

7.1.3

Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following

- 1. Green audit / Environment audit**
- 2. Energy audit**
- 3. Clean and green campus initiatives**
- 4. Beyond the campus environmental Promotional activities**

DVV Clarification: -

- Policy document on environment and energy usage
- Action taken reports and achievement report as clear and Green campus initiatives.
- Reports of the Audits.
- Certificate from the external accredited auditing agency (preferably government, concern department of affiliating university).
- Geo tagged photographs with caption and date.
- Any Other supporting document for beyond the campus environmental promotions.

HEI Response: -

As per DVV Suggestions supporting documents are attached here

Supporting Documents: -

Annexures			
Annexure No.	Description	Link	Digital Page No.
Annexure - 1	Policy document on environment and energy usage	<u>Annexure – 1</u>	2
Annexure - 2	Action taken reports and achievement report as clear and Green campus initiatives	<u>Annexure – 2</u>	4
Annexure - 3	Reports of the Audits	<u>Annexure – 3</u>	7
Annexure - 4	Certificate from the external accredited auditing agency (preferably government, concern department of affiliating university)	<u>Annexure – 4</u>	50
Annexure - 5	Geo tagged photographs with caption and date.	<u>Annexure – 5</u>	53
Annexure - 6	Any other supporting document for beyond the campus environmental promotions.	<u>Annexure – 6</u>	65

Annexure – 1

Policy document on environment and energy usage

INDEX

Sr. No.	Description	Digital Page No
1	Policy document on environment and energy usage	03



विद्या ऽपि विवेकिनः पतिः ऽपि वाङ्मयम्

“ The Shetkari Shikshan Mandal, Sangli”
PADMABHOOSHAN VASANTDADA PATIL INSTITUTE OF TECHNOLOGY

Affiliated 'A' Grade by NAAC Bangalore

(Approved by AICTE, Govt. of Maharashtra & Affiliated to Savitribai Phule Pune University)

(AICTE Apl : 1-4068259) (PU/PN/Engg./252/2006) (AISHE Code : C-41818)

Sr.No.33/22 Bavdhan (Khurd), Paud Road, Near Chandani Chowk, Pune-411021

Tel:- 8830565816,8530134040

Email id-principalpvpit@tssm.edu.in

Website-pvpittssm.edu.in



Prof. Dr.R.S. Pawar

BE, ME, Ph.D.(Mech)

PRINCIPAL

Prof. Dr.T.J. Sawant

B.E.(Elec.), PGDBM, Ph.D.

PRESIDENT

Policy on Environment and Energy Usage

PVPIT is committed to maintain the environment and usage of energy using the facilities provided. PVPIT has Green Campus, Sanitary Incubation system, Energy Conservation using solar panels and Parametric Evaluation of vertical axis wind turbine, Water Conservation using rain water harvesting, Degradable and non – degradable waste management system and Plastic free environment. All are informed to use and maintain the above facilities in the campus.



Dr. R.S.Pawar

Principal

PRINCIPAL

Padmabhooshan Vasantadada Patil
Institute of Technology
Bavdhan, Pune-411021

Annexure – 2

Action taken reports and achievement report as clear and Green campus initiatives

INDEX

Sr. No.	Description	Digital Page No.
1	Circular for clear and Green campus initiatives	05
2	Action taken reports and achievement report as clear and Green campus initiatives	06

1. Circular for clear and Green campus initiatives:-



विद्यया ऽमृतं विनोदं विनाशाय ऽस्ति पादव्याम

**“ The Shetkari Shikshan Mandal, Sangli”
PADMABHOOSHAN VASANTDADA PATIL INSTITUTE OF TECHNOLOGY**

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Prof. Dr.R.S. Pawar
BE, ME, Ph.D.(Mech)
PRINCIPAL

Prof. Dr.T.J. Sawant
B.E.(Elec.), PGDBM, Ph.D.
PRESIDENT

Date: 10/08/2022

Circular for clear and Green campus initiatives

This is to inform you that TSSM's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune-21 has Green Campus Sanitary Incubation system, Energy Conservation using solar panels is available, Water Conservation using rain water harvesting is available, Degradable and non – degradable waste management system is available and barrier free environment for physically disable people is available.





Dr. R.S.Pawar
Principal

PRINCIPAL
Padmabhooshan Vasantadada Patil
Institute of Technology
Bavdhan, Pune-411021

Circular for clear and Green campus initiatives

2. Action taken reports and achievement report as clear and Green campus initiatives:-

 <p>PVPIT 2009 PUNE</p> <p>विद्यया ऽपि विना विद्यया ऽपि यत्नम्</p>	<p align="center">“ The Shetkari Shikshan Mandal, Sangli” PADMABHOOSHAN VASANTDADA PATIL INSTITUTE OF TECHNOLOGY Affiliated 'A' Grade by NAAC Bangalore (Approved by AICTE, Govt. of Maharashtra & Affiliated to Savitribai Phule Pune University) (AICTE Apl : 1-4068259) (PU/PN/Engg./252/2006) (AISHE Code : C-41818) Sr.No.33/22 Bavdhan (Khurd), Paud Road, Near Chandani Chowk, Pune-411021 Tel:- 8830565816,8530134040 Email id-principalpvpit@tssm.edu.in Website-pvpittssm.edu.in</p> 
<p>Prof. Dr.R.S. Pawar BE, ME, Ph.D.(Mech) PRINCIPAL</p>	<p>Prof. Dr.T.J. Sawant B.E.(Elec.), PGDBM, Ph.D. PRESIDENT</p>


Action taken Report and Achievement Report as Clean and


Green Campus Initiative:

1. The Institute had organized Cleanliness Drive in association with the NSS in different Occasions like World Environment Day, World water Day and before and after the special Functions organized in the institute.
2. An initiative on Swachhta Education & Practice has been organized in the institute by the NSS in collaboration with Swachata Abhiyan on 02/10/2022.
3. Plantation Drives had been organized time to time in and around the campus by the institute in association with NSS committee. Students and staff members participate in these Plantation Program with great enthusiasm.
4. Green Campus initiatives by the institute includes Water Conservation, Tree Plantation, Waste Management and Alternative Energy. With this in mind, Green audit has been Conducted by the institute.
5. Slogans on Energy Conservation, Water conservation, Conservation of Greenery etc. has been placed by the institute within the campus to aware the students towards energy and Greenery conservation.
6. Restricted entry of automobiles, Ban on use of Plastic, Use of Bicycles/Battery powered vehicles, Pedestrian Friendly pathways, Landscaping with trees and plants in the campus are initiated for the awareness of Green campus initiative.

Green Campus Award:

- The Institute received “PEHEL 2022” Award under E Waste and Plastic Waste Mega drive on 16/10/2022.
- “JANA WANI” provided certificate for E waste and Plastic Waste collection drive conducted on 15/12/2020




Dr. R.S.Pawar
Principal
PRINCIPAL
Padmabhooshan Vasantadada Patil
Institute of Technology
Bavdhan, Pune-411021

Annexure – 3

Reports of the Audits

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1. **Green audit Report:-**

GREEN AUDIT REPORT

of
The Shetkari Shikshan Mandal's,
Padmabhooshan Vasantdada Patil Institute of Technology,
Bavdhan, Pune



Year: 2022-23

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: engress123@gmail.com



ENGRESS SERVICES

Yashashree, 26, Nimal Bag Society, Near Muktangan English School,
Parvati, Pune 411 009 Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

GREEN AUDIT CERTIFICATE

Certificate No: ES/PVPIT/22-23/02

Date: 10/7/2023

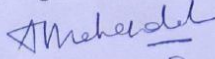
This is to certify that we have conducted Green Audit at The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune, in the Academic year 2022-23.

The Institute has adopted following Green & Sustainable Practices:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 3 kWp
- Segregation of Waste at Source
- Installation of Sewage Treatment Plant
- Implementation of Rain Water Harvesting Project
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness on Ban on single Use Plastic 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



REGISTRATION CERTIFICATES



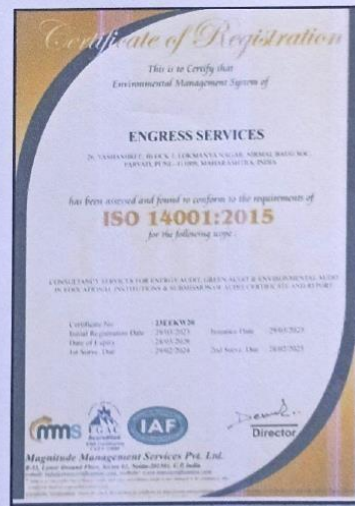
MEDA REGISTRATION CERTIFICATE



ASSOCHAM GEM CP CERTIFICATE



ISO: 9001-2015 Certificate



ISO: 14001-2015 Certificate



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Sr. No	Particulars	Page No
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4	Study of Waste Management	11
5	Study of Rain water Harvesting	12
6	Study of Green & Sustainable Practices	13
	Annexure	
I	List of Trees in the Campus	15



ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune for awarding us the assignment of Green Audit of their Campus for the Year: 2022-23.

We are thankful to all the Staff members for helping us during the field study.



EXECUTIVE SUMMARY

1. The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	92245	kWh
2	Annual CO ₂ Emissions	83.02	MT

3. Renewable Energy & Reduction in CO₂ Emissions:

- The Institute has installed Roof Top Solar PV Plant of Capacity 3 kWp.
- The Energy generated by Solar PV Plant in 22-23 is 1200 kWh.
- Reduction in CO₂ Emissions in 22-23 is 3.24 MT

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Liquid Waste	Installed Sewage Treatment Plant
3	E Waste	Recommended to dispose of through Authorized Agency

5. Rain Water Harvesting:

The Rain water falling on the terrace is used to recharge the open well.

6. Green & Sustainable Practices:

- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of awareness on Ban on Single Use Plastic 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



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- For Solar PV Energy generation: www.solarrooftop.gov.in



ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity

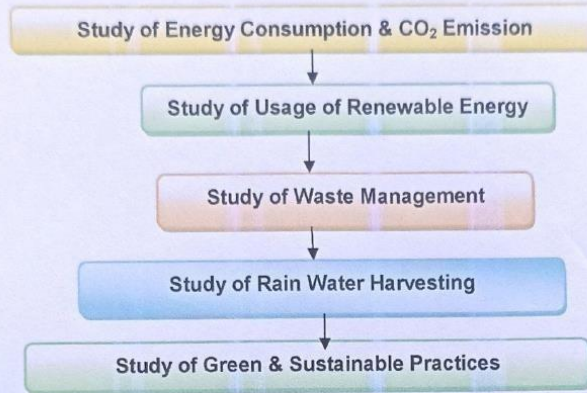


CHAPTER-I INTRODUCTION

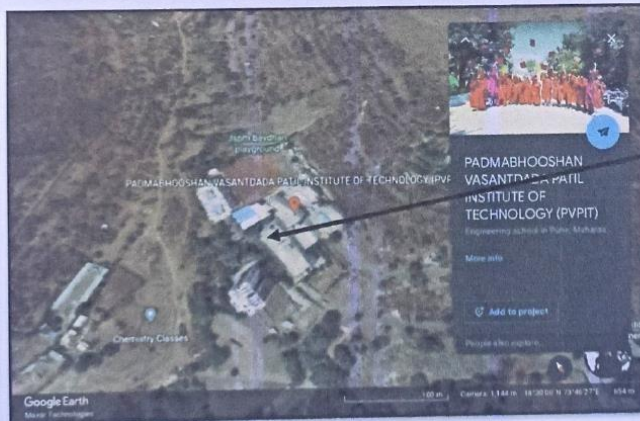
1.1 Introduction:

A Green Audit is conducted at The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune.

1.2 Audit Procedural Steps:



1.3 Institute Location Image:



Institute
Campus

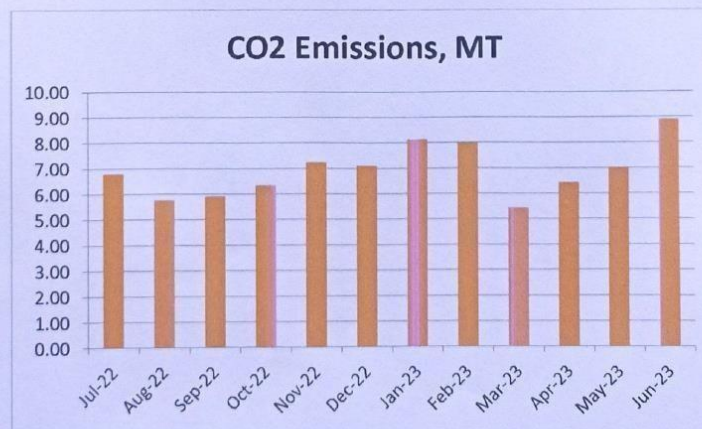
CHAPTER-II STUDY OF ENERGY CONSUMPTION & CO₂ EMISSION

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	CO ₂ Emissions, MT
1	Jul-22	7553	6.80
2	Aug-22	6408	5.77
3	Sep-22	6559	5.90
4	Oct-22	7036	6.33
5	Nov-22	8039	7.24
6	Dec-22	7896	7.11
7	Jan-23	9036	8.13
8	Feb-23	8875	7.99
9	Mar-23	6039	5.44
10	Apr-23	7136	6.42
11	May-23	7798	7.02
12	Jun-23	9870	8.88
13	Total	92245	83.02
14	Maximum	9870	8.88
15	Minimum	6039	5.44
16	Average	7687	6.92

Chart No 1: Month wise CO₂ Emissions:



CHAPTER III STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity 3 kWp.

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 2: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	3	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 22-23	3600	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	3.24	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 recyclable waste, like paper waste is segregated at source and is handed over to agency for further action.

Photograph of Waste Collection Bin:



4.2 Liquid Waste Management:

The Institute has installed Sewage Treatment Plant for treatment of Liquid Waste.

Photograph of Sewage Treatment Plant:



4.3 E-Waste Management:

The E-Waste is disposed of through Authorized Agency.

CHAPTER-V STUDY OF RAIN WATER HARVESTING

The Institute has implemented the Rain Water Harvesting Project. The Institute has installed Pipes from the terrace and the Rain water falling on the terrace is used to recharge the open well.

Photograph of Rain water Carrying Pipe:



Rain Water
Carrying Pipe

CHAPTER-VI STUDY OF GREEN & SUSTAINABLE PRACTICES

6.1 Pedestrian Friendly Roads:

The Institute has well maintained internal road to facilitate the easy movement of the students within the campus.

Photograph of Internal Road:



6.2 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



6.3 Provision of Ramp:

For easy movement of Divyangajan, the Institute has made provision of Ramp at the main entrance.

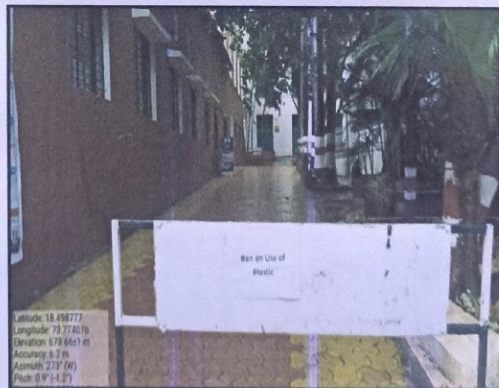
Photograph of Ramp:



6.4 Creation of Awareness about Ban on Single Use Plastic:

The Institute has displayed posters on importance of Ban on Single Use Plastic.

Photograph of Poster on Ban on Single Use Plastic:



**ANNEXURE-1:
DETAILS OF TREES IN THE CAMPUS:**

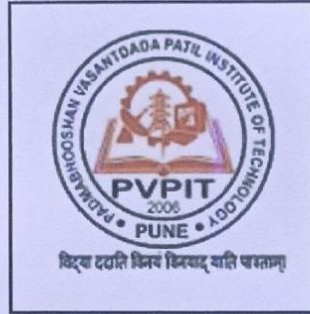
No	Name of Tree	Quantity
1	Mango	8
2	Banana	3
3	Phycus	2
4	Palm	36
5	Badam	23
6	Kadulimba	5
7	Bouganvelia	11
8	Ticoma	8
9	Kanher	12
10	Saptaparni	2
11	Double Tagar	4
12	Tagar	5
13	Shevari	15
14	Gulmohor	1
15	Vad	1
16	Umberella Palm	2
17	Chrismas Tree	1
18	Audumbar	1
19	Limboo	1
20	Total	141



2. Environmental audit Report:-

ENVIRONMENTAL AUDIT REPORT

of
The Shetkari Shikshan Mandal's,
Padmabhooshan Vasantdada Patil Institute of Technology,
Bavdhan, Pune



Year: 2022-23

Prepared by:

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: engress123@gmail.com



ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

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

Date: 10/7/2023

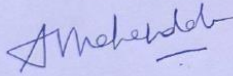
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The Institute has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of 3 kWp Roof Top Solar PV Plant

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

For Engress Services,



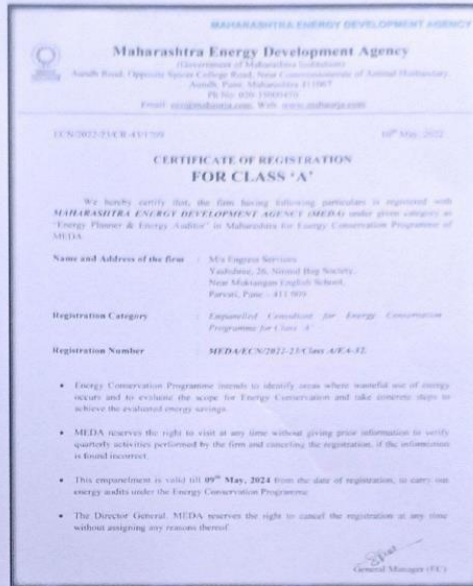
A Y Mehendale,
B E-Mechanical, M Tech- Energy
BEE Certified Energy Auditor, EA-8192



REGISTRATION CERTIFICATES



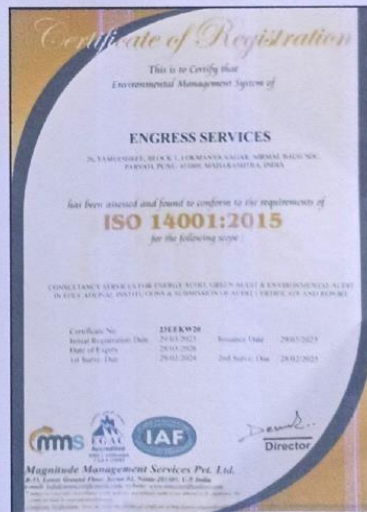
AUDITOR CERTIFICATE



MEDA Registration Certificate



ISO: 9001-2015 Certificate



ISO: 14001-2015 Certificate



INDEX

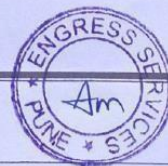
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3	Study of Present Energy Consumption	10
4	Study of Energy Performance Index	11
5	Study of Lighting	12
6	Study of Renewable Energy & Energy Efficiency	14



ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune for awarding us the assignment of Energy Audit of their Campus for the Year: 2022-23.

We are thankful to all the Staff members for helping us during the field study.



EXECUTIVE SUMMARY

1. The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	206	kW
2	Annual Energy Purchased	92245	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	92245	kWh
2	Annual Energy Generated	3600	kWh
3	Annual Energy Consumed=1+2	95845	kWh
4	Total Built up area of Institute	16598	m ²
5	Energy Performance Index =(3) / (4)	5.77	kWh/m ²

4. Study of % Usage of LED Lighting:

No	Particulars	Value	Unit
1	% of Usage of LED Lighting to Total Lighting Load	51.89	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Installation of 3 kWp Roof Top Solar PV Plant

6. 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

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO₂ Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in



ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
BEE	: Bureau of Energy Efficiency
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton



CHAPTER-I INTRODUCTION

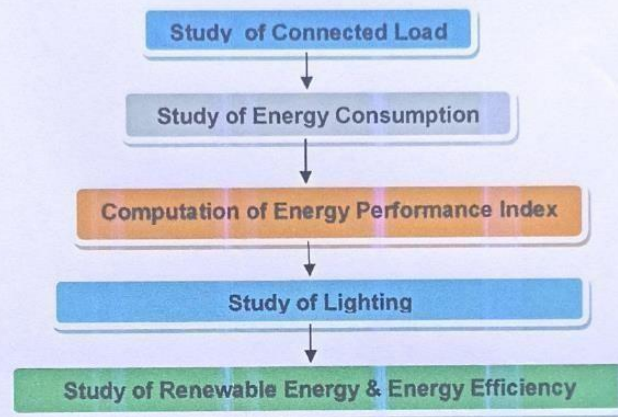
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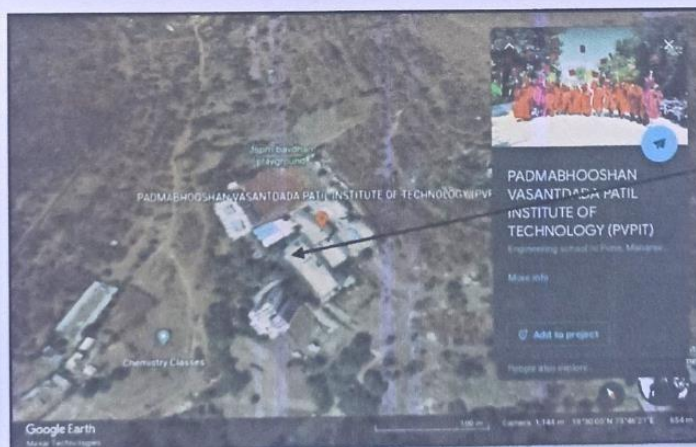
The guidelines followed for conducting the Energy Audit are:

- 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:



Institute
Campus

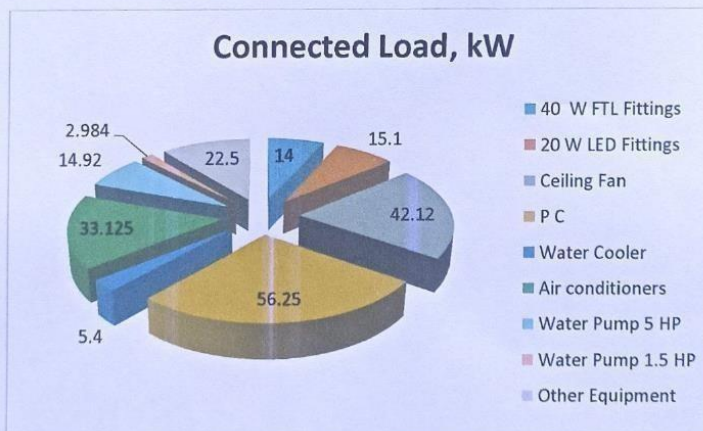
CHAPTER-II STUDY OF CONNECTED LOAD

The major contributors to the connected load of the Institute are discussed below.

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Quantity	Load, W/Unit	Load, kW
1	40 W FTL Fittings	350	40	14
2	20 W LED Fittings	755	20	15.1
3	Ceiling Fan	648	65	42.12
4	P C	450	125	56.25
5	Water Cooler	12	450	5.4
6	Air conditioners	25	1325	33.125
7	Water Pump 5 HP	4	3730	14.92
8	Water Pump 1.5 HP	2	1492	2.984
9	Other Equipment	150	150	22.5
10	Total			206

Chart No 1: Study of Connected Load:



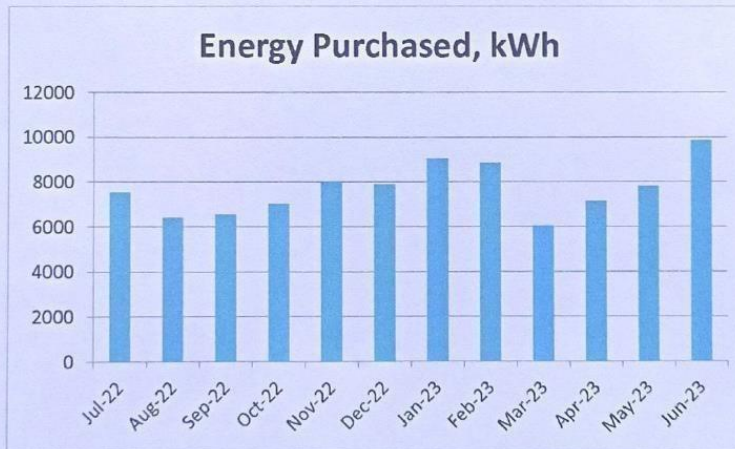
CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

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Table No 2: Electrical Bill Analysis- 2022-23:

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6	Dec-22	7896	7.11
7	Jan-23	9036	8.13
8	Feb-23	8875	7.99
9	Mar-23	6039	5.44
10	Apr-23	7136	6.42
11	May-23	7798	7.02
12	Jun-23	9870	8.88
13	Total	92245	83.02
14	Maximum	9870	8.88
15	Minimum	6039	5.44
16	Average	7687	6.92

Chart No 2: Variation in Monthly Energy Consumption:



CHAPTER-IV STUDY OF ENERGY PERFORMANCE INDEX

Energy Performance Index: Energy Performance Index of a Building is its Annual Energy Consumption in Kilo Watt Hours per square meter of the Building

It is determined by:

$$\text{EPI} = \frac{\text{Annual Energy Consumption in kWh}}{\text{Total Built-up area in m}^2}$$

Now we compute the EPI for the Institute as under:

Table No 3: Computation of Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	92245	kWh
2	Energy Generated by Solar PV Plant	3600	kWh
3	Total Energy Consumed= 1+2	95845	kWh
4	Total Built up area of Institute	16598	m ²
5	Energy Performance Index =(3) / (4)	5.77	kWh/m ²

CHAPTER V STUDY OF LIGHTING

Terminology:

1. **Lumen** is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. **Lux** is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. **Circuit Watts** is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. **Installed Load Efficacy** is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m²)

5. **Lamp Circuit Efficacy** is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. **Installed Power Density**. The installed power density per 100 lux is the power needed per square metre of floor area to achieve 100 lux of average maintained illuminance on a horizontal working plane with general lighting of an interior. Unit: watts per square metre per 100 lux (W/m²/100 lux) 100 Installed power density (W/m²/100 lux)

7. **Lighting Power Density**: It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the percentage usage of LED Lighting to total Lighting Load of the Institute.

Now, we compute the usage of LED Lighting to Total Lighting Load, as under.

Table No 4: Percentage Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Tube Lights	350	Nos
2	Demand of 40 W FTL Tube Light	40	W/Unit
3	Total Electrical Load of 40 W FTL Fittings	14	kW
4	No of 20 W LED Tube Lights	755	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit



6	Total Electrical Load of 20 W LED Fittings	15.1	kW
7	Total LED Lighting Load = 6	15.1	kW
8	Total Lighting Load = 3+6	29.1	kW
9	Annual Lighting Requirement met by LED= $7*100/8$	51.89	%



CHAPTER-VI STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

The Institute has installed:

- Roof Top Solar PV Plant of Capacity 3 kWp

Photograph of Roof Top Solar PV Plant:



6.2 Energy Efficiency Measures adopted:

- The Institute has Energy Efficient LED Fittings.
- Usage of BEE STAR Rated Equipment

Photographs of LED Lighting:



3. Energy audit Report:-

Energy Audit Report: Padmabhooshan Vasantdada Patil Institute of Technology, Pune: 2022-23

ENGRESS SERVICES

Yashashree, 26, Nimal Bag Society, Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

ENERGY AUDIT CERTIFICATE

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

Date: 10/7/2023

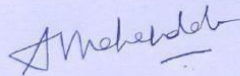
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- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of 3 kWp Roof Top Solar PV Plant

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

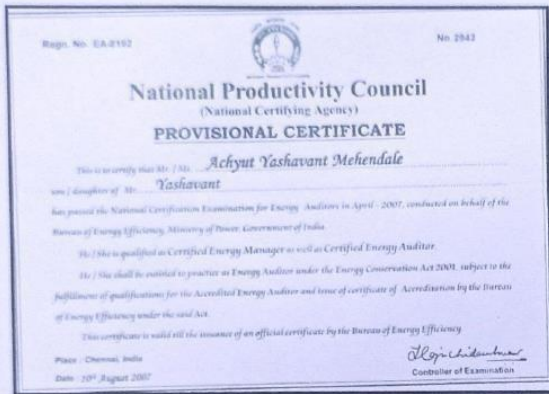
For Engress Services,



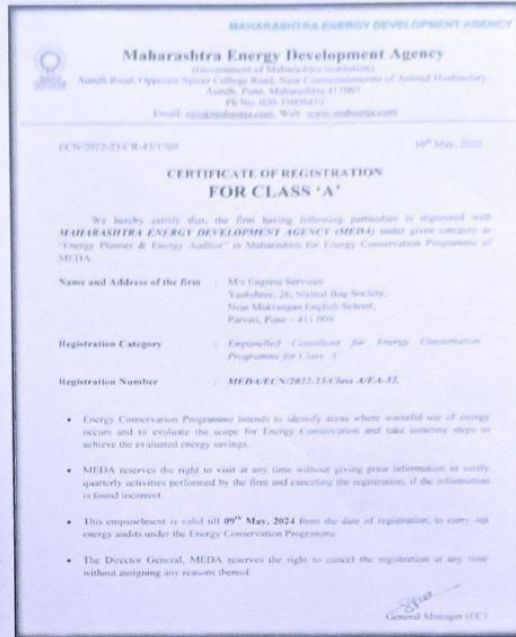
A Y Mehendale,
B E-Mechanical, M Tech- Energy
BEE Certified Energy Auditor, EA-8192



REGISTRATION CERTIFICATES



AUDITOR CERTIFICATE



MEDA Registration Certificate



ISO: 9001-2015 Certificate



ISO: 14001-2015 Certificate



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



ACKNOWLEDGEMENT

We at Engress Services, Pune, express our sincere gratitude to the management of The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune for awarding us the assignment of Energy Audit of their Campus for the Year: 2022-23.

We are thankful to all the Staff members for helping us during the field study.



EXECUTIVE SUMMARY

1. The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	206	kW
2	Annual Energy Purchased	92245	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	92245	kWh
2	Annual Energy Generated	3600	kWh
3	Annual Energy Consumed=1+2	95845	kWh
4	Total Built up area of Institute	16598	m ²
5	Energy Performance Index =(3) / (4)	5.77	kWh/m ²

4. Study of % Usage of LED Lighting:

No	Particulars	Value	Unit
1	% of Usage of LED Lighting to Total Lighting Load	51.89	%

5. Renewable Energy & Energy Efficiency Projects:

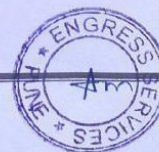
- Usage of Energy Efficient LED fittings
- Installation of 3 kWp Roof Top Solar PV Plant

6. 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

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO₂ Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in



ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
BEE	: Bureau of Energy Efficiency
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton

CHAPTER-I INTRODUCTION

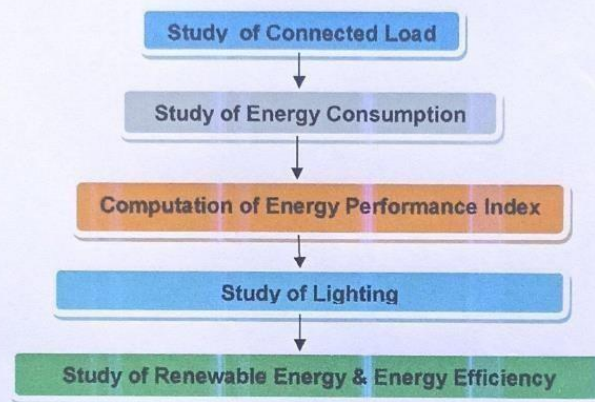
1.1 Introduction:

An Energy Audit is conducted at The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune.

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:



Institute
Campus

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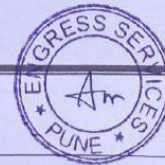
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Photograph of Roof Top Solar PV Plant:



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Photographs of LED Lighting:



Annexure – 4

**Certificate from the external accredited auditing agency
(Preferably government, concern department of affiliating university)**

INDEX

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1.	Green audit/ Environment audit Certificate	51
2.	Energy audit Certificate	52

1. Green audit/Environmental audit Certificate:-

Green Audit Report: Padmabhooshan Vasantdada Patil Institute of Technology: 2022-23

ENGRESS SERVICES

Yashashree, 26, Nimal Bag Society, Near Muktangan English School,
Parvati, Pune 411 009 Tel: 09890444795 Email: engress123@gmail.com
MEDA Registration No: ECN/2022-23/CR-43/1709
ISO: 9001-2015 Certified (Cert No: 23EQKC13),
ISO: 14001-2015 Certified (Cert No: 23EEKW20)

GREEN AUDIT CERTIFICATE

Certificate No: ES/PVPIT/22-23/02

Date: 10/7/2023

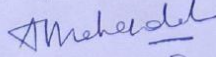
This is to certify that we have conducted Green Audit at The Shetkari Shikshan Mandal's Padmabhooshan Vasantdada Patil Institute of Technology, Bavdhan, Pune, in the Academic year 2022-23.

The Institute has adopted following Green & Sustainable Practices:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 3 kWp
- Segregation of Waste at Source
- Installation of Sewage Treatment Plant
- Implementation of Rain Water Harvesting Project
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness on Ban on single Use Plastic 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



2. Energy audit Certificate:-

Energy Audit Report: Padmabhooshan Vasantdada Patil Institute of Technology, Pune: 2022-23

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009
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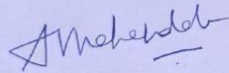
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We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient.

For Engress Services,



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



Annexure – 5

Geo tagged photographs with caption and date

INDEX

Sr. No.	Description of Activities	Digital Page No.
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4	Elocution Competition	60
5	Health Awareness Webinar	62
6	Swachh Bharat Abhiyan On the occasion of Gandhi Jayanti	63
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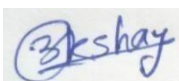
TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

TREE PLANTATION

Name of Event	Tree Plantation
Date and Time	28 July 2021
Venue	PVPIT College Campus
NSS Volunteers	27
Objective	1.Awareness about global warming 2.Impact on ecosystem
Outcome	Students are able to understand importance of ecosystem and take oath to plant more trees





Prof. Akshay Auti
NSS Program Officer





Dr. R.S. Pawar
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

APPRECIATION CERTIFICATE BY PMC



Prof. Akshay Auti
NSS Program Officer



Dr. R.S. Pawar
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

E WASTE DRIVE

Name of Event	Ewaste Drive
Date and Time	22/10/2021
Venue	VC Room, PVPIT Pune
NSS Volunteers	73
Collaboration Partner	PMC and Janvani NGO
Objective	1.Awareness about Ewaste
Outcome	Students are able to understand 3 R concept to avoid ewaste (Reduce ,Reuse and Recycle)



Akshay



Dr. R.S. Pawar

Prof. Akshay Auti
NSS Program Officer

Dr. R.S. Pawar
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

E-WASTE DRIVE AND COLLECTION REPORT

Name of Event	E-Waste Drive,
Date and Time	15 Dec ,2020 at 11am
Venue	PVPIT Pune
Total NSS volunteers participated	15
In Association with	JanVani Foundation
Objective	1.Awareness about impact of E-Waste 2.Impact on ecosystem
Outcome	From near by Society members , E-Waste collected and received the certificate for the same.



Prof. Akshay Auti
NSS Program Officer

Dr. R.S. Pawar
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

ENVIRONMENT DAY REPORT

Name of Event	Environment day Celebration
Date and Time	5 th June 2020,7pm
Venue	Online zoom platform
NSS Volunteers	16
Resource Person	Mrs. JyotiSatav
Objective	1.Awareness about global warming 2.Impact on ecosystem
Outcome	Students are able to understand importance of ecosystem .



Gandhi

Prof. Swati Gandhi

NSS Program Officer

C.M. Sedani

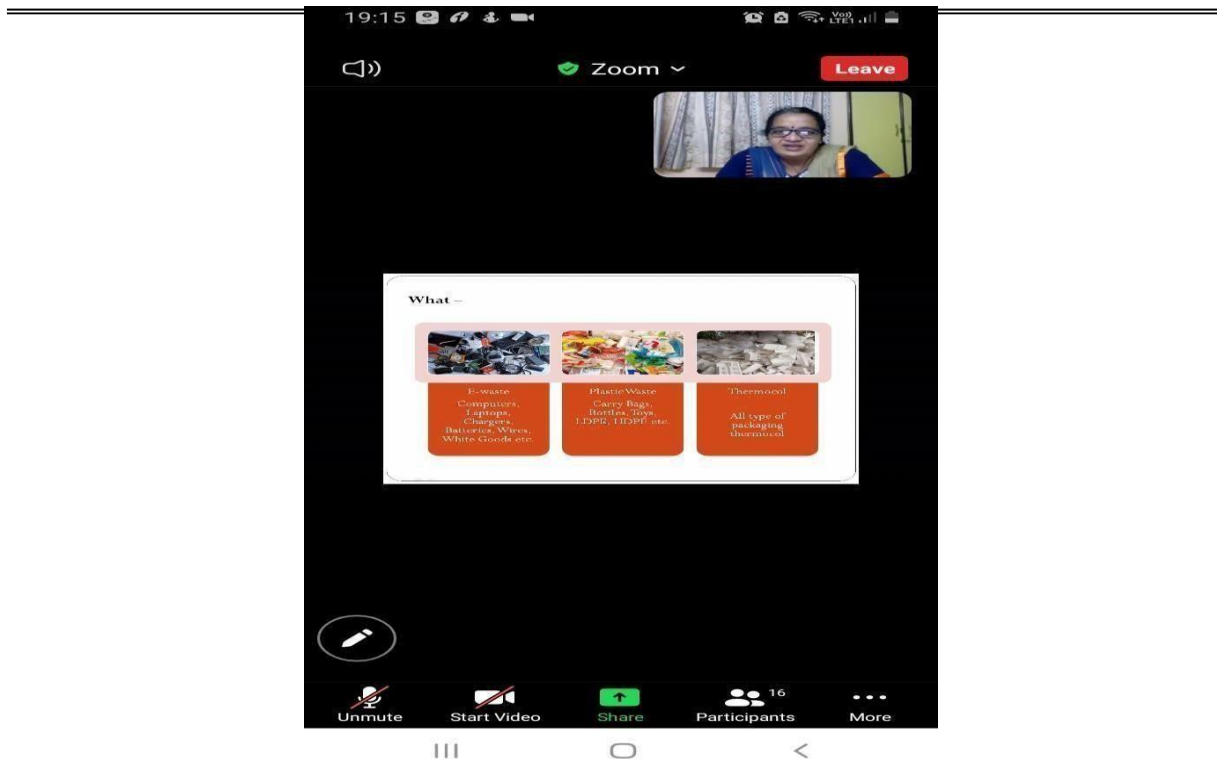
Dr. C.M. Sedani

Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)



Expert on environmental issues, Mrs Jyoti Satav guiding the audience



Gandhi

Prof. Swati Gandhi
NSS Program Officer

C.M. Sedani

Dr. C.M. Sedani
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

ELOCUTION ONLINE COMPETITION FOR "TODAYS INDIA"

Name of Event	Elocution Competition
Date and Time	15 Aug,2020 at 4pm
Venue	Online zoom
Evaluation Done by Guest	Dr Shamsundar Kulkarni
Total NSS volunteers participated	38
Objective	1.Awareness about Indian Culture 2.Create National Integrity
Outcome	Students have participated and created idea about Bharat after 100yrs





Prof. Swati Gandhi

NSS Program Officer



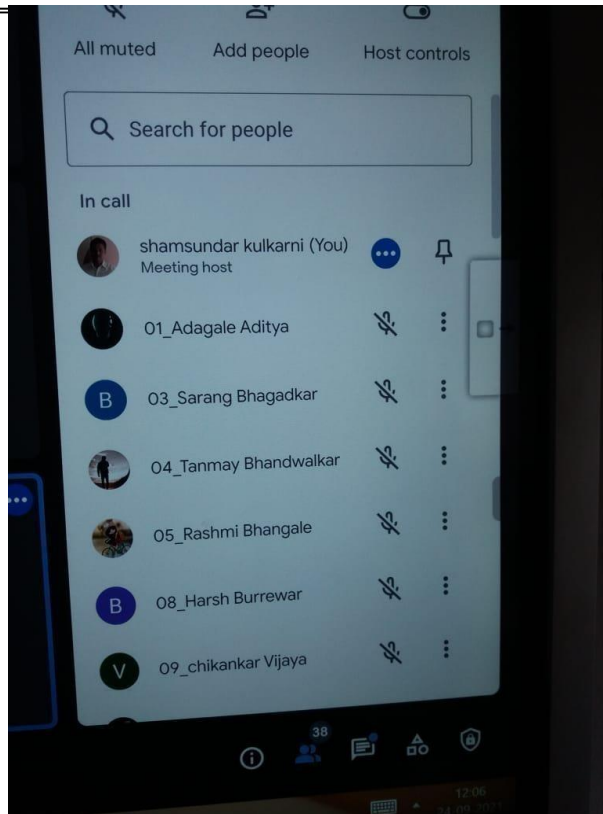
Dr. C.M. Sedani

Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)



Gandhi

Prof. Swati Gandhi
NSS Program Officer

C.M. Sedani

Dr. C.M. Sedani
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

HEALTH AWARENESS WEBINAR REPORT

Name of Event	Health Awareness Webinar
Date and Time	24 Sep,2020 at 7pm
Venue	Online zoom
Total NSS volunteers participated	40
Resource Person	Dr Jyoti Toshniwal
Objective	1. Awareness about health and different reasons for health diseases 2. Tips to avoid disease through diet
Outcome	Students understand the concept of Health is wealth . Also students get tips to how to get recover from covid 19 stages.



Gandhi

Prof. Swati Gandhi
NSS Program Officer

C.M. Sedani

Dr. C.M. Sedani
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

SWACHH BHARAT ABHIYAN REPORT

Name of Event	Swachh Bharat Abhiyan On the occasion of Gandhi Jayanti
Date and Time	2 oct ,2020 at 11am
Venue	PVPIT Ground Pune
Resource Person	PI Rajesh Puranik Sir
Total NSS volunteers participated	40
Objective	1.Mahatma Gandhi,s Journey 2.Corruption free India
Outcome	PI Rajesh Puranik Sir, discussed about the thoughts of Gandhiji. As a citizen,what we can do,to make India corrupt free .



Gandhi

Prof. Swati Gandhi
NSS Program Officer

C.M. Sedani

Dr. C.M. Sedani
Principal



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

PLASTIC FREE PUNE REPORT

Name of Event	Plastic Free Pune
Date and Time	7 Nov,2020 at 11am
Venue	PVPIT Canteen Bavdhan Pune
Total NSS volunteers participated	35
Resource Person	AnantGharat CEO of My Earth Foundation
Objective	1.Awareness about impact of plastic use 2.Impact on ecosystem
Outcome	From college nearby Society members ,plastic waste collected and provided certificate for thesame.



Gandhi

Prof. Swati Gandhi

NSS Program Officer

C.M. Sedani

Dr. C.M. Sedani

Principal

Annexure – 6

Beyond the campus environmental promotion activities

INDEX

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1) Tree Plantation:-



TSSM's Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

TREE PLANTATION

Report On Tree Plantation (As a part of NSS Activity A.Y. 2021-22)

Participants: - NSS Vultures

Venue: - Mokarwadi Tal. Haveli, Dist. Pune.

Date: - 3-3-2022

Organizing Committee: - NSS Team

CONTENT

<u>Sr. No</u>	<u>Content</u>
1	<u>Objective of the Event</u>
2	<u>Content & Scheduled details</u>
3	<u>Program Outcome achieved</u>
4	<u>Attendance</u>
5	<u>Event Photo</u>

Name of Event: - Tree Plantation Date and

Time: - 28 July 2021

Venue: - Mokarwadi Tal. Haveli, Dist. Pune.

Objective: -
1. Awareness about global warming
2. Impact on ecosystem

Outcome: -

Students are able to understand importance of ecosystem and take oath to plant more trees



Tree Plantation Mokarwadi Tal. Haveli, Dist. Pune. (A.Y.2020-21)

Tree Planitation Attendance Date :- 3-3-2022

Sr. No	Candidate Name	Sign
1	GAIKWAD ADESH ASHOK	Gaikh
2	KADU OMKAR SANTOSH	omkar
3	MAHAKALE AKASH PARMESHWAR	AB
4	MATHE UTKARSHA RAVINDRA	Mathe
5	NALAWADE ANUJ RAJENDRA	Anuj
6	PATIL OMKAR PADMAKAR	omkarpatil
7	SATHE DHEERAJ DHANAJI	Sathe
8	GITE AKSHAYA MOHAN	Gite
9	GAIKWAD KAUSTUBH VINAYAK	AB
10	KAMBLE RAJU SHANKAR	Kamble
11	SAPKAL PRATIK SANJAY	Sapkale
12	KAMBLE SANKET SATISH	Kamble
13	SIDDHANT SHEKHAR DHUMAL	Siddhant
14	NARALE PRATIK ASHOK	Narale
15	DHAGATE PAWAN NANDKISHOR	Dhagate
16	AKSHAY SHANTARAM SHELAR	AB
17	NEHA ABHIJEET MORE	Near.
18	PAWAR MANASI RAMDAS	Pawar.
19	KHADE AKSHATA ASHOK	Khade
20	DANDE NIKHIL MAHESH	AB
21	SATPUTE ANAND ARUN	Satpute
22	JAWALE ASHISH PRAKASH	AB
23	KADAM TUSHAR SHAM	Kadam
24	MANE SHREEYASH TANAJI	Mane
25	KARANJIKAR ASHITOSH DEVIDAS	AB
26	GHANEKAR SAYALI SUNIL	Ghanekar
27	THAKUR BHUSHAN BAPU	Thakur
28	MAHAKAL TANMAY VASANT	Mahakal
29	YASH SUNIL PALASKAR	Yashpal
30	HARPAL SAKSHI SANJAY	Harpal
31	KHUDE ASHUTOSH RAJKUMAR	Ashutosh
32	YANGANDUL ANIRUDH HIRALAL	AB
33	TAWARE PARTH RAJENDRA	AB
34	PINGALE AMOL SUNIL	Pingale
35	GARAD PRASHANT MANCHAK	Garad.
36	KALOKHE VISHWAJEET DASHRATH	Kalokhe
37	CHETAN ASHOK BIRHADE	Chetan
38	MUSALE ROHIT YUVARAJ	Rohit
39	BACHHAV SOHAM RAJENDRA	AB
40	ZADE AMEY MAHESH	Ameyp
41	KUMBHAR GAJANAN VIRBHADRA	Kumbhar
42	GHORPADE MAYUR ASHOK	AB
43	SALVE AYUSH SUNIL	Salve
44	CHODHARI DIMPLE BHURARAM	AB
45	KADAM ABHISHEK MADHUKAR	Kadam
46	KATTE ROHAN PANDURANG	Rohan
47	RATHOD RUSHIKESH BABURAO	AB



TSSM's
Padmabhooshan Vasantdada Patil Institute of Technology

Extension and outreach programs National Service Scheme (NSS)

TREE PLANTATION

Name of Event	Tree Plantation
Date and Time	31/01/23
Venue	Taljai Hills, Pune
NSS Volunteers	73
Objective	1) To reduce the surface run-off discharge and checking soil erosion along the embankments. 2) To reduce temperature and increase humidity.
Outcome	Planted 100 Plants



Tree Plantation at Taljai Hills, Pune (A.Y. 2022-23)

2. Plastic Free Drive: -



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Extension and outreach programs National Service Scheme (NSS)



Plastic Free Drive at Kothrud Pune



E- waste Drive at Shivajinagar Pune

3. Traffic Awareness: -



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Extension and outreach programs National Service Scheme (NSS)

TRAFFIC AWARENESS

Name of Event	Traffic awareness
Date and Time	18/11/2021
Venue	Nalstop, Paud Phata
NSS Volunteers	40
Collaboration Pattern	Kothrud Traffic Police
Objective	1. Awareness about traffic rules 2. Unders role and responsibilities of traffic police
Outcome	Students are able to understand importance of traffic rules and also help to senior citizens to cross the roads



Traffic awareness at Nalstop, Paud Phata

4. Swachata Abhiyan:-



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Extension and outreach programs National Service Scheme (NSS)

SWACHATA ABHIYAN

Name of Event	Swachata Abhiyan
Date and Time	02/10/2022
Venue	Kothrud, Pune.
NSS Volunteers	40
Objective	1) Create awareness among communities towards sanitation and cleanliness. 2) To bring behavioral changes in the people towards sanitation and hygiene.
Outcome	40 volunteers actively participated in Swachata Abhiyan



Swachata Abhiyan at Kothrud Pune



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Extension and outreach programs National Service Scheme (NSS)

NSS SPECIAL WINTER CAMP

Name of Event	7 days NSS Camp
Date and Time	18 March to 24 March,2022
Venue	Urwade ,tal Mulshi Pune
NSS Volunteers	50
Objective	<ol style="list-style-type: none">1. Create awareness about Villegas/rural life2. Understand the social issues3. Create technical solution for the problems
Outcome	<ol style="list-style-type: none">1. Health Awareness Session2. Participated in traditional kirtan for mediation3. Rally for save girl child4. Cleanliness drive



NSS Camp at Urwade ,tal Mulshi Pune