Phyrus Tree	80	50	-	
21.	SapttaPanni	5	60	50	
22.	Rain Tree	130	100	30	
23.	Kashid	800	200	100	
24.	Pelto Form	600	100	258	
25.	Nilgiri	852	-	40	
26.	Kanchan	-	- 80	-	
27.	Sandal Wood (Chandan)	22	35	-	
28.	Bogan Wel	-	225	30	
29.	Morpankhi	-		-	
30.	Rudraksha	-	- 2	27	
31.	Bhadraksha	-	2	-	
32.	Subabul	15	35	-	
33.	Other Flower Bushes	-		100	
33.	Bamboo		510	900	
54.	Dalliboo	-	50	-	



Suggested Opportunities for Energy Savings 3.2

We identified a number of opportunities for further energy savings at the site; these are summarised as below.

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Above measures for energy saving mentioned in 3.1; to be extended to other locations in campus for horizontal deployment.

Further to this, following initiatives to be taken by institute for further saving in all types of energy conservation, preservation of natural resources and protection of environment.

<u>Sr No</u>	Project	Category	Status	Impact
1	Replacement of Fluorescent tubes by LED bulbs	Electricity	In progress	Increase in Bulb life ↑ and Electricity units ↓
2	Replacement of Window Air conditioner to Split Air Conditioners	Electricity	To Plan	Electricity consumption reduction upto 25% .
. 3	Remote sensing lighting in isolated area / non traffic zones (Corridors / lawns, Play grounds, Halls)	Electricity	To Plan	Electricity consumption↓
4	AMCs schedules & activities of Equipment such as Pumps / Motors / DG set and Transport vehicles to be reviewed from the point of equipment performance	Electricity, Fossil Fuel	To Plan	To ensure better performance of equipment resulting in reduction of Energy consumption and Air pollution.
5	To review the AMC with Housekeeping agency @ the disposal of wastes from campus is done as per Eco guideline and explore the possibility for re use in sugar factory	Waste Manageme nt	To plan	To use segregate the wastes as hazardous /Non hazardous Use of campus waste as fuel
6	Additional Building expansion	Green Building	In progress.	To benchmark project as a model of Eco-friendly environment for budding engineers awareness /study

Table no 7 : Projects identified for Opportunities for Energy saving



3.3 Activity Metrics

If energy use is driven by other activities (e.g. rioster occupancy, Conege student **Population, Running** in day/ shift), this will have to be identified.

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We suggest following activity metric to be monitored by the institute:

List of activities to be captured in the activity metric may include Electric meter and submeter for each building as well as utility, Water meter at intake and usage points, Pollution checks, and category wise waste generation in the campus.

Identify here any activity metrics that should be recorded, Location of measurement unit, the frequency of recording interval, Responsibility of recording and monitoring and the mechanism by which they will be recorded.

Activity Metrics For Energy Profile :

We propose institute to capture the energy usage as per energy type, to monitor the energy usage in KWH and energy cost in Rupees as well as explore the feasibility of using alternative low cost fuel. The energy types are Electricity, Diesel, Petrol, LNG, Solar, Wind, Wood, Coal etc.



4 Conclusions & Next Steps

4.1 SANJIVANI College management commitment

As a part of commitment to Environment consciousness, Institute has made the necessary provision of infrastructure such as <u>Green Policy</u>, <u>Green Committee</u> looking after implementation of Policy by monthly review meetings and making the <u>Budgetary provisions for necessary Green initiatives and implementing the same</u>.

The committee has also prepared the <u>yearly calendar for Environmental days</u> identified for the celebration to create the <u>awareness for green Environment</u> among the <u>budding Engineers</u>.

4.2 Mechanism for project proposal review

Environment project review should be based on following simple formula to verify the viability and ROI and Payback period.

 Total investment budget

 Simple Payback =

Expected savings per year

- Note- if the payback period of any project is less than one year those should be taken on priority basis.
- Record all non-quantified benefits and legal compliances

4.3 <u>Checklist for Environment Consciousness in campus</u>

As a part of Environment Consciousness in the College campus on continual basis, institute is following the checklist as mentioned in the Annexure no 1.

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Vivekananda Koranglekar

PVC Aurangabad

PRACTICAL VISION CONSULTANTS T2, DNYANESH, KECHAVNAGARI, DARGA ROAD, AURANGABAD-05. PH, : 0240 - 2361613



ANNEXTURE 1: Campus Sustainability Best Practices

Primarily focuses on energy and climate change, but also includes topics such as campus waste, food, and water usage which can impact climate change.

Based on above College can formulate strategies and ensure the success of campus sustainability programs.

List of initiatives being undertaken by SANJIVANI RURAL EDUCATION SOCIETY CAMPUS

as a part of Campus sustainability to check for adopting the best practices followed.

Initiatives				
A. <u>Small-Scale Energy Efficiency Initia</u>	atives			
Energy Competitions	Preliminary work done			
Computer Energy Savings	Replaced by energy efficient			
	screens			
Energy Efficiency in equipment	done			
Light Bulb Replacement	done			
University Heating/Cooling Policy	AC temp to lock on 27 deg. Cel.			
B. Large-Scale Efficiency Initiatives	AC temp to lock on 27 deg. Cel.			
Metering of Buildings	Senarata matara far anak ku'i l'			
	Separate meters for each buildir is must for monitoring the impa-			
	of various energy conservation			
	initiatives & participation			
Cogeneration	Progress			
C. <u>Renewable Energy Initiatives</u>	1.05.000			
Wind Energy				
Biomass	implemented			
Solar/ Photovoltaic Energy	Project is now fully operational			
Solar Hot Water	Implemented in hostel			
Biomass mixed with Fossil Fuels	Experimentation is under progress			
Geothermal	progress			
Renewable Energy Certificates				
Carbon Offsets				
D. Transportation				
Bicycle Initiatives	No personal vehicles within			
-	campus is boosting bicycle usage			
Commuter Programs	Common buses for staff and			
Public Transit	students are already in place			
Bio-fuels / Efficiency				
E. Food				
Organic and Local Food				
Gardens and Farming				
Waste Associated with Food	Bio digester plant is implemented			

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□ Food Procurement and Production			
F. <u>Environmental Procurement</u>			
Recycled Paper, Water Bottles	Waste item are segregated at the		
Computer Folicies.	point of collection		
□ Electrical items with higher star rating by BEE	equipment with higher BEE		
G. Waste	ratings		
E waste Generation, Recycling and Disposal Management	Being followed, with		
Conservation Incentives	comprehensive policy for		
Recycling Awareness Programs	monitoring effectiveness for incentives, promoting awareness		
Reducing Consumption	programs for conservation and		
H. Green Building Design	reduction. Implemented.		
White Roofs			
Natural ventilation	Implemented Excellent implementation		
Day lighting			
I. <u>Water and Ecological Design</u>	Excellent implementation		
Green Roofs			
Using Native Plants	Implemented		
Parking Improvements	Neem tree plantation observed		
Reducing Water Consumption	Implemented		
□ Rainwater Harvesting	Awareness is observed Excellent implementation		
J. Education and Outreach	Excellent implementation		
Eco-Representatives	Will be monitored		
Expanding the Curriculum	Projects to help environment		
Green Laboratories	conservation, using labs for		
□ Incorporate Sustainability Awareness Early	extensive analysis are observed		
K Innovative Financing			
Revolving Load Fund	Management is working on it.		
Alumni Sustainability Fund			
Project Contracting / Performance Contracts			





1) STUDENT PARTICIPATION IN THE ENVIROMENTAL AWARENESS

Annexture 2 : PHOTOGRAPHS



2) PHOTOGRAPH : STUDENT PARTICIPATION IN THE ENVIROMENT PRESERVATION, PROTECTION







3) LIST OF ENVIRONMENTAL PROJECTS

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Preliminary Energy Audit

Date: 2nd November 2023

Place: Sanjivani Rural Education Society Campus, Kopergaon

We are happy to certify that the institute has implemented necessary framework in following areas: -

- > Energy Conservation,
- > Energy Management,
- > Use of Renewal Energy.

Based on the documentation submitted and our site visit, we appreciate the commitment demonstrated by the institute in implementing initiatives for energy conservation and use of natural resource like solar energy.

This has resulted in achieving nourishment of student education for Energy conservation, substantial savings and sustenance of energy independence.

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Vivekanand Koranglekar

Practical Vision Consultants

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PRACTICAL VISION CONSULTANTS

Preliminary Green Audit

Date: 2nd November 2023

Place: Sanjivani Rural Education Society Campus, Kopergaon

We are happy to certify that the institute has implemented necessary framework in following areas: -

- ➤ Green plantation,
- > Biodigester and waste water recycling
- Maintenance of Trees, Garden

Based on the documentation submitted and our site visit, we appreciate the commitment demonstrated by the institute in implementing initiatives for tree plantation drive and protection of green cover.

This has resulted in achieving nourishment of student education for Green Environment, continuous supply of recycled water and sustenance of Green March.

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Vivekanand Koranglekar

Practical Vision Consultants





Preliminary Environment Audit

Date: 2nd November 2023

Place: Sanjivani Rural Education Society Campus, Kopergaon

We are happy to certify that the institute has implemented necessary framework in following areas: -

- > Water Conservation,
- > Waste management.
- > Environment Protection

Based on the documentation submitted and our site visit, we appreciate the commitment demonstrated by the institute in implementing initiatives for Environment protection and conservation of natural resource.

This has resulted in achieving nourishment of student education for Environment issues and preservation of clean environment.

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Vivekanand Koranglekar

Practical Vision Consultants

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