



JAYAWANT SHIKSHAN PRASARAK MANDAL'S

Bhivarabai Sawant Institute of Technology & Research

(Approved by AICTE New Delhi, DTE Mumbai & Affiliated to Savitribai Phule Pune University)
Gat No. 719/1 & 2, Wagholi, Pune-Nagar Road, Pune-412207

Prof. Dr. T. J. Sawant
B.E. (Elec.) PGDM, Ph.D
Founder Secretary

Ph : 020-067335108, 65217050, 67335100
Telefax : 020-67335100
Website : www.ispmbisotr.edu.in
(DTE CODE: EN 6311, University Code: CEGP-013100)



Dr. T.K. Nagaraj
ME. (civil Engg), Ph.D (civil Engg)
LMISTE, LMIGS, LMIRC
LMISRMTT, LMIE

Principal

**Institute Accredited by National Assessment and Accreditations Council (NAAC) and NBA accredited Programs:
Information Technology, Electronics & Telecommunication Engineering, and Electrical Engineering**

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 promotion activities

Findings of DVV: "1. Provide Certificate of (Green audit Energy audit Environment audit Clean and green campus recognitions / awards Beyond the campus environmental promotion activities) from the external accredited auditing agency (preferably government, concern department of affiliating university). 2. Provide Certificates of the awards received from the recognized agency. 3. Provide Report on environmental promotional activities conducted beyond the campus with geo tagged photographs with caption and date.

Clarification for findings of DVV:

1. Certificate of Green audit, Energy audit, Environment audit from the external accredited auditing agency are attached herewith.
2. Report on environmental promotional activities conducted beyond the campus with geo tagged photographs with caption and date, attached herewith.



Vision: "To Satisfy the aspirations of youth force, who want to lead the nation towards prosperity through techno-economic development"

Mission: "To provide, nurture and maintain an environment of high academic excellence, research and entrepreneurship For all aspiring Students, which will prepare them to face global challenges maintaining high ethical and moral Standards"





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Telefax : 020-67335100

Website : www.jspm.edu.in / www.bsiostr.org

EN 6311 / CEGP-013100



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Report
on
Energy & Green Audit
of
Camp Education Society's,
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune

2018

Prepared by:

Enrich Consultants,

Yashashree, 26, Nirmal Bag Society,
Near Mukhtangan English School, Parvati, Pune 411009
Phone: 020-24220747 Email: enrichcons@gmail.com

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ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune for awarding us the assignment of Energy & Green Audit of their Wagholi Campus

We are thankful to:

- Prof Dr T K Nagaraj, Principal
- Prof Dr N. N. Ghuge, HOD, Electrical Engg Department

We are also thankful to various Head of Departments & other Staff members for helping us during the field measurements.

EXECUTIVE SUMMARY

After the Field measurements & analysis, we present herewith important observations made and various measures to reduce the Energy Consumption & mitigate the CO₂ emissions

1. Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities & LPG for cooking purpose.

2. PRESENT ENERGY CONSUMPTION: In the following Table, we present the details of Energy Consumption & CO₂ emissions.

No	Parameter	Energy consumed, kWh	CO ₂ emissions, MT
1	Maximum	66001	52.80
2	Minimum	44357	35.49
3	Average	56022.6	44.82

3. ALTERNATE ENERGY INITIATIVES:

It is recommended to install a **Solar PV System** to cater the Demand of Office Load during the Day time.

4. PERCENTAGE OF LIGHTING POWER REQUIREMENTS MET BY LED BULBS:

The College has replaced 500 Nos Old FTL fittings with 20 W fittings. It is recommended to replace the existing 654 Nos T-12 FTL fittings by 20 W LED fittings.

5. WASTE MANAGEMENT:

5.1 ORGANIC WASTE MANAGEMENT:

For disposal of Organic Waste, the College has adopted the route of Composting, wherein the waste is collected in a pit and after the composting the same is used as fertilizer.

5.2. LIQUID WASTE MANAGEMENT:

The College has already installed a Sewage Treatment Plant in order to treat the Liquid Waste generated in the College. The treated water is used for Gardening purpose.

5.3 e-WASTE MANAGEMENT:

All the internal communication is through emails and hardly any e-Waste is generated in the Day to Day operation of the College. The College authorities have already contacted Authorized e-Waste management vendor to dispose off any wastage generated.

6. RAIN WATER HARVESTING:

It is recommended to install **Rainwater Harvesting System** to collect the Rain Water collected at the Terrace & is fed to main Water Tank, which in turn is used for domestic purpose.

7. RECOMMENDATIONS:

No	Recommendation	Energy Saving, kWh/Annum	CO ₂ reduction, MT/Annum	Monetary Saving, Rs	Investment, Rs	Payback period, Months
1	Replacement of 654 Nos T-12 FTL fittings by 20 W LEDs	36493	29.19	332088	163500	6
2	Installation of 10 kW Solar PV Plant	12000	9.6	109200	600000	66
3	Total	49493	38.79	441288	763500	21

8. NOTES & ASSUMPTIONS:

1. 1 Unit of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere
2. **1 kWp** Solar PV system generates **4 Units** (kWh) of Energy per Day
3. Daily working hours-10 Nos
4. Annual working Days-300 Nos
5. Average Rate of Electrical Energy : **Rs 9.10/- per kWh**

ABBREVIATIONS

CFL	:	Compact Fluorescent Lamp
CO ₂	:	Carbon- Di- Oxide
EESL		Energy Efficiency Services Limited
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
V	:	Voltage
I	:	Current
kW	:	Kilo- Watt
kWh	:	kilo-Watt Hour
kVA	:	Active Power
MT	:	Metric Ton
P V	:	Photo Voltaic

CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study present level of Energy Consumption
2. To Study the present CO₂ emissions
3. To assess the various equipment/facilities from Energy efficiency aspect
4. To study Scope for usage of Renewable Energy
5. To study various measures to reduce the Energy Consumption

1.2 Audit Methodology:

1. Study of connected load
2. Study of various Electrical equipment
3. To prepare the Report with various Encon measures with payback analysis

1.3 General Details of Institute: Table No-1:

No	Head	Particulars
1	Name	Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Courses Offered	Courses in various Engineering disciplines

CHAPTER-II STUDY OF CONNECTED LOAD

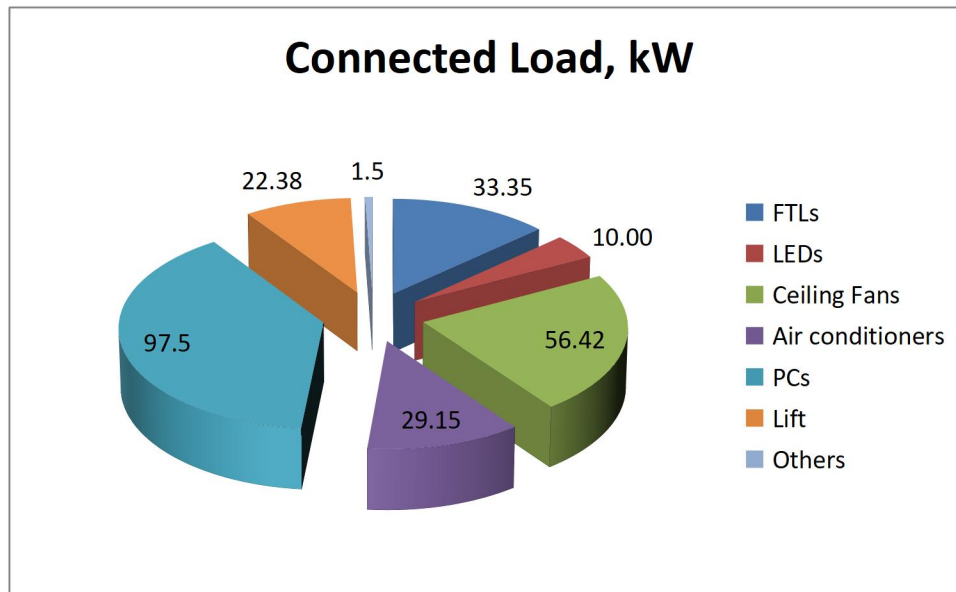
In this chapter, we present the details of various Electrical loads as under

2.1 Study of Floor Wise Electrical Load: Table No-2:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	FTLs	654	51	33.35
2	LEDs	500	20	10.00
3	Ceiling Fans	868	65	56.42
4	Air conditioners	22	1325	29.15
5	PCs	650	150	97.5
6	Lift	2	11190	22.38
7	Others	10	150	1.5
8	Total			250.30

We present the same in a PIE Chart as under:

Chart No-1: Details of Connected Load:



Note: From the above Table, we observe that out of Total Connected Load of **250.3 kW**, the load due to PCs is **97.5 kW** while on account of Ceiling Fans is **56.42 kW**

CHAPTER-III STUDY OF ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills

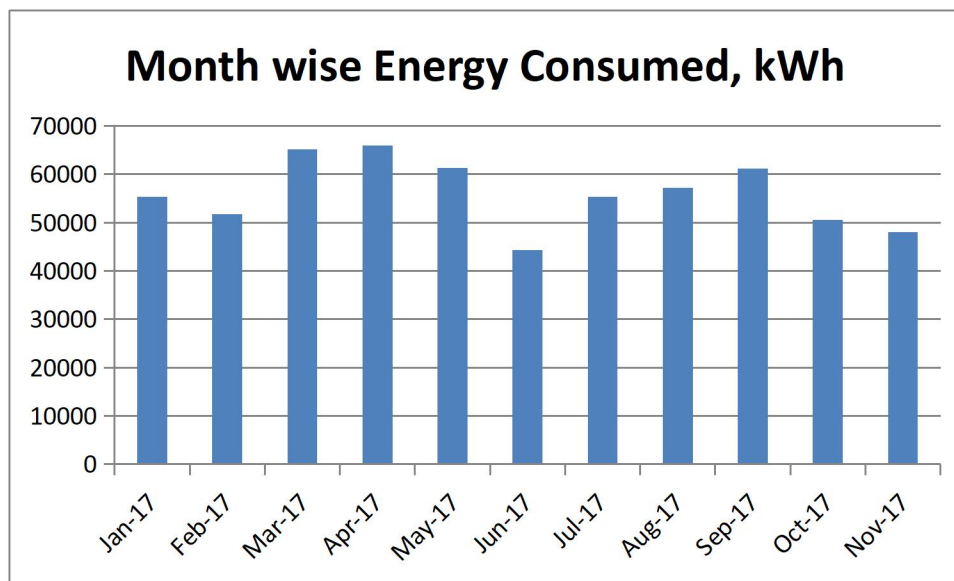
3.1.1 To study the variation of Monthly Energy Consumption:

Table No- 3: Electrical Bill Analysis- 2017:

No	Month	Energy Consumed, kWh	CO2 emissions, MT
1	Jan-17	55336	44.27
2	Feb-17	51819	41.46
3	Mar-17	65105	52.08
4	Apr-17	66001	52.80
5	May-17	61310	49.05
6	Jun-17	44357	35.49
7	Jul-17	55291	44.23
8	Aug-17	57260	45.81
9	Sep-17	61177	48.94
10	Oct-17	50576	40.46
11	Nov-17	48017	38.41
12	Maximum	66001	52.80
13	Minimum	44357	35.49
14	Average	56022.6	44.82

In the following Chart we present the above Data of Energy Consumption.

Chart No-2: Month wise Energy Consumption, kWh:



Key Inference drawn:

From the above analysis, we present following important parameters:

Table No-5: Various Important Parameters:

No	Parameter	Energy consumed, kWh
1	Maximum	66001
2	Minimum	44357
3	Average	56022.6

CHAPTER-IV CARBON FOOTPRINTING

4.1 A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses two forms of Energy namely:

Electrical Energy for various Electrical gadgets.

4.2 Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to LPG & Electrical Energy are as under

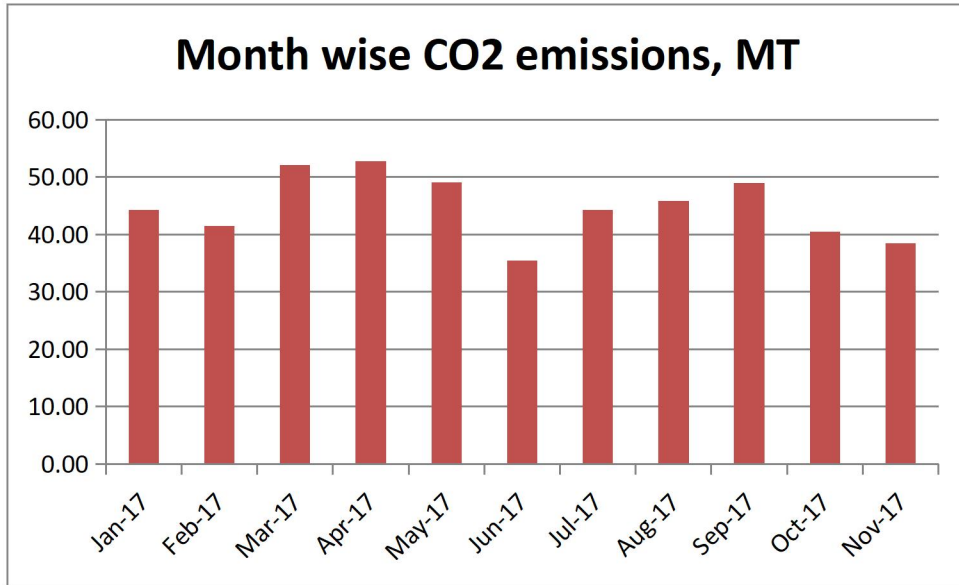
- 1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

4.3 Table No-4: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ emissions, MT
1	Jan-17	55336	44.27
2	Feb-17	51819	41.46
3	Mar-17	65105	52.08
4	Apr-17	66001	52.80
5	May-17	61310	49.05
6	Jun-17	44357	35.49
7	Jul-17	55291	44.23
8	Aug-17	57260	45.81
9	Sep-17	61177	48.94
10	Oct-17	50576	40.46
11	Nov-17	48017	38.41
12	Maximum	66001	52.80
13	Minimum	44357	35.49
14	Average	56022.6	44.82

4.4 Representation of Month wise CO₂ emissions:



CHAPTER-V

USAGE OF ALTERNATE ENERGY SOURCES

5.1 Installation of Solar PV Power Pack:

During the Audit, it was revealed that the College has ample space on the Terrace.

During the Electrical Load survey, the Day Electrical Load was found to be about **10 kW**.

5.2 Computation of Daily Units consumed in Day time & Solar PV Plant Capacity:

In the following Table, we present the Calculations for Solar PV Plant, the Cost involved & Simple Payback Calculations.

No	Particulars	Value	Unit
1	Solar PV Plant Capacity	10	kW
2	Avg Units Gen/kWp of Solar PV Plant	4	kWh/Day
3	Daily Average Units generated	40	kWh/Day
4	Annual units generated	12000	kWh/Annum
5	Annual Saving potential @ Rs 7.26/kWh	87120	Rs lump sum
6	Cost of Solar PV Plant	0.60	Lakh/kW
7	Investment Required	600000	Rs lump sum
8	Simple Payback period	83	Months

CHAPTER-VI STUY OF PERCENTAGE OF LIGHTING POWER REQUIREMENT MET BY LED LIGHTS

In the campus there are about 1154 Light point fittings, of which the College has installed 500 Nos, 20 W LED fittings. It is recommended to replace the remaining 654 nos old fittings by new Energy Efficient LED Light fittings in place of Old fittings.

CHAPTER VII STUDY OF WASTE MANAGEMENT

In this Chapter, we study the Waste management systems of the College.

7.1 Organic Waste Management:

For disposal of Organic Waste, the College has adopted the route of Composting, wherein the waste is collected in a pit and after the composting the same is used as fertilizer.

7.2 Liquid Waste Management:

The College has already installed a Sewage Treatment Plant in order to treat the Liquid Waste generated in the College. The treated water is used for Gardening purpose.

7.3 e-Waste Management:

The College communication is through Internet within the staff. There are hardly any floppies or CDs used for day to day operations. Hence as far as the e-waste is concerned hardly any waste is generated during the day to day operations. In addition to this the College authorities have already finalized Authorized e-Waste management agency to dispose of the old equipment

CHAPTER-VIII

STUDY OF RAIN WATER HARVESTING

It is recommended to collect the water collected during the monsoon, on the terrace of the College and store in a pit, which in turn can be used to enrich the bore well, which will reduce the dependency on the municipal water.

CHAPTER-IX

ENERGY CONSERVATION PROPOSALS

ECP-1: Replacement of 654 Nos T-12 Fittings with 20 W LEDs:

During the audit, it was revealed that, in the Class rooms, office section, Library section, **T-12** type tube light fittings are used. It is recommended to replace all these fittings with **20 W LED** Fittings.

In the following Table, we present the saving calculations

No	Particulars	Value	Unit
1	Present Quantity of T-12 FTL Fittings	654	Nos
2	Consumption of T-12 FTL fitting	51	W/unit
3	Consumption of 7 W LED fitting	20	W/unit
4	Total saving potential	31	W/unit
5	Average Daily period of Usage	10	Hrs/Day
6	Average saving potential	121.64	kWh/Day
7	Annual Operating Days	300	Days/Annum
8	Annual saving potential	36493.2	kWh/Annum
9	Present Energy Charges	9.10	Rs/kWh
10	Annual monetary Gain	332088.12	Rs/Annum
12	Annual CO ₂ emissions reduction	29.19	MT/Annum
13	Investment required	163500	Rs lump sum
14	Simple Payback period	6	Months

ECP-2: Installation of 10 KW Solar PV Plant:

It is recommended to install 10 KW Roof top Solar PV Plant.

In the following Table, we present the saving potential.

No	Particulars	Value	Unit
1	Design Load	10	kW
2	Avg Units Gen/kWp of Solar PV Plant	4	kWh/Day
3	Daily Average Units generated	40	kWh/Day
4	Annual units generated	12000	kWh/Annum
5	Annual Saving potential @ Rs9.10/ kWh	109200	Rs lump sum
6	Cost of Solar PV Plant	0.60	Lakh/kW
7	Investment Required	600000	Rs lump sum
8	Simple Payback period	66	Months

Summary of Recommendations:

No	Recommendation	Energy Saving, kWh/Annum	CO₂ reduction, MT/Annum	Monetary Saving, Rs	Investment, Rs	Payback period, Months
1	Replacement of 654 Nos T-12 FTL fittings by 20 W LEDs	36493	29.19	332088	163500	6
2	Installation of 10 kW Solar PV Plant	12000	9.6	109200	600000	66
3	Total	49493	38.79	441288	763500	21

ENERGY AUDIT REPORT
Of
Jayawant Shikshan Prasarak Mandal's
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune



Year: 2020-21

Prepared by:

Enrich Consultants

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577

22nd April, 2021

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : **M/s Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Mukhtangan English School, Parvati,
Pune - 411009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2021-22/Class A/EA-03*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/BSIOTR/20-21/01

Date: 10/08/2021

CERTIFICATE

This is to certify that we have conducted Energy Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi. Pune, in the Academic year 2020-21.

.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 13 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 Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi. Pune for awarding us the assignment of Energy Audit of their Campus for the Year: 2020-21.

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

EXECUTIVE SUMMARY

1. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

1. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	76768	69.09
2	Maximum	8921	8.03
3	Minimum	4785	4.31
4	Average	6397	5.76

2. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Maximum Usage of Day Lighting

3. Usage of Alternate Energy:

- The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.
- Energy purchased from MSEDCL is **76768 kWh**.
- Energy generated by Roof Top Solar PV Plant is **15600 kWh**.
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **17 %**.

4. Usage of LED Lighting:

- The Total Annual Lighting Demand of the Institute is **15178 kWh**.
- The Total Annual LED Lighting Demand is **12298 kWh**.
- The percentage of Annual LED Lighting to Annual Lighting Demand is **81 %**.

5. Assumptions:

1. 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Daily working hours-**8 Nos** (For Lighting Calculations)
3. Annual working Days-**90 Nos** (For Lighting Calculations)
4. Annual Solar Energy Generation: **300 Nos**.

6. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar PV Plant Energy generation: www.solarroftop.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 Objectives:

1. To study present Energy Consumption
2. To Study the present CO₂ emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

1.2 Table No 1: General Details of the Institute:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

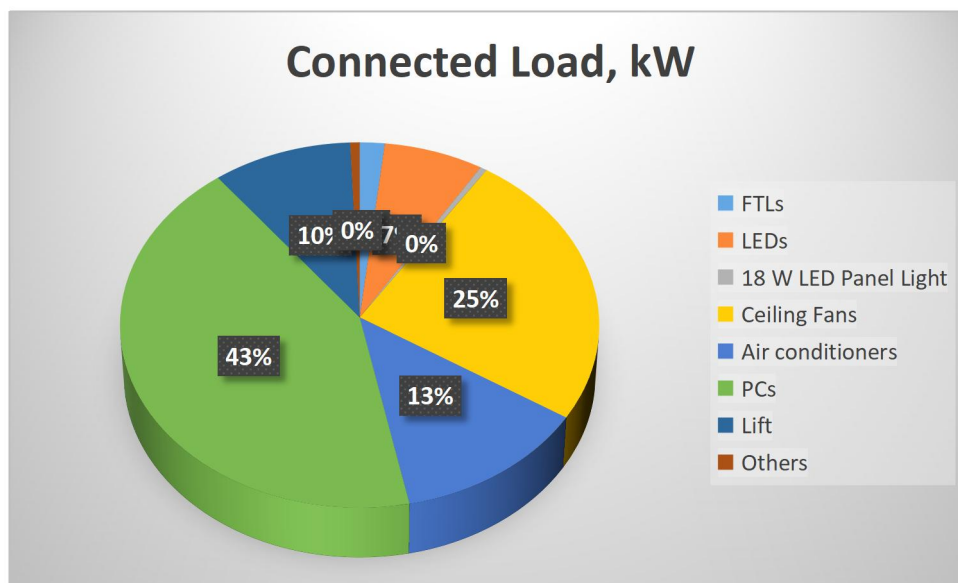
CHAPTER-II STUDY OF CONNECTED LOAD

The major contributors to the connected load of the Institute include:

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	FTLs	100	40	4
2	LEDs	800	20	16
3	18 W LED Panel Light	60	18	1.08
4	Ceiling Fans	870	65	56.55
5	Air conditioners	22	1325	29.15
6	PCs	650	150	97.5
7	Lift	2	11190	22.38
8	Others	10	150	1.5
9	Total			228

Chart No 1: Study of Connected Load:



CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills

Table No 3: Electrical Bill Analysis- 2020-21:

No	Month	Energy Consumed, kWh
1	Jul-20	5339
2	Aug-20	6347
3	Sep-20	6774
4	Oct-20	6828
5	Nov-20	6099
6	Dec-20	6969
7	Jan-21	7069
8	Feb-21	6787
9	Mar-21	8921
10	Apr-21	5912
11	May-21	4936
12	Jun-21	4785
13	Total	76768
14	Maximum	8921
15	Minimum	4785
16	Average	6397

Chart No 2: Variation in Monthly Energy Consumption:

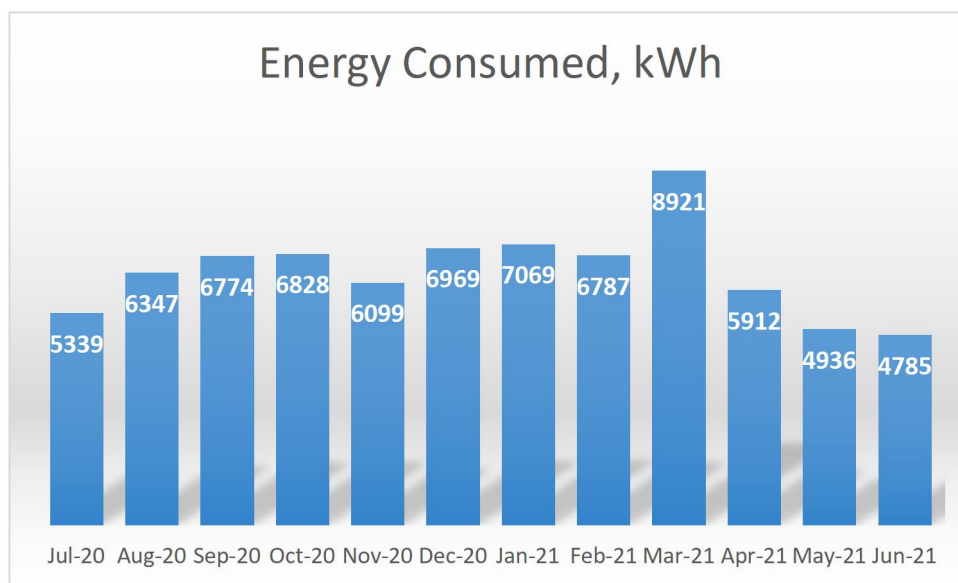


Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	45356
2	Maximum	13444
3	Minimum	2158
4	Average	3779.67

CHAPTER-IV

CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

- 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Jul-20	5339	4.81
2	Aug-20	6347	5.71
3	Sep-20	6774	6.10
4	Oct-20	6828	6.15
5	Nov-20	6099	5.49
6	Dec-20	6969	6.27
7	Jan-21	7069	6.36
8	Feb-21	6787	6.11
9	Mar-21	8921	8.03
10	Apr-21	5912	5.32
11	May-21	4936	4.44
12	Jun-21	4785	4.31
13	Total	76768	69.09
14	Maximum	8921	8.03
15	Minimum	4785	4.31
16	Average	6397	5.76

Chart No 3: Month wise CO₂ Emissions:

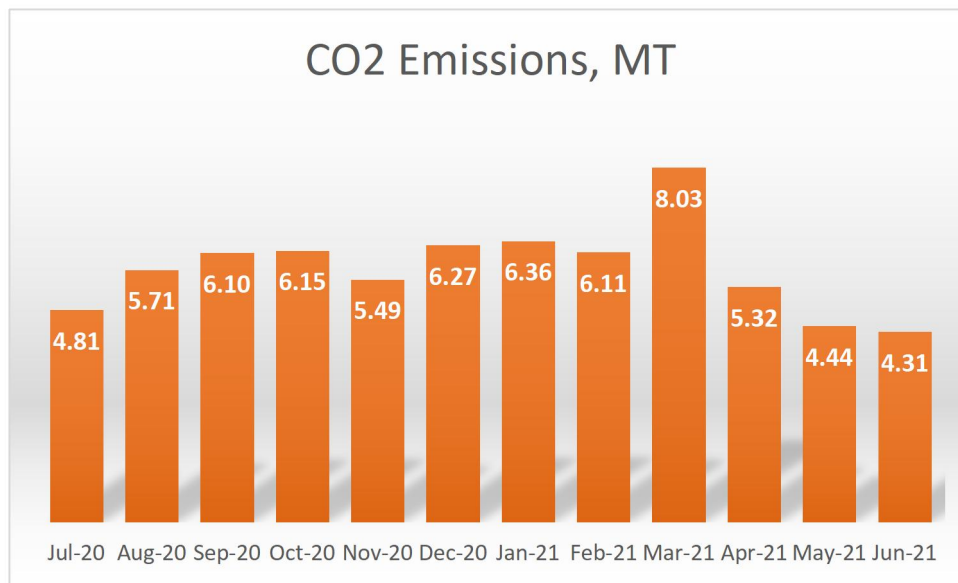


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO2 Emissions, MT
1	Total	76768	69.09
2	Maximum	8921	8.03
3	Minimum	4785	4.31
4	Average	6397	5.76

CHAPTER-V STUDY OF USAGE OF ALTERNATE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.

In the following Table, we compute the percentage of Usage of Alternate Energy to Annual Energy Demand of the Institute.

Table No 7: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Roof Top Solar PV Plant Capacity	13	kWp
2	Average Energy generated per kWp	4	kWh
3	Annual Energy Generation Days	300	Nos
4	Energy generated by Solar PV Plant in 20-21= 1*2*3	15600	kWh
5	Energy purchased from MSEDCL	76768	kWh
6	Total Energy Requirement = 4+5	92368	kWh
7	% of Usage of Alternate Energy = (4)*100/(6)	17	%

Photograph of Roof Top Solar PV Plant:



CHAPTER VI STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Annual Lighting power requirement.

Table No 8: Percentage of Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of FTL Fittings	100	Nos
2	Demand of 20 W LED Tube Light	40	W/Unit
3	Total Electrical Load of 20 W LED Fittings	4	kW
4	No of 20 W LED Tube Lights	800	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	16	kW
7	No of 18 W LED D/L Fitting	60	Nos
8	Demand of 18 W LED D/L Fitting	18	W/Unit
9	Total Electrical Load of 18 W LED D/L Fittings	1.08	kW
10	Total Lighting Load=3+6+9	21.08	kW
11	Total LED Lighting Load= 6+9	17.08	kW
12	Average Daily Usage Period	8	Hours
13	Annual Working Days	90	Nos
14	Annual Total Lighting Load =10*12*13	15178	kWh
15	Annual LED Lighting Load = 11*12*13	12298	kWh
16	Annual Lighting Requirement met by LED= $15 \times 100 / 14$	81	%

ENERGY AUDIT REPORT
of
**JAYAWANT SHIKSHAN PRASARAK MANDAL'S,
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY &
RESEARCH, WAGHOLI, PUNE**



Year: 2021-22

Prepared by:

ENGRESS SERVICES

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709

10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Mukhtangan English School,
Parvati, Pune – 411 009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Mukangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/BSIOTR/21-22/01

Date: 10/5/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi. Pune, in the Academic year 2021-22.

.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 13 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,
Certified Energy Auditor
EA-8192

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5	Study of Usage of Alternate Energy	14
6	Study of LED Lighting	15

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's, Bhivarabai Sawant Institute of Technology & Research Wagholi. Pune for awarding us the assignment of Energy Audit of their Campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy** which is used for various Electrical Equipment.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	80281	72.25
2	Maximum	9812	8.83
3	Minimum	4785	4.31
4	Average	6690	6.0

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Installation of 13 kWp Roof Top Solar PV Plant

4. Usage of Alternate Energy:

- Energy purchased from MSEDCL is **80281 kWh**.
- The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**
- Energy generated by Roof Top Solar PV Plant is **15600 kWh**.
- Total Energy Consumed is **95881 kWh**
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **16.27 %**.

5. Usage of LED Lighting:

- The Total Lighting Load of the Institute is **21.08 kW**.
- The Total LED Lighting Load is **18.08 kW**.
- The percentage of Annual LED Lighting to Annual Lighting Demand is **85 %**.

6. Assumptions:

1. 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by **1 kWp** Solar PV Plant is **4 kWh/Day**
3. Annual Solar Energy Generation Days: **300 Nos**.

7. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar PV Plant Energy generation: www.solarroftop.gov.in

ABBREVIATIONS

BSIOTR	:	Bhivarabai Sawant Institute of Technology and Research
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

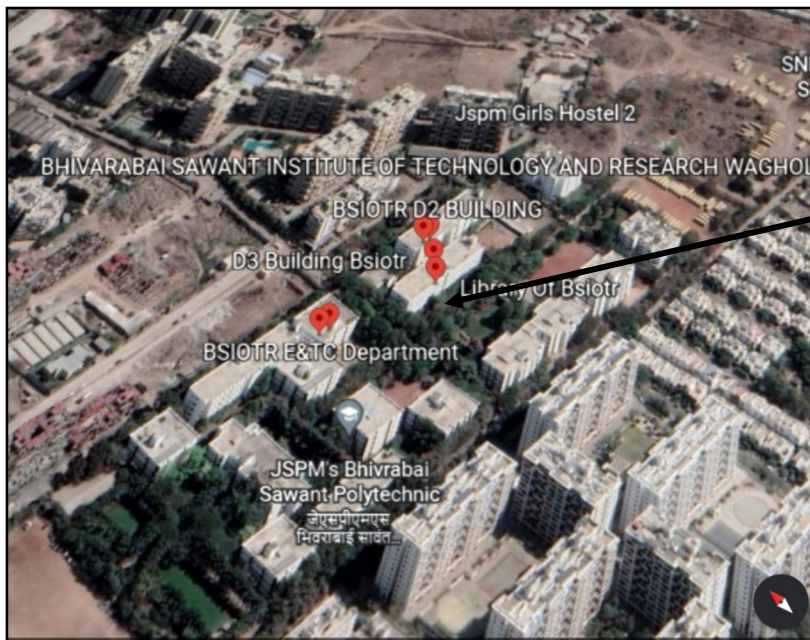
1.1 Objectives:

1. To study Connected Load
2. To study present Energy Consumption
3. To compute the present CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the Institute:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



Institute
Campus

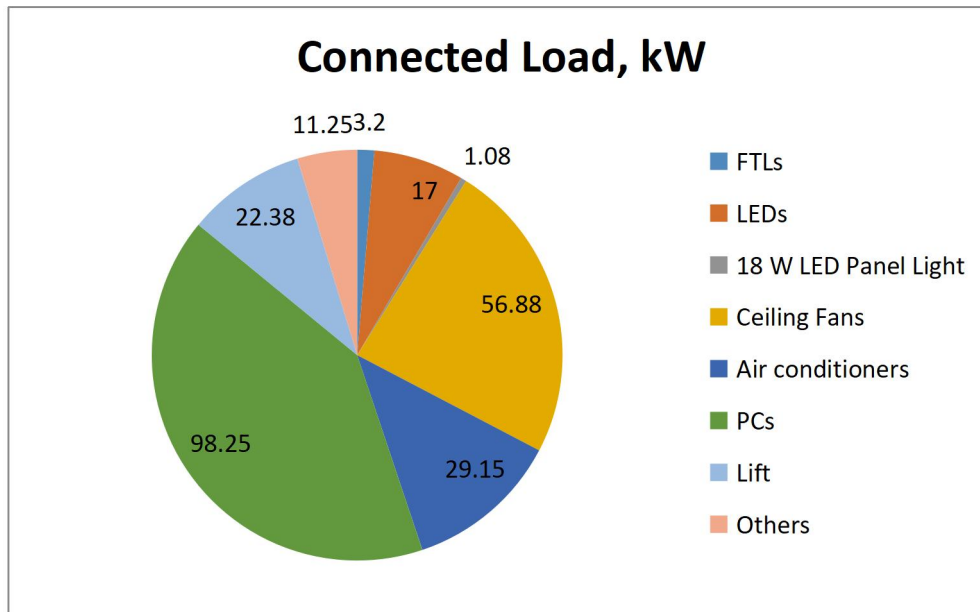
CHAPTER-II STUDY OF CONNECTED LOAD

The major contributors to the connected load of the Institute include:

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	FTLs	80	40	3.2
2	LEDs	850	20	17
3	18 W LED Panel Light	60	18	1.08
4	Ceiling Fans	875	65	56.88
5	Air conditioners	22	1325	29.15
6	PCs	655	150	98.25
7	Lift	2	11190	22.38
8	Others	75	150	11.25
9	Total			239

Chart No 1: Study of Connected Load:



CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy consumption.

Table No 3: Electrical Energy Purchase Details: 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	5912
2	May-21	4936
3	Jun-21	4785
4	Jul-21	7511
5	Aug-21	6709
6	Sep-21	7667
7	Oct-21	7787
8	Nov-21	7567
9	Dec-21	9812
10	Jan-22	6512
11	Feb-22	5785
12	Mar-22	5298
13	Total	80281
14	Maximum	9812
15	Minimum	4785
16	Average	6690

Chart No 2: Variation in Monthly Energy Purchased:

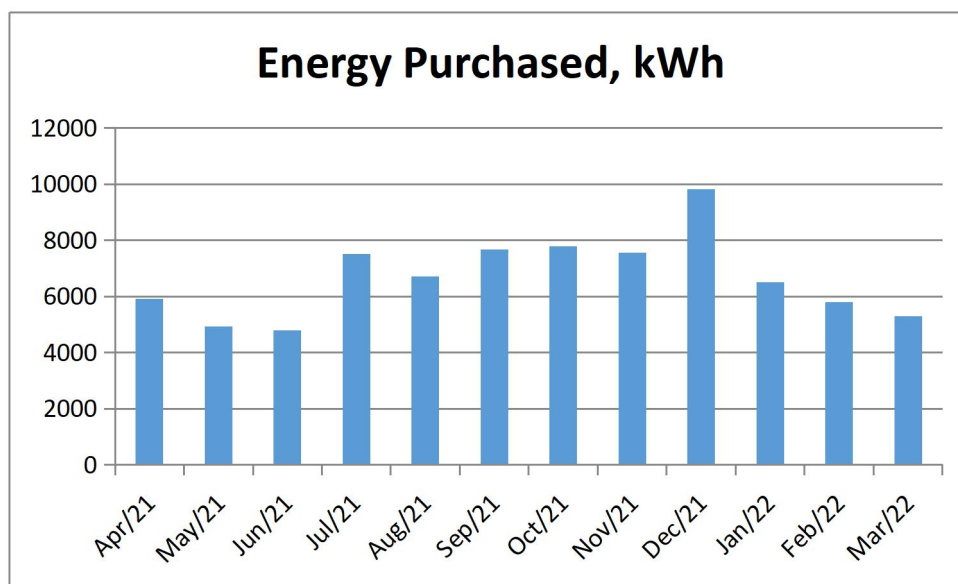


Table No 4: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	80281
2	Maximum	9812
3	Minimum	4785
4	Average	6690

CHAPTER-IV CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

- 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO2 Emissions, MT
1	Apr-21	5912	5.32
2	May-21	4936	4.44
3	Jun-21	4785	4.31
4	Jul-21	7511	6.76
5	Aug-21	6709	6.04
6	Sep-21	7667	6.90
7	Oct-21	7787	7.01
8	Nov-21	7567	6.81
9	Dec-21	9812	8.83
10	Jan-22	6512	5.86
11	Feb-22	5785	5.21
12	Mar-22	5298	4.77
13	Total	80281	72.25
14	Maximum	9812	8.83
15	Minimum	4785	4.31
16	Average	6690	6.0

Chart No 3: Month wise CO₂Emissions:

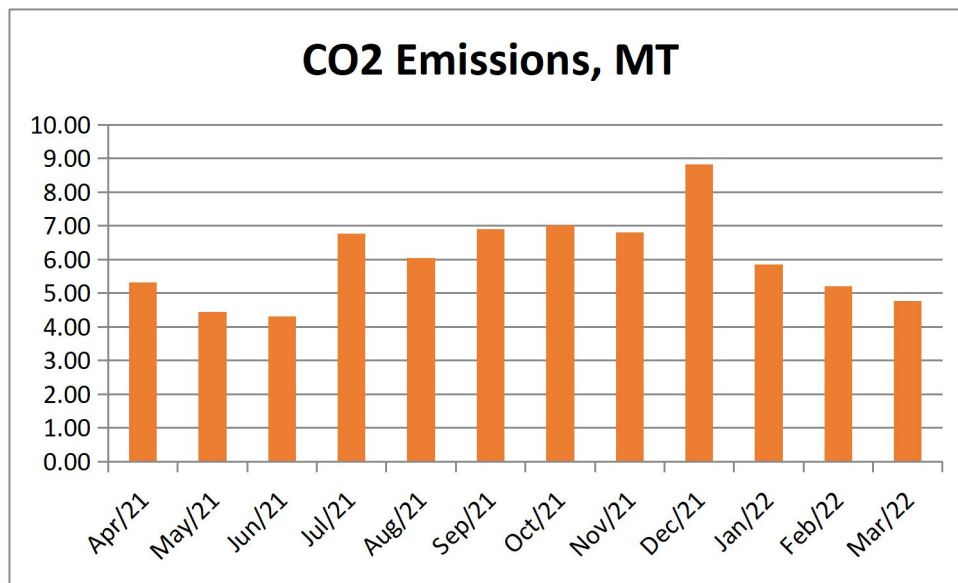


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	80281	72.25
2	Maximum	9812	8.83
3	Minimum	4785	4.31
4	Average	6690	6.0

CHAPTER-V STUDY OF USAGE OF ALTERNATE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**. In the following Table, we compute the percentage of Usage of Alternate Energy to Annual Energy Demand of the Institute.

Table No 7: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Energy purchased from MSEDCL	80281	kWh
2	Roof Top Solar PV Plant Capacity	13	kWp
3	Average Energy generated per kWp	4	kWh
4	Annual Energy Generation Days	300	Nos
5	Energy generated by Solar PV Plant in 21-22= $2*3*4$	15600	kWh
6	Total Energy Requirement = $1+5$	95881	kWh
7	% of Usage of Alternate Energy = $(5)*100/(6)$	16.27	%

Photograph of Roof Top Solar PV Plant:



CHAPTER VI

STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Annual Lighting power requirement.

Table No 8: Percentage of Usage of LED Lighting to Annual Lighting Load

No	Particulars	Value	Unit
1	Qty of FTL Fittings	80	Nos
2	Qty of 20 W LED Tube Lights	850	Nos
3	Qty of 18 W LED D/L Fitting	60	Nos
4	Demand of FTL Fitting	40	W/Unit
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Demand of 18 W LED Fitting	18	W/Unit
7	Total Electrical Load of FTL Fittings	3.2	kW
8	Total Electrical Load of 20 W LED Fittings	17	kW
9	Total Electrical Load of 18 W LED Fittings	1.08	kW
10	Total LED Lighting Load= 8+9	18.08	kW
11	Total Lighting Load=7+8+9	21.28	kW
12	% of LED Lighting to Total Lighting= $11 \times 100 / 11$	85	%

ENERGY AUDIT REPORT

of

Jayawant Shikshan Prasarak Mandal's,
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune



Year: 2022-23

Prepared by:

ENGRESS SERVICES

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



ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Mukhtangan 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/ BSIOTR /22-23/01

Date: 12/7/2023

CERTIFICATE

This is to certify that we have conducted Energy Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi. Pune, in the Academic year 2022-23.

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 13 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.

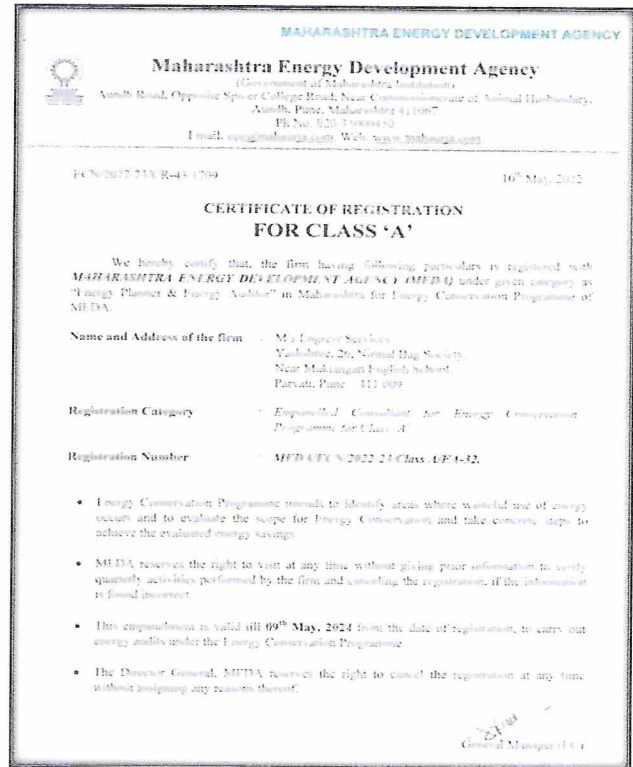
For Engress Services,



A Y Mehendale,
Certified Energy Auditor
EA-8192



REGISTRATION CERTIFICATES



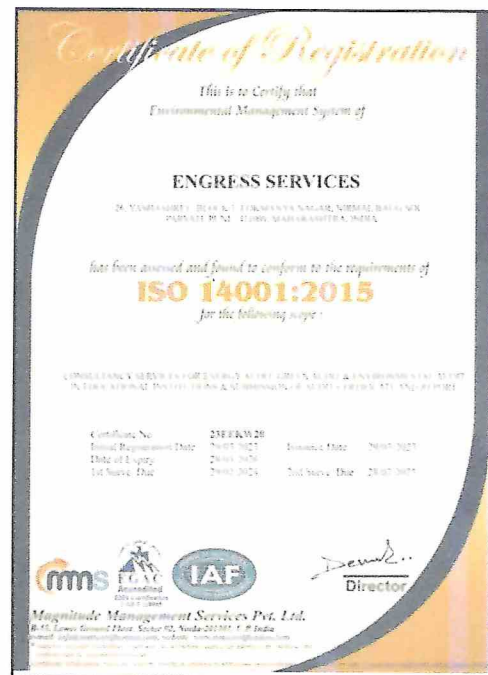
MEDA Registration Certificate



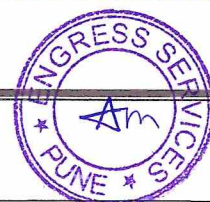
AUDITOR CERTIFICATE



ISO: 9001-2015 Certificate

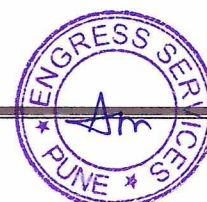


ISO: 14001-2015 Certificate



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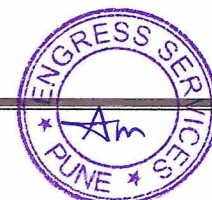
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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's, Bhivarabai Sawant Institute of Technology & Research Wagholi. 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. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	222	kW
2	Annual Energy Purchased	76820	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	76820	kWh
2	Annual Energy Generated	15600	kWh
3	Annual Energy Consumed=1+2	92420	kWh
4	Total Built up area of Institute	13030	m ²
5	Energy Performance Index =(3) / (4)	7.09	kWh/m ²

4. Study of Lighting Power Density & % Usage of LED Lighting:

No	Particulars	Value	Unit
1	Lighting Power Density	1.52	W/m ²
2	% of Usage of LED Lighting to Total Lighting Load	84	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Installation of **13 kWp** Roof Top Solar PV Plant

6. Assumptions:

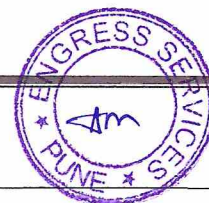
1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **300 Nos**

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

BSIOTR	:	Bhivarabai Sawant Institute of Technology and Research
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

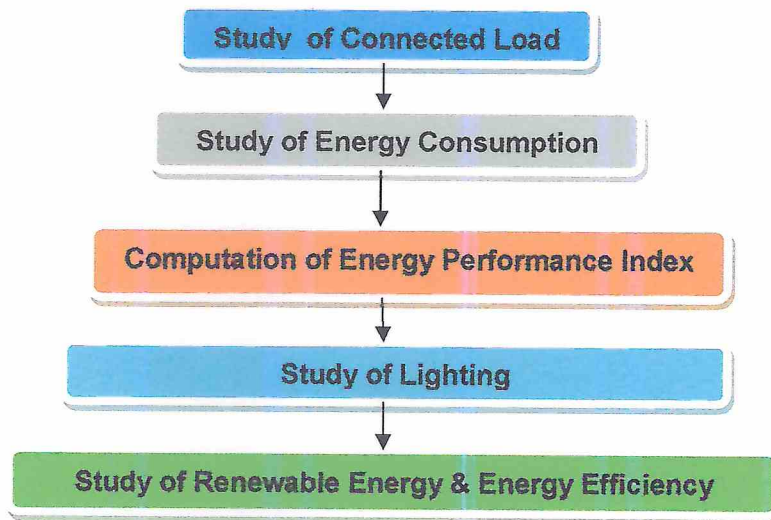
1.1 Introduction:

An Energy Audit is conducted at Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi, Pune.

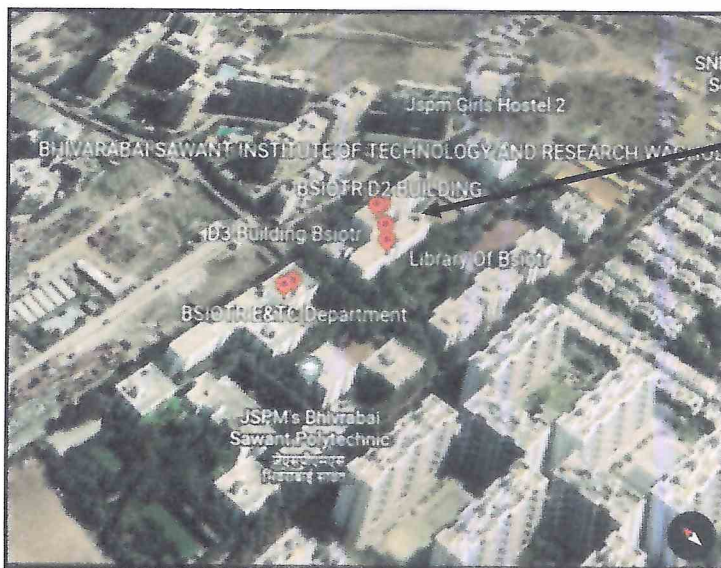
The guidelines followed for conducting the Energy Audit are:

- 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

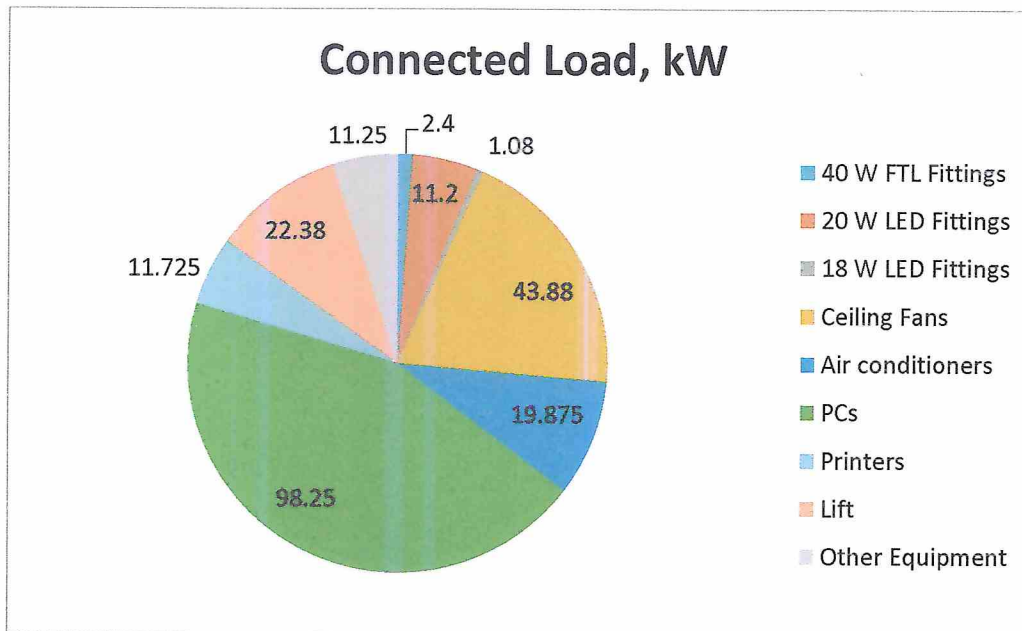
CHAPTER-II STUDY OF CONNECTED LOAD

The major contributors to the connected load of the Institute include:

Table No 1: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fittings	60	40	2.4
2	20 W LED Fittings	560	20	11.2
3	18 W LED Fittings	60	18	1.08
4	Ceiling Fans	675	65	43.88
5	Air conditioners	15	1325	19.875
6	PCs	655	150	98.25
7	Printers	67	175	11.725
8	Lift	2	11190	22.38
9	Other Equipment	75	150	11.25
10	Total			222

Chart No 1: Study of Connected Load:



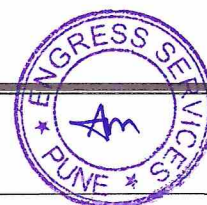
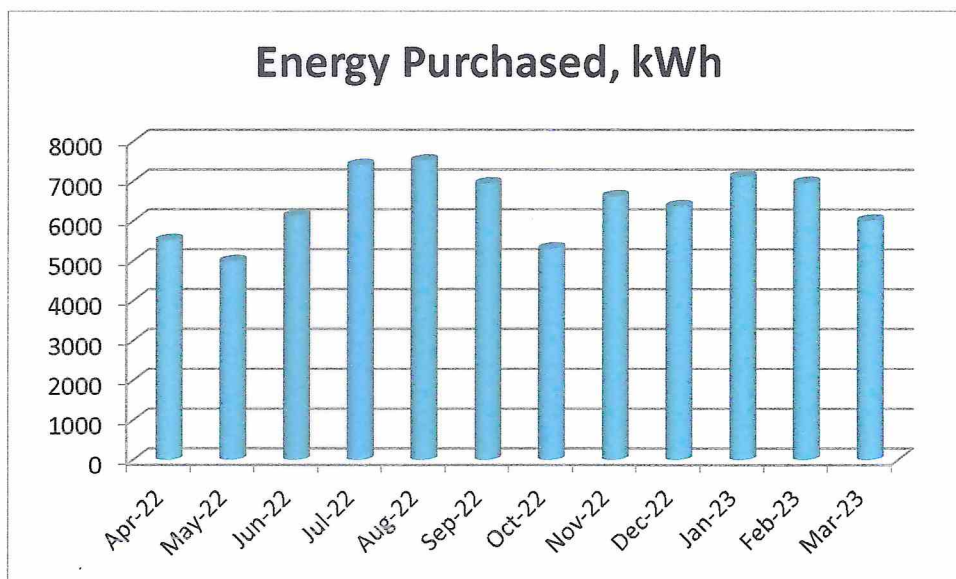
CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy consumption.

Table No 2: Electrical Energy Purchase Details: 2022-23:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-22	5513	4.96
2	May-22	4985	4.49
3	Jun-22	6126	5.51
4	Jul-22	7397	6.66
5	Aug-22	7512	6.76
6	Sep-22	6936	6.24
7	Oct-22	5298	4.77
8	Nov-22	6615	5.95
9	Dec-22	6363	5.73
10	Jan-23	7109	6.40
11	Feb-23	6958	6.26
12	Mar-23	6008	5.41
13	Total	76820	69.14
14	Maximum	7512	6.76
15	Minimum	4985	4.49
16	Average	6402	5.8

Chart No 2: Variation in Monthly Energy Purchased:



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	76820	kWh
2	Energy Generated by Solar PV Plant	15600	kWh
3	Total Energy Consumed= 1+2	92420	kWh
4	Total Built up area of Institute	13030	m ²
5	Energy Performance Index =(3) / (4)	7.09	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 Lighting Power Density of Class Room and 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: Computation of Lighting Power Density: Class Room: R-405:

No	Particulars	Value	Unit
1	Qty of 20 W LED Fittings in Class Room: R-405	5	Nos
2	Load of 420 W LED Fitting	20	W/unit
3	Total Load of 6 Nos, 40 W Fittings	100	W
4	Built up area of Class Room: R-405	66	m ²
5	Lighting Power Density = (3)/(4)	1.52	W/m ²

Table No 5: Percentage Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	Qty of 40 W FTL Fittings	60	Nos
2	Qty of 20 W LED Tube Lights	560	Nos
3	Qty of 18 W LED Fittings	60	Nos
4	Demand of 40 WFTL Fitting	40	W/Unit
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Demand of 18 W LED Fitting	18	W/Unit
7	Total Electrical Load of FTL Fittings	2.4	kW
8	Total Electrical Load of 20 W LED Fittings	11.2	kW
9	Total Electrical Load of 18 W LED Fittings	1.08	kW
10	Total LED Lighting Load= 8+9	12.28	kW
11	Total Lighting Load=7+8+9	14.68	kW
12	% of LED Lighting to Total Lighting = $10 \times 100 / 11$	84	%

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 13 kWp

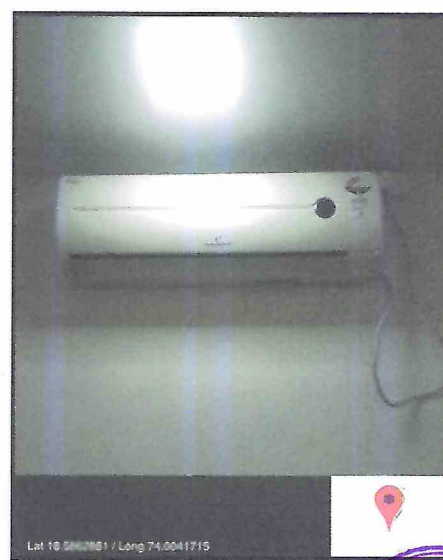
Photograph of Roof Top Solar PV Plant:



6.2 Energy Efficiency Measures adopted:

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

Photographs of LED Lighting:



ENVIRONMENTAL AUDIT REPORT
of
Jayawant Shikshan Prasarak Mandal's
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune



Year: 2020-21

Prepared by:

Enrich Consultants

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,

Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577

22nd April, 2021

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : **M/s Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Muktangan English School, Parvati,
Pune - 411009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2021-22/Class A/EA-03*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/BSIOTR /20-21/03

Date: 10/8/2021

CERTIFICATE

This is to certify that we have conducted Environmental Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi. Pune, in the Academic year 2020-21.

The College has adopted following Environment Friendly 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 **13 kWp**.
- Provision of Waste Collection Bins
- Installation of Organic Converter Unit to convert the organic Waste
- Installation of Sewage Treatment Plant of Capacity 500 m³/Day
- Tree Plantation in the campus

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

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor
EA-8192

INDEX

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi. Pune for awarding us the assignment of Environmental Audit of their Campus for the Year: 2020-21.

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

EXECUTIVE SUMMARY

1. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Various Pollution due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	76768	69.09
2	Maximum	8921	8.03
3	Minimum	4785	4.31
4	Average	6397	5.76

4. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity **13 kWp**.

5. Usage of Renewable Energy & Reduction in CO₂ Emissions:

- The College has installed Roof Top Solar PV Plant of Capacity **13 kWp**.
- The Electrical Energy generated in 20-21 is **15600 kWh**.
- Reduction in CO₂ Emissions in 2020-21 works out to be **14.04 MT**.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	143	75	90
2	Minimum	100	60	50

7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	29.2	41	256	74
2	Minimum	28.9	40	94	40

8. Waste Management:

8.1 Solid Waste Management:

The recyclable waste, like paper, plastic waste is handed over to Authorized waste collecting agent for further recycling.

8.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

8.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated Water is used for internal gardening purpose.

8.4 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

9. Rain Water Harvesting:

The Institute has installed the Rainwater harvesting project, the rain water falling on the terrace is collected and is used for recharging the bore well.

10. Sustainable Initiatives

- Maintenance of Internal Garden
- Provision of Sanitary Waste Incinerator
- Display of Posters on Resource Conservation

11. Notes & Assumptions:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
- Annual Solar Generation Days: **300 Nos.**

12. References:

- For CO₂ Emissions: www.tatapower.com
- For Energy Saved by Solar Thermal Water Heating System: www.mahaurja.com
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

1.2 Objectives:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To study Indoor Comfort Condition Parameters
5. To Study of Waste Management
6. To Study of Rain Water Harvesting
7. To Study of Sustainable Initiatives

1.3 General Details of College: Table No 4:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

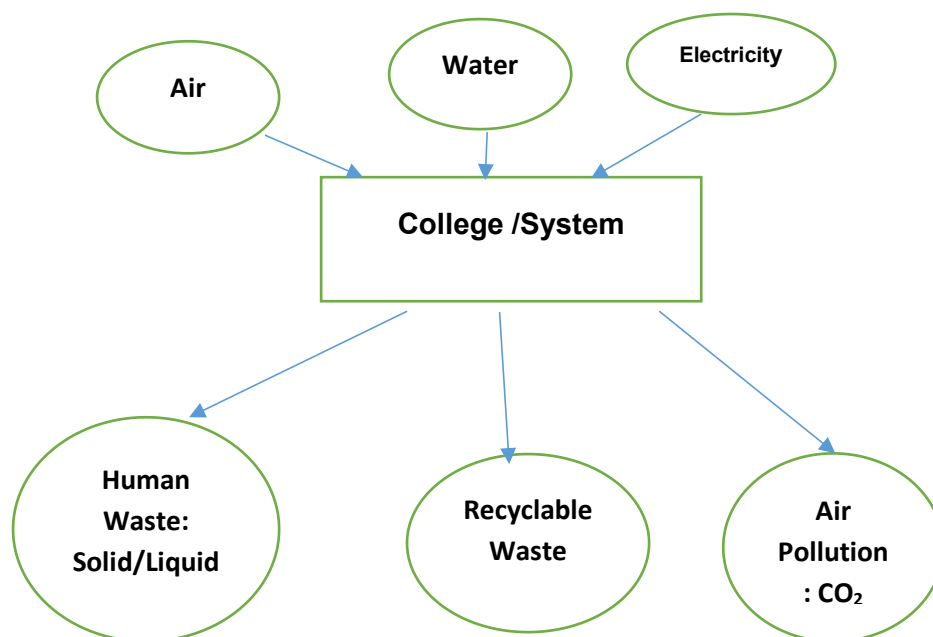
CHAPTER-II STUDY OF CONSUMPTION OF RECOURCES & CO₂ EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

Chart No 1: Representation of College as System & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy.

The basis of Calculation for CO₂ emissions due to LPG & Electrical Energy are as under

- 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 20-21:

No	Month	Energy Consumed kWh	CO ₂ Emissions, MT
1	Jul-20	5339	4.81
2	Aug-20	6347	5.71
3	Sep-20	6774	6.10
4	Oct-20	6828	6.15
5	Nov-20	6099	5.49
6	Dec-20	6969	6.27

7	Jan-21	7069	6.36
8	Feb-21	6787	6.11
9	Mar-21	8921	8.03
10	Apr-21	5912	5.32
11	May-21	4936	4.44
12	Jun-21	4785	4.31
13	Total	76768	69.09
14	Maximum	8921	8.03
15	Minimum	4785	4.31
16	Average	6397	5.76

Chart No 2: Month wise CO₂ Emissions:

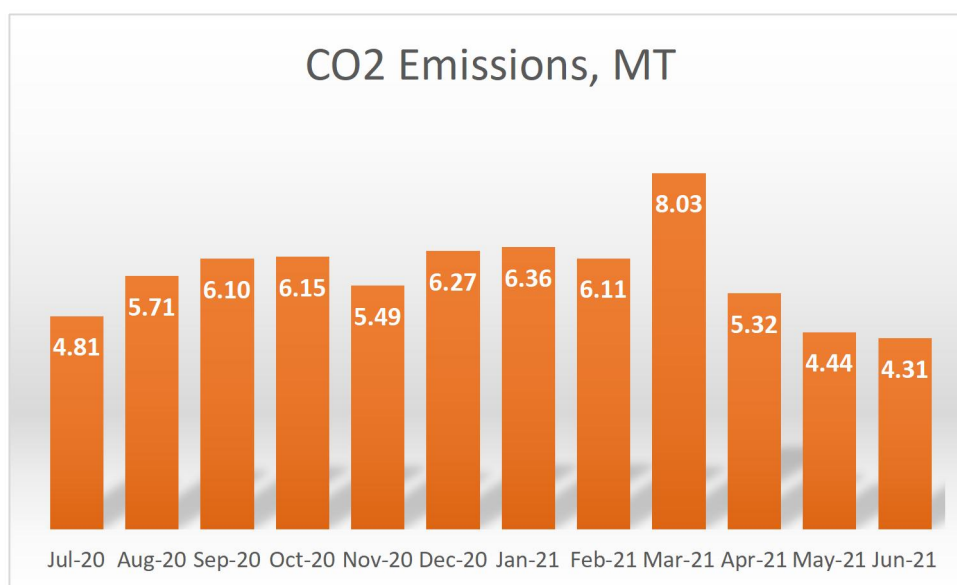


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	76768	69.09
2	Maximum	8921	8.03
3	Minimum	4785	4.31
4	Average	6397	5.76

CHAPTER III STUDY OF CO₂ EMISSION REDUCTION

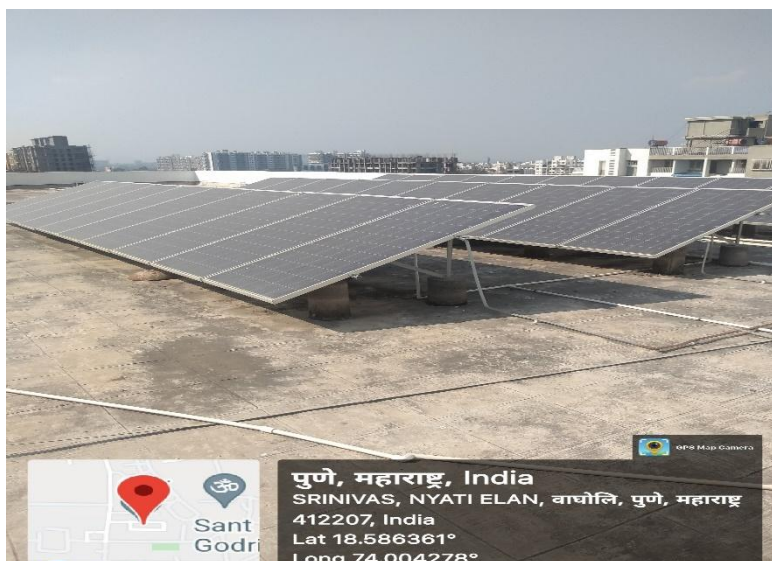
The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.

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

Table No 6: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	13	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: 20-21	15600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO₂ Saved by Solar PV Plant = (4)*(5) /1000	14.04	MT of CO₂

Photograph of Roof Top Solar PV Plant:



CHAPTER IV STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 'air pollution' has been defined as 'the presence in the atmosphere of any air pollutant.'

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as 'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10 micron

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
	Building D1			
	Ground Floor			
1	101 Computer Centre	110	63	52
2	103 Theory Of Machines Lab	112	68	54

3	104 Heat Transfer Lab	120	69	56
4	110 Fluid mechanics Lab	109	62	50
	First Floor			
1	IQAC Head Cabin	120	62	84
2	Interior Room	113	66	86
3	Admin Office	142	73	87
4	R-206	143	74	87
	Second Floor			
1	301 Microprocessor Lab	103	61	78
2	302 Multimedia Lab	112	64	80
3	303 Network lab	113	65	80
4	304 Project Lab	102	60	78
	Third Floor			
1	405 Programming lab	103	61	76
2	412 PG Tutorial Room	102	61	75
3	Seminar Hall	103	62	78
4	404 Research Lab	100	60	70
	Building D2			
	Ground Floor			
1	Library	103	61	79
	First Floor			
1	205 Refrigeration & AC Lab	123	65	81
2	211 Lecture Hall	113	67	82
3	2 4 Lecture Hall	123	69	82
	Second Floor			
1	313 Lecture Hall	142	74	88
2	305 Electrical Machine Lab	141	75	89
3	312 Electrical Measurements & Machine Lab	142	74	88
4	304 Lecture Hall	143	72	82
	Third Floor			
1	412 Material Science Lab	110	65	78
2	413 Analog & Digital Electronics Lab	123	64	82
3	411 High Voltage engg. Lab	130	65	86
4	403 Lecture Hall	112	65	71
	Fourth Floor			
1	512 LH-(D-Div)	120	67	81
2	511 Basic Electronics Lab	123	69	82
3	505 Basic Civil & Environmental Lab	120	66	80
4	504 LH(A-Div)	110	64	78
	Building D3			
	Ground Floor			
1	102 Staff Room	113	63	80

2	103 Staff Room	112	65	81
3	106 PG Lab	120	70	84
4	109 PG Tutorial Room	118	65	85
	First Floor			
1	206 Project & Design Lab	100	60	74
2	202 Embedded System Lab	133	70	90
3	201 Wave Theory	123	68	86
	Second Floor			
1	305 Classroom	120	64	85
2	306 Classroom	123	65	87
3	307 Classroom	112	64	84
4	301 PG Research Lab	121	68	87
	Third Floor			
1	402 Staff Room	103	62	81
2	403 Staff Room	102	60	80
3	405 Network & Power Lab	106	61	82
	Maximum	143	75	90
	Minimum	100	60	50

CHAPTER V

STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit.

The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 9: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
	Building D1				
	Ground Floor				
1	101 Computer Centre	29	40	184	42
2	103 Theory Of Machines Lab	29.1	40	159	56
3	104 Heat Transfer Lab	29	41	192	52
4	110 Fluid mechanics Lab	28.9	41	152	74
	First Floor				
1	IQAC Head Cabin	29.1	41	94	64
2	Interior Room	29	41	104	52
3	Admin Office	29	40	116	56
4	R-206	29	40	152	49
	Second Floor				
1	301 Microprocessor Lab	29	40	156	45
2	302 Multimedia Lab	29	41	152	41.3
3	303 Network lab	28.9	41	152	56.2
4	304 Project Lab	29.2	41	123	65
	Third Floor				
1	405 Programming lab	29	40	152	61
2	412 PG Tutorial Room	29	40	152	62.3
3	Seminar Hall	29.1	40	163	65
4	404 Research Lab	28.9	40	202	69
	Building D2				
	Ground Floor				
1	Library	29	41	123	40
	First Floor				
1	205 Refrigeration & AC Lab	29.1	41	142	42.1

2	211 Lecture Hall	29	40	202	46
3	2 4 Lecture Hall	28.9	40	213	58
	Second Floor				
1	313 Lecture Hall	29	40	256	45
2	305 Electrical Machine Lab	29	40	125	56
3	312 Electrical Measurements & Machine Lab	29.1	40	120	57
4	304 Lecture Hall	29.1	41	142	59
	Third Floor				
1	412 Material Science Lab	28.9	41	120	54
2	413 Analog & Digital Electronics Lab	28.9	41	114	49
3	411 High Voltage engg. Lab	29	41	156	49.3
4	403 Lecture Hall	29	40	209	48
	Fourth Floor				
1	512 LH-(D-Div)	29.1	40	145	41
2	511 Basic Electronics Lab	29.1	40	178	42.3
3	505 Basic Civil & Environmental Lab	29	41	145	42
4	504 LH(A-Div)	29	41	123	54
	Building D3				
	Ground Floor				
1	102 Staff Room	29	40	123	41
2	103 Staff Room	29	40	125	45
3	106 PG Lab	29	41	126	47
4	109 PG Tutorial Room	28.9	40	156	42.3
	First Floor				
1	206 Project & Design Lab	28.9	40	96	41.6
2	202 Embedded System Lab	29.1	40	97	57
3	201 Wave Theory	29.1	40	201	59
	Second Floor				
1	305 Classroom	29	40	132	45
2	306 Classroom	29	40	139	42
3	307 Classroom	29.1	41	126	41.6
4	301 PG Research Lab	28.9	41	212	64
	Third Floor				
1	402 Staff Room	29	41	152	59
2	403 Staff Room	29	41	220	58
3	405 Network & Power Lab	29.1	41	200	52
	Maximum	29.2	41	256	74
	Minimum	28.9	40	94	40

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Solid Waste Management:

The recyclable waste, like paper waste is handed over to authorized waste collecting agent for further recycling.

Photograph of Waste Collection Bin:



6.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

Photograph of Organic Converter Unit:



6.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated water is used for internal gardening purpose.

Photograph of Sewage Treatment Plant:



6.4 E-Waste Management: The E-Waste is disposed of through Authorized Agency.

CHAPTER-VII 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 gathered and is used to recharge the bore well.

Photograph of Rain water Harvesting Pipe Section:



CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



ANNEXURE-I: VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR 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 Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5

3. 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

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

No	Parameter	Value
1	Temperature	Less Than 33 ⁰ C
2	Humidity	Less Than 70%

ENVIRONMENTAL AUDIT REPORT
of
JAYAWANT SHIKSHAN PRASARAK MANDAL'S
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY &
RESEARCH, WAGHOLI, PUNE



Year: 2021-22

Prepared by:

ENGRESS SERVICES

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,

Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709

10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
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Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Mukangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/BSIOTR/21-22/03

Date: 10/5/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi. Pune, in the Academic year 2021-22.

The Institute has adopted following Environment Friendly 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 13 kWp.
- Provision of Waste Collection Bins
- Installation of Organic Converter Unit to convert the organic Waste
- Installation of Sewage Treatment Plant of Capacity 500 m³/Day
- Tree Plantation in the campus

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,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi. Pune for awarding us the assignment of Environmental Audit of their Campus for the Year: 2021-22.

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

EXECUTIVE SUMMARY

1. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Pollution due to Institute Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	80281	72.25
2	Maximum	9812	8.83
3	Minimum	4785	4.31
4	Average	6690	6.0

4. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity **13 kWp**.

5. Usage of Renewable Energy & Reduction in CO₂ Emissions:

- The Institute has installed Roof Top Solar PV Plant of Capacity **13kWp**.
- The Electrical Energy generated in 21-22 is **15600 kWh**.
- Reduction in CO₂ Emissions in 2021-22 works out to be **14.04 MT**.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	76	49	55
2	Minimum	64	38	41

7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	26	78	185	47
2	Minimum	25.5	77	139	41.3

8. Waste Management:

8.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and handed over to Authorized waste collecting agency for further recycling.

8.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

8.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated Water is used for internal gardening purpose.

8.4 E-Waste Management:

The E-Waste is disposed of through Authorized Agency.

9. Rain Water Harvesting:

The Institute has installed the Rainwater harvesting project; the rain water falling on the terrace is collected and is used for recharging the bore well.

10. Environment Friendly Initiatives:

- Maintenance of Internal Garden

11. Notes & Assumptions:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
- Annual Solar Generation Days: **300 Nos.**

12. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar Energy generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	: Kilo Gram
MSEDCL	: Maharashtra State Distribution Company Limited
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board
ISHRAE	: The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

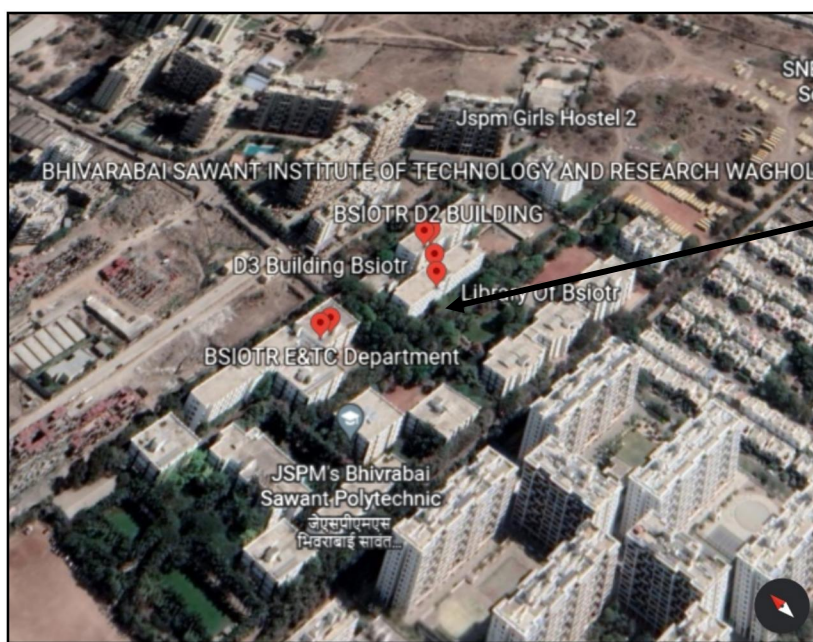
1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

1.2 Objectives:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To study Indoor Comfort Condition Parameters
5. To Study of Waste Management
6. To Study of Rain Water Harvesting
7. To Study of Eco Friendly Initiatives

1.3 Google Earth Image:



**Institute
Campus**

1.4 General Details of Institute: Table No 4:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

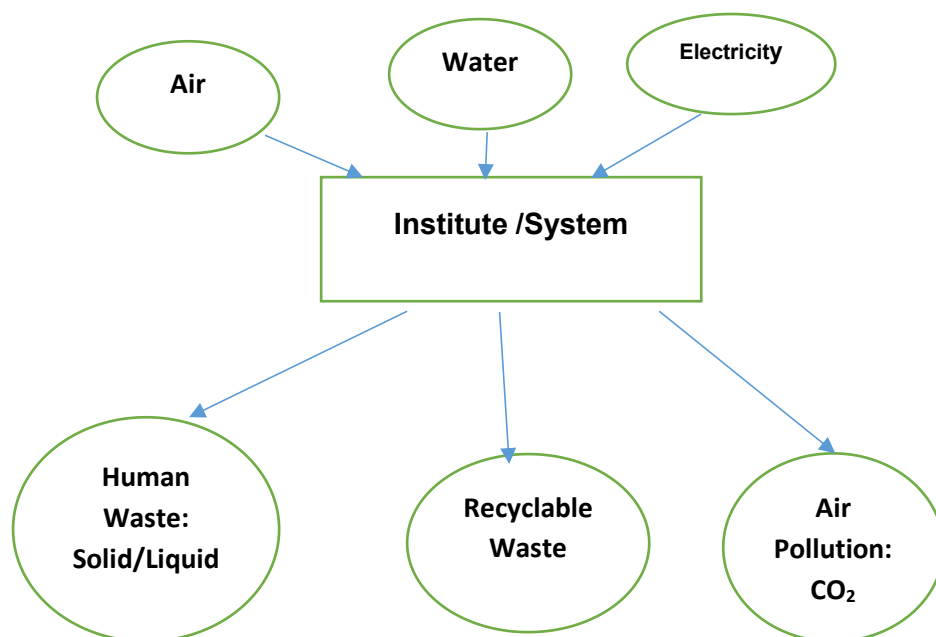
CHAPTER-II STUDY OF CONSUMPTION OF RECOURCES & CO₂ EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the Institute System & Environment as under.

Chart No 1: Representation of Institute as System & Study of Resources & Waste:



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under

- 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 21-22:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	5912	5.32
2	May-21	4936	4.44
3	Jun-21	4785	4.31
4	Jul-21	7511	6.76
5	Aug-21	6709	6.04
6	Sep-21	7667	6.90
7	Oct-21	7787	7.01
8	Nov-21	7567	6.81

9	Dec-21	9812	8.83
10	Jan-22	6512	5.86
11	Feb-22	5785	5.21
12	Mar-22	5298	4.77
13	Total	80281	72.25
14	Maximum	9812	8.83
15	Minimum	4785	4.31
16	Average	6690	6.0

Chart No 2: Month wise CO₂ Emissions:

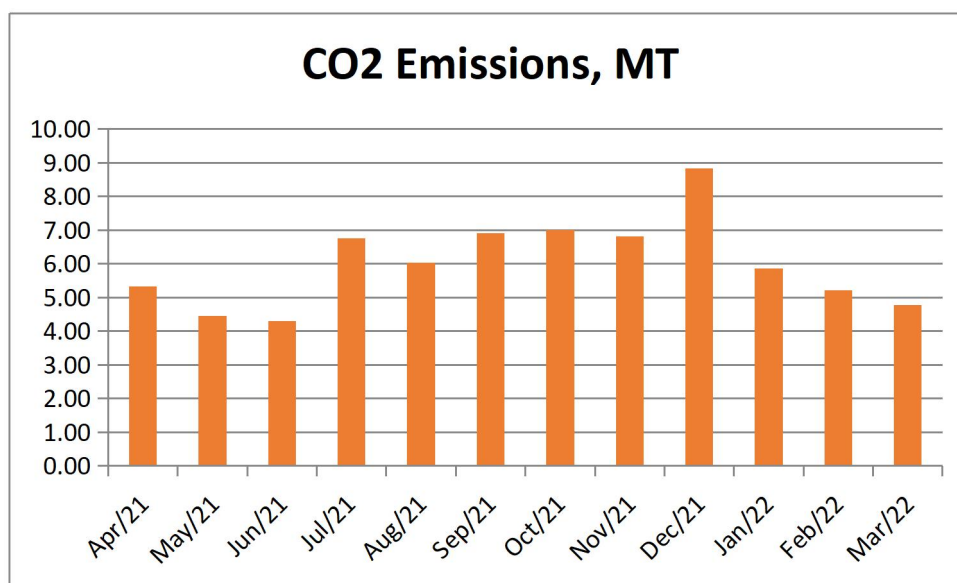


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	80281	72.25
2	Maximum	9812	8.83
3	Minimum	4785	4.31
4	Average	6690	6.0

CHAPTER III STUDY OF CO₂ EMISSION REDUCTION

The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**. In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof TOP Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	13	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: 21-22	15600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO₂ Saved by Solar PV Plant = (4)*(5) /1000	14.04	MT of CO₂

Photograph of Roof Top Solar PV Plant:



CHAPTER IV STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 'air pollution' has been defined as 'the presence in the atmosphere of any air pollutant.'

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as 'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10micron

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
	D-1			
1	R-504	66	42	49
2	R-503	65	40	51

3	R-414	65	38	44
4	R-306	75	45	55
5	Admin Office	64	40	51
6	R-103	76	49	52
	D-2			
1	Library	66	40	49
2	R-204	64	40	41
3	R-214	76	42	47
4	R-311	65	39	51
	Maximum	76	49	55
	Minimum	64	38	41

CHAPTER V

STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit.

The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 9: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
	D-1				
1	R-504	26	77	184	42.3
2	R-503	26	77	145	45
3	R-414	25.8	77	159	46.1
4	R-306	25.6	78	152	45
5	Admin Office	25.6	77	149	47
6	R-103	25.8	77	178	41.3
	D-2				
1	Library	25.5	78	169	45
2	R-204	25.6	77	139	45.6
3	R-214	25.5	77	167	46
4	R-311	25.6	78	185	46.3
	Maximum	26	78	185	47
	Minimum	25.5	77	139	41.3

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source and is handed over to authorized waste collecting agent for further recycling.

Photograph of Waste Collection Bins:



6.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

Photograph of Organic Converter Unit:



6.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated water is used for internal gardening purpose.

Photograph of Sewage Treatment Plant:



6.4 E-Waste Management: The E-Waste is disposed of through Authorized Agency.

CHAPTER-VII STUDY OF RAIN WATER HARVESTING

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

Photograph of Rain water Harvesting Pipe and Bore well Recharge Section:



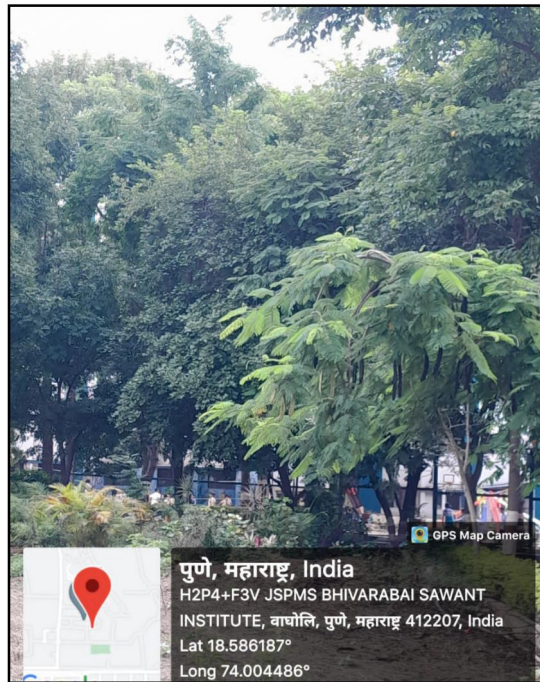
CHAPTER-VIII

STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



**ANNEXURE-I:
VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR
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 Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5

3. 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

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

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

ENVIRONMENTAL AUDIT REPORT

of
Jayawant Shikshan Prasarak Mandal's,
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune



Year: 2022-23

Prepared by:

ENGRESS SERVICES

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



ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Mukhtangan 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)

ENVIRONMENTAL AUDIT CERTIFICATE

Certificate No: ES/BSIOTR/22-23/03

Date: 12/7/2023

This is to certify that we have conducted Environmental Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi. Pune, in the Academic year 2022-23.

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- Installation of Roof Top Solar PV Plant of Capacity 13 kWp
- Segregation of Waste at Source
- Installation of Organic Converter Unit for conversion of Organic Waste
- Installation of Sewage Treatment Plant of Capacity
- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness on Energy Conservation, by Display of Poster

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

For Engress Services,

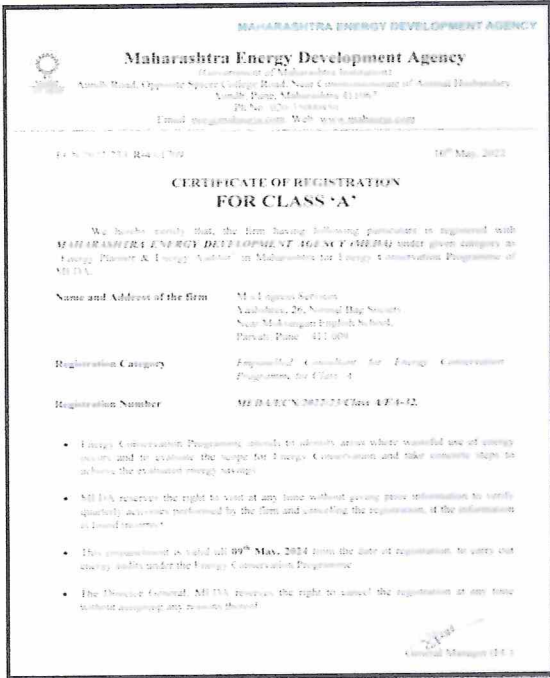


A Y Mehendale,

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

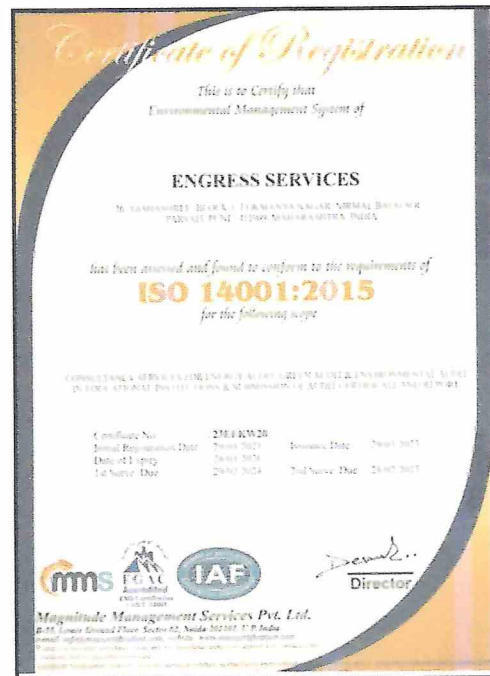


REGISTRATION CERTIFICATES



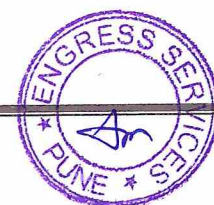
MEDA REGISTRATION CERTIFICATE

ASSOCHAM GEM CP CERTIFICATE



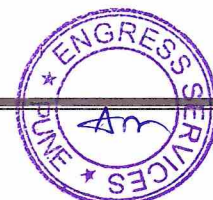
ISO: 9001-2015 CERTIFICATE

ISO: 14001-2015 CERTIFICATE



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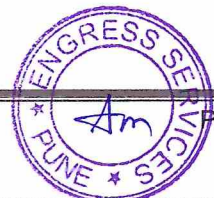
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I	Indoor Air Quality, Noise, & Indoor Comfort Standards	20



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- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Purchased	76820	kWh
2	Annual CO ₂ Emissions	69.14	MT

4. Renewable Energy & Reduction in CO₂ Emissions:

- The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.
- The Energy generated by Solar PV Plant in 22-23 is **15600 kWh**.
- Reduction in CO₂ Emissions in 22-23 is **14.04 MT**

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	70	43	64
2	Minimum	63	38	46

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	29.1	41	212	64
2	Minimum	28.9	40	97	41.6

7. Waste Management:

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

8. Rain Water Harvesting:

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

9. Environment Friendly Initiatives:

- Tree Plantation in the campus.
- Creation of awareness on Energy Conservation Display of Posters

10. Assumptions:

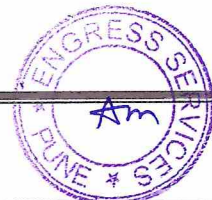
1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **300 Nos**

11. References:

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1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.4 Audit Procedural Steps:



1.3 Google Earth Image:



Institute
Campus

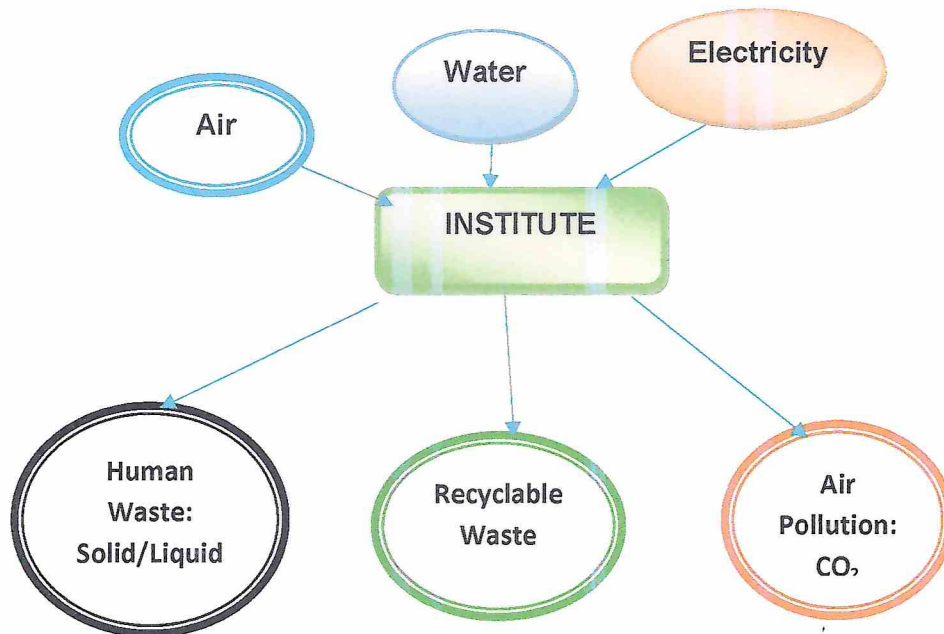


CHAPTER-II

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the Institute System & Environment as under.
Chart No 1: Representation of Institute as System & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

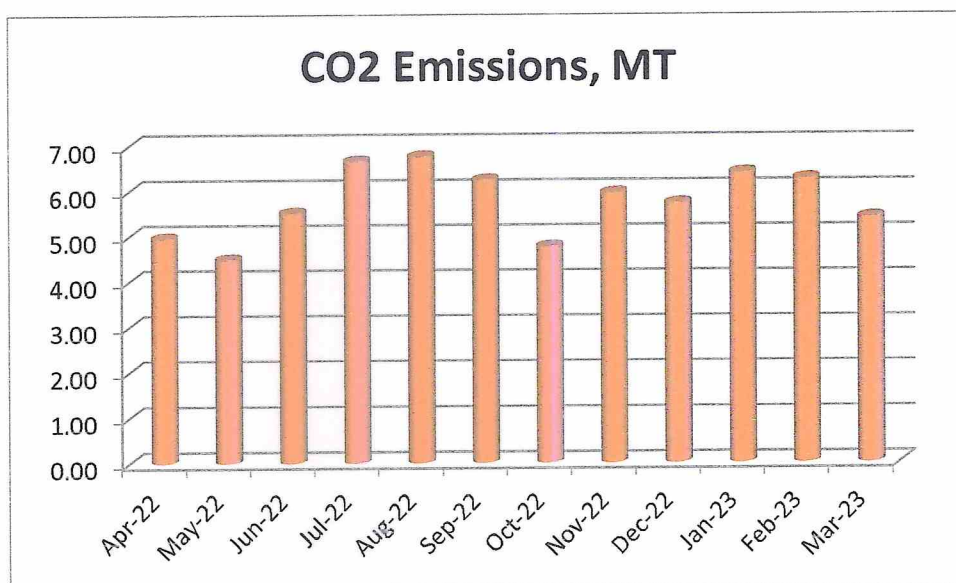
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Table No 1: Study of Purchase of Energy & CO₂ Emissions: 22-23:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-22	5513	4.96
2	May-22	4985	4.49
3	Jun-22	6126	5.51
4	Jul-22	7397	6.66
5	Aug-22	7512	6.76
6	Sep-22	6936	6.24
7	Oct-22	5298	4.77

8	Nov-22	6615	5.95
9	Dec-22	6363	5.73
10	Jan-23	7109	6.40
11	Feb-23	6958	6.26
12	Mar-23	6008	5.41
13	Total	76820	69.14
14	Maximum	7512	6.76
15	Minimum	4985	4.49
16	Average	6402	5.8

Chart No 2: Month wise CO₂ Emissions:



CHAPTER III STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity 13 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	13	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: 21-22	15600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	14.04	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



CHAPTER IV STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10 micron

Table No 3: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
1	Lecture Hall	70	43	52
2	Electrical Measurements & Machine Lab	64	39	64
3	Analog & Digital Electronics Lab	63	38	54
4	Basic Civil & Environmental Lab	63	38	46
5	Staff Room	65	39	50
	Maximum	70	43	64
	Minimum	63	38	46

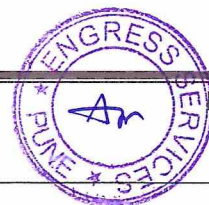
CHAPTER V STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit. The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 5: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Lecture Hall	29.1	41	126	41.6
2	Electrical Measurements & Machine Lab	28.9	41	212	64
3	Analog & Digital Electronics Lab	29.1	40	97	57
4	Basic Civil & Environmental Lab	29.1	40	201	59
5	Staff Room	28.9	41	120	54
	Maximum	29.1	41	212	64
	Minimum	28.9	40	97	41.6



CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source and is handed over to authorized waste collecting agent for further recycling.

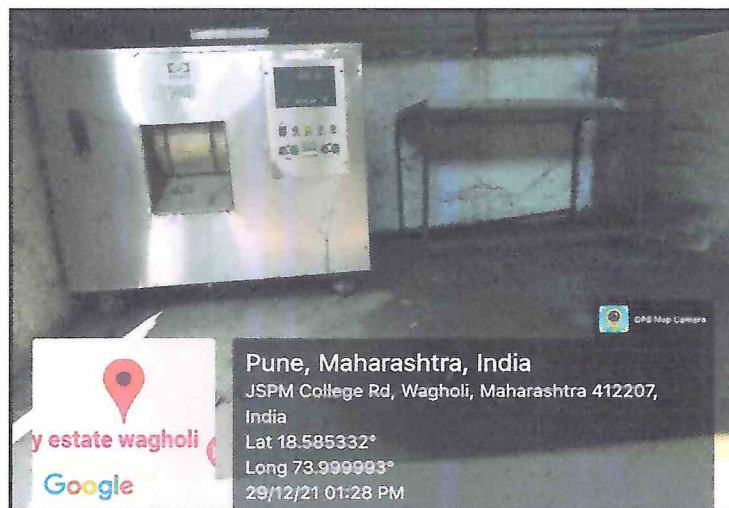
Photograph of Waste Collection Bins:



6.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

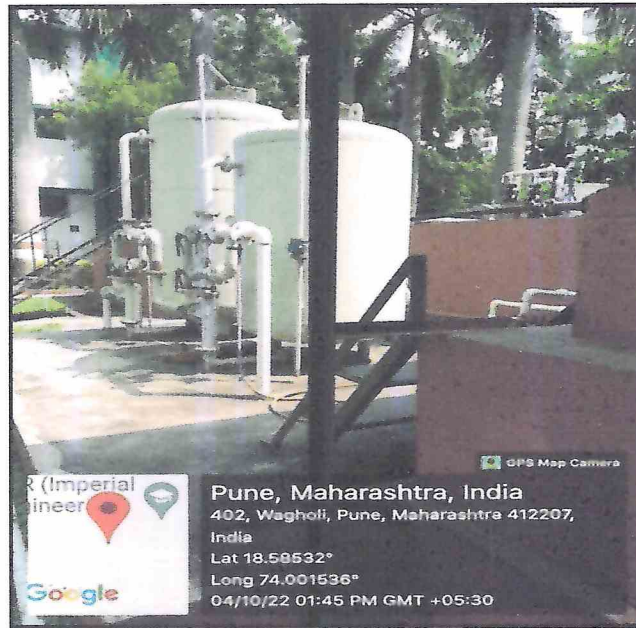
Photograph of Organic Converter Unit:



6.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated water is used for Gardening purpose.

Photograph of Sewage Treatment Plant:



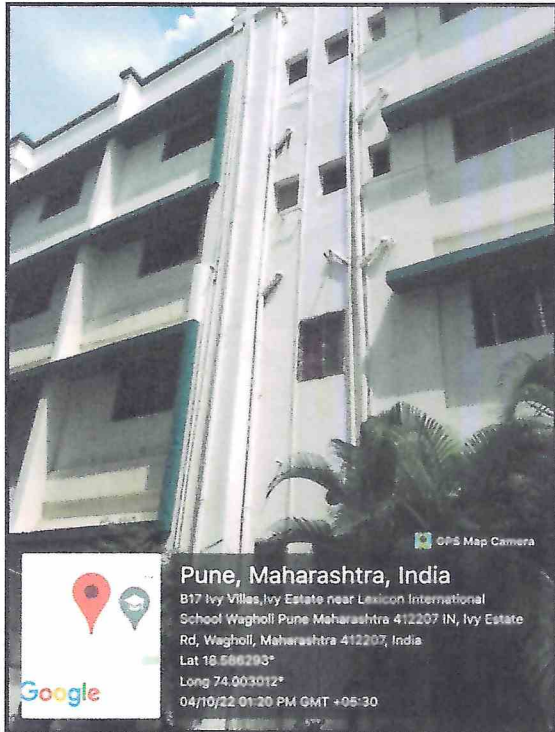
6.4 E-Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

CHAPTER-VII STUDY OF RAIN WATER HARVESTING

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

Photograph of Rain water Harvesting Pipe and Bore well Recharge Section:



CHAPTER-VIII STUDY OF ECO FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

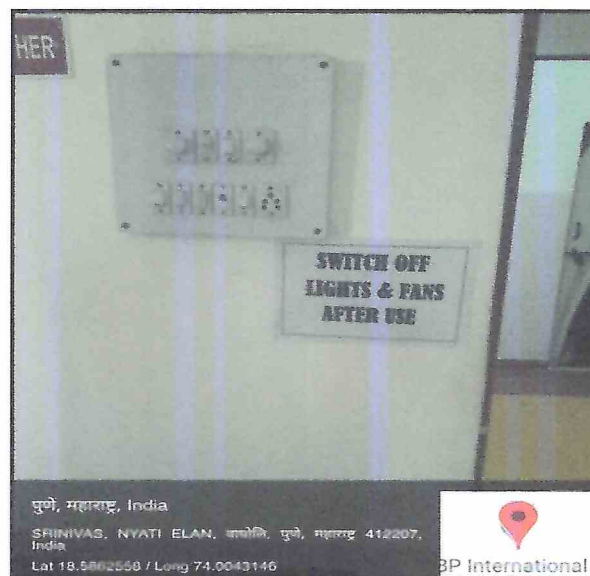
Photograph of Tree plantation:



8.2 Creation of Awareness about Energy Conservation:

The Institute has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



**ANNEXURE-I:
AIR QUALITY, NOISE & INDOOR 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%

GREEN AUDIT REPORT
of
Jayawant Shikshan Prasarak Mandal's
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune



Year: 2020-21

Prepared by:

Enrich Consultants

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,

Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577

22nd April, 2021

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : **M/s Enrich Consultants**
Yashashree, Plot No. 26, Nirmal Bag Society,
Near Mukhtangan English School, Parvati,
Pune - 411009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2021-22/Class A/EA-03*

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- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com

Ref: EC/BSIOTR /20-21/02

Date: 10/8/2021

CERTIFICATE

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The Institute has adopted following Green Initiatives:

- 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 13 kWp
- Provision of Waste Collection Bins
- Installation of Organic Converter Unit to convert the organic Waste
- Installation of Sewage Treatment Plant of Capacity 500 m³/Day
- Maintenance of good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan

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

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi. Pune for awarding us the assignment of Green Audit of their Campus for the Year: 2020-21.

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

EXECUTIVE SUMMARY

1. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	76768	69.09
2	Maximum	8921	8.03
3	Minimum	4785	4.31
4	Average	6397	5.76

3. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp.

4. Usage of Renewable Energy:

- The Institute has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 20-21 is **15600 kWh**.
- Reduction in CO₂ Emissions in 2020-21 works out to be **14.04 MT**.

5. Waste Management:

5.1 Solid Waste Management:

The recyclable waste, like paper, plastic waste is handed over to Authorized waste collecting agent for further recycling.

5.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

5.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated Water is used for internal gardening purpose.

5.4 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

6. Rain Water Harvesting:

The Institute has installed the Rainwater harvesting project, the rain water falling on the terrace is collected and is used for recharging the bore well.

7. Green & Sustainable Initiatives

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan

8. Notes & Assumptions:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
- Annual Solar Generation Days: **300 Nos.**

9. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar 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 Objectives:

1. To study present Energy Consumption
2. To Study CO₂ emissions
3. To study usage of Renewable Energy
4. Study of Waste Management
5. Study of Rain Water Harvesting
6. Study of Green & Sustainable Practices

1.2 General Details of Institute: Table No 1:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Bills

Table No 2: Electrical Bill Analysis- 2020-21:

No	Month	Energy Consumed kWh
1	Jul-20	5339
2	Aug-20	6347
3	Sep-20	6774
4	Oct-20	6828
5	Nov-20	6099
6	Dec-20	6969
7	Jan-21	7069
8	Feb-21	6787
9	Mar-21	8921
10	Apr-21	5912
11	May-21	4936
12	Jun-21	4785
13	Total	76768
14	Maximum	8921
15	Minimum	4785
16	Average	6397

Chart No 1: Variation in Monthly Energy Consumption:

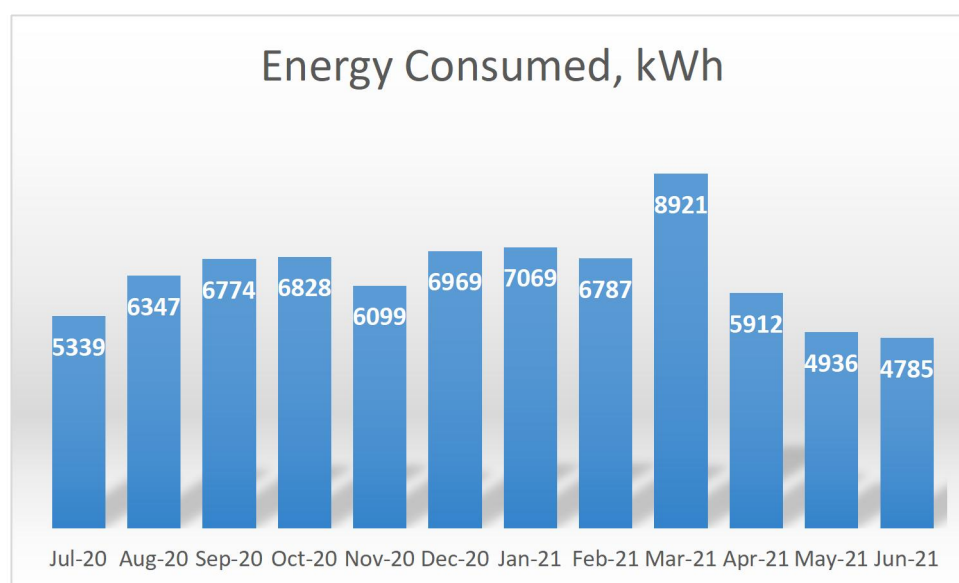


Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	76768
2	Maximum	8921
3	Minimum	4785
4	Average	6397

CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to LPG & Electrical Energy are as under

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Jul-20	5339	4.81
2	Aug-20	6347	5.71
3	Sep-20	6774	6.10
4	Oct-20	6828	6.15
5	Nov-20	6099	5.49
6	Dec-20	6969	6.27
7	Jan-21	7069	6.36
8	Feb-21	6787	6.11
9	Mar-21	8921	8.03
10	Apr-21	5912	5.32
11	May-21	4936	4.44
12	Jun-21	4785	4.31
13	Total	76768	69.09
14	Maximum	8921	8.03
15	Minimum	4785	4.31
16	Average	6397	5.76

Chart No 2: Month wise CO₂ Emissions:

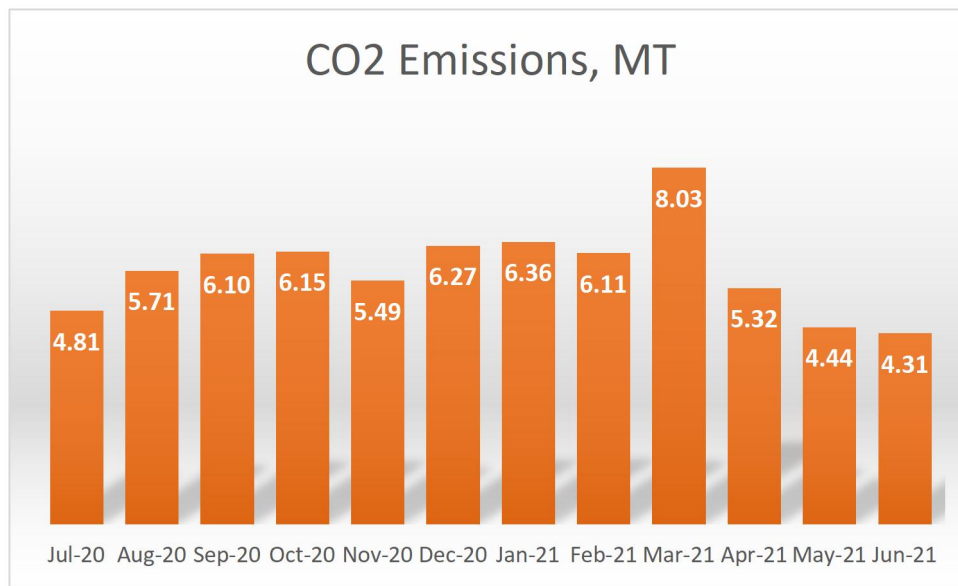


Table No 5: Variation in Important Parameters:

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1	Total	76768	69.09
2	Maximum	8921	8.03
3	Minimum	4785	4.31
4	Average	6397	5.76

CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.

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

Table No 6: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	13	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: 20-21	15600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO₂ Saved by Solar PV Plant = (4)*(5) /1000	14.04	MT of CO₂

Photograph of Roof Top Solar PV Plant:



CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Solid Waste Management:

The recyclable waste, like paper waste is handed over to authorized waste collecting agent for further recycling.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

Photograph of Organic Converter Unit:



5.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated water is used for internal gardening purpose.

Photograph of Sewage Treatment Plant:



5.4 E-Waste Management: The E-Waste is disposed of through Authorized Agency.

CHAPTER-VI

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 gathered and is used to recharge the bore well.

Photograph of Rain water Harvesting Pipe Section:



CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 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:



7.2 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



7.3 Provision of Ramp:

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

Photograph of Ramp:



ANNEXURE-1:
LIST OF TREES & PLANTS IN THE CAMPUS:

No	Name of the tree	Biological Name of Tree	Qty
1	GULMOHAR	PEACOCK FLOWER	83
2	ARECA PALM	ARECA PALM	1938
3	BOTTLE PALM	BOTTLE PALM/ROYAL PALM	274
4	JASWAND	HIBISCUS	64
5	TAGAR	CRAPE JASMIN/PIN WHEEL	18
6	PERU	GUAVA	16
7	SAPTPARNI	DEVIL TREE	78
8	KADULIMB	NEEM TREE	53
9	LIMBU	LEMON TREE	6
10	GULAB	ROSE	48
11	SHEVAGA	DRUMSTICK TREE/HORSE RADISH	4
12	CHRISTMAS	CHRISTMAS TREE	14
13	UMBAR	CLUSTER FIG TREE	6
14	SHEVARI	SILK COTTON TREE	37
15	AMBA	MANGO TREE	6
16	PARIJATAK	CORAL JASMIN	23
17	RUBBER	RUBBER FIG	8
18	SURU	BEEFWOOD /SURU	44
19	KADAMBA	BURFLOWER TREE	24
20	ASHOK	MAST TREE	9
21	BADAM	ALMOND	107
22	TIKUMA	SAL TREE	1479
23	MOHAGUNI	MAHOGANY	79
24	PIMPAL	SACRED FIG	3
25	KARANJI	KARANJI TREE	16
26	CHANDAN	SANDALWOOD	4
27	CHINCH	TAMARIND TREE	5
28	JAMBAL	JAVA PLUM	6
29	MORPANKHI	THUJA	23
30	SADAFULI	PERIWINKLE	5
31	VAD	BANYAN TREE	2
32	BOR	JAJUBE TREE	1
33	UMBAR	CLUSTER FIG TREE	4
34	MOGARA	JASMIN	7
35	JANGALI JHADE	JUNGLE TREE	42
36	BAKUL	BULLET WOOD/INDIAN MEDALLAR	1
37	KADIPATA	CURRY TREE	1
38	ANJIR	FIG	1
39	RUI	GIANT MILKWOOD	1
40	MEHANDI	HENNA TREE	1
41	AAVALA	INDIAN GOOSEBERRY	2

GREEN AUDIT REPORT
of
**JAYAWANT SHIKSHAN PRASARAK MANDAL'S,
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY &
RESEARCH,
WAGHOLI, PUNE**



Year: 2021-22

Prepared by:

ENGRESS SERVICES

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

MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,

Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709

10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

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Near Muktangan English School,
Parvati, Pune – 411 009.

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Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

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General Manager (EC)

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
Near Mukhtangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/BSIOTR/21-22/02

Date: 10/5/2022

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- Maximum Usage of Day Lighting
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- The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.
- The Electrical Energy generated in 21-22 is **15600 kWh**.
- Reduction in CO₂ Emissions in 21-22 works out to be **14.04 MT**.

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and handed over to Authorized waste collecting agent for further recycling.

5.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

5.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated Water is used for internal gardening purpose.

5.4 E-Waste Management:

The E-Waste is disposed of through Authorized E-Waste collecting agency.

6. Rain Water Harvesting:

The Institute has installed the Rainwater harvesting project; wherein the rain water falling on the terrace and slopes is collected and is used for recharging the bore well.

7. Green & Sustainable Initiatives

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan

8. Notes & Assumptions:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
- **1 kWp** of Solar PV Plant generates **4 kWh** of Electrical Energy per day
- Annual Solar Generation Days: **300 Nos.**

9. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar 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

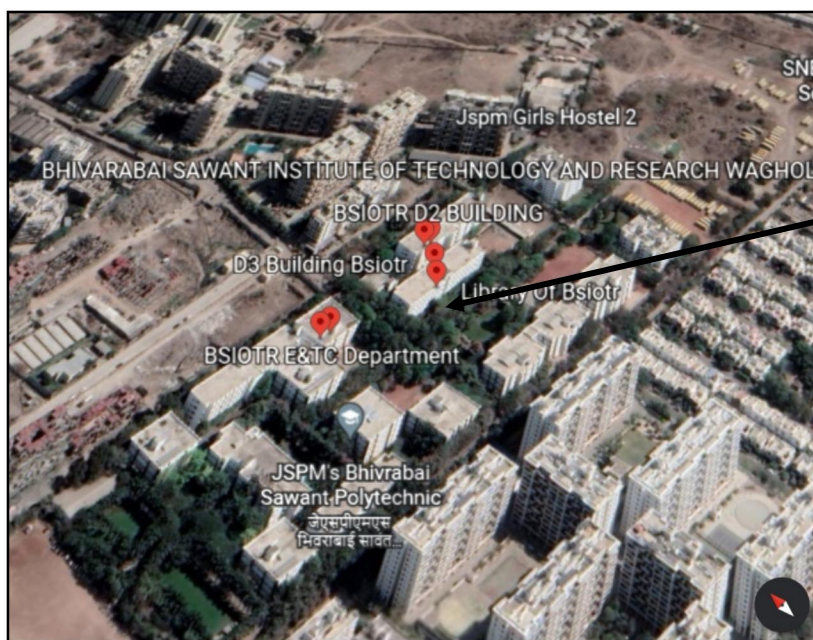
1.1 Objectives:

1. To study present Energy Consumption
2. To Study CO₂ emissions
3. To study usage of Renewable Energy
4. Study of Waste Management
5. Study of Rain Water Harvesting
6. Study of Green & Sustainable Practices

1.2 General Details of Institute: Table No 1:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research
2	Address	Wagholi, Pune
3	Year of Establishment	2009
4	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



**Institute
Campus**

CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Bills

Table No 2: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	5912
2	May-21	4936
3	Jun-21	4785
4	Jul-21	7511
5	Aug-21	6709
6	Sep-21	7667
7	Oct-21	7787
8	Nov-21	7567
9	Dec-21	9812
10	Jan-22	6512
11	Feb-22	5785
12	Mar-22	5298
13	Total	80281
14	Maximum	9812
15	Minimum	4785
16	Average	6690

Chart No 1: Variation in Monthly Energy Purchased:

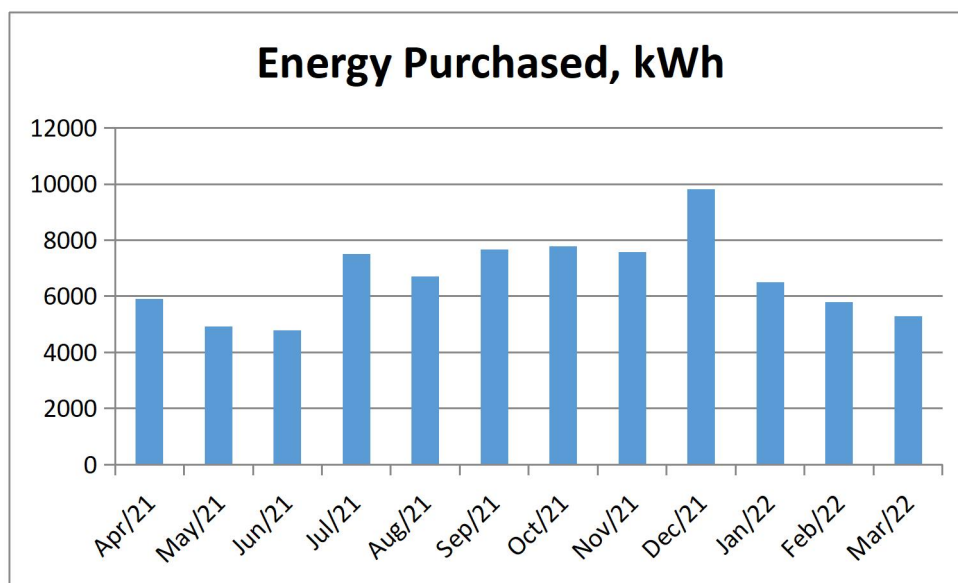


Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	80281
2	Maximum	9812
3	Minimum	4785
4	Average	6690

CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the Institute due to its Day to Day operations

Table No4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	5912	5.32
2	May-21	4936	4.44
3	Jun-21	4785	4.31
4	Jul-21	7511	6.76
5	Aug-21	6709	6.04
6	Sep-21	7667	6.90
7	Oct-21	7787	7.01
8	Nov-21	7567	6.81
9	Dec-21	9812	8.83
10	Jan-22	6512	5.86
11	Feb-22	5785	5.21
12	Mar-22	5298	4.77
13	Total	80281	72.25
14	Maximum	9812	8.83
15	Minimum	4785	4.31
16	Average	6690	6.0

Chart No 2: Month wise CO₂Emissions:

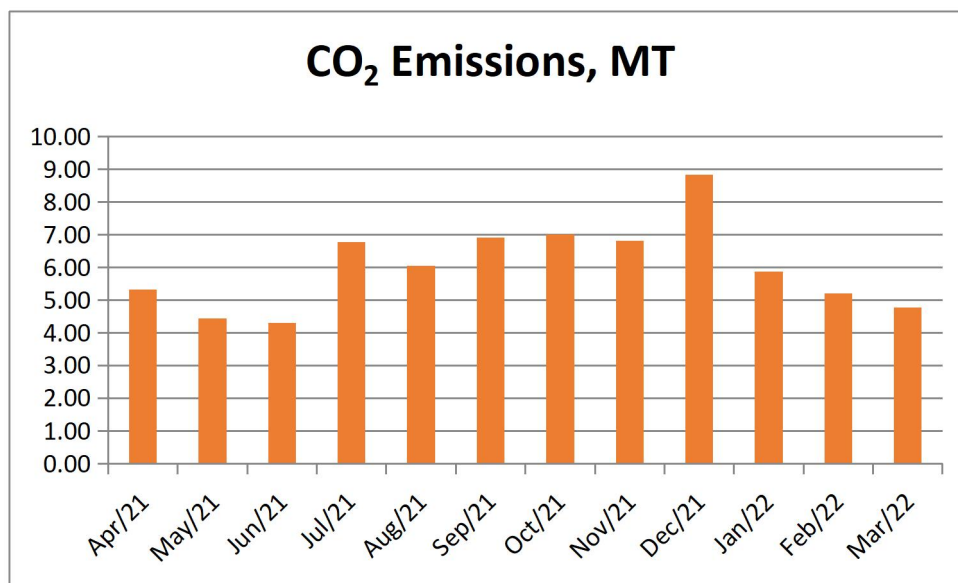


Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	80281	72.25
2	Maximum	9812	8.83
3	Minimum	4785	4.31
4	Average	6690	6.0

CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.

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

Table No6: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	13	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: 21-22	15600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO₂ Saved by Solar PV Plant = (4)*(5) /1000	14.04	MT of CO₂

Photograph of Roof Top Solar PV Plant:



CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source and is handed over to authorized waste collecting agent for further recycling.

Photograph of Waste Collection Bins:



5.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

Photograph of Organic Converter Unit:



5.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated water is used for internal gardening purpose.

Photograph of Sewage Treatment Plant:



5.4 E-Waste Management: The E-Waste is disposed of through Authorized Agency.

CHAPTER-VI

STUDY OF RAIN WATER HARVESTING

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

Photograph of Rain water Harvesting Pipe and Bore well Recharge Section:



CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 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:



7.2 Internal Tree Plantation:

The Institute has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



7.3 Provision of Ramp:

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

Photograph of Ramp:



ANNEXURE-1:

LIST OF TREES & PLANTS IN THE CAMPUS:

No	Name of the Tree	Biological Name of Tree	Qty
1	GULMOHAR	PEACOCKFLOWER	83
2	ARECAPALM	ARECAPALM	1938
3	BOTTLEPALM	BOTTLEPALM/ROYALPALM	274
4	JASWAND	HIBISCUS	64
5	TAGAR	CRAPEJASMIN/PINWHEEL	18
6	PERU	GUAVA	16
7	SAPTPARNI	DEVILTREE	78
8	KADULIMB	NEEMTREE	53
9	LIMBU	LEMONTREE	6
10	GULAB	ROSE	48
11	SHEVAGA	DRUMSTICKTREE/HORSERADISH	4
12	CHRISTMAS	CHRISTMASTREE	14
13	UMBAR	CLUSTERFIG TREE	6
14	SHEVARI	SILKCOTTONTREE	37
15	AMBA	MANGOTREE	6
16	PARIJATAK	CORALJASMIN	23
17	RUBBER	RUBBERFIG	8
18	SURU	BEEFWOOD/SURU	44
19	KADAMBA	BURFLOWERTREE	24
20	ASHOK	MASTTREE	9
21	BADAM	ALMOND	107
22	TIKUMA	SALTREE	1479
23	MOHAGUNI	MAHOGANY	79
24	PIMPAL	SACREDFIG	3
25	KARANJI	KARANJITREE	16
26	CHANDAN	SANDALWOOD	4
27	CHINCH	TAMARINDTREE	5
28	JAMBAL	JAVAPLUM	6
29	MORPANKHI	THUJA	23
30	SADAFULI	PERIWINKLE	5
31	VAD	BANYANTREE	2
32	BOR	JAJUBETREE	1
33	UMBAR	CLUSTERFIG TREE	4
34	MOGARA	JASMIN	7
35	JANGALIJHADE	JUNGLETREE	42
36	BAKUL	BULLETWOOD/INDIANMEDALLAR	1
37	KADIPATA	CURRYTREE	1
38	ANJIR	FIG	1
39	RUI	GIANTMILKWOOD	1
40	MEHANDI	HENNATREE	1
41	AAVALA	INDIANGOOSEBERRY	2

GREEN AUDIT REPORT

of

Jayawant Shikshan Prasarak Mandal's,
Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune

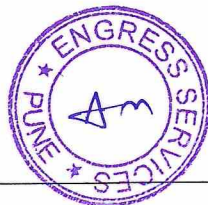


Year: 2022-23

Prepared by:

ENGRESS SERVICES

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



ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society, Near Mukhtangan 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/BSIOTR/22-23/02

Date: 12/7/2023

This is to certify that we have conducted Green Audit at, Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, 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 13 kWp
- Segregation of Waste at Source
- Installation of Organic Converter Unit for conversion of Organic Waste
- Installation of Sewage Treatment Plant of Capacity
- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness on Energy Conservation, by Display of Poster

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,

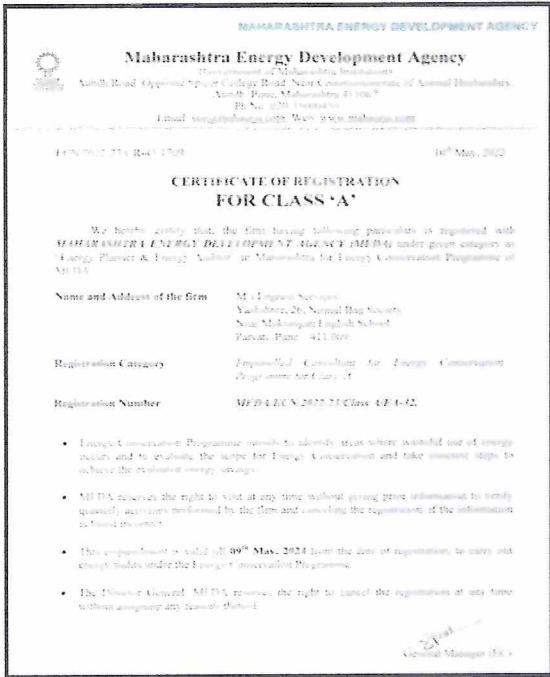


A Y Mehendale,

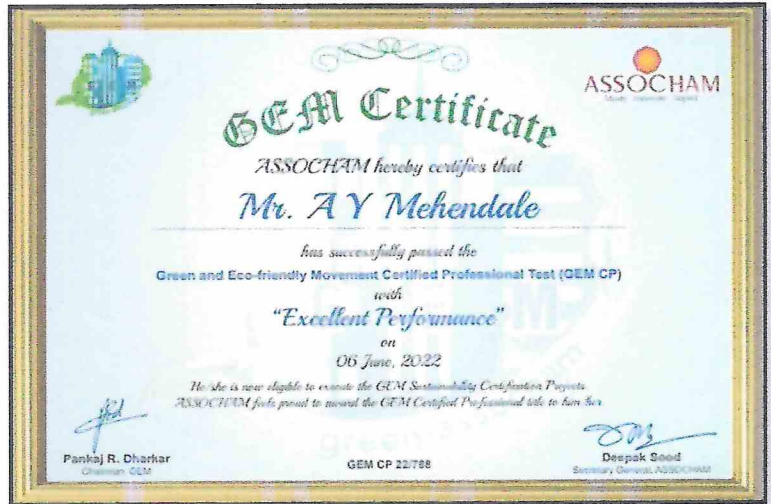
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ASSOCHAM GEM Certified Professional: GEM: 22/788



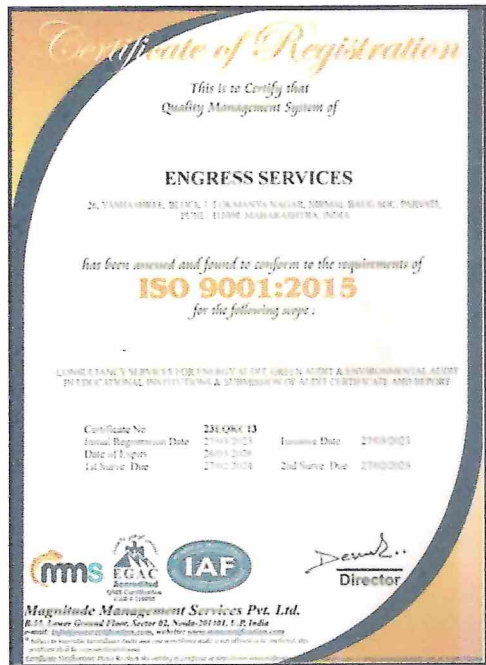
REGISTRATION CERTIFICATES



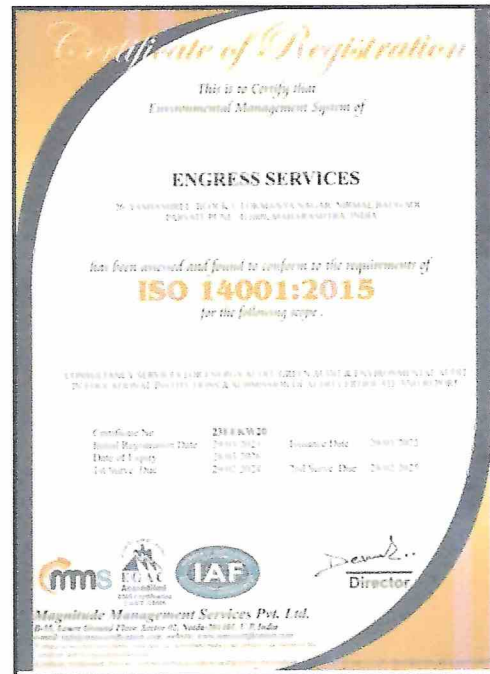
MEDA REGISTRATION CERTIFICATE



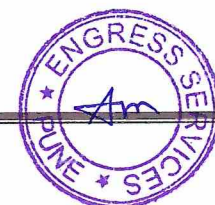
ASSOCHAM GEM CP CERTIFICATE



ISO: 9001-2015 Certificate

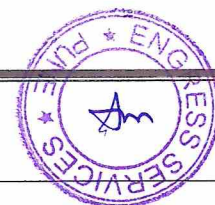


ISO: 14001-2015 Certificate



INDEX

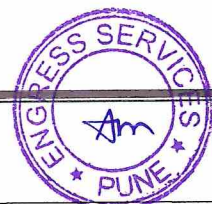
Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Energy Consumption & CO ₂ Emission	9
3	Study of Usage of Renewable Energy	10
4	Study of Waste Management	11
5	Study of Rain water Harvesting	13
6	Study of Green & Sustainable Practices	14
	Annexure	
I	List of Trees & Plants	16



ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi. 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. Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research, Wagholi, 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	76820	kWh
2	Annual CO ₂ Emissions	69.14	MT

3. Renewable Energy & Reduction in CO₂ Emissions:

- The Institute has installed Roof Top Solar PV Plant of Capacity **13 kWp**.
- The Energy generated by Solar PV Plant in 2022-23 is **15600 kWh**.
- Reduction in CO₂ Emissions in 2022-23 is **14.04 MT**

4. Waste Management:

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

5. Rain Water Harvesting:

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

6. Green & Sustainable Practices:

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

7. Assumptions:

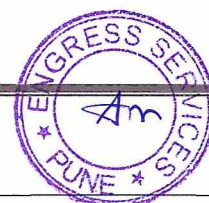
1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Energy generated by Roof Top Solar PV Plant: **4 kWh/kWp per Day**
3. Annual Solar Energy generation Days: **300 Nos**

8. References:

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

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

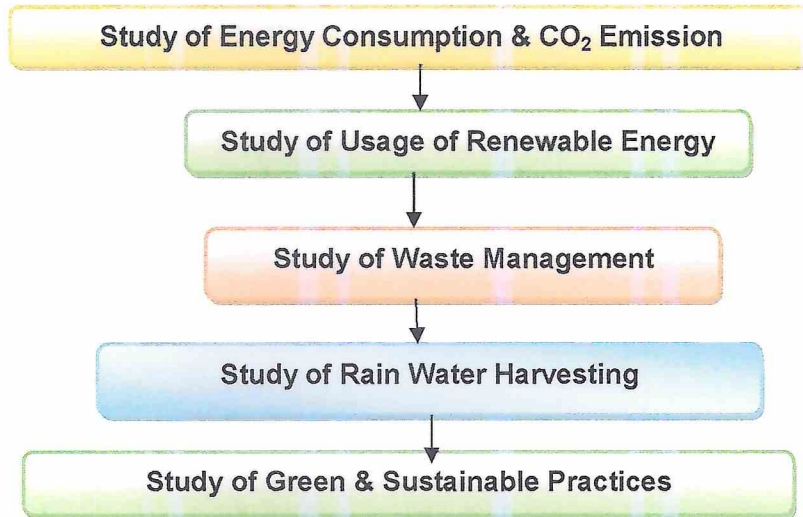


CHAPTER-I INTRODUCTION

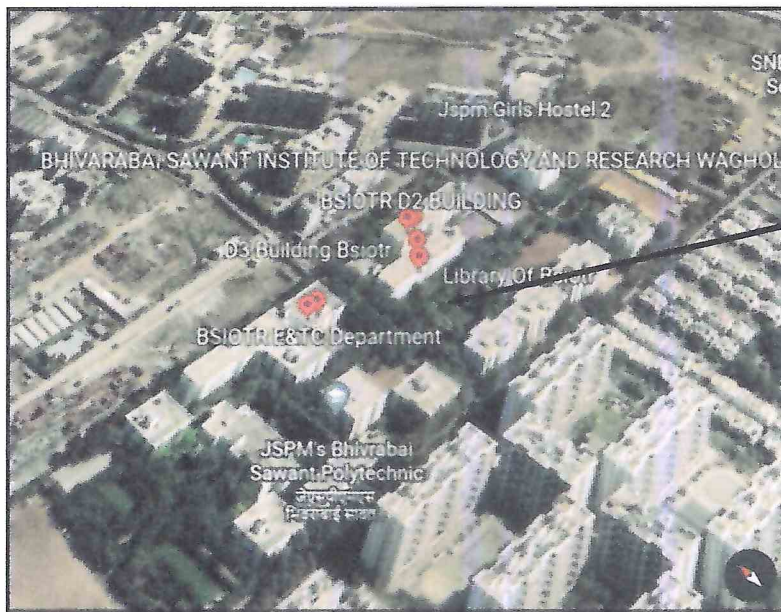
1.1 Introduction:

A Green Audit is conducted at Jayawant Shikshan Prasarak Mandal's Bhivarabai Sawant Institute of Technology & Research Wagholi, Pune.

1.2 Audit Procedural Steps:



1.3 Google Earth Image:



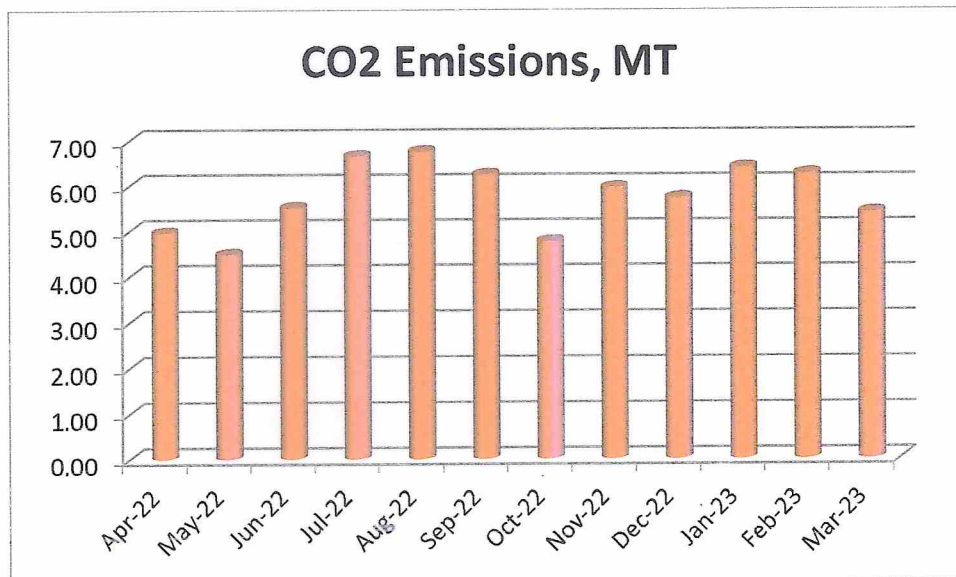
CHAPTER-II STUDY OF ENERGY CONSUMPTION & CO₂ EMISSION

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	CO ₂ Emissions, MT
1	Apr-22	5513	4.96
2	May-22	4985	4.49
3	Jun-22	6126	5.51
4	Jul-22	7397	6.66
5	Aug-22	7512	6.76
6	Sep-22	6936	6.24
7	Oct-22	5298	4.77
8	Nov-22	6615	5.95
9	Dec-22	6363	5.73
10	Jan-23	7109	6.40
11	Feb-23	6958	6.26
12	Mar-23	6008	5.41
13	Total	76820	69.14
14	Maximum	7512	6.76
15	Minimum	4985	4.49
16	Average	6402	5.8

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 13 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	13	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: 21-22	15600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	14.04	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 authorized waste collecting agent for further recycling.

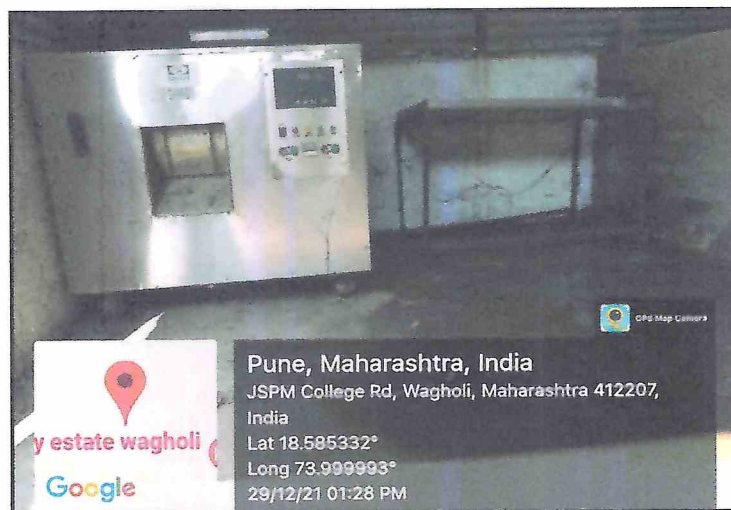
Photograph of Waste Collection Bins:



4.2 Organic Waste Management:

The Institute has installed an Organic Waste Converter Unit and the organic Waste is converted into compost, which is further used in the own garden.

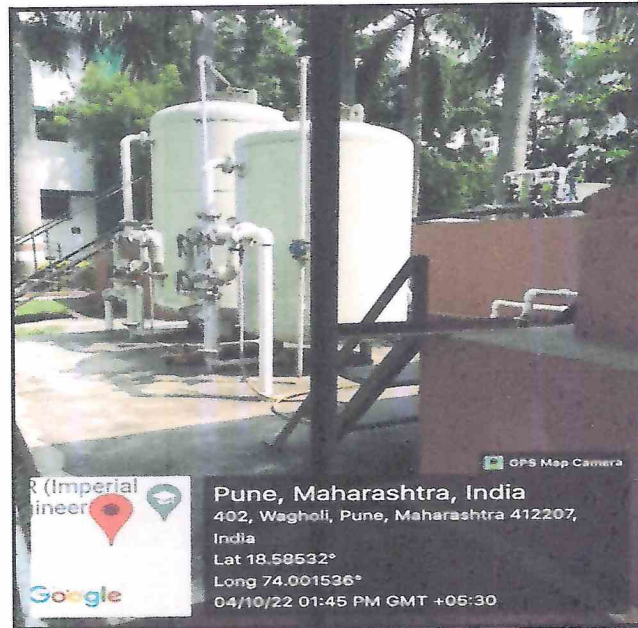
Photograph of Organic Converter Unit:



4.3 Liquid Waste Management:

The Institute has installed a Sewage Treatment Plant of Capacity 500 m³/Day. The treated water is used for Gardening purpose.

Photograph of Sewage Treatment Plant:



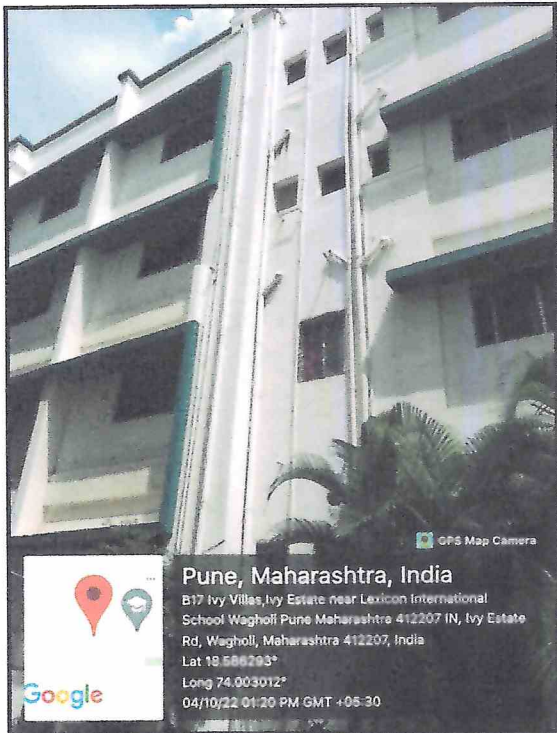
4.4 E-Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

CHAPTER-V STUDY OF RAIN WATER HARVESTING

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

Photograph of Rain water Harvesting Pipe and Bore well Recharge Section:

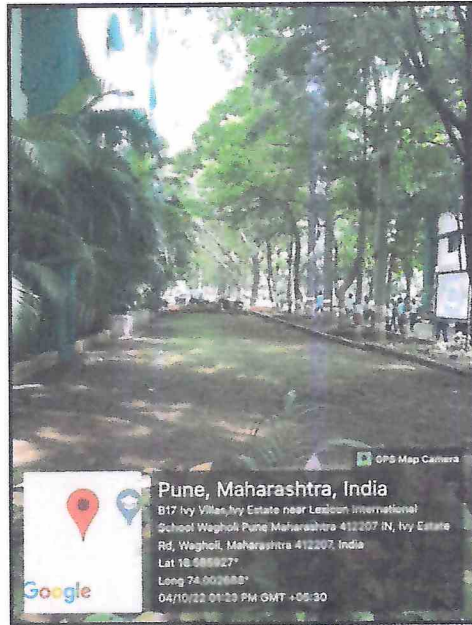


CHAPTER-VI STUDY OF GREEN & SUSTAINABLE PRACTICES

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.

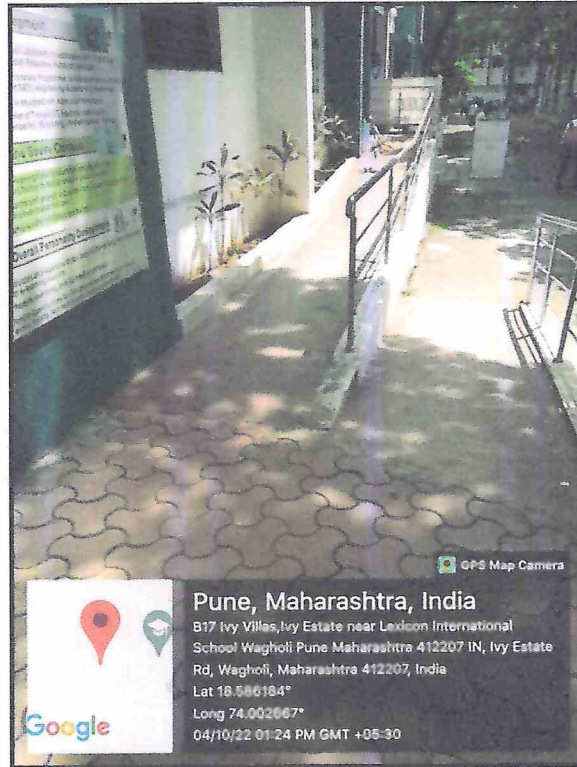
Photograph of Tree plantation:



6.3 Provision of Ramp:

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

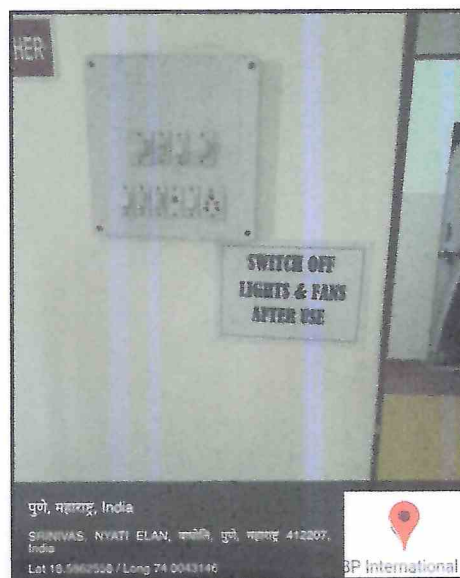
Photograph of Ramp:



6.4 Creation of Awareness about Energy Conservation:

The Institute has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



ANNEXURE-1:**LIST OF TREES & PLANTS IN THE CAMPUS:**

No	Name of the Tree	Biological Name of Tree	Qty
1	GULMOHAR	PEACOCKFLOWER	83
2	ARECAPALM	ARECAPALM	1938
3	BOTTLEPALM	BOTTLEPALM/ROYALPALM	274
4	JASWAND	HIBISCUS	64
5	TAGAR	CRAPEJASMIN/PINWHEEL	18
6	PERU	GUAVA	16
7	SAPTPARNI	DEVILTREE	78
8	KADULIMB	NEEMTREE	53
9	LIMBU	LEMONTREE	6
10	GULAB	ROSE	48
11	SHEVAGA	DRUMSTICKTREE/HORSERADISH	4
12	CHRISTMAS	CHRISTMASTREE	14
13	UMBAR	CLUSTERFIG TREE	6
14	SHEVARI	SILKCOTTONTREE	37
15	AMBA	MANGOTREE	6
16	PARIJATAK	CORALJASMIN	23
17	RUBBER	RUBBERFIG	8
18	SURU	BEEFLOWOOD/SURU	44
19	KADAMBA	BURFLOWERTREE	24
20	ASHOK	MASTTREE	9
21	BADAM	ALMOND	107
22	TIKUMA	SALTREE	1479
23	MOHAGUNI	MAHOGANY	79
24	PIMPAL	SACREDFIG	3
25	KARANJI	KARANJITREE	16
26	CHANDAN	SANDALWOOD	4
27	CHINCH	TAMARINDTREE	5
28	JAMBAL	JAVAPLUM	6
29	MORPANKHI	THUJA	23
30	SADAFULI	PERIWINKLE	5
31	VAD	BANYANTREE	2
32	BOR	JAJUBETREE	1
33	UMBAR	CLUSTERFIG TREE	4
34	MOGARA	JASMIN	7
35	JANGALIJHADE	JUNGLETREE	42
36	BAKUL	BULLETWOOD/INDIANMEDALLAR	1
37	KADIPATA	CURRYTREE	1
38	ANJIR	FIG	1
39	RUI	GIANTMILKWOOD	1
40	MEHANDI	HENNATREE	1
41	AAVALA	INDIANGOOSEBERRY	2

**JSPM's Bhivarabai Sawant Institute of Technology & Research, Wagholi,
Pune (412207)**

**DEPARTMENT OF
ENGINEERING SCIENCE**

**JAYAWANT SHIKSHAN PRASARAK MANDALS'S
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY AND
RESEARCH, WAGHOLI, PUNE**

Name of the Event- First Year Technical Poster Making Competition.

Day and Date of the Event- Thursday, Jan 17, 2019

Time of Event- 12.30 Pm

Venue of Event: Drawing Hall, 4th Floor, Bsiotr, Wagholi, Pune.

DESCRIPTION

a) Introduction, theme and significance.

Introduction- First Year Technical Poster Making Competition. for **CYNOSURE 2K19**

Theme and significance- The subject matter of the poster must address a technical, economic or environmental aspect of engineering, or other basic engineering theme, provided it pertains to some sphere in which an engineer is or should be involved.

b) Conduction, guest details, activity.

The event was inaugurated by Dr. Mukund Wani (HOD FE ICOER) and Dr. Prafulla Sharma (HOD FE BSIOTR). The judge for the event was Dr. Mukund Wani (HOD FE ICOER) and The event started at 12.30 pm and finished at 3.30pm. The students were given 10 min for poster presentation. The criteria for judgement were the creativity, design, clarity, elements and presentation. The first prize for the event was Rs1500 and for runner up Rs 700. The winner and runner up were given trophies.

c) Student and faculty response and participation.

The students had delivered presentation on their poster for about 10 min. The activity was allowed in individual entry. About 61 students had enrolled their names. The entry fee was Rs 50 per individual student. The Faculty Coordinators were Mrs. Wrushali S. Dhange (Bsiotr) and Mr. D. N. Mandlik (Icoer). The Student Coordinators for Event were Trupti Pawar (Bsiotr) and Shweta Bachute (Icoer).

List of Winners:

First Prize:

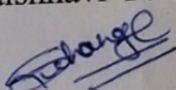
1) Rinal Lokhande (BSIOTR)

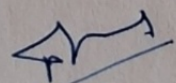
Second Prize:

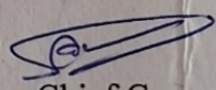
1) Keshav Valmik Patil (BSIOTR)
2) Dhumal Pratiksha Ankush (ICOER)

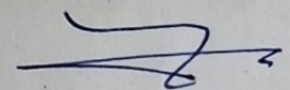
Third Prize:

3) Sumeet Balwade (ICOER)
4) Vaishnavi Yetekar (BSIOTR)

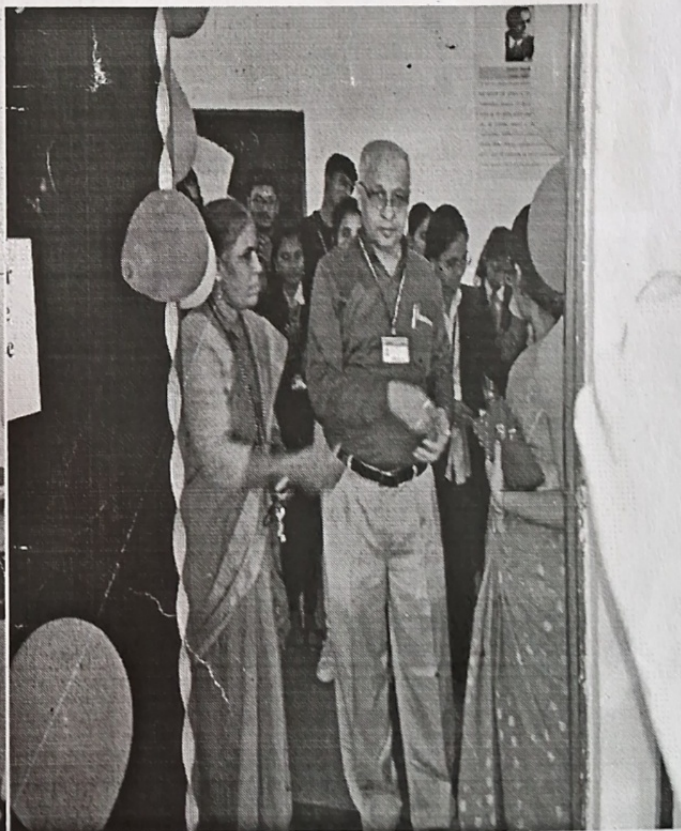
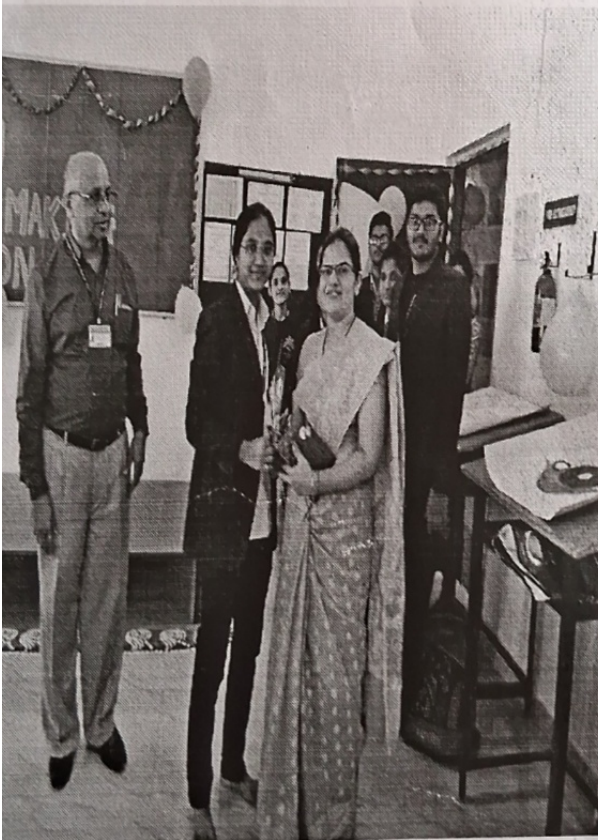

Event Coordinator
Prof. Wrushali S. Dhange
(BSIOTR)


Institute Coordinator
Prof. Nilesh Thorat
(BSIOTR)

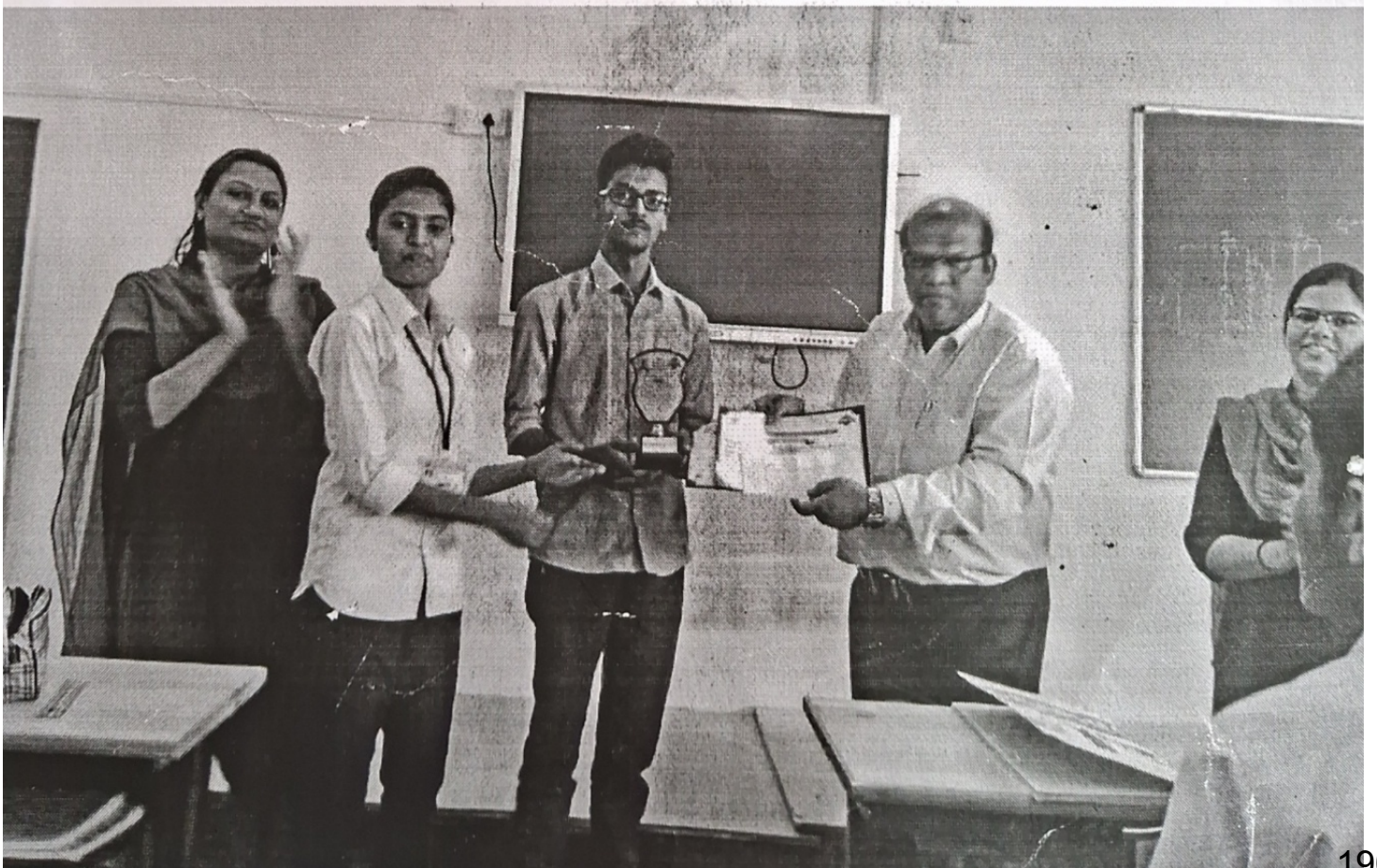

Chief Convener
Dr. Sachin Nehe
(BSIOTR)


Principal
Dr. T.K. Nagraj
(BSIOTR)
PRINCIPAL

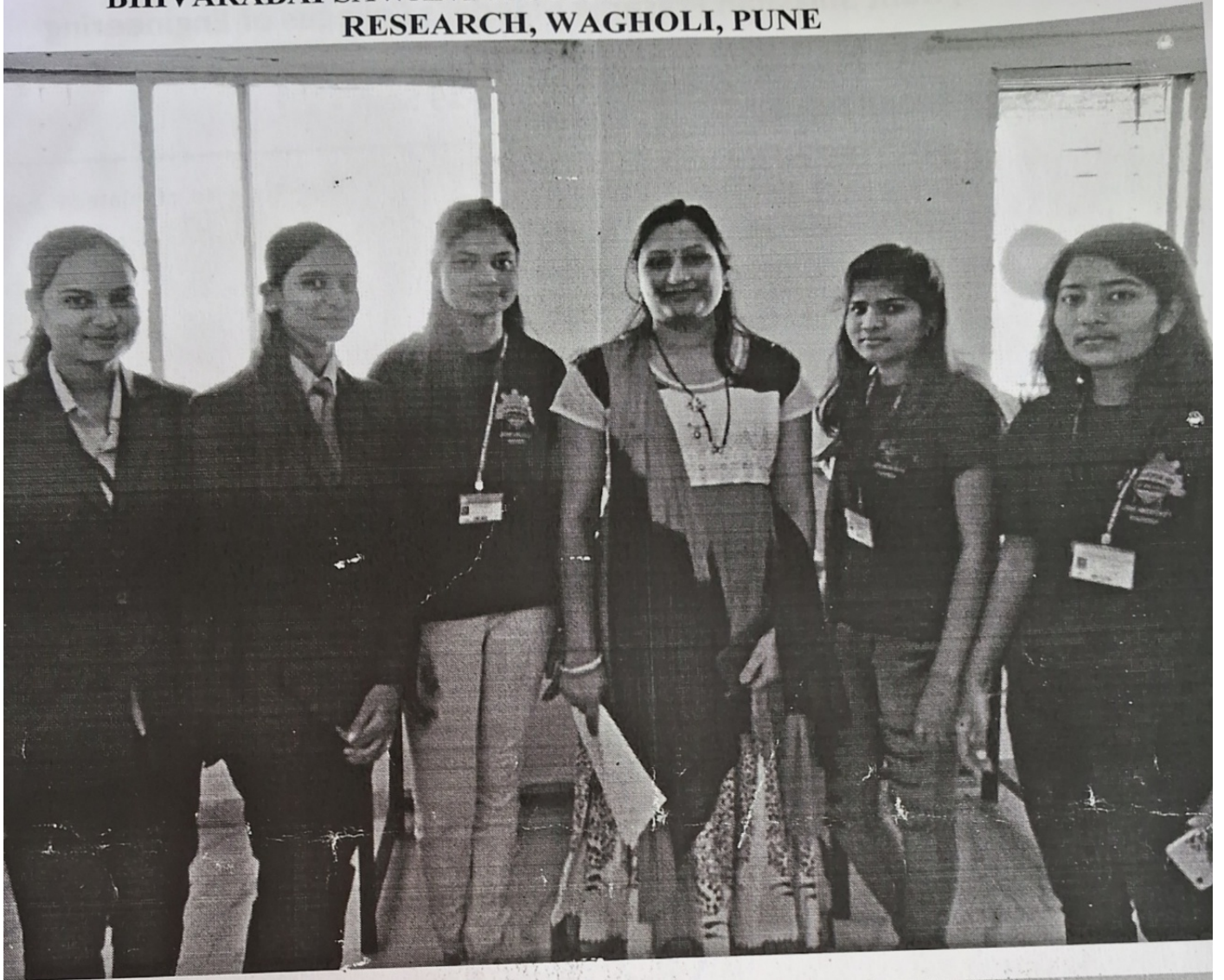
**JAYAWANT SHIKSHAN PRASARAK MANDALS'S
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY AND
RESEARCH, WAGHOLI, PUNE**
Photos of Event:



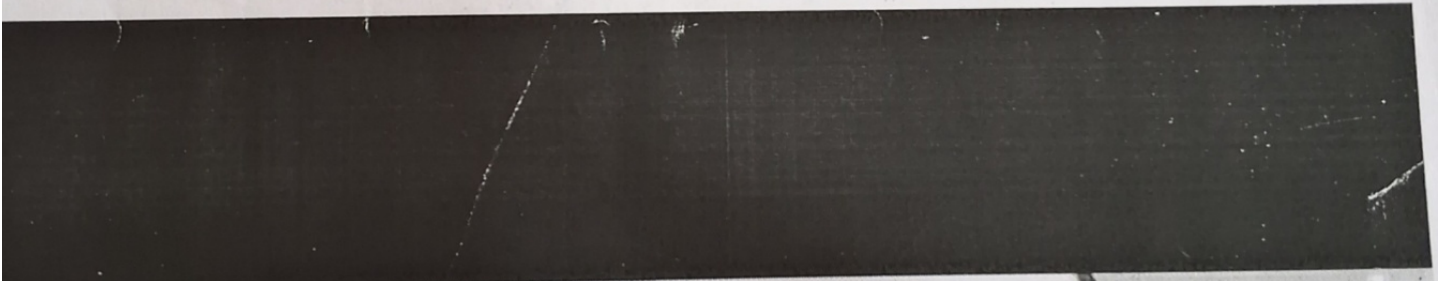
JAYAWANT SHIKSHAN PRASARAK MANDALS'S
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY AND
RESEARCH, WAGHOLI, PUNE



**JAYAWANT SHIKSHAN PRASARAK MANDALS'S
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY AND
RESEARCH, WAGHOLI, PUNE**



JAYAWANT SHIKSHAN PRASARAK MANDALS'S
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY AND
RESEARCH, WAGHOLI, PUNE



JSPM's
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY & RESEARCH,
Wagholi, Pune 412207

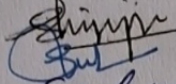
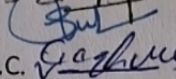
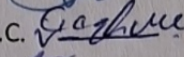

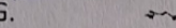
NOTICE

Date-21/11/2019

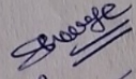
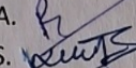
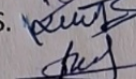
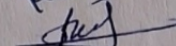
This is for the information of all staff members of First Year Engineering Dept. of our institute that, an event **POSTER EXHIBITION** will be organized by our FE Dept. on **Saturday, 23rd November 2019** At **11:30 am** at 408, Drawing Hall, BSIOTR.

For this event the duties and responsibilities of teaching and non-teaching staff are as Follows:


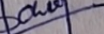
1) Internal discipline and arrangement inside drawing hall

- i) Prof. Shimpi P.D. 
- ii) Prof. Awate S.S. 
- iii) Prof. Waghule S.C. 
- iv) Prof. Mane S.L. 
- v) Prof. Shrigan M.G. 

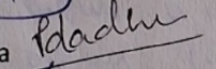

2) Decoration inside & outside of Drawing Hall (Rangoli, Banner, Board writing, Ribbon cutting arrangement)

- i) Prof. Dhange W.S. 
- ii) Prof. Mahajan R.A. 
- iii) Mrs. Kumbhar I.S. 
- iv) Mrs. Thorat R.P. 

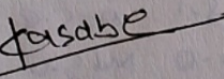
3) Format preparation

- i) Prof. Godase S.S. 
- ii) Mr. Shinde S.A. 

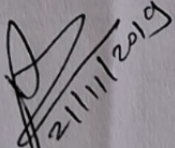
4) Accompany Judges panel

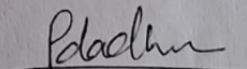
- i) Dr. Prafulla Sharma 
- ii) Prof. Godase S.S. 

5) Cleaning & Helping Assistance

- i) Mr. Kishor Kasbe 

kindly take note of this.


21/11/2019
Dr. Pragati Deore
Exhibition Co-ordinator


Dr. Prafulla Sharma
H.O.D. FE Dept

**JSPM's
Bhivarabai Sawant Institute
of Technology & Research,
Wagholi, Pune**

**Invites you to
visit an Art show**

**POSTER
EXHIBITION**

Featuring artwork created by
our beloved students of First
Year Engineering Department

Welcome your arrival

On

23rd - NOV-2019

At

11:30 AM

Venue

408, Drawing Hall

BSIOTR

With regards

Dr. Prafulla Sharma

H.O.D FE DEPT

Dr. Pragati Deore

Exhibition Co-ordinator

Event Title : POSTER EXHIBITION OF AC-ES
FE(BSIOTR, Pune)SEM-I-2019-20

Photograph of the event: **“POSTER EXHIBITION OF ENVIRONMENTAL STUDIES”**



Poster Exhibition event ribbon cutting ceremony by **Hon’ble Principal Dr. T.K.Nagaraj, Prof. Javed Kadegaonkar, Dr.Prafulla Sharma**

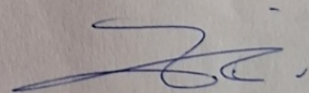
First Year Engineering Dept. has organized Poster Exhibition event for first year students under the activity for audit course Environmental studies for the year 2019-20, SEM-I on 23/11/2019 at 11:30am. This event was inaugurated by Hon’ble Principal Dr. T.K.Nararaj as a chief guest, alongwith Judges panel of **Prof. Javed Kadegaonkar,ICOER** and **Prof. Ankita Sharma, Dept of IT,BSIOTR** and **Dr.Prafulla Sharma, HOD, Dept.of FE** with

ribbon cutting ceremony in presence of first year students and faculties.

After entering the Exhibition hall everybody was amused to see beautiful poster creations by first year students of divisions A,B,C and D. Students had shown enthusiastic response in environmental as well as social awareness, nature awareness topics and shown tremendous interest in preparing beautiful posters by their creative and innovative ideas. Even very experienced Judges panel also surprised while evaluating each and every poster. It became a challenging task for them to observe any six best posters. Still they analysed and appreciated skills and performances of all participants. At the end Judges announced six posters as rankers.

First winner group was (SAMIKSHA PHAND, NANDINI GAVHANE & SNEHAL TELORE group), second winner was (PURVA AWHALE, SHRADHA AWHALE & RAJASHREE GOTE group) and third winner was (PRANAV KHULPE, TANMAY BODAKHE & BALAJI PAWAR group), fourth winner was (POOJA PAL, DNYANESHWARI JOGDAND & SONI SALONI group), fifth winner was (GARGI DESHMUKH & SANJANA CHAWADIMANI group), sixth winner was (DIKSHA SHELKE & NILAM GAVHANE group).

This event was concluded with Prize distribution to the winners followed by votes of thanks given by Dr. Pragati Deore, Poster Exhibition Coordinator. Principal Dr. Nagaraj and F.E. Dept. HOD Dr. Prafulla Sharma and judges' panel appreciated & congratulated to the team work & fruitful efforts of organizers, faculty & students for taking united efforts to make this exhibition successful and informative for all.





First year students with Chief Guest Dr.Nagaraj



Student presentation in front of Principal Sir

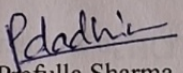


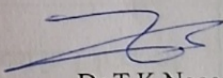
Student presentation in front of
HOD, Judges and coordinator



Winners of the event
At prize distribution ceremony


Pragati Deore
Exhibition
Coordinator


Dr. Prafulla Sharma
HOD-FE
HOD
General Science Department
J.S.P.M.'s Bhivarabai Sawant Institute of
Technology & Research
Wagholi Pune 412 207


Dr. T.K. Nagaraj
Principal
PRINCIPAL
Bhivarabai Sawant Institute Of Technology & R
Wagholi, Pune- 412207.

Event Title: National Science Day (Online Mode)

Organized by

FE(BSIOTR, Pune)

Poster of the event: The details of the Program communicated through the WhatsApp Groups of each class.



Celebration of National Science Day

Day and Date: Monday, 01/03/2021

Time: 12:30pm

In 1928 an Indian Scientist Sir Chandrasekhara Venkata Raman discovered a phenomenon known as Raman Effect and for his remarkable discovery in 1930 he got Nobel Prize, which was the first Nobel Prize in India in the field of Science and to mark this discovery every year on 28th February National Science Day is celebrated.

As a part of the same First Year Engineering Dept. organized Various Competitions like Elocution, Essay Writing and poster making Competitions for first year Engineering Students on 01/03/2021 at 12:30pm. The programme was graced by the presence of **Hon'ble Principal Dr. T.K.Nararaj** as a chief guest, HOD of F.E Prof.Swati Godse and all Staff members of FE. All these three competitions are conducted division-wise and then final winners are decided by the judges.

The Elocution Competition was conducted on the topic "Science for People and People for Science". There were 12 students participated in this competition and winners of this event are Deshmukh Onkar (First), Rajkule Mrunali (Second) & Khatode Ashish (Third).

The Competition was Essay Writing Competition on the topic "Contribution of Dr.C.V.Raman to Science & Technology". Total 45 students were participated in this activity and winners are Tamhane Vaishnavi (First), Bute Akankhsa (second) and Aware Pooja (Third).

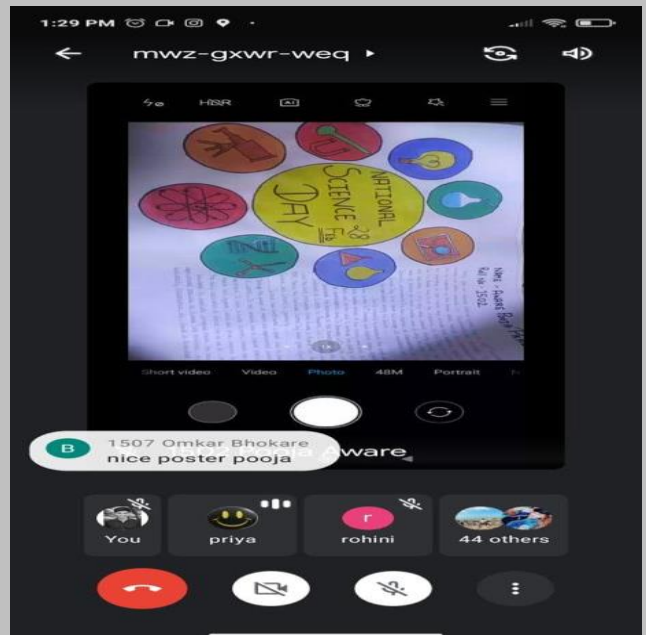
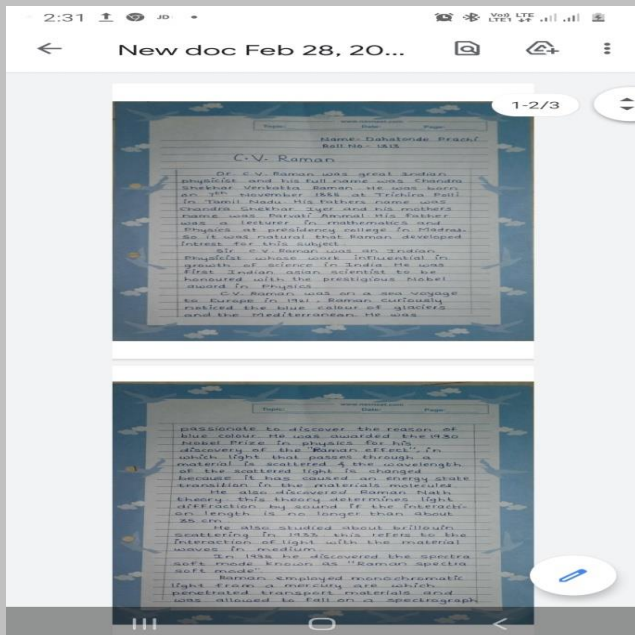
The third activity was Poster making Competition on the topic "Science and Technology". In this event total 29 students were actively participated and shown their hidden talents. The winners of this competition are Mane Nikita (First), Sah Ritesh (Second), Tambe Rutuja (third). All these competitions are judged by GFM of respective batches, Senior faculty member Prof.M.G.Shrigan and HOD Prof.Swati Godse. The HOD and **Hon'ble Principal Dr. T.K.Nararaj** congratulated to all winners and participants.

The programme ended with vote of thanks on behalf of the Institute by Prof.Sheetal Mane. All students along with FE Staff members attended this programme. Principal, Dean and HOD, F.E. congratulated faculty members of FE department and appreciated the efforts put by the Staff members in organizing such a Nice Competition. All faculty from F. E. Department worked hard for the success of the program. The event coordinated by Prof. M.G.Shrigan.

Poster Making Competition-Snaps:



Elocution and Essay Writing Competition-Snaps:



[Signature]

FE HOD
Dr. Swati Godse

[Signature]

Principal
Dr. T. K. Nagaraj



Jaywant Sawant Institute of Technology & Research

Bhivarabai Sawant Institute of Technology and Research Wagholi, PUNE



Event Title:Poster Making Competition

Organized by

FE(BSIOTR, Pune)

Day and Date: Friday 3rd June 2022

Venue: Seminar Hall

Time: 1:30pm.

The Poster Making Competition On the account of **World Environment day** was started with ribbon cutting ceremony by resource person Dr.T.K Nagaraj Principal, Dr. Gayatri Bhandari HOD-Computer Dept , Prof Vidya Jagtap HOD-IT Dept, Prof. Radha Shirbhate, Dr.Swati Godse HOD FE. Initially Prof.Shrigan M.G & Prof. Bhourgunde S.D gave brief introduction about the program. After that resource person observed all poster with their presentation and gave suggestions for improvement. In this competition total 287 Students have participated.

The winners are as follows:

Division	Winners Name
A	1) Chaitanya Thakor 2) Dhruv Patil 3) Sandeep Klakude
B	1) Anjali Nair 2) Shivani Shitole 3) Saniya walkikar
C	1)Abhineya Beduru 2) Harshali Madake
D	1)Venketeyash Jadhav 2) Sakshi Jagtap 3) Aryan Varma
E	1)Pallavi Kolkur 2)Adwaita Bhadre 3)Ratndeeep Salgare

The programme ended with vote of thanks on behalf of the Institute by Dr. Swati Godse . All students along with FE Staff members attended this programme. HOD of F.E. congratulated faculty members of FE department and appreciated the efforts put by the Staff members in organizing such a Nice event . All faculty from

FE Department worked hard for the success of the program. The event coordinated by Prof . Shrigan M.G ,Prof . Bhourgande S.D & Prof. Thombre A.A.





FE HOD
Dr. Swati Godse

Principal
Dr. T. K. Nagaraj



Poster Making Competition Report

NAME OF THE EVENT	<u>“Poster Making Competition”</u>
DATE	27 th January 2023
TIME	10:45 am to 3 p.m.
HOST	Department of First Year Engineering of JSPM’s BSIOTR,Wagholi,Pune.
TARGET AUDIENCE	FE faculties and First year engg. students
TOTAL ATTENDEES	334

Poster making Competition Objectives:

1. To create awareness about environment related issues and share information about it.
2. To acknowledge create aspects of student and trigger their thought process towards finding solution
3. To imbibe critical analysis and introspects on the issues .

PO attainment:PO3,PO7,PO12.

JSPMs Group of Institutes was established with a vision to satisfy the aspirations of youth force who want to lead nation towards prosperity through techno- economic development. So, keeping this vision in mind our Department of First Year Engineering organized “Poster Making Competition”on27th January 2023 at 10:45 am to 3 p.m. for awareness about environment related issues that is visually inclusive. The inauguration ceremony was auspiciously graced by Honorable Dr. T.K. Nagaraj (Principal, BSIOTR) along with Dr.Gayatri Bhandari(HOD Computer Dept.),Dr.Yogesh Angal(HOD E&TC Dept.),Dr.N.N. Ghuge (HOD,Electrical Dept.),Prof.Prabhuling Jatti(IQAC Head).

The competition was organized on following topics:

1. Local Polluted Site (Urban/Rural/Industrial/Agricultural)
2. Global Warming
3. Disaster Management (Natural disaster/Flood/Earthquake/Cyclones/Landslide)
4. Environment Assests / Environment Sustainability (River/Forest/Flora/Fauna)
5. Biodiversity
6. Environmental Impact Assessment

Hon. Mr.Rushiraj Sawant, Director, JSPM & TSSM Group of Institutes and Dr. S.V. Admane, Campus director JSPM Wagholi Campus has appreciated for successful conduction of this competition. Dr. T.K. Nagaraj, Principal BSIOTR, have supported us for this event. FE HoD and all faculties were present for this competition.

FE HOD
Dr. Swati Godse

Principal
Dr. T. K. Nagaraj

Co-ordinators
Prof. Priyanka Bhojar
Prof. Dnyaneshwar Magar
Prof. Raviraj Kapure
Prof. Vivek Mohite

1. Dr. T.K. Nagaraj (Principal, BSIOTR) and All departments HOD's with Participants.





Department of First Year Engineering Science
Report On
“ENGINEER’S DAY”
on 15/09/2023

Name of The Programme	1. Logo making Competition (Theme-FESA) 2. Poster Making Competition (Theme-Respective Branch-wise) 3. Best out of waste (Theme-Respective Branch-wise)
Date	15/09/2023 Friday
Mode	Offline
Organizer	Department of First Year Engineering Science of <i>Bhivarabai Sawant Institute of Technology & Research</i> Wagholi, Pune
Programme Convenor	Dr. Swati Godse, HOD (FE)
Programme Coordinator	Asst. Prof. Komal Dagwal (FE) Asst. Prof. Neha Holey (FE) Asst. Prof. Snehal Pachegaonkar (FE) Asst. Prof. Rani phulpagar (FE)
Participants	Div A - 27 Div B - 54 Div C - 34 Div D - 36 Div E - 59 Div F - 35 Div G - 43 Div H - 22
Outcome	1.Improvement in Technical knowledge and skills 2.Improve presentationskills 3.Students develop behaviors such as curiosity, initiative, and persistence that will help them engage with the world in productive ways
Aligned PO	PO 6 – Engineering and Society PO 7 - Environment and Sustainability PO9 - Individual and Team Work PO10-Communication PO12-Life-long Learning

First Year Engineering Department , BSIOTR organized three competitions viz., Logo making Competition, Poster Making Competition and Best out from West on the occasion of ENGINEER’S DAY for the FE students, on Saturday 15/09/2023. Event inauguration function started at 2.30 pm , Inaugurated by Dr T. K. Nagaraj, Principal, BSIOTR in presence of Dr Swati Godse, Head of Department First Year Engineering Science. After inauguration all the judges observes all the logos, posters and models and ask questions to participants one by one. All the judges appreciated the efforts taken by all the participants. This competition help to Improve presentation power and technical knowledge of their respective branches.

Principal Sir and HOD mam motivated all the students for actively participate in all the events conducted by the department . The session ended with the vote of thanks on behalf of all the students. All the students along with the all the faculties attended the programme.







List of Participants attach here by

Sr.No.	Name of Participants	Sr.No.	Name of Participants
1	Samiksha Kawade	9	Girish Patil
2	Ankita Khot	10	Samruddhi Gorde
3	Tamanna Ghadse	11	Anurag Shinde
4	Akhilesh Shelke	12	Nikhil Padsare
5	Bhakti Tour	13	Kuldeep Mane
6	Maske Rushikesh	14	Abhijit Khaire
7	Atharv Ingale	15	Khushi Dhakate
8	Vaishnavi dange	16	Rushab jain

Name of Winners

Sr. No.	Division	Name of Participants
1	D (1411)	Girish Patil
2	D (1408)	Nikhil Padsare
3	E (1514)	Samruddhi Gorde

Report Prepared By:

Prof D.V.Magar

Prof Komal Dagwal

The programme ended with vote of thanks by HOD Dr. Swati Godse.

We are very much thankful to our institute management and department for the encouragement to conduct such event. Also thankful to “**AICTE SPICES BSIOTR MANTHAN CLUB**” for their continuous support and encouragement to conduct event under **MANTHAN**.



FE HOD
Dr. Swati Godse



Principal
Dr. T. K. Nagaraj

Details of Trees and Plants in the campus

Sr .No	Name of the tree	Biological Name of Tree	No
1	GULMOHAR	PEACOCK FLOWER	83
2	ARECA PALM	ARECA PALM	1938
3	BOTTLE PALM	BOTTLE PALM/ROYAL PALM	274
4	JASWAND	HIBISCUS	64
5	TAGAR	CRAPE JASMIN/PIN WHEEL	18
6	PERU	GUAVA	16
7	SAPTPARNI	DEVIL TREE	78
8	KADULIMB	NEEM TREE	53
9	LIMBU	LEMON TREE	6
10	GULAB	ROSE	48
11	SHEVAGA	DRUMSTICK TREE/HORSE RADISH	4
12	CHRISTMAS	CHRISTMAS TREE	14
13	UMBAR	CLUSTER FIG TREE	6
14	SHEVARI	SILK COTTON TREE	37
15	AMBA	MANGO TREE	6
16	PARIJATAK	CORAL JASMIN	23
17	RUBBER	RUBBER FIG	8
18	SURU	BEEFWOOD /SURU	44
19	KADAMBA	BURFLOWER TREE	24
20	ASHOK	MAST TREE	9
21	BADAM	ALMOND	107
22	TIKUMA	SAL TREE	1479
23	MOHAGUNI	MAHOGANY	79
24	PIMPAL	SACRED FIG	3
25	KARANJI	KARANJI TREE	16
26	CHANDAN	SANDALWOOD	4
27	CHINCH	TAMARIND TREE	5
28	JAMBAL	JAVA PLUM	6
29	MORPANKHI	THUJA	23
30	SADAFULI	PERIWINKLE	5
31	VAD	BANYAN TREE	2
32	BOR	JAJUBE TREE	1
33	UMBAR	CLUSTER FIG TREE	4
34	MOGARA	JASMIN	7
35	JANGALI JHADE	JUNGLE TREE	42
36	BAKUL	BULLET WOOD/INDIAN MEDALLAR	1
37	KADIPATA	CURRY TREE	1
38	ANJIR	FIG	1
39	RUI	GIANT MILKWOOD	1
40	MEHANDI	HENNA TREE	1
41	AAVALA	INDIAN GOOSEBERRY	2

42	BIBA	BHILAWA/MARKING NUT	1
43	GULVEL	GULBEL/INDIAN TINOSPORA	1
44	KANHET	OLEANDER	1
45	KAT	KHAT TREE	1
46	SITAPHAL	CUSTERD APPLE TREE	2
47	GAVATI CHAHA	LEMONGRASS	1
48	DALIMB	POMEGRANATE	1
49	CHITRAK	CHITRAK/PLUMBAGO	1
50	LAJALU	SENSITIVE PLANT	1
51	BAMBU	BAMBOO	31
52	PUDINA	MENTHA/PEPPERMINT	25
53	CHAPHA	ANNONA HEXAPETALA	1
54	GUGAL	GUGAL TREE	2
55	BITI	SISOO TREE	1
56	PAPAI	PAPAYA	1
57	BEL	STONE APPLE/BAEL	2
58	NIRGUDI	NIRGUDI/CHASTE TREE	1
59	SHANKHESHWAR	PEACOCK FLOWER	1
60	RAKTROHIDA	ROHEDA /TECOMELLA	2
61	KATEKORANTI	KORANTI	1
62	KANCHAN	WHITE ORCHID TREE	1
63	VELDODA	CARDOMOM	1
64	NIVDUNG	CACTUS	1
65	BEHADA	BAHEDA/BEACH ALMOND	1
66	DALACHINI	CINNAMON	1
67	AAPATA	BIDI LEAF TREE	2
68	SAGARGOTA	SAGARGOTA/FEVER NUT	1
69	NARAL	COCONUT PALM	1
70	MURUDSHENG	SCREW TREE	1
71	PURNANAVA	PUNARNAVA/TARVINE	1
72	SHIVAN	GAMHAR/SHIVAN	1
73	KUDA	INDRAJAO	1
74	PADAL	YELLOW SNAKE TREE	1

GREEN LANDSCAPING WITH TRESS AND PLANTS



PEDESTRIAN FRIENDLY ROADS



TRANSPORTATION



JSPM's Bhivarabai Sawant Institute of Technology & Research
Wagholi, Pune.412207


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STUDENTS' CLUB UNDER THE SCHEME Promoting Interests, Creativity and Ethics among
Students (SPICES)

AY-2022-23

BSIOTR MANTHAN



Date: 16th sept, 2022

Report On "Tree Plantation"

Name of Event	Tree Plantation
Organized Under	AICTE SPICES BSIOTR MATHAN Students' Club
Date of Event	16 th sept, 2022
Location of Event	JSPM's Bhivarabai Sawant Institute of Technology & Research
Number of Persons Attending	40
Sponsoring Organization(s)	All India Council for Technical Education (AICTE), New Delhi & Management of JSPM Group of Institutes, Pune
Principal	Dr. T.K Nagaraj
Program Co-Coordinator Name	Dr. Y.S. Angal
Personality development Lead Name	Mr. Aekagra Dhamani

Objectives of the Drama Activity:

Sr. no.	Objectives	Aligned POS
1	To create green belt and avenues for meeting aesthetic recreational needs to the people.	PO-8, PO12, PO-10
2	To beautify the areas for scenic beauty.	PO-1
3	To reduce the surface run-off discharge and checking soil erosion along the embankments.	PO-12
4	To reduce temperature and increase humidity.	PO-11, PO-9, PO-10, PO-12

The students of BSIOTR MANTHAN Club had taken an initiative to Organize “**Secrets of Achievements**” on date 16/09/2022. Tree plantation is one of the most important constituents of soft landscaping. Trees, shrubs and climbers have been used to enhance the soft natural ambience against harsh elements in most of the enhancement schemes. The planting species are decided based on the physical growth characteristics of trees, like form and shape, foliage pattern, growth rate, branching pattern, soil characteristics etc.

Students of BSIOTR MANTHAN Club of all departments organized event with enthusiasm. The tree planting was organized in systematic manner and ever students played their role very well.

All students of BSIOTR MANTHAN Club enjoyed this event with a lot of enthusiasm. In Presence of Dr. T. K. Nagaraj, Principal (BSIOTR) and Dr. Y. S. Angal, faculty Program Co-Ordinator of MANTHAN Club & HOD (E&TC) have inaugurated this event.

Dr. T. K. Nagaraj, Principal (BSIOTR) & Dr. Y. S. Angal, HOD (E&TC) given welcome speech and motivated all students. They congratulated all Students for their active participation.

Plantation Pattern:

- The first row along the college road to be planted with small to medium sized ornamental trees.
- Planting of shrubs in the median.
- Turfing with grasses in the median and embankment slopes.
- Planting of herbaceous species as ground cover in the median, special landscapes on embankment slopes.
- The last row to be planted with tall shade bearing trees for better road safety and for enhancing aesthetics.

JSPM's Bhivarabai Sawant Institute
of Technology and
Research, Wagholi, Pune - 412 207



Under the Scheme
Promoting Interests Creativity & Ethics
Among Students (SPICES)



BSIOTR MANTHAN

Invites you all for

**TREE
PLANTATION**



DATE :- 16/09/2022

VENUE :- JSPM'S BSIOTR

Flyer of Secrets of Achievements at JSPM's BSIOTR



Photo 1: Core team of MANTHAN for Secrets of Achievements



Photo 2: Students planting trees in college campus

Participants attach here with This Report:

Sr.No.	Name of Participants	Class	Department
1.	Tayade Devendra Ajay	Division A	E&TC
2.	Takle Anjali Basvraj	BE	E&TC
3.	Thakur Gaurav Ram	TE	E&TC
4.	Shinde Abhay Pramod	BE	E&TC
5.	Shaikh Ujef Samad	SE	E&TC
6.	Ajinkya Sunil Dahiwal	SE	E&TC
7.	Ahiwale Sahil Sambhaji	TE	E&TC
8.	Aekagra Dhamani	TE	E&TC
9.	Harsh Dhumal	TE	IT
10.	Anjali Nair	SE	E&TC
11.	Vidya Ahire	SE	COMP
12.	Lokhande Shrdha	TE	ELECTRICAL
13.	Bapdev Fartare	BE	COMP
14.	Akash Gayakwad	BE	IT
15.	Swaraj Patil	TE	COMP
16.	Mangesh Satpute	TE	Mechanical

OUTCOME:

Sr.no	Outcome
1.	Conserve Biodiversity
2.	Provide Shade
3.	Increases green spaces in cities



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STUDENTS' CLUB UNDER THE SCHEME Promoting Interests, Creativity and Ethics among
Students (SPICES)

AY-2022-23



BSIOTR MANTHAN



Date: 1st October, 2022

Report On "Cleanliness Drive"

Name of Event	Cleanliness Drive
Organized Under	AICTE SPICES BSIOTR MATHAN Students' Club
Date of Event	2 nd October, 2022
Location of Event	JSPM's Bhivarabai Sawant Institute of Technology & Research
Number of Persons Attending	30
Sponsoring Organization(s)	All India Council for Technical Education (AICTE), New Delhi & Management of JSPM Group of Institutes, Pune
Principal	Dr. T.K Nagaraj
Program Co-Coordinator Name	Dr. Y.S. Angal
Social Team Lead Name and Personality Development Team Lead Name	Miss Anushka Umale and Mr. Aekagra Dhamani

Objectives of the Cleanliness Drive:

Sr. no.	Objectives	Aligned POS
1.	Improving the quality of life in rural areas through cleanliness and personal hygiene.	PO-8, PO-12, PO-10
2.	Motivating the communities for adopting a proper sanitation model for better health and life.	PO-1, PO-12
3.	To promote cleanliness awareness among the students	PO-1, PO-10, PO-12, PO-11
4.	Improve hygiene and sanitation conditions	PO-12

The students of BSIOTR MANTHAN Club had taken an initiative to Organize “**Cleanliness Drive**” on date 01/10/2022. MANTHAN Club students organized Cleanliness Drive under BSIOTR MANTHAN Club on the occasion of Gandhi Jayanti. The main purpose of this program was to create awareness among the students regarding Cleanliness and its consequently its effect on personality.

Students of BSIOTR MANTHAN Club of all departments organized event with enthusiasm. The cleanliness drive was organized in systematic manner and the students played their role very well.

Under this program, all the students from all departments had to participate. Even teachers were the essential part of this drive. As a part of this Cleanliness Drive, we cleaned JSPM Wagholi campus. The sweepers of the college had to be the observers.

All students of BSIOTR MANTHAN Club enjoyed this event with a lot of enthusiasm. In Presence of Dr. T. K. Nagaraj, Principal (BSIOTR) and Dr. Y. S. Angal, Faculty Program Co-Ordinator of MANTHAN Club & HOD (E&TC) have inaugurated this event.

Dr. Swati Godse, HOD(General Science) given welcome speech and motivated all participants and faculty. They congratulated all participants for their active participation.

Some of us picked brooms and started drive Some of the students did the dusting of the rooms and others went to the playground and started picking wrappers lying scattered there. After collecting them they threw them in to the dustbins. After doing this job for two to three hours, we all assembled in the BSIOTR VC Room. There we were given refreshment in the form of bananas and apples.

Importance of cleaning:

- Cleanliness promotes mental clarity.
- Regular hand washing can prevent the spread of infections.
- A clean environment automatically boosts our self-confidence.
- Cleanliness gives a fresh and good look to our surroundings.
- Cleanliness gives rise to a good character by keeping body, mind, and soul clean and peaceful.



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STUDENTS' CLUB UNDER THE SCHEME Promoting Interests, Creativity and Ethics among
Students(SPICES)



AY-2022-23

BSIOTR MANTHAN



Invites you all for

CLEANLINESS DRIVE

ON 01/10/2022
From 10 am Onwards

VENUE :- JSPM'S BSIOTR

Flyer of Cleanliness Drive at JSPM's BSIOTR



Photo 1: Students of BSIOTR MANTHAN Club with Prof. Manjusha Patil, Faculty Coordinator, BSIOTR.



Photo 2: BSIOTR MANTHAN Club students cleaning the vicinity of the campus



Photo 3: Collaborative efforts of JSPM BSIOTR students in the cleaning drive



Photo 4: BSIOTR MANTHAN Club students collecting the waste at one place

List of Participants attach here with This Report:

Sr.No.	Name of Participants	Class	Department
1.	Devndra Tayde	TE	E&TC
2.	Rajnandani Sawargave	TE	E&TC
3.	Saurabh Shinde	TE	E&TC
4.	Rajnandini Tupsondare	TE	E&TC
5.	Nikita Mane	TE	E&TC
6.	Rohan Zill	TE	IT
7.	Omakar Devkar	TE	IT
8.	Chetna Patil	TE	IT
9.	Komal Jadwar	TE	IT
10.	Sahil Yadav	TE	IT
11.	Parthmesh Tangade	TE	IT
12.	Ishika Sandhu	TE	ELECTRICAL
13.	Sumit Pandit	TE	ELECTRICAL
14.	Shantanu Rawde	TE	CS
15.	Alok Singh	SE	CS
16.	Aryan Varma	SE	IT
17.	Gauri Rawas	SE	CS
18.	Gauri Wankhede	SE	CS
19.	Abinaya Bendru	SE	CS
20.	Vidya Ahire	SE	CS
21.	Supriya Rajdivate	TE	Electrical
22.	Ritesh Shah	SE	CS
23.	Sypriya Kulal	TE	MECH.
24.	Lakhman Sharma	DIV. B	FE
25.	Hemal Bhoge	Div.A	FE
26.	Ankit Tiwari	Div. D	FE
27.	Pankaj Pawar	BE	E&TC
28.	Anuja Jadav	BE	IT
29.	Priyanka Sonavne	BE	COMP

OUTCOME:

Sr.no	Outcome
1.	Reduce temperature and Increases humidity
2.	Reduce the impact of air pollution and dust
3.	Sustain nature and maintain dignity of human life
4.	Conserve biodiversity

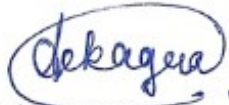
This Event was organized by BSIOTR MANTHAN Students' Club and Social Committee of BSIOTR MANTHAN Students' club.

Scheme	Coordinators name	Social Committee	Members Name
Coordinators		Club Coordinator	Miss Anushka Umale TE(IT)
Lead	Mr. Ashutosh Falgaonker TE(IT)	Executive Member	Parwej Shaikh TE(E&TC)
Lead	Miss.Chaitra Deshpande TE(E&TC)	Executive Member	Miss. Prajakta Kekan TE(E&TC)

Report Prepared by		
Mr. Mahesh Waghmode	TE(E&TC)	JSPM ^{PS} BSIOTR



Miss Anushka Umale
Social Team Student
Lead MANTHAN Club



Mr. Aekagra Dhamani
Personality Development Team
Student Lead MANTHAN Club



Miss.Chaitra Deshpande
Students Coordinator
MANTHAN Club



Dr. Y. S. Angal
Prof. & HOD, E &TC
MANTHAN Faculty Co-ordinator



Dr. T.K. Nagaraj
PRINCIPAL
PRINCIPAL
Technology & Management Institute of
(Project Director)



JAYAWANT SHIKSHAN PRASARAK MANDAL's
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Gat No. 719/1 & 2, Wagholi, Pune-Nagar Road, Pune-412207

Ph : 020-067335108, 65217050, 67335100

Telefax : 020-67335100

Website : www.jspm.edu.in / www.bsiotr.org

EN 6311 / CEGP-013100



Prof. Dr. T. J. Sawant
B.E. (Elec.) PGDM, Ph.D
Founder Secretary

Dr. T.K. Nagaraj
ME. (Civil Engg), Ph.D (Civil Engg)
LMISTE, LMIGS, LMIRC
LMISRMTT, LMIE
Principal

*****Programs Accredited by National Board of Accreditation (NBA), New Delhi *****

*** Electrical Engineering * Electronics and Telecommunication Engineering. * Information Technology**

Date: 01/01/2019

ENVIRONMENT AND ENERGY USAGE POLICY

JSPM's Bhivarabai Sawant Institute of Technology and Research, Pune is one of the Premier Institutions in providing quality education for engineering students and it aims to produce professionals of technically competent and socially responsible. The institute has formulated the policy on environmental and energy usage to affirm the Institution's commitment to environmental and energy issues and to solve those issues through continuous improvement in environment-related activities. The policy aims to ensure environmental and energy compliance by adhering the sound environment and energy policies in the academic and administration departments of the institution.

The institute understands that ecological sustainability is the key component of social responsibility and therefore strives to conserve the environment by adhering eco-friendly approach. This includes conserving raw materials, energy, water and waste management.

The environment and energy policy connects all the sectors of the institution and it applies to all its stakeholders and the various activities carried out by the institution. It will help us to improve efficiency and environmental awareness in our everyday activities, thus helping us to realize our responsibilities and commitment to the conservation of natural resources and to limit their usage.

The policy is to conserve the natural environment, provide sustainable solutions and control energy consumption in order

- To create awareness among students about conserving natural resources and the development of a sustainable environment for national prosperity.
- To adopt an ethical and environment-friendly approach in all the activities of the institution to conserve the natural environment.
- To evolve futuristic technologies and develop engineering solutions that help us to sustain the environment and energy in an optimum way.
- To build a society that has an attitude of conservation and harmony with nature.

POLICY DOCUMENT ON ENVIRONMENT AND ENERGY USAGE

Extension and Outreach Activities under NSS and Departmental students associations sensitize the students towards environment sustainability through activities like cleanliness drives, tree plantations, speeches on environment and sustainability etc. Few audit courses are also offered to students which address the issues related to Environment and Energy usage and alternate sources of energy. Department of IT, Electrical and Electronics and Telecommunication Engineering have implemented student projects on renewable energy sources and energy conservation initiatives using latest technology in the departments.

On the campus in which the institute is located Sewage Treatment Plant is available which treats wastewater from various establishments on the campus. This treated water is used for gardening purposes to keep the campus green and clean. This helps in the conservation of clean water.

The campus is lush green with various types of plants and trees which produce lots of organic waste which is used after composting.

Solar energy systems are installed on rooftops which save a certain amount of energy. LED tubes/bulbs are used to conserve energy. Boards are displayed in classrooms and laboratories to switch off the lights, fans etc when not in use.

The policy document of the institute is aimed

- To assess our energy usage and measure its impact on the environment.
- To reduce local air pollution emissions using environment-friendly vehicles, including bicycles, public transportation and use of pedestrian-friendly roads.
- To maximize the natural ventilation for maximum conservation of energy.
- To install photovoltaic solar panels for the generation of alternate energy. To install LED bulbs in the complete campus to save energy.
- To develop a systematic waste management mechanism. To maintain the rainwater harvesting unit.
- To undertake a tree plantation drive.
- To use technological advancement to improve our energy consumption.
- To educate our faculty members and students on environmental knowledge and skills to improve our environmental performance.
- To provide information and training opportunities on energy-saving measures.
- To offer opportunities for faculty members and students to engage in initiatives that contribute to environmental protection.
- To train our faculty members and students and make them 'Go Green Specialists' and partners to plant trees each year.
- To take up environment, energy and green audit every year.
- To review the activities related to measures and initiatives taken for environment sustainability and energy usage.



Principal

PRINCIPAL

Bhivarabai Sawant Institute Of Technology & Research
Wagholi, Pune- 412207.