7.1: Institutional Values and Social Responsibilities

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

HEI has reconciled the data as follows.

As per the HEI data green audit/Environment audit certificate attached.

The energy audit and event report of clean and green campus initiatives is attached herewith.

DVV suggested Supporting Documents:

Sr No	Particulars	Page No
1	Energy Audit Report (2022-23)	3
2	Energy Audit (2022-23) Certificate	16
3	Energy Audit Report (2021-22)	17
4	Energy Audit Report (2020-21)	32
5	Policy document on clean and green campus	47
6	Tree Plantation Report	53
7	Swachhata Abhiyan Report	56

Director
JSPM Narhe Technical Campus
Narhe, Pune - 411041

Index

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7	Swachhata Abhiyan Report	56

ENERGY AUDIT REPORT

of

Jayawant Shikshan Prasarak Mandal's,

NARHE TECHNICAL CAMPUS, NARHE

Year: 2022-23

Prepared by:

ENGRESS SERVICES

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

REGISTRATION CERTIFICATES

Regn. No. EA-0192 No. 2942

National Productivity Council
(National Certifying Agency)
PROVISIONAL CERTIFICATE

This is to certify that Mr. / Ms. Achyut Yashavant Mehendale
son / daughter of Mr. Yashavant
has passed the National Certification Examination for Energy Auditors in April - 2002, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India
Date : 10th August 2002

Controller of Examination

AUDITOR CERTIFICATE

MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(Government of Maharashtra Institution)
Amith Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandry, Aundh, Pune, Maharashtra 411067
Ph No: 020-15000450
Email: ... Web: www.mahaenrgy.com

ECN/2022-23/CB-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 Mahiangan 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 cancelling 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 (I/C)

MEDA Registration Certificate

Certificate of Registration

This is to Certify that
Quality Management System of

ENGRESS SERVICES

26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BAUG SOC., PARVATI, PUNE- 411009, MAHARASHTRA, INDIA

has been assessed and found to conform to the requirements of
ISO 9001:2015
for the following scope :

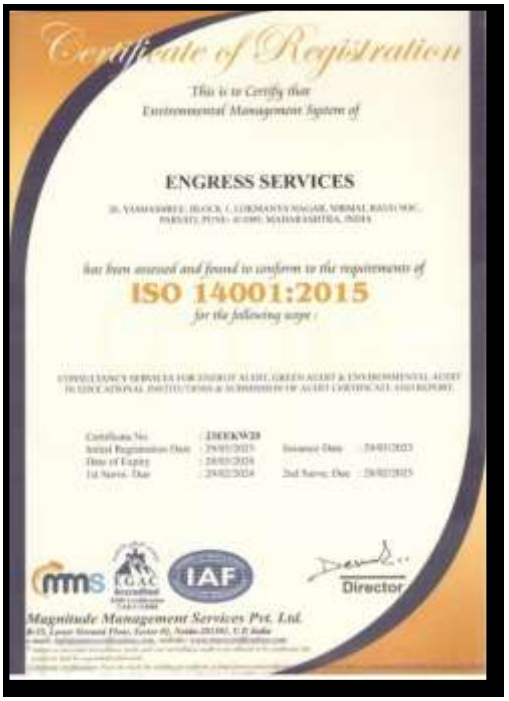
CONSULTANCY SERVICES FOR ENERGY AUDIT, GREEN AUDIT & ENVIRONMENTAL AUDIT IN EDUCATIONAL INSTITUTIONS & SUBMISSION OF AUDIT CERTIFICATE AND REPORT.

Certificate No: 23EQKC32
Initial Registration Date: 27/03/2023 Issuance Date: 27/03/2023
Date of Expiry: 26/03/2026
1st Surv. Due: 27/02/2024 2nd Surv. Due: 27/02/2025

Director

Magnitude Management Services Pvt. Ltd.

ISO: 9001-2015 Certificate



Certificate of Registration

This is to Certify that
Environmental Management System of

ENGRESS SERVICES

26, YASHASHREE, BLOCK 1, LOKMANYA NAGAR, NIRMAL BAUG SOC., PARVATI, PUNE- 411009, MAHARASHTRA, INDIA

has been assessed and found to conform to the requirements of
ISO 14001:2015
for the following scope :

CONSULTANCY SERVICES FOR ENERGY AUDIT, GREEN AUDIT & ENVIRONMENTAL AUDIT IN EDUCATIONAL INSTITUTIONS & SUBMISSION OF AUDIT CERTIFICATE AND REPORT.

Certificate No: 23EEKW28
Initial Registration Date: 29/01/2023 Issuance Date: 29/01/2023
Date of Expiry: 28/01/2026
1st Surv. Due: 29/02/2024 2nd Surv. Due: 29/02/2025

Director

Magnitude Management Services Pvt. Ltd.

ISO: 14001-2015 Certificate

INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	4
II	Executive Summary	5
III	Abbreviations	6
1	Introduction	7
2	Study of Connected Load	8
3	Study of Present Energy Consumption	9
4	Study of Energy Performance Index	10
5	Study of Lighting	11
6	Study of Renewable Energy & Energy Efficiency	13

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Jayawant Shikshan Prasarak Mandal's Narhe Technical Campus, Narhe, Pune for awarding us the assignment of Energy Audit of their Campus for the Academic 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 Narhe Technical Campus, Narhe, Pune consumes Energy in the form of **Electrical Energy;** used for various Electrical Equipment, office & other facilities.

2. Present Connected Load & Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	**348**	kW
2	Annual Energy Purchased	**130220**	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Purchased	**130220**	kWh
2	Annual Energy Generated	**12000**	kWh
3	Annual Energy Consumed=1+2	**142220**	kWh
4	Total Built up area of Institute	**21825**	m^2
5	Energy Performance Index **=(3) / (4)**	**6.51**	kWh/m^2

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

No	Particulars	Value	Unit
1	Lighting Power Density	**5.79**	W/m^2
2	% of Usage of LED Lighting to Total Lighting Load	**25**	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Installation of **10 kWp** Roof Top Solar PV Plant

6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO_2** 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 CO_2 Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in

ABBREVIATIONS

LED	:	Light Emitting Diode
JSPM	:	Jayawant Shikshan Prasarak Mandal
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube Light
PV	:	Photo Voltaic
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO_2	:	Carbon Di Oxide
MT	:	Metric Ton

CHAPTER-I
INTRODUCTION

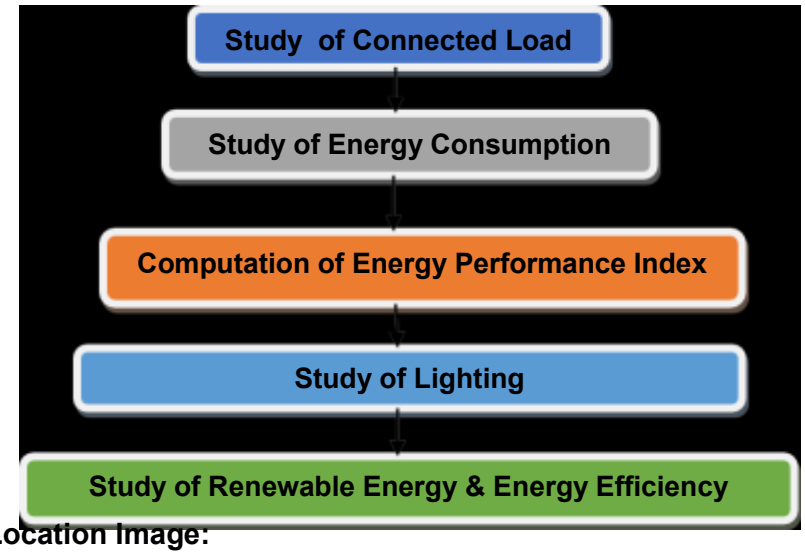
1.1 Introduction:

An Energy Audit is conducted at Jayawant Shikshan Prasarak Mandal's Narhe Technical Campus, Narhe, 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 Institute Location Image:

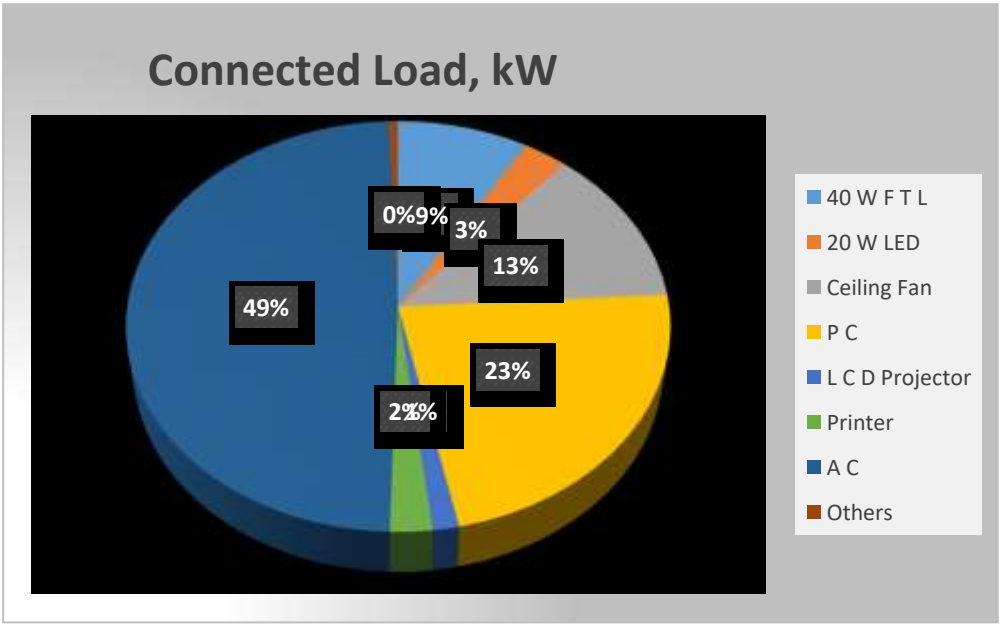
CHAPTER-II
STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College are as under.

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load, kW
1	40 W F T L	752	40	30
2	20 W LED	500	20	10
3	Ceiling Fan	677	65	44
4	P C	714	110	79
5	L C D Projector	17	275	5
6	Printer	48	175	8
7	A C	86	1987.5	171
8	Others	10	150	2
9	**Total**			**348**

Chart No 1: Study of Connected Load:



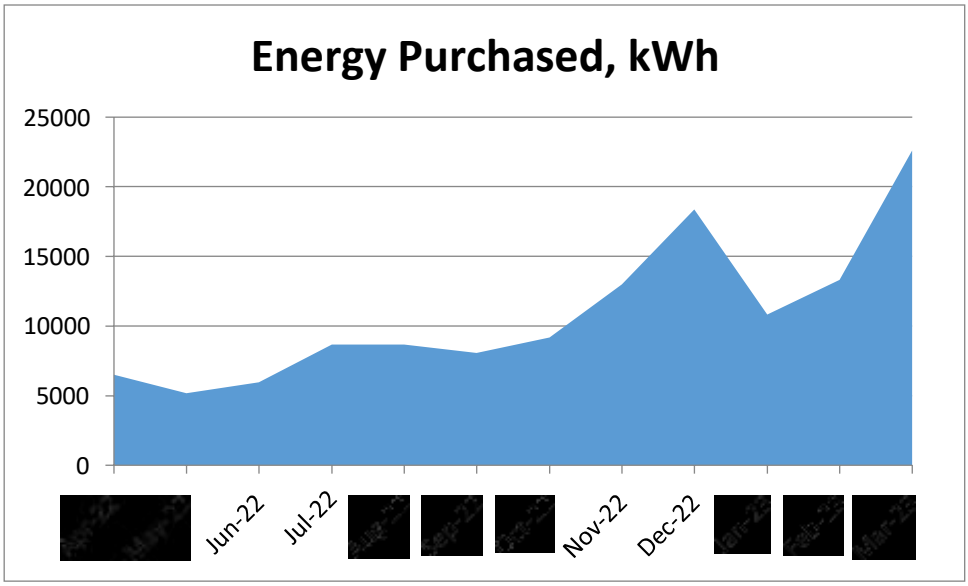
CHAPTER-III
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2022-23:

No	Month	Energy Purchased, kWh
1	Apr-22	6493
2	May-22	5180
3	Jun-22	5948
4	Jul-22	8678
5	Aug-22	8641
6	Sep-22	8060
7	Oct-22	9146
8	Nov-22	12963
9	Dec-22	18382
10	Jan-23	10812
11	Feb-23	13317
12	Mar-23	22601
13	Total	130220
14	Maximum	22601
15	Minimum	5180
16	Average	10852

Chart No 2: Variation in Monthly Energy Purchased:



CHAPTER-IV
STUDY OF ENERGY PERFORMANCE INDEX

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

It is determined by:

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

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	**130220**	kWh
2	Energy Generated by Solar PV Plant	**12000**	kWh
3	Total Energy Consumed= 1+2	**142220**	kWh
4	Total Built up area of Institute	**21825**	m^2
5	Energy Performance Index **=(3) / (4)**	**6.51**	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 horizon tal 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: B-205:

No	Particulars	Value	Unit
1	Qty of 40 W Fittings in Class Room: B-205	10	Nos
2	Load of 40 W Fitting	40	W/unit
3	Total Load of 10 Nos, 40 W Fittings	**400**	W
4	Built up area of Class Room: B-205	**69**	m^2
5	**Lighting Power Density = (3)/(4)**	**5.79**	W/m^2

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

No	Particulars	Value	Unit
1	No of 20 W LED Tube Lights	500	Nos
2	Demand of 20 W LED Tube Light	20	W/Unit
3	Total Electrical Load of 20 W LED Fittings	**10**	kW
4	No of 40 W FTL Tube Lights	752	Nos
5	Demand of 40 W FTL Fitting	40	W/Unit
6	Total Electrical Load of 40 W FTL Fittings	**30.08**	kW
7	Total Lighting Load= **3**	**40.08**	kW
8	Total Lighting Load= **3 + 6**	**10**	kW
9	% of LED to Total Lighting Requirement = **(7)*100/(8)**	**25**	%

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 10 kWp

Photograph of Roof Top Solar PV Plant:

6.2 Energy Efficiency Measures adopted:

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

Photographs of LED Lighting:

ENGRESS SERVICES

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

ENERGY AUDIT CERTIFICATE

Certificate No: ES/JSPMNTC/22-23/01 **Date: 14/5/2023**

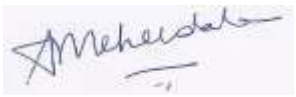
This is to certify that we have conducted Energy Audit at Jayawant Shikshan Prasarak Mandal's Narhe Technical Campus, Narhe, Pune, in the Academic year 2022-23

.The College 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 10 kWp Roof Top Solar PV Plant

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

For Engress Services,



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

ENERGY AUDIT REPORT

of

Jayawant Shikshan Prasarak Mandal's,
Narhe Technical Campus, Narhe

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'

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 Muktangan 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 Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/JSPMNTC/21-22/01 Date: 10/5/2022

CERTIFICATE

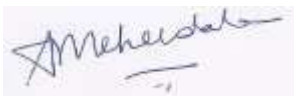
This is to certify that we have conducted Energy Audit at Jayawant Shikshan Prasarak Mandal's Narhe Technical Campus, Narhe, Pune, in the Academic year 2021-22

.The College 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 10 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

INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	10
4	Carbon Foot Printing	12
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 Narhe Technical Campus, Narhe, Pune for awarding us the assignment of Energy Audit of their Campus for the Academic 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 Narhe Technical Campus, Narhe, Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO_2 Emission:

No	Parameter/ Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	125212	112.69
2	Maximum	21732	19.56
3	Minimum	4981	4.48
4	Average	10434	9.39

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Installation of 10 kWp Roof Top Solar PV Plant.

4. Usage of Alternate Energy:

- The College has installed Roof Top Solar PV Plant of Capacity **10kWp.**
- Energy purchased from MSEDCL is **125212 kWh.**
- Energy generated by Roof Top Solar PV Plant is**12000 kWh.**
- Total Energy Demand of the College is **137212 kWh.**
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **8.75 %.**

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **40.08 kW.**
- The LED Lighting Load of the College is **10 kW.**
- The percentage of LED Lighting to Total Lighting Load is **25 %.**

6. Assumptions:

1. 1 kWh of Electrical Energy releases **0.9 Kg** of **CO_2**into atmosphere
2. **1 kWp** Solar PV Plant generates **4 kWh** of Electrical Energy per Day
3. Annual Solar Energy Generation Days: **300 Nos.**

7. References:

- For CO_2 Emissions: www.tatapower.com
- For Roof Top Solar PV Plant Energy generation: www.solarrooftop.gov.in

ABBREVIATIONS

LED	:	Light Emitting Diode
JSPM	:	Jayawant Shikshan Prasarak Mandal
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube 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 and Present Energy Consumption
2. To Study the present CO_2 emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

1.2Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal Narhe Technical Campus
2	Address	Narhe, Pune
3	Year of Establishment	2011
4	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:

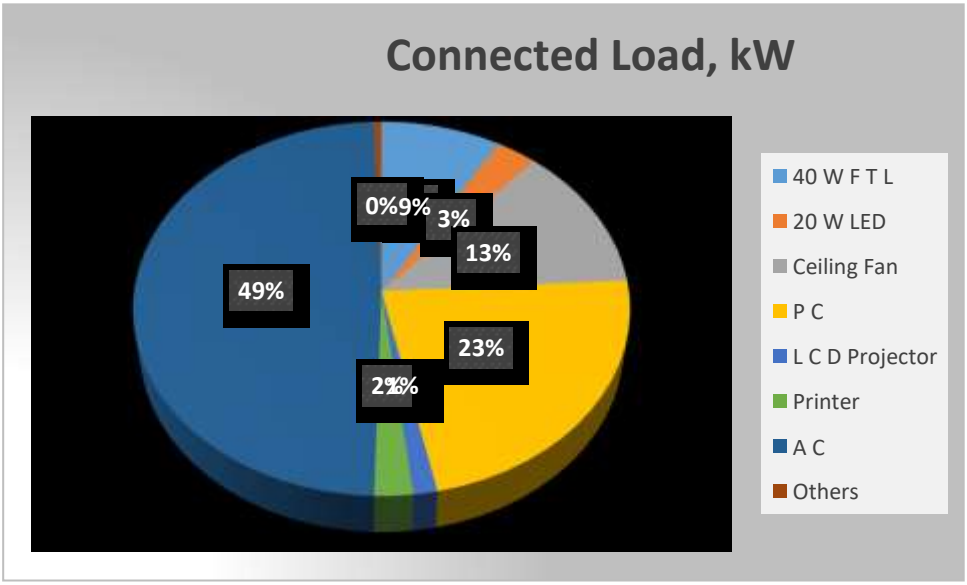
CHAPTER-II
STUDY OF CONNECTED LOAD

The major contributors to the connected load of the College are as under.

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load, kW
1	40 W F T L	752	40	30
2	20 W LED	500	20	10
3	Ceiling Fan	677	65	44
4	P C	714	110	79
5	L C D Projector	17	275	5
6	Printer	48	175	8
7	A C	86	1987.5	171
8	Others	10	150	2
9	**Total**			**348**

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- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	6243
2	May-21	4981
3	Jun-21	5719
4	Jul-21	8344
5	Aug-21	8309
6	Sep-21	7750
7	Oct-21	8794
8	Nov-21	12464
9	Dec-21	17675
10	Jan-22	10396
11	Feb-22	12805
12	Mar-22	21732
13	Total	125212
14	Maximum	21732
15	Minimum	4981
16	Average	10434

Chart No 2: Variation in Monthly Energy Purchased:

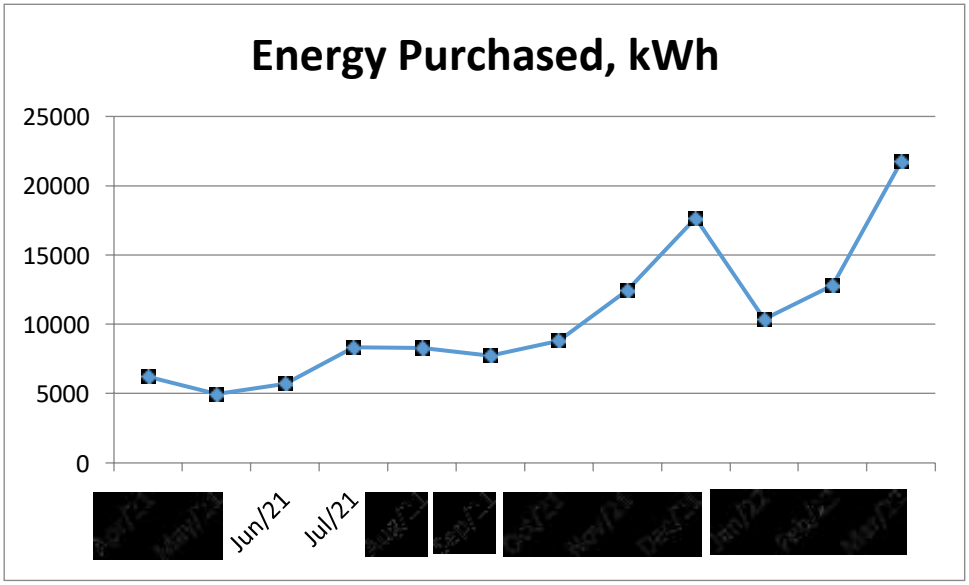


Table No 4: Key Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	125212
2	Maximum	21732
3	Minimum	4981
4	Average	10434

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 College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO_2 Emissions:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Based on the above Data we compute the CO_2 emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No5: Month wise CO_2 Emissions:

No	Month	Energy Purchased, kWh	CO_2 Emissions, MT
1	Apr-21	6243	5.62
2	May-21	4981	4.48
3	Jun-21	5719	5.15
4	Jul-21	8344	7.51
5	Aug-21	8309	7.48
6	Sep-21	7750	6.98
7	Oct-21	8794	7.91
8	Nov-21	12464	11.22
9	Dec-21	17675	15.91
10	Jan-22	10396	9.36
11	Feb-22	12805	11.52
12	Mar-22	21732	19.56
13	Total	125212	112.69
14	Maximum	21732	19.56
15	Minimum	4981	4.48
16	Average	10434	9.39

Chart No 3: Month wise CO_2Emissions:

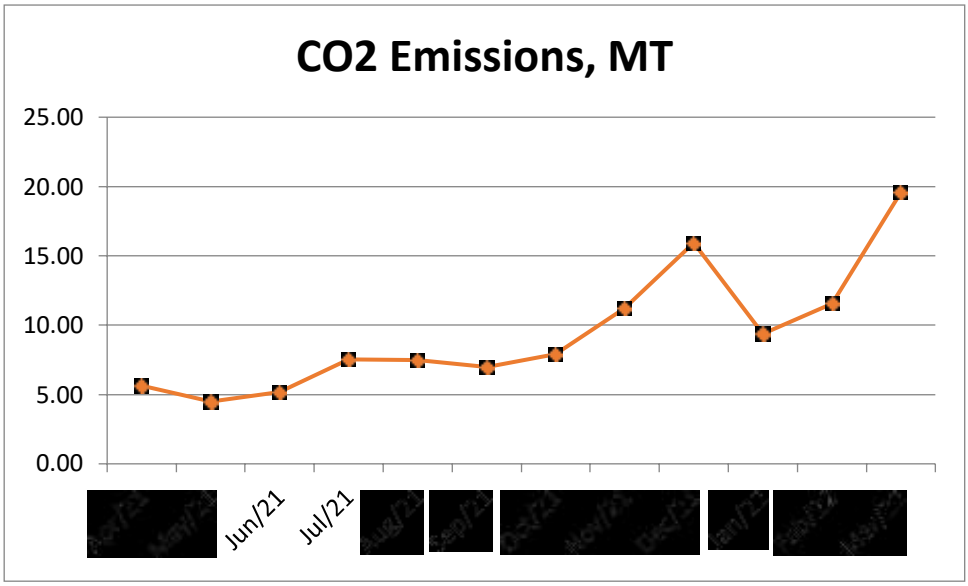


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO_2 Emissions, MT
1	Total	125212	112.69
2	Maximum	21732	19.56
3	Minimum	4981	4.48
4	Average	10434	9.39

CHAPTER-V
STUDY OF USAGE OF ALTERNATE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.

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

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

No	Particulars	Value	Unit
1	Energy purchased from MSEDCL	**125212**	kWh/Annum
2	Capacity of Roof Top Solar PV Capacity	10	kWp
3	Average Energy Generated per kWp per Day	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated = 2*3*4	**12000**	kWh/Annum
6	Total Energy Requirement = (1) + (5)	137212	kWh/Annum
7	Percent of Alternate Energy to Annual Energy Requirement = (**5**)*100/(**6**)	**8.75**	%

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 Lights to Total Lighting.

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

No	Particulars	Value	Unit
1	No of 20 W LED Tube Lights	500	Nos
2	Demand of 20 W LED Tube Light	20	W/Unit
3	Total Electrical Load of 20 W LED Fittings	**10**	kW
4	No of 40 W FTL Tube Lights	752	Nos
5	Demand of 40 W FTL Fitting	40	W/Unit
6	Total Electrical Load of 40 W FTL Fittings	**30.08**	kW
7	Total Lighting Load= **3**	**40.08**	kW
8	Total Lighting Load= **3 + 6**	**10**	kW
9	% of LED to Total Lighting Requirement = **(7)*100/(8)**	**25**	%

ENERGY AUDIT REPORT

of

Jayawant Shikshan Prasarak Mandal's,
Narhe Technical Campus, Narhe

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/JSPMNTC/20-21/01 Date: 10/8/2021

CERTIFICATE

This is to certify that we have conducted Energy Audit atJayawant Shikshan Prasarak Mandal's Narhe Technical Campus, Narhe, Pune, in the Academic year 2020-21

.The College has adopted followingEnergy Efficientpractices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of 10 kWp Roof Top Solar PV Plant

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

For Enrich Consultants,

A Y Mehendale,
Certified Energy Auditor
EA-8192

INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	12
4	Carbon Foot Printing	14
5	Study of Usage of Alternate Energy	16
6	Study of LED Lighting	17

ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management ofJayawant Shikshan Prasarak Mandal's Narhe Technical Campus, Narhe, Punefor awarding us the assignment of Energy Audit of their Campus for the Academic 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 Narhe Technical Campus, Narhe, Puneconsumes Energy in the form of **Electrical Energy**used for various Electrical Equipment, office & other facilities.

1. Present Energy Consumption& CO_2 Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO_2 Emissions, MT
1	Total	93505	84.15
2	Maximum	9581	8.62
3	Minimum	4981	4.48
4	Average	7792	7.01

2. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment
- Installation of 10 kWp Roof Top Solar PV Plant.

3. Usage of Alternate Energy:

- The College has installed Roof Top Solar PV Plant of Capacity **10kWp.**
- Energy purchased from MSEDCL is **93505 kWh.**
- Energy generated by Roof Top Solar PV Plant is**12000 kWh.**
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **11.37 %.**

4. Usage of LED Lighting:

- The Total Annual Lighting Demand of the College is **16032 kWh.**
- The Total Annual LED Lighting Demand is**4000 kWh.**
- The percentage of Annual LED Lighting to Annual Lighting Demand is **25 %.**

5. Assumptions:

1. 1 kWh of Electrical Energy releases **0.9 Kg** of **CO_2**into atmosphere
2. Daily working hours-**6 Nos**(For Lighting Calculations)
3. Annual working Days-**180 Nos**(For Lighting Calculations)
4. Annual Solar Energy Generation Days:**300 Nos.**

6. References:

- For CO_2 Emissions: www.tatapower.com
- For Roof Top Solar PV Plant Energy generation: www.solarrooftop.gov,in

ABBREVIATIONS

LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
BEE	:	Bureau of Energy Efficiency
FTL	:	Fluorescent Tube 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 CO_2 emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

1.2Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal Narhe Technical Campus
2	Address	Narhe, Pune
3	Year of Establishment	2011
4	Affiliation	Savitribai Phule Pune University

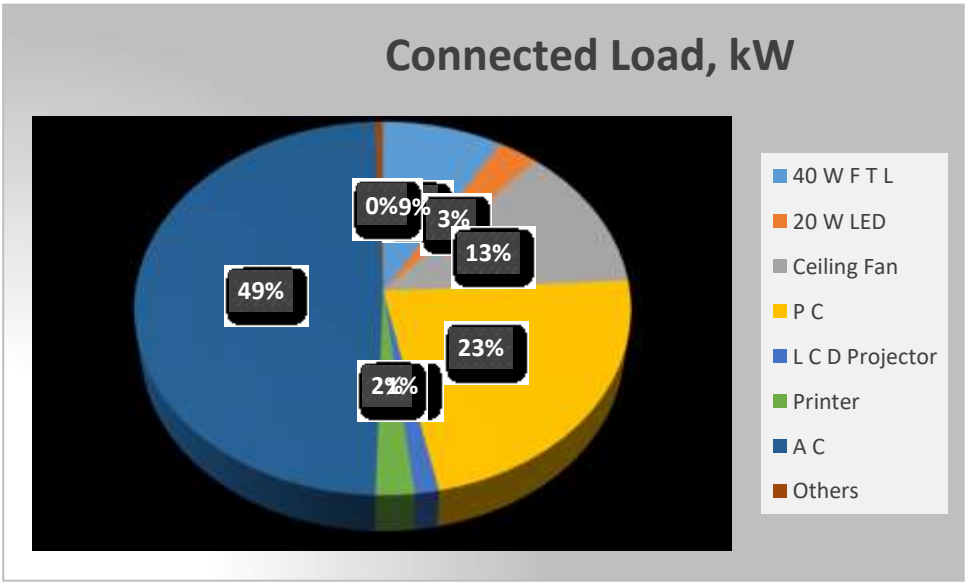
CHAPTER-II
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load, kW
1	40 W F T L	752	40	30
2	20 W LED	500	20	10
3	Ceiling Fan	677	65	44
4	P C	714	110	79
5	L C D Projector	17	275	5
6	Printer	48	175	8
7	A C	86	1987.5	171
8	Others	10	150	2
9	**Total**			**348**

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	7017
2	Aug-20	8419
3	Sep-20	9155
4	Oct-20	9269
5	Nov-20	7778
6	Dec-20	8734
7	Jan-21	9581
8	Feb-21	8105
9	Mar-21	8504
10	Apr-21	6243
11	May-21	4981
12	Jun-21	5719
13	Total	93505
14	Maximum	9581
15	Minimum	4981
16	Average	7792

Chart No 2: Variation in Monthly Energy Consumption:

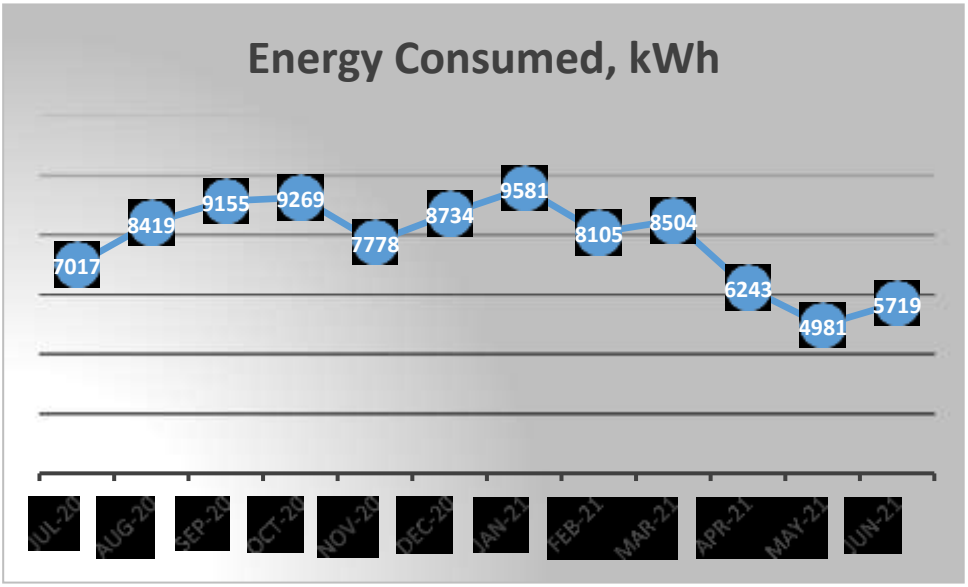


Table No 4: Key Parameters:

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	93505
2	Maximum	9581
3	Minimum	4981
4	Average	7792

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 College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO_2 Emissions:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO_2** into atmosphere

Based on the above Data we compute the CO_2 emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No5: Month wise CO_2 Emissions:

No	Month	Energy Consumed, kWh	CO_2 Emissions, MT
1	Jul-20	7017	6.32
2	Aug-20	8419	7.58
3	Sep-20	9155	8.24
4	Oct-20	9269	8.34
5	Nov-20	7778	7.00
6	Dec-20	8734	7.86
7	Jan-21	9581	8.62
8	Feb-21	8105	7.29
9	Mar-21	8504	7.65
10	Apr-21	6243	5.62
11	May-21	4981	4.48
12	Jun-21	5719	5.15
13	Total	93505	84.15
14	Maximum	9581	8.62
15	Minimum	4981	4.48
16	Average	7792	7.01

Chart No 3: Month wise CO_2Emissions:

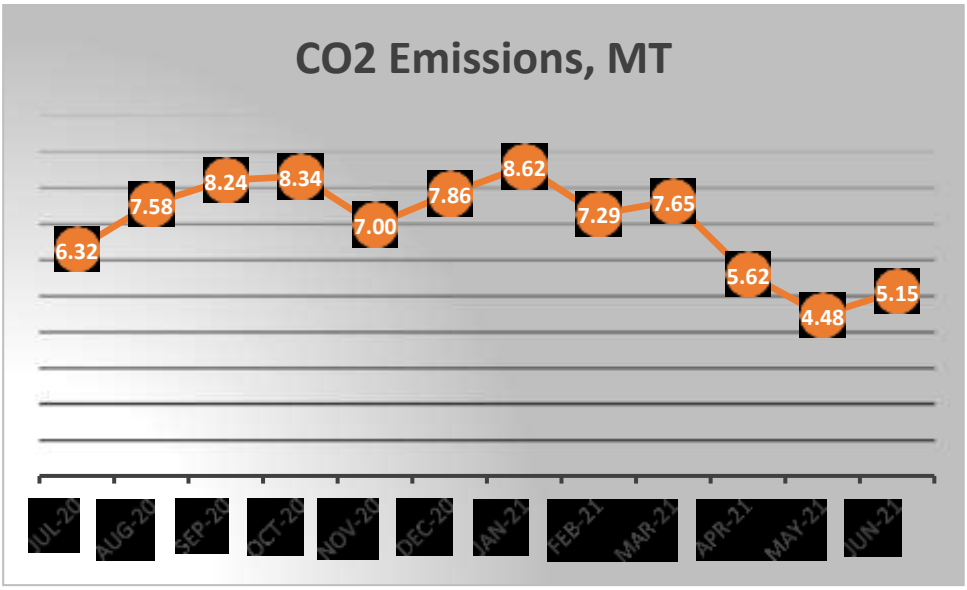


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Consumed, kWh	CO2 Emissions, MT
1	Total	93505	84.15
2	Maximum	9581	8.62
3	Minimum	4981	4.48
4	Average	7792	7.01

CHAPTER-V
STUDY OF USAGE OF ALTERNATE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.

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

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

No	Particulars	Value	Unit
1	Energy purchased from MSEDCL	**93505**	kWh/Annum
2	Capacity of Roof Top Solar PV Capacity	10	kWp
3	Average Energy Generated per kWp per Day	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated = 2*3*4	**12000**	kWh/Annum
6	Total Energy Requirement = (1) + (5)	105505	kWh/Annum
7	Percent of Alternate Energy to Annual Energy Requirement = (**5**)*100/(**6**)	**11.37**	%

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 20 W LED Tube Lights	500	Nos
2	Demand of 20 W LED Tube Light	20	W/Unit
3	Total Electrical Load of 20 W LED Fittings	**10**	kW
4	No of 40 W FTL Tube Lights	752	Nos
5	Demand of 40 W FTL Fitting	40	W/Unit
6	Total Electrical Load of 40 W FTL Fittings	**30.08**	kW
7	Total Lighting Load= 3 + 6	40.08	kW
8	Daily Working Period	4	Hrs/Day
9	Annual Working Days	100	Nos/Annum
10	Annual Lighting Load = 7*8*9	**16032**	kWh/Annum
11	Annual LED Lighting Load = 3*4*9	**4000**	kWh/Annum
12	% of LED Lighting to Annual Lighting Requirement = (**11**)*100/(**10**)	**25**	%

Jayawant Shikshan Prasarak Mandal's
JSPM Narhe Technical Campus
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Prof.(Dr.)M.M.Sardeshmukh
B.Tech (E&TC) M.Tech (E&TC),Ph.D (Engg.)
DIRECTOR

Policy Document

on

Clean and Green Campus

The Clean and Green Campus Policy of JSPM's Narhe Technical Campus, Narhe, Pune is to sensitize the students and the staff to promote the use of environment-friendly products and services and to instill the importance of cleanliness for a healthy life.

The policy aims to create awareness about environmental issues by organizing events, rallies, cleanliness drives, seminars, workshops, presentations, tree plantation drives, rangoli competitions, essay competitions, guest lectures, etc.

Policies

Promotion of "Save Energy Tips

- Turn off your monitor when you leave your table.
- Whenever possible, shut down rather than logging off.
- Turn off unnecessary lights and use daylight instead.
- Avoid the use of decorative lighting.
- Use LED bulbs and tubes.
- Keep lights off in conference rooms, classrooms, seminar hall, common rooms, staff cabin when they are not in use.
- Use the fans only when they are needed.
- Unplug appliances not plugged into power strips (ACs, printers, faxes, and chargers etc.).
- Use solar source of energy.

Water Management:

To adopt following measures in campus to reduce water consumption

- Rain water harvesting.
- Change of taps which have leakage.
- Display water management instructions/alerts at prominent/relevant locations in the campus.
- Use of sprinkler irrigation in campus.

Waste Management

- To increase the green cover in and around the campus.
- To adopt methods for waste segregation.
- To manage, collect and dispose e-waste appropriately.
- To reduce hazardous waste and its management.
- To promote plastic free campus.
- To encourage paperless work culture and reuse office
- Display waste management instructions/alerts at prominent/relevant locations in the campus.

Initiatives Taken to Implement the Clean and Green Campus Policy

Landscaping with Trees and Plants

As per the Clean and Green Policy, the institute strives to plant various types of medicinal plant species in large numbers within the campus. Gardeners and full time adequate support staff have been appointed for the maintenance of gardens and keeping the campus litter-free, clean and Green Campus.

Ban on Single-Use Plastic

The campus is a plastic free campus where there is a ban on single-use plastics in classrooms, laboratories, canteen, hostel and other premises. The institute facilitates environment friendly substitutes like stainless steel, washable and reusable tumblers at all water units and mandates the canteen to serve in stainless steel vessels to systematically ban the plastic in the campus.

Promote use of electronic vehicles

Students and the staff of the institute are promoted to make use of bicycles, battery-operated e-bikes.

Solar Plant in the Institute

The institute has installed a Solar Energy Plant. The energy output of the solar panels are connected to the power grid of the MSEDCL where the power produced by the solar panels are supplied to the grid for which subsidy has been provided by the MSEDCL for the power consumption of the institute.

Use of LED bulbs

Most of the electric lights and computers of the institute are LED enabled.

Rainwater Harvesting

The college ensures rain-water conservation through rainwater harvesting. The rain rainwater harvesting. Water from the rooftop outlets is carried through the well connected pipelines to the wells or is collected in the large water harvesting tanks and the overflowing rain-water from these tanks is discharged in the soak-pits for ground water recharge. Rain water collected in the tank is supplied to the plants in the medicinal plant garden of the institute.

Paperless Office and Communication

The institute has a policy to minimize the use of paper in all types of official/academic communication of the college through e-communication. The use of paper is substantially reduced through digitization. One-side blank pages are used to avoid wastage of paper. All the institute staff make required official and college related communication through e-mail IDs, What's App, Class-wise groups, Department wise groups, Committee wise groups, which led to reduce the usage of paper in the form of notices and circulars. Moreover, the college has avoided massive usage of paper by introducing the "Learning Management System MOODLE AND GOOGLE CLASSROOM " wherein references, notes, syllabi, question banks, study material are stored and shared on the e-platform.

This practice has proved highly beneficial to save money, boost productivity, save space, and have made information sharing easier, and help the environment.

Solid waste management

The Solid waste generated in the campus is segregated as bio degradable and non-degradable and handed over to municipal corporations.

All the departments, laboratories, and classrooms are provided with dustbins for dry wastage disposal. Segregation of the waste into dry and wet waste is done through the separately allotted dustbins in the institute.

Liquid waste management

Chemistry laboratory has separate basin marked with hazardous chemical waste. In this liquid waste can be defined as waste water of practical without chemicals. As this liquid is not hazardous to the environment so it can be percolated in the soil so as to avoid stagnant water and to facilitate ground water recharge. The hazardous liquid is handled in a sand bath.

Water management

Rain water harvesting is the process of collecting, conveying and storing water from rainfall in an area.

Our institution has a Roof Top Rainwater Harvesting System, it is a system of catching rainwater where it falls. Rainwater collected from the rooftop of the building is diverted through down take pipes to bore wells. There is always skepticism regarding Roof Top Rainwater Harvesting since doubts are raised that rainwater may contaminate groundwater. So filters are attached to the down take pipes. After flushing of rainfall, water passes through filters to remove mud, turbidity, color and microorganisms. Clear water then passes to the bore well to recharge the groundwater. The College 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.

E-Waste management

The campus has a centralized facility to collect e-waste from institutes, housekeeping and disposal. E-wastes such as computers, laptops, scanners, printers etc. if generated are collected centrally & disposed off.

Old monitors and CPUs are repaired and reused in most of the cases.

Display Boards to Promote Environmental Sensibility in the institute

Various boards including quotes that promote environmental awareness and ethics including air-pollution control, plastic-free campus, conservation of energy, recycling of resources, tree plantation, nature conservation, etc. are displayed for all the stakeholders of the institute.

Events to Protect and Nurture Environment

Various events like Rallies, Awareness Campaigns, Seminars, Conferences, Workshops, Tree Plantation Drives, Rangoli Competitions, Essay Competitions, are conducted every year. WPS are Seminars, Conferences, Guest Lectures, etc.

The Green, Environmental and Energy Audit

The Green, Environmental and Energy Audit of the institute is done by Enrich Consultancy, Pune.

JSPM Narhe Technical Campus Narhe, Pune-41

Director
Director
JSPM Narhe Technical Campus
Narhe, Pune - 411041

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Prof.(Dr.)M.M.Sardeshmukh
B.Tech (E&TC) M.Tech (E&TC),Ph.D.(Engg.)
DIRECTOR

Date: 7th March 2024

NOTICE

On account of International Women's Day, Tree Plantation Drive is organized by JSPM Narhe Technical Institute on 8th March 2024. Saplings will be provided. All students and faculties are expected to be present in front of the building at 10 am sharp.

Director

Dr. M. M. Sardeshmukh

Jayawant Shikshan Prasarak Mandal's
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B.Tech (E&TC) M.Tech (E&TC),Ph.D (Engg.)
DIRECTOR

Date: 8th March 2024

TREE PLANTATION

JSPM's Narhe Technical Campus, Pune, organized a tree planting event on 8th March 2024 on account of International Women's Day. The students from all Courses actively participated in this event. Dr. M. M. Sardeshmukh, the Director was invited to be a part of it. The students, along with the teachers, agreed to plant trees in the Campus. Various types of tree saplings, like palm, cinnamon, and neem, were planted in the premises. All the students were given a sapling each to plant. Faculty also actively took part inn the tree plantation.

Students also prepared amazing awareness banners for the event. "Save Trees, Save Air from Pollution". Students created awareness about how planting trees helps to regulate the temperature and absorb all the carbon dioxide from the air. Awareness about how planting trees helps to make the surroundings greener and how trees serve as homes to many birds and animals. The Director also suggested that every student should at least plant and take care of five trees per year as it will help the world to fight against global warming. The day's event was brought to an end with a vote of thanks.

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Prof.(Dr.) S.A.Choudhari
B.E.(CWM),M.E.(WRE) Ph.D.(Engg.)
DIRECTOR

Notice

Date: 26/09/2023

As stewards of our planet, it's our responsibility to take action and preserve the environment for future generations. We're excited to announce the launch of our Environmental Awareness Campaign; all students of JSPM NTC campus are informed that the "**Swachhata Abhiyan"** will be organized on 1st October 2023. All students are encourage to actively participate in this activity.

Date – 01/10/2023

Time -10.00 AM Onwards

Venue – JSPM NTC Campus

Dr S. A Chaudhari

JSPM Narhe Technical Campus Pune

Director
JSPM Narhe Technical Campus
Narhe, Pune

Date: 04/10/2023

Report on environmental promotion and sustainability activities

Activity:-"Swachhata Abhiyan"

Date: 01/10/2023

Location: JSPM NTC Campus

On 01/10/2023, JSPM NTC organized a Campus Clean-up Day as part of our ongoing commitment to environmental sustainability and community engagement. This event aimed to bring together students, faculty, and staff to beautify our campus, raise awareness about littering, and foster a sense of responsibility towards our environment.

Photos of "**Swachhata Abhiyan" conducted on 01/10/2023**

Photos of "**Swachhata Abhiyan" conducted on 01/10/2023**

Photos of "**Swachhata Abhiyan" conducted on 01/10/2023**

Dr S. A Chaudhari

JSPM Narhe Technical Campus Pune

Director
JSPM Narhe Technical Campus
Narhe, Pune-41