

ENERGY AUDIT REPORT
of
Shikshan Prasarak Mandali's,
TILAK COLLEGE OF EDUCATION,
S. P. College Campus, Pune 411 030



Year: 2022-23

Prepared by

ENGRESS SERVICES

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ISO: 9001-2015 Certified (Cert No: 23EQKC13),

ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

Certificate No: ES/TCOE/22-23/01

Date: 21/7/2023

This is to certify that we have conducted Energy Audit at Shikshan Prasarak Mandali's Tilak College of Education, S. P. College Campus, Pune 411 030, in the Academic year 2022-23.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of 10 kWp Roof Top Solar PV Plant.

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation.

For Engress Services,



A Y Mehendale,
B E-Mechanical, M Tech- Energy
BEE Certified Energy Auditor, EA-8192



INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	10
4	Study of Energy Performance Index	11
5	Study of Lighting	12
6	Study of Renewable Energy & Energy Efficiency	14



CHAPTER-I INTRODUCTION

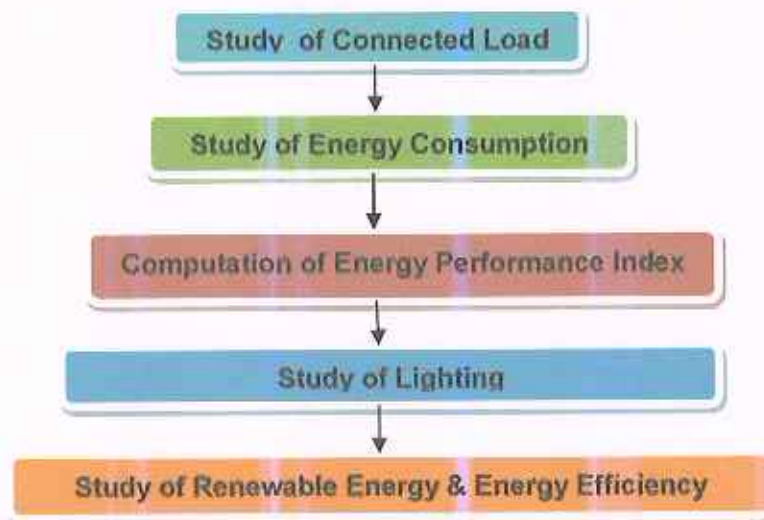
1.1 Introduction:

An Energy Audit is conducted at Shikshan Prasarak Mandali's Tilak College of Education, S. P. College Campus, Pune 411 030.

The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Audit Procedural Steps:



1.3 Google Earth Image:



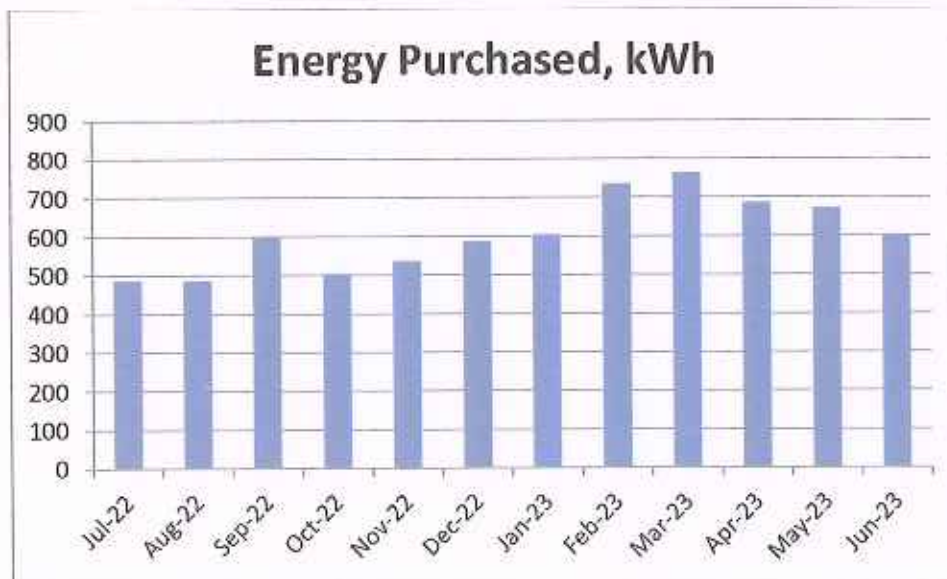
College
Campus

CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption
Table No 2: Electrical Energy Consumption Analysis- 2022-23:

No	Month	Energy Purchased, kWh	CO2 Emissions, MT
1	Jul-22	487	0.44
2	Aug-22	487	0.44
3	Sep-22	598	0.54
4	Oct-22	503	0.45
5	Nov-22	536	0.48
6	Dec-22	587	0.53
7	Jan-23	604	0.54
8	Feb-23	736	0.66
9	Mar-23	765	0.69
10	Apr-23	687	0.62
11	May-23	672	0.60
12	Jun-23	598	0.54
13	Total	7260	6.53
14	Maximum	765	0.69
15	Minimum	487	0.44
16	Average	605	0.54

Chart No 2: To study the variation of Month wise Energy Consumption, kWh:



CHAPTER-VI STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

The College has installed:

- Roof Top Solar PV Plant of Capacity 50 kWp

Photograph of Roof Top Solar PV Plant:



6.2 Energy Efficiency Measures adopted:

- The College has Energy Efficient LED Fittings.

Photographs of LED Lighting:



GREEN AUDIT REPORT
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Certificate No: ES/TCOE/22-23/02

Date: 21/7/2023

This is to certify that we have conducted Green Audit at Shikshan Prasarak Mandali's Tilak College of Education, S. P. College Campus, Pune 411 030, in the Academic year 2022-23.

The College has adopted following Energy Efficient & Green Practices:

- Usage of Energy Efficient LED Fittings
- Installation of 10 kWp Roof Top Solar PV Plant.
- Segregation of Waste at source
- Provision of Bio Composting Bed, for conversion of Organic Waste
- Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Creation of awareness about Water Conservation by Display of Posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,



A Y Mehendale,

B E- Mech, M Tech-Energy, Certified Energy Auditor, EA-8192
ASSOCHAM GEM Certified Professional: GEM: 22/788



INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Energy Consumption & CO ₂ Emission	9
3	Study of Usage of Renewable Energy	11
4	Study of Waste Management	12
5	Study of Rain water Management	13
6	Study of Green & Sustainable Practices	14
	Annexure	
I	List of Trees in the Campus	16

EXECUTIVE SUMMARY

1. Shikshan Prasarak Mandali's Tilak College of Education, Pune consumes Energy in the form of **Electrical Energy**; used for various equipment.

2. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	7260	kWh
2	Annual CO ₂ Emissions	6.53	MT

3. Renewable Energy & Reduction in CO₂ Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Energy generated by Solar PV Plant in 22-23 is **12000 kWh**.
- Reduction in CO₂ Emissions in 22-23 is **10.8 MT**

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Arrangement of Bio Composting Bed
3	E Waste	Disposed of by Parent Society

5. Rain Water Management:

The College has installed Rain Water Management Project; the Rain Water from the terrace is collected through Pipes and is used to increase the underground Water Table.

6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Tree Plantation in the campus.
- Provision of Ramp for Divyangajan
- Creation of awareness on Water Conservation Display of Posters

7. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of CO₂ into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **300 Nos**

8. References:

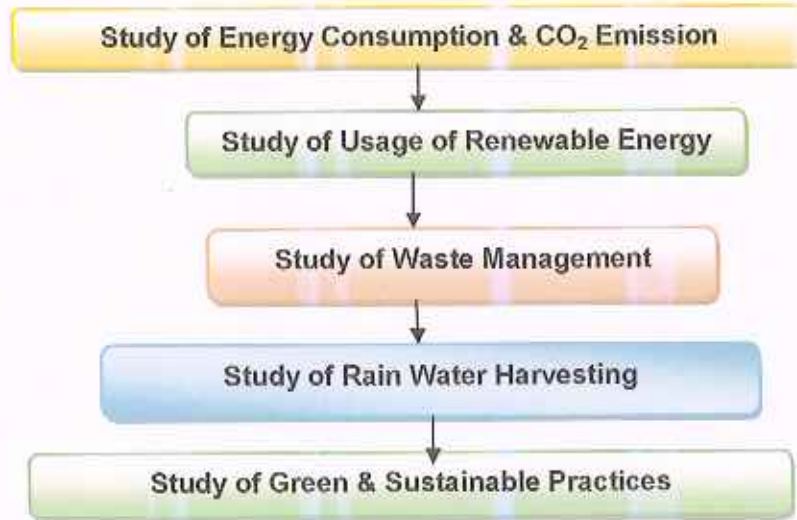
- For CO₂ Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in

CHAPTER-I INTRODUCTION

1.1 Introduction:

A Green Audit is conducted at Shikshan Prasarak Mandali's Tilak College of Education, S. P. College Campus, Pune 411 030.

1.2 Audit Procedural Steps:



1.3 Google Earth Image:



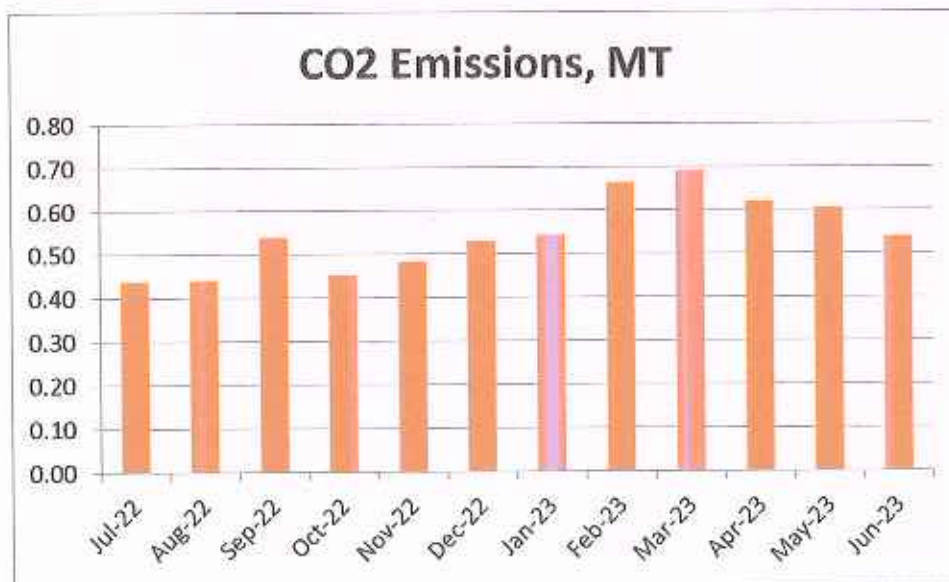
CHAPTER-II STUDY OF ENERGY CONSUMPTION & CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions: 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.

Table No 1: Month wise Energy Consumption & CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO2 Emissions, MT
1	Jul-22	487	0.44
2	Aug-22	487	0.44
3	Sep-22	598	0.54
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Chart No 1: To study the variation of Month wise Energy Consumption, kWh:



CHAPTER III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 10 kWp
In the following Table, we present the reduction in CO₂ emissions due to Solar Energy:

Table No 2: Computation of Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant = (4)*(5) /1000	10.8	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



CHAPTER IV STUDY OF WASTE MANAGEMENT

4.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

Photograph of Waste Collection Bins:



4.2 Organic Waste Management:

The College has a Bio Composting Bed for conversion of Organic Waste.

Photograph of Bio Composting Arrangement:



4.3 E Waste Management:

The College has made a Separate E Waste Collection Bin. The E Waste is disposed of centrally through the Parent Society.

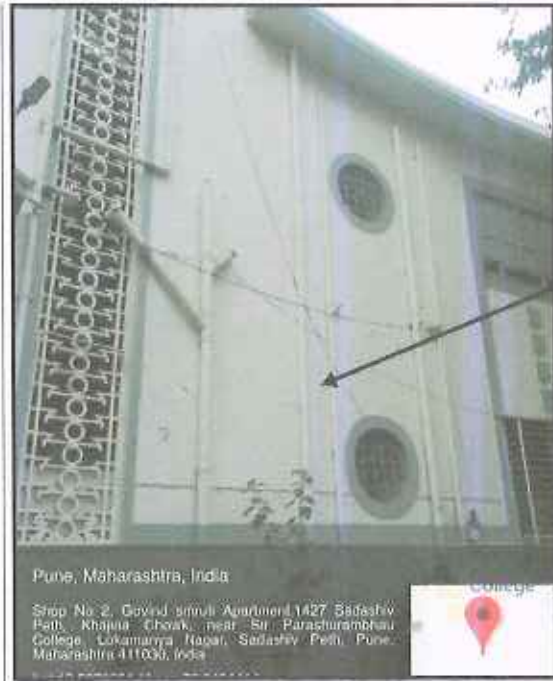
Photograph of E Waste Collection Bin:



CHAPTER V STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management Project; the Rain Water from the terrace is collected through Pipes and is used to increase the Underground Water Table.

Photograph of Rain Water Collecting Pipe Section:



Rain Water
Carrying Pipe

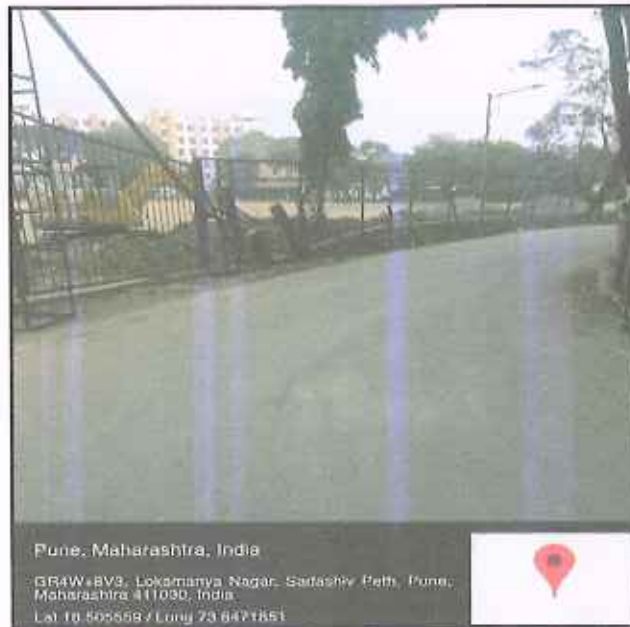
Pune, Maharashtra, India
Shop No. 2, Govind Anand Apartment, 1427 Sadashiv
Peth, Khajura Chowk, near St. Parasurambhau
College, Lokamanya Nagar, Sadashiv Peth, Pune,
Maharashtra 411030, India

CHAPTER VI STUDY OF GREEN & SUSTAINABLE PRACTICES

6.1 Pedestrian Friendly Road & Internal Tree Plantation:

The College has well maintained internal road to facilitate the easy movement of the students within the campus. The College has well maintained landscaped garden in the campus.

Photograph of Internal Road & Tree plantation:



6.2 Provision of Ramp for Divyangajan:

For easy movement of Divyangajan, the College has made provision of Ramp.

Photograph of Ramp:



6.3 Creation of Awareness about Water Conservation:

The College has displayed posters emphasizing on importance of Water Conservation.

Photograph of Poster on Water Conservation:



REGISTRATION CERTIFICATES



MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE



ISO: 9001-2015 CERTIFICATE

ISO: 14001-2015 CERTIFICATE



CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The College has installed Rain Water Management Project; the Rain Water from the terrace is collected through Pipes and is used to increase the Underground Water Table.

Photograph of Rain Water Collecting Pipe Section:



Rain Water
Carrying Pipe

CHAPTER-VIII STUDY OF ECO FRIENDLY PRACTICES

8.1 Tree Plantation in the Campus:

The College has maintained Tree Plantation in the campus.

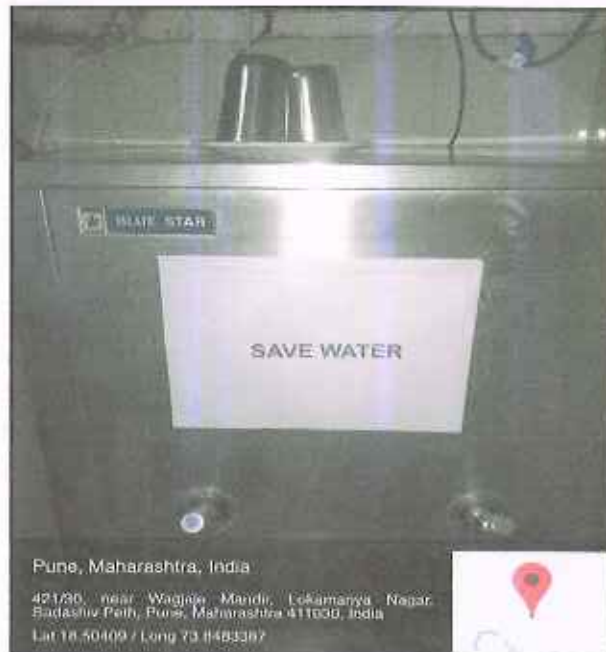
Photograph of Tree Plantation:



8.2 Creation of Awareness about Water Conservation:

The College has displayed posters emphasizing on importance of Water Conservation.

Photograph of Poster on Water Conservation:



P. W. Manday
PRINCIPAL

Tilak College of Education
Pune-411030.

ANNEXURE-I: INDOOR AIR QUALITY, NOISE & COMFORT STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

3. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%