

**ENERGY AUDIT REPORT**  
of  
Shri Sharda Bhavan Education Society's  
**INSTITUTE OF TECHNOLOGY AND MANAGEMENT**  
VIP ROAD, NANDED




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](mailto:engress123@gmail.com)



  
Director  
Shri Sharda Bhavan Education Society's  
Institute of Technology and Management,  
NANDED.

## 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/ITM/22-23/01

Date: 19/06/2023

This is to certify that we have conducted an Energy Audit at Shri Sharda Bhavan Education Society's, Institute of Technology & Management, Nanded in the 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 60 kWp Roof Top Solar PV Plant

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

For Engress Services,



A Y Mehendale,

B E-Mechanical, M Tech- Energy

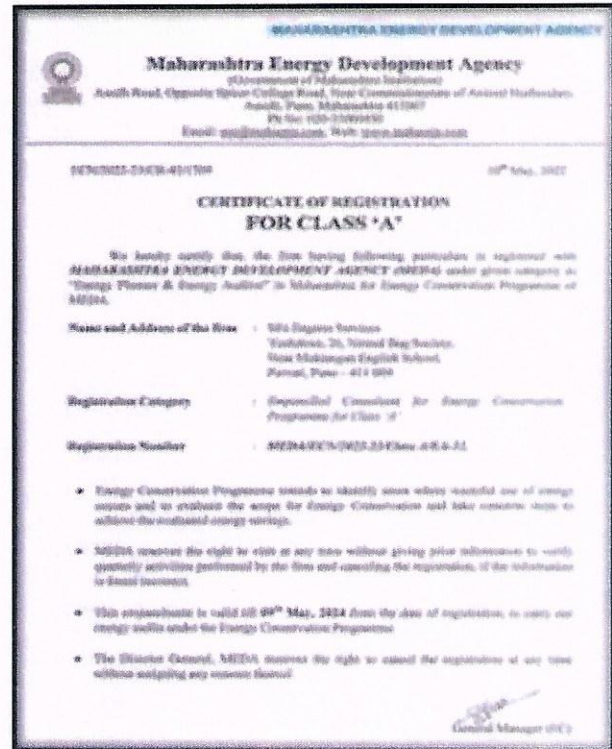
BEE Certified Energy Auditor, EA-8192



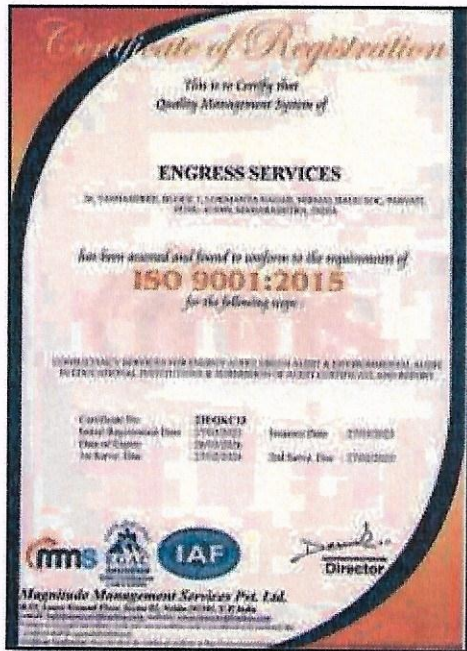
REGISTRATION CERTIFICATES



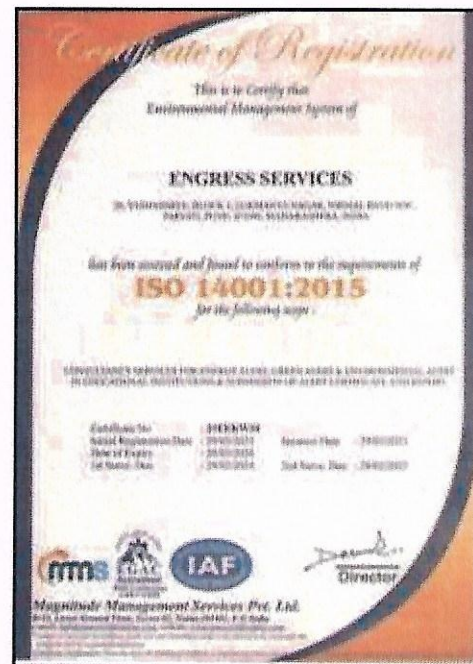
AUDITOR CERTIFICATE



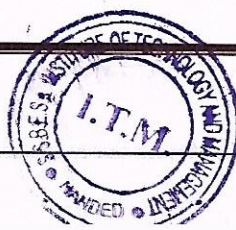
MEDA Registration Certificate



ISO: 9001-2015 Certificate

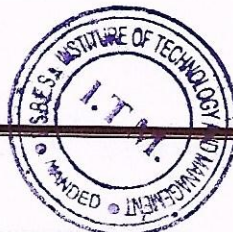


ISO: 14001-2015 Certificate



## INDEX

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



## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded 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. Institute of Technology & Management, Nanded consumes Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

### 2. Present Connected Load & Annual Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	71.11	kW
2	Annual Energy Consumption	96290	kWh
3	Annual CO <sub>2</sub> Emissions	86.66	MT

### 3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	96290	kWh
2	Total Built up area of Institute	2229.67	m <sup>2</sup>
3	Energy Performance Index =(1) / (2)	43.18	kWh/m <sup>2</sup>

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

No	Particulars	Value	Unit
1	Lighting Power density	1.24	W/m <sup>2</sup>
2	% of Usage of LED Lighting to Total Lighting Load	32.47	%

### 5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting
- Installation of 60 kWp Roof Top Solar PV Plant

### 6. Assumption:

1. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

### 7. References:

- Audit Methodology: [www.mahaurja.com](http://www.mahaurja.com)
- Energy Conservation Building Code: ECBC-2017: [www.beeindia.gov.in](http://www.beeindia.gov.in)
- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)

## ABBREVIATIONS

LED	:	Light Emitting Diode
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
BEE	:	Bureau of Energy Efficiency
ECBC	:	Energy Conservation Building Code
MEDA	:	Maharashtra Energy Development Agency
PV	:	Photo Voltaic
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO <sub>2</sub>	:	Carbon Di Oxide
MT	:	Metric Ton



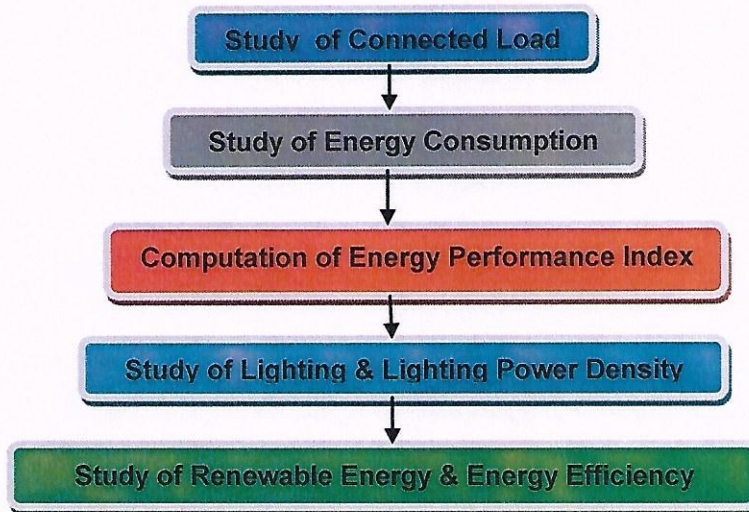
## CHAPTER-I INTRODUCTION

### 1.1 Introduction:

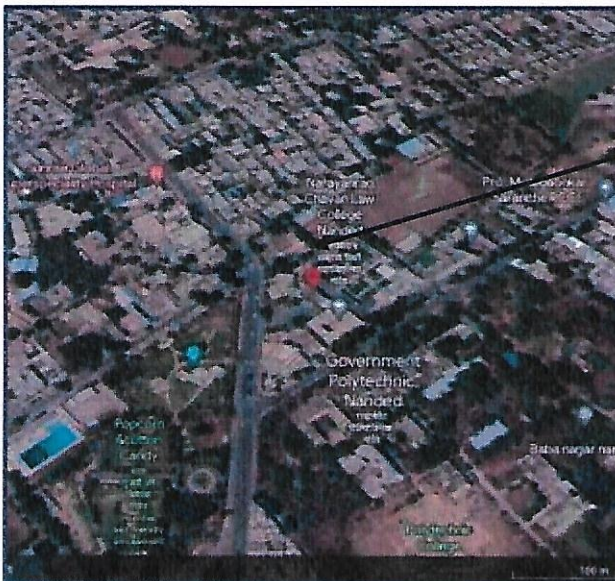
An Energy Audit is conducted at Institute of Technology & Management, Nanded. The guidelines followed for conducting the Energy Audit are:

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

### 1.2 Audit Procedural Steps:



### 1.3 Institute Location Image:



Institute  
Campus



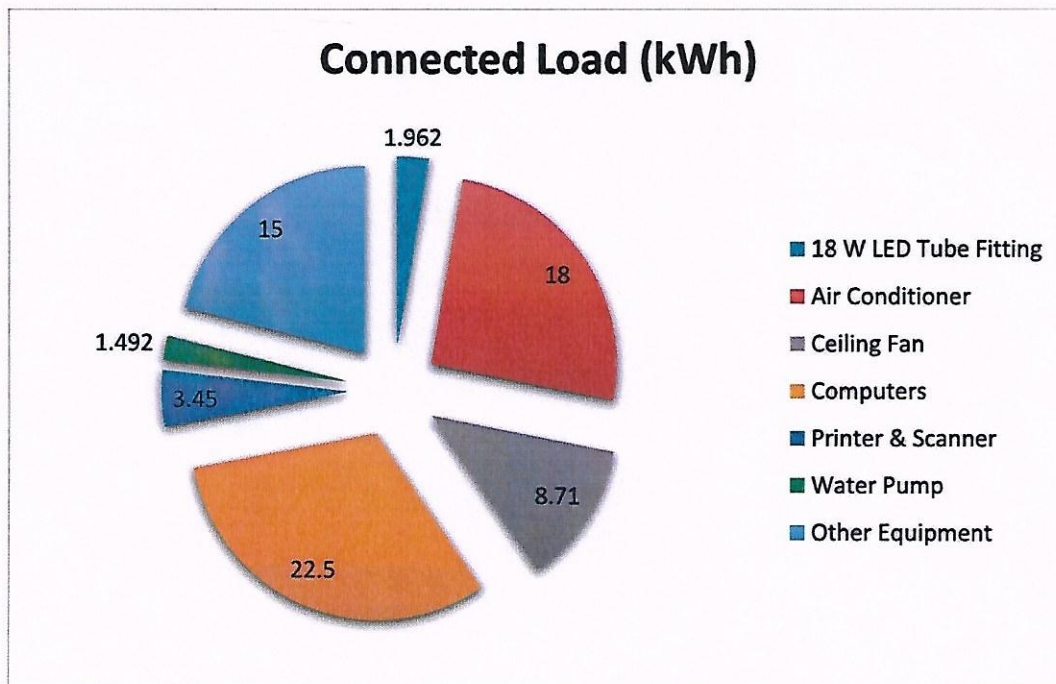
## CHAPTER-II STUDY OF CONNECTED LOAD

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 Fitting	102	40	4.08
2	18 W LED Tube Fitting	109	18	1.962
3	Air Conditioner	12	1500	18
4	Ceiling Fan	134	65	8.71
5	Computers	150	150	22.5
6	Printer & Scanner	23	150	3.45
7	Water Pump	2	746	1.492
8	Other Equipment	100	150	15
9	<b>Total</b>			<b>71.114</b>

**Chart No 1: Study of Connected Load:**



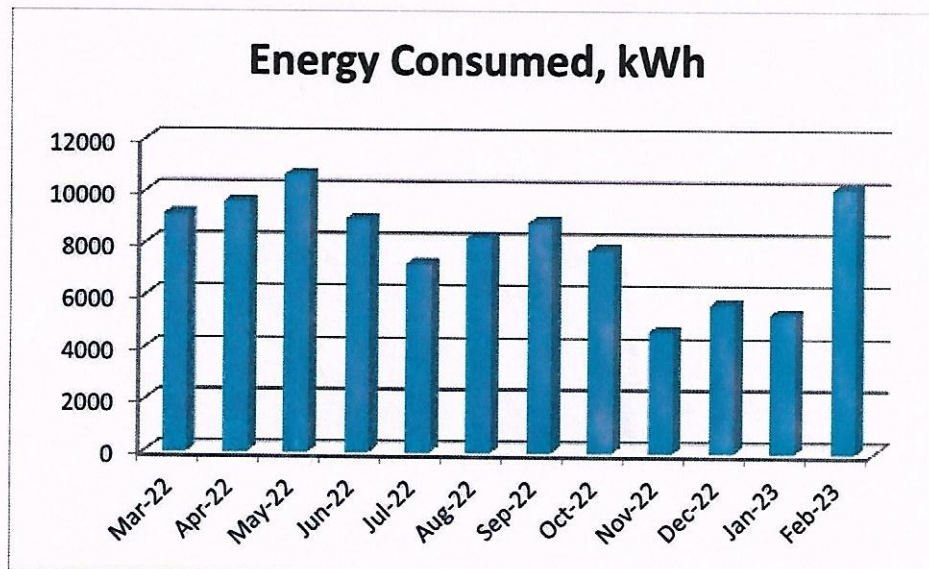
### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

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

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

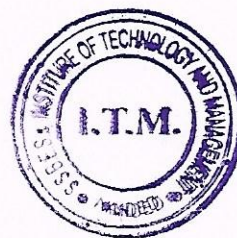
No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Mar-22	9111	8.200
2	Apr-22	9616	8.655
3	May-22	10652	9.587
4	Jun-22	8941	8.047
5	Jul-22	7238	6.514
6	Aug-22	8261	7.434
7	Sep-22	8823	7.940
8	Oct-22	7777	6.998
9	Nov-22	4691	4.221
10	Dec-22	5718	5.145
11	Jan-23	5348	4.812
12	Feb-23	10114	9.102
13	Total	96290	86.66
14	Maximum	10652.7	9.587
15	Minimum	4690.86	4.221
16	Average	8024.19	7.221

**Chart No 2: Variation in Monthly Energy Consumption:**



**Table No 3: Important Parameters:**

No	Parameter/ Variation	Energy Consumed, kWh	CO2 Emissions, MT
1	Total	96290	86.66
2	Maximum	10652.7	9.587
3	Minimum	4690.86	4.221
4	Average	8024.19	7.221



## CHAPTER-IV STUDY OF ENERGY PERFORMANCE INDEX

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

It is determined by:

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

Now we compute the EPI for the Institute as under:

**Table No 4: Computation of Energy Performance Index:**

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	96290	kWh
2	Total Built up area of Institute	2229.67	m <sup>2</sup>
3	Energy Performance Index =(1) / (2)	<b>43.18</b>	kWh/m <sup>2</sup>



## 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/m<sup>2</sup>)

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/m<sup>2</sup>/100 lux) 100 Installed power density (W/m<sup>2</sup>/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: Lighting Power Density of a Class Room. We also compute the percentage usage of LED Lighting to total Lighting Load of the Institute.

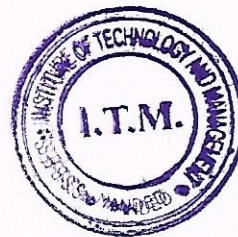
**Table No 5: Computation of Lighting Power Density:**

No	Particulars	Value	Unit
1	No of 18 W LED Tube Lights in Class Room	6	Nos
2	Demand of 18 W LED Tube Light	18	W/Unit
3	Total Lighting Load in the Class Room= (1) * (2)	108	W
4	Area of Class Room	86.95	m <sup>2</sup>
5	Lighting Power Density = (3)/ (4)	1.24	W/m <sup>2</sup>

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

**Table No 6: Percentage Usage of LED Lighting to Annual Lighting Load:**

No	Particulars	Value	Unit
1	Qty of 40 W FTL Light Fittings	102	Nos
2	Load per Fitting	40	W/Unit
3	Total Load of 40 W FTL Fitting	<b>4.08</b>	kW
4	Qty of 18 W LED Light Fittings	109	Nos
5	Load per Fitting	18	W/Unit
6	Total Load of 18 W LED Fitting	<b>1.962</b>	kW
7	Total Lighting Load=3+6	<b>6.042</b>	kW
8	Total LED Lighting Load=6	<b>1.962</b>	kW
9	% of Total Lighting Demand met by LED Lighting= $23 \times 100 / 22$	<b>32.47</b>	%



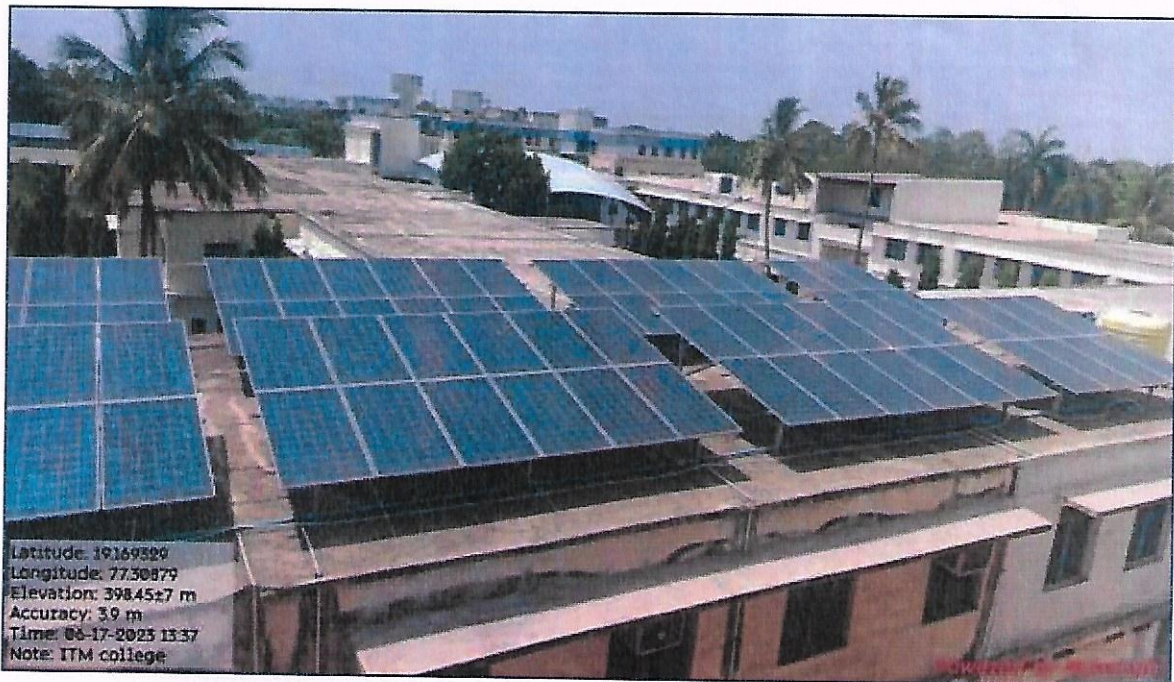
## CHAPTER-VI STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

The Institute has installed a **60 kWp** capacity Roof top Solar PV Plant.  
Now we compute the Percentage of Alternate Energy to Annual Energy demand:

**Table No 7: Percentage of Usage of Alternate Energy to Annual Energy Demand:**

No	Particulars	Value	Unit
1	Energy Purchased from MSEDCL	96290	kWh
2	Installed Roof Top Solar PV Plant Capacity	60	kWp
3	Average Daily Energy Generated	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated	72000	kWh
6	Total Energy Demand = (1) + (5)	168290.3	kWh
7	% of Usage of Alternate Energy to Total Annual Energy Demand= (5)*100/ (6)	<b>42.78</b>	%

**Photograph of Roof Top Solar PV Plant:**



**ENERGY AUDIT REPORT**  
of  
**Shri Sharda Bhavan Education Society's**  
**INSTITUTE OF TECHNOLOGY AND MANAGEMENT**  
VIP ROAD, NANDED

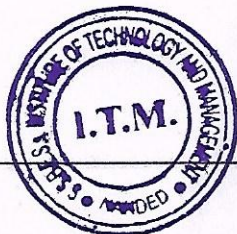


Year: 2021-22

Prepared by:

**Engress Services**

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



  
Director  
Shri Sharda Bhavan Education Society's  
Institute of Technology and Management,  
NANDED.



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](mailto:eee@mahaurja.com), Web: [www.mahaurja.com](http://www.mahaurja.com)

ECN/2022-23/CR-43/1709

10<sup>th</sup> 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 Muktagan 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 09<sup>th</sup> 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 Mukhtangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [engress123@gmail.com](mailto:engress123@gmail.com)

Ref: ES/ITM/21-22/01

Date: 12/6/2022

## CERTIFICATE

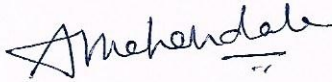
This is to certify that we have conducted Energy Audit at Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded in the Academic Year 2021-22.

The Institute has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

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	11
4	Carbon Foot Printing	13
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 Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded for awarding us the assignment of Energy Audit of their Campus for the Academic Year: 21-22.

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



## EXECUTIVE SUMMARY

1. **Institute of Technology & Management, Nanded** consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

### 2. Present Energy Consumption & CO<sub>2</sub> Emission:

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	92310	83.079
2	Maximum	10616	9.555
3	Minimum	5100	4.590
4	Average	7692.55	6.923

### 3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

### 4. Usage of Alternate Energy:

- As on today College has not installed solar rooftop power plant. It is recommended to install solar power rooftop system on the college building as per availability of funds.

### 5. Usage of LED Lighting:

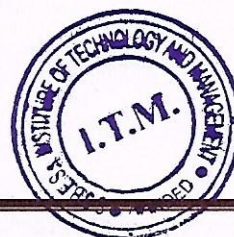
- The Total Lighting Load is **7.538 KW**
- The Total LED Lighting Load is **0.738 KW**.
- The percentage of Annual LED Lighting to Annual Lighting Demand is **9.79 %**.

### 6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO<sub>2</sub>** into atmosphere.
2. **100 LPD** Solar Thermal System saves **1500 kWh** of Electrical Energy per Annum.
3. Average Energy generated by **1 kWp** Solar PV Plant: **4 kWh/Day**.
4. Annual Solar Energy Generation Days: **300 Nos.**

### 7. References:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)
- For Roof Top Solar Energy Generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)
- For Various Indoor Air Parameters: [www.ishrae.com](http://www.ishrae.com)
- For AQI & Water Quality Standards: [www.cpcb.com](http://www.cpcb.com)



## 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
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
CO <sub>2</sub>	:	Carbon Di Oxide
MT	:	Metric Ton



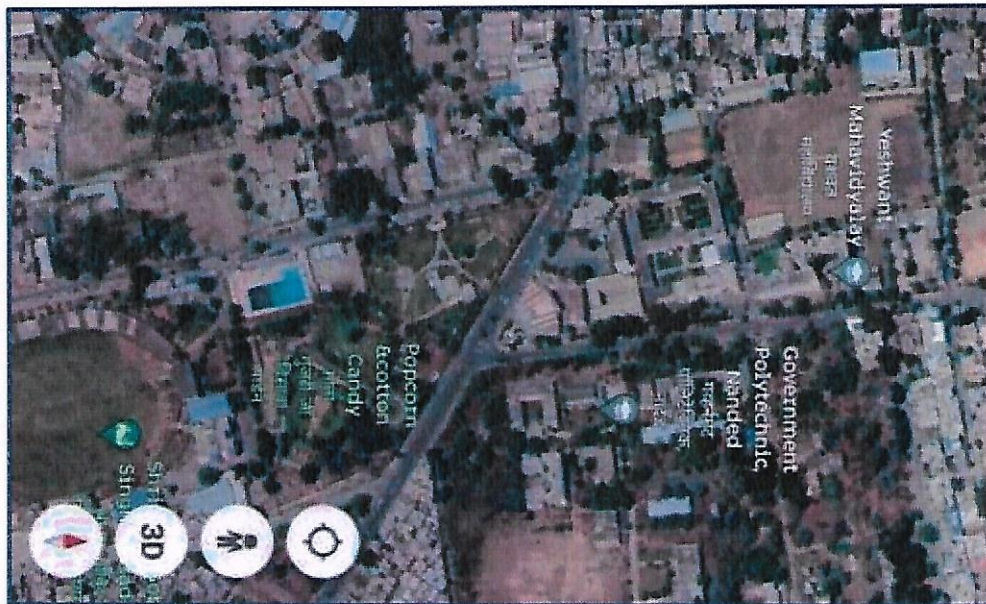
## CHAPTER-I INTRODUCTION

### 1.1 Objectives:

1. To study present Energy Consumption
2. To Study the present CO<sub>2</sub> emissions
3. To study usage of Alternate Energy
4. To study usage of LED Lighting

### 1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Shri Sharda Bhavan Education Society's, Institute of Technology & Management
2	Address	Near Kusum Auditorium, VIP Road, Nanded 431 602
3	Affiliation	S.R.T.Marathawada University, Nanded



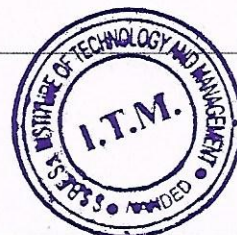
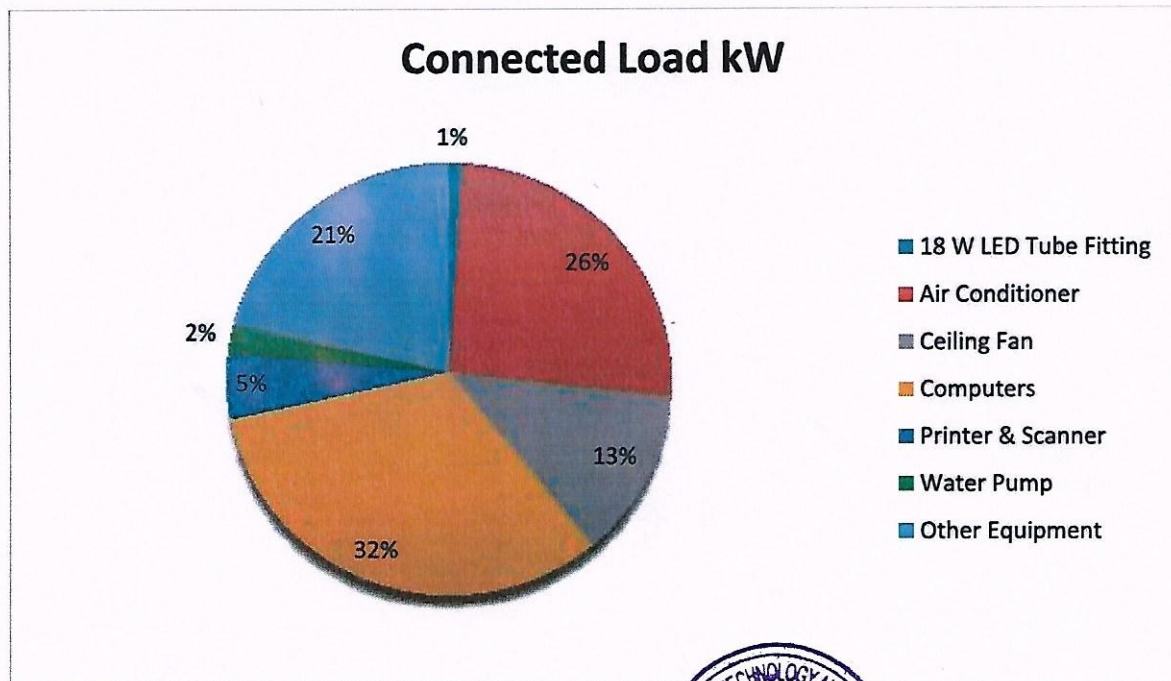
## CHAPTER-II STUDY OF CONNECTED LOAD

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

**Table No 2: Study of Equipment wise Connected Load:**

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fitting	170	40	6.8
2	18 W LED Tube Fitting	41	18	0.738
3	Air Conditioner	12	1500	18
4	Ceiling Fan	134	65	8.71
5	Computers	150	150	22.5
6	Printer & Scanner	23	150	3.45
7	Water Pump	2	746	1.492
8	Other Equipment	100	150	15
9	<b>Total</b>			<b>69.89</b>

**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 Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Mar-21	8741
2	Apr-21	9546
3	May-21	10617
4	Jun-21	8865
5	Jul-21	7159
6	Aug-21	8210
7	Sep-21	8676
8	Oct-21	7766
9	Nov-21	5101
10	Dec-21	6499
11	Jan-22	5348
12	Feb-22	5782
13	Total	92310
14	Maximum	10617
15	Minimum	5101
16	Average	7692.55

Chart No 2: Variation in Monthly Energy Consumption:

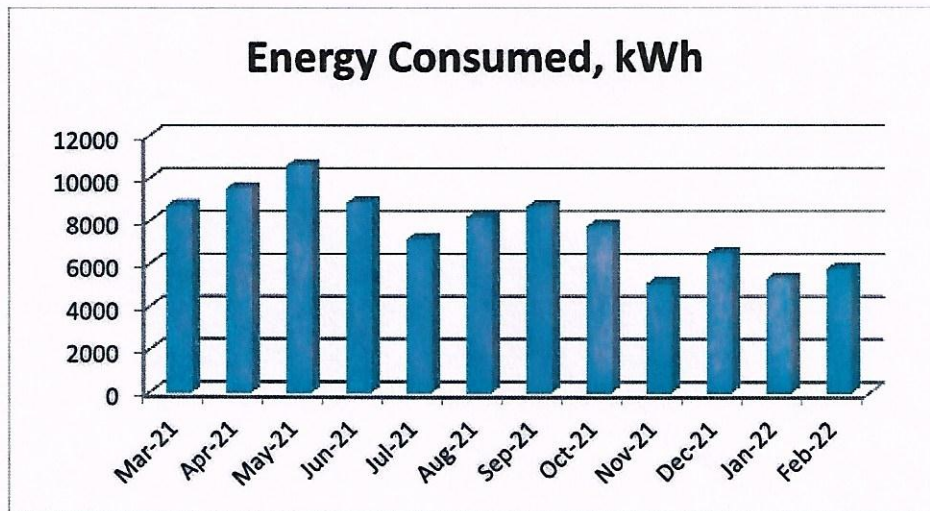


Table No4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	92310
2	Maximum	10617
3	Minimum	5101
4	Average	7692.55

## 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 taking into account the usage of the Electrical Energy.

### Basis for computation of CO<sub>2</sub> Emissions:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO<sub>2</sub> Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Mar-21	8741	7.867
2	Apr-21	9546	8.591
3	May-21	10617	9.555
4	Jun-21	8865	7.978
5	Jul-21	7159	6.443
6	Aug-21	8210	7.389
7	Sep-21	8676	7.808
8	Oct-21	7766	6.989
9	Nov-21	5101	4.590
10	Dec-21	6499	5.848
11	Jan-22	5348	4.812
12	Feb-22	5782	5.204
13	Total	92310	83.079
14	Maximum	10617	9.555
15	Minimum	5101	4.590
16	Average	7692.55	6.923



Chart No 3: Month wise CO<sub>2</sub> Emissions:

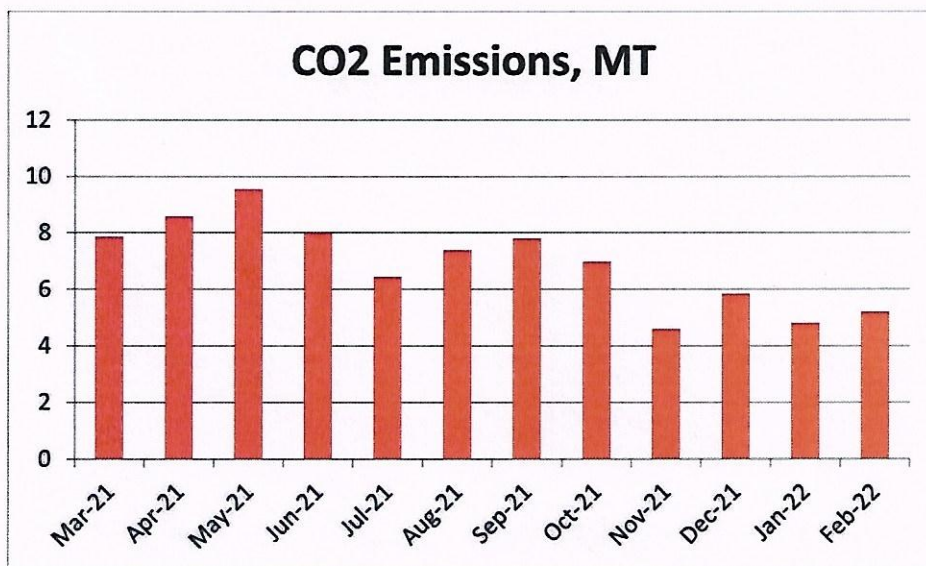


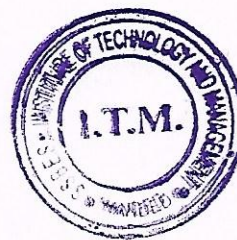
Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	92310	83.079
2	Maximum	10617	9.555
3	Minimum	5101	4.590
4	Average	7692.55	6.923



**CHAPTER V**  
**STUDY OF USAGE OF ALTERNATE ENERGY**

As on today College has not install solar roof-top PV plant, it is recommended to install solar roof-top PV plant on the college building.



## 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 40 W FTL Light Fittings	170	Nos
2	Load per Fitting	40	W/Unit
3	Total Load of 40 W FTL Fitting	6.8	kW
4	Qty of 18 W LED Light Fittings	41	Nos
5	Load per Fitting	18	W/Unit
6	Total Load of 18 W LED Fitting	0.738	kW
7	Total Lighting Load=3+6	7.538	kW
8	Total LED Lighting Load=6	0.738	kW
9	% of Total Lighting Demand met by LED Lighting= $23 \times 100 / 22$	9.79	%



**ENERGY AUDIT REPORT**  
of  
**Shri Sharda Bhavan Education Society's,**  
**INSTITUTE OF TECHNOLOGY & MANAGEMENT**  
VIP Road, Nanded

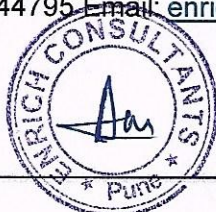


Year: 2020-21

Prepared by:

**ENRICH CONSULTANTS**

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



**Director**  
Shri Sharda Bhavan Education Society's  
Institute of Technology and Management,  
NANDED.

**MAHARASHTRA ENERGY DEVELOPMENT AGENCY**

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2482



**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@mahauria.com](mailto:eee@mahauria.com), Web: [www.mahauria.com](http://www.mahauria.com)

ECN/2021-22/CR-14/1577

22<sup>nd</sup> 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.

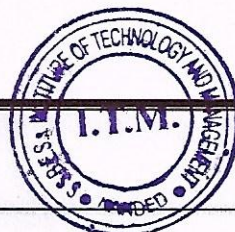
**Name and Address of the firm** : M/s Enrich Consultants  
Yashashree, Plot No. 26, Nirmal Bag Society,  
Near Mukhtangan English School, Parvati,  
Pune - 411009.

**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 21<sup>st</sup> 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 Mukangan English School, Parvati, Pune 411 009  
Tel: 09890444795 Email: [enrichcons@gmail.com](mailto:enrichcons@gmail.com)

Ref: EC/ITM/20-21/01

Date: 30/5/2021

## CERTIFICATE

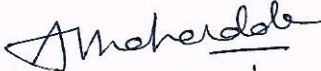
This is to certify that we have conducted Energy Audit at Shri Sharda Bhavan Education Society's Institute of Technology & Management, Nanded in the Year 2020-21.

The Institute has adopted Energy Efficient Practices:

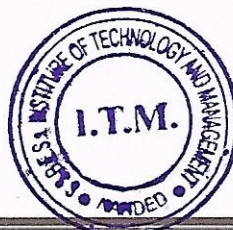
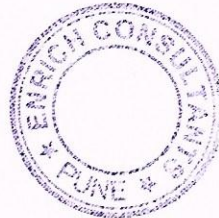
- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting

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

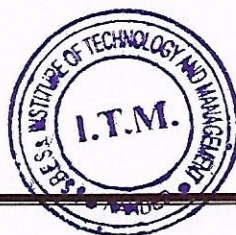
Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	10
4	Study of CO <sub>2</sub> Emission	12
5	Study of Usage of Alternate Energy	14
6	Study of Usage of LED Lighting	15



## **ACKNOWLEDGEMENT**

We at Enrich Consultants, Pune, express our sincere gratitude to the management of at Shri Sharda Bhavan Education Society's, Institute of Technology & Management, Nanded for awarding us the assignment of Energy Audit of their Nanded Campus, for the Academic Year: 2020-21.

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



## EXECUTIVE SUMMARY

1. **Institute of Technology & Management, Nanded** consumes Energy in the form of **Electrical Energy**; used for various gadgets, office & other facilities.

### 2. Present Energy Consumption:

No	Parameter/ Value	Energy Consumed, kWh
1	Total	95987
2	Maximum	11360
3	Minimum	4767
4	Average	7998.92

### 3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

### 4. Usage of Alternate Energy:

- The College has yet to install Roof Top Solar PV Plant.

### 5. Usage of LED Lighting:

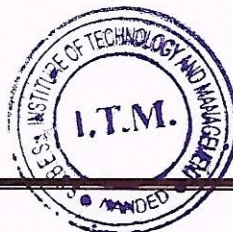
- The Total Lighting load of College is **7.86 kW**.
- The LED Lighting Load is **0.46 kW**.
- The % of LED Lighting to Total Lighting Load is **5.95 %**.

### 6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of **CO<sub>2</sub>** into atmosphere
2. **1 Kg** of LPG releases **2.68 Kg** of **CO<sub>2</sub>** into atmosphere

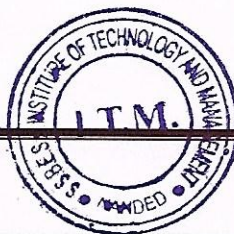
### 7. Reference:

- For CO<sub>2</sub> Emissions: [www.tatapower.com](http://www.tatapower.com)



## ABBREVIATIONS

BEE	Bureau of Energy Efficiency
MSEDCL	Maharashtra Electricity Distribution Company Limited
kWh	Kilo Watt Hour
kWp	Kilo Watt Peak
Kg	Kilo Gram
MT	Metric Ton
CO <sub>2</sub>	Carbon Di Oxide
LPG	Liquefied Petroleum Gas
FTL	Fluorescent Tube Light
LED	Light Emitting Diode



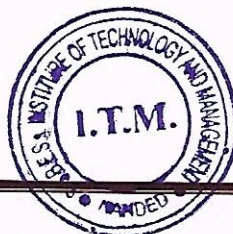
## **CHAPTER-I INTRODUCTION**

### **1.1 Objectives:**

1. To study Connected Load
2. To study Present Energy Consumption
3. To Study the CO<sub>2</sub> Emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

### **1.2 Table No 1: General Details of the College:**

No	Head	Particulars
1	Name of the Institution	Shri Sharda Bhavan Education Society's, Institute of Technology & Management
2	Address	Near Kusum Auditorium, VIP Road, Nanded 431 602
3	Year of Establishment	1997



## CHAPTER-II STUDY OF CONNECTED LOAD

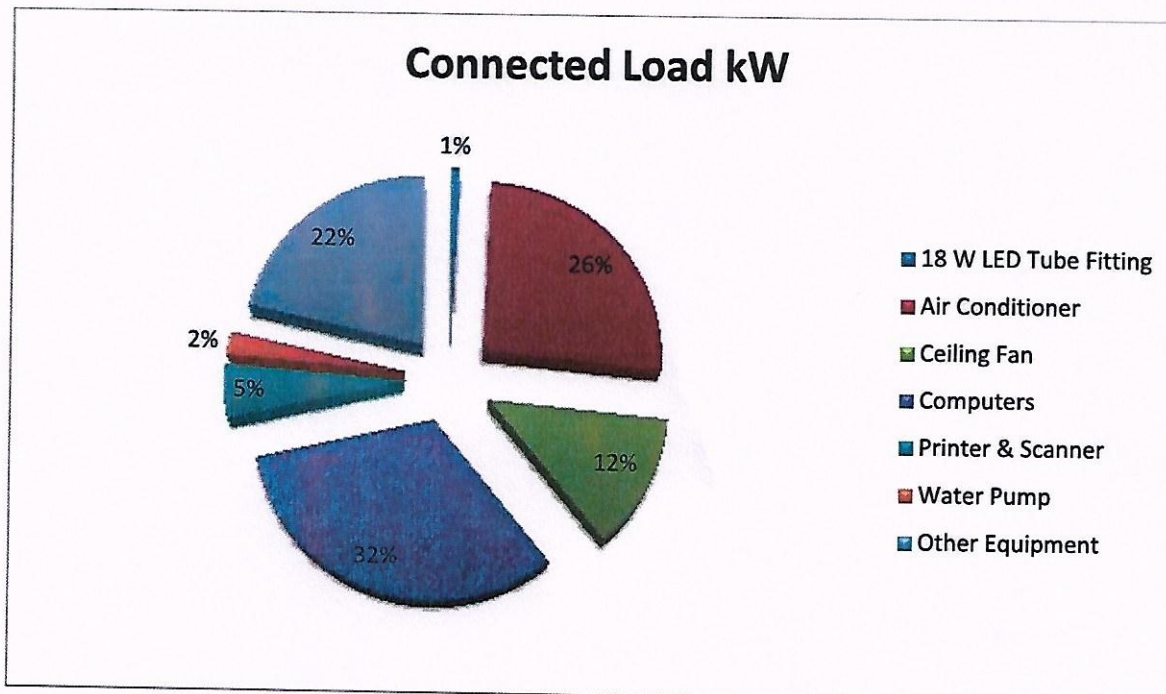
The major contributors to the connected load of the College are as under.

**Table No 2: Equipment wise Connected Load:**

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fitting	185	40	7.4
2	18 W LED Tube Fitting	26	18	0.468
3	Air Conditioner	12	1500	18
4	Ceiling Fan	134	65	8.71
5	Computers	150	150	22.5
6	Printer & Scanner	23	150	3.45
7	Water Pump	2	746	1.492
8	Other Equipment	100	150	15
9	<b>Total</b>			<b>69.62</b>

We present the above Data in a PIE Chart as under.

**Chart No1: Connected Load:**



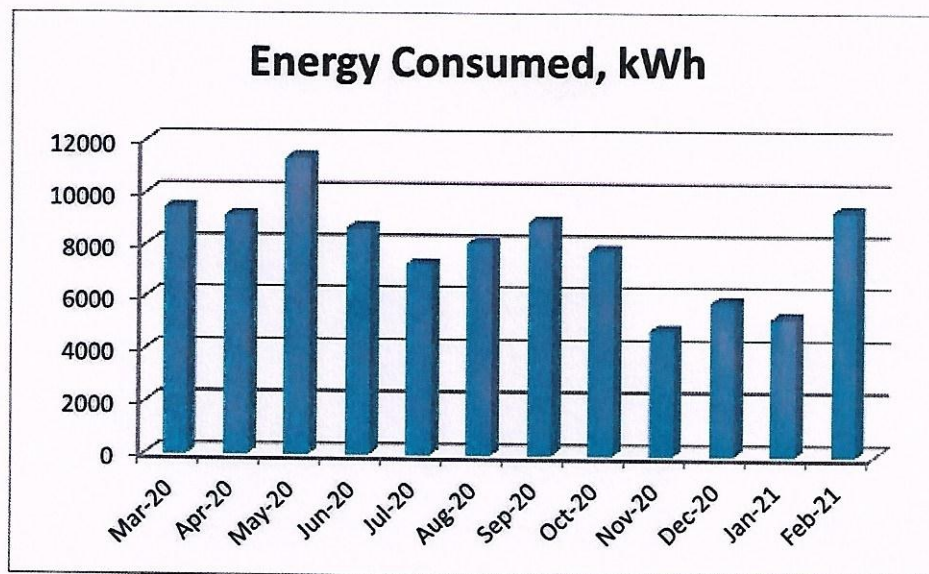
### CHAPTER-III STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of Energy Consumption

Table No. 3: Study of Electrical Energy: 20-21:

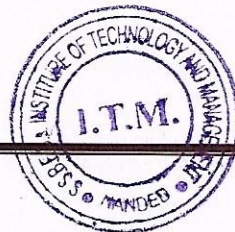
No	Month	Energy Consumed, kWh
1	Mar-20	9430
2	Apr-20	9140
3	May-20	11360
4	Jun-20	8670
5	Jul-20	7310
6	Aug-20	8125
7	Sep-20	8925
8	Oct-20	7835
9	Nov-20	4767
10	Dec-20	5843
11	Jan-21	5235
12	Feb-21	9347
13	Total	95987
14	Maximum	11360
15	Minimum	4767
16	Average	7998.92

Chart No 2: To study the variation of Monthly Electrical Energy Consumption:



**Table No 4: Important Parameters:**

No	Parameter/ Variation	Energy Consumed, kWh
1	Total	95987
2	Maximum	11360
3	Minimum	4767
4	Average	7998.92





## CHAPTER-IV STUDY OF CO<sub>2</sub> EMISSION

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 and LPG.

### Basis for computation of CO<sub>2</sub> Emissions:

The basis of Calculation for CO<sub>2</sub> emissions due to LPG & Electrical Energy are as under

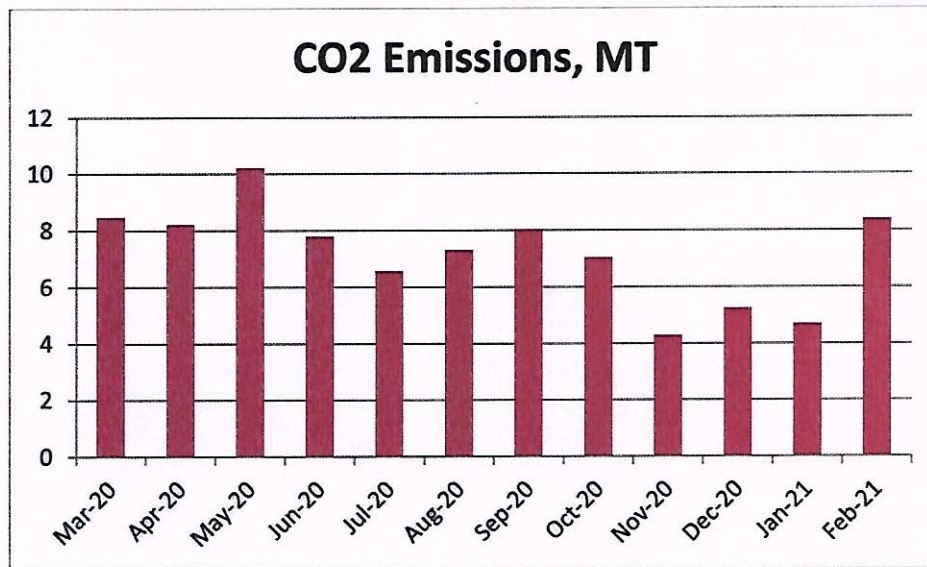
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere

Based on the above Data we compute the CO<sub>2</sub> emissions which are being released in to the atmosphere by the College due to its Day to Day operations

**Table No 5: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Mar-20	9430	8.487
2	Apr-20	9140	8.226
3	May-20	11360	10.224
4	Jun-20	8670	7.803
5	Jul-20	7310	6.579
6	Aug-20	8125	7.3125
7	Sep-20	8925	8.0325
8	Oct-20	7835	7.0515
9	Nov-20	4767	4.2903
10	Dec-20	5843	5.2587
11	Jan-21	5235	4.7115
12	Feb-21	9347	8.4123
13	Total	95987	86.3883
14	Maximum	11360	10.224
15	Minimum	4767	4.2903
16	Average	7998.92	7.19903

**Chart No 4: Representation of Month wise CO<sub>2</sub> Emissions:**

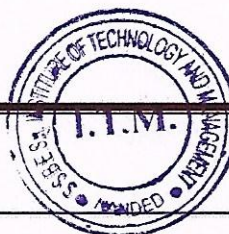


**Table No 6: Important Parameters:**

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	95987	86.3883
2	Maximum	11360	10.224
3	Minimum	4767	4.2903
4	Average	7998.92	7.19903

**CHAPTER-V**  
**STUDY OF USAGE OF ALTERNATE ENERGY**

The College has yet to install 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 Total Lighting Load, as under.

**Table No 7: Percentage of Usage of LED Lighting to Total Lighting Load:**

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	185	Nos
2	Load of 40 W FTL Fitting	40	W/unit
3	Total Load of 40 W FTL Fittings	<b>7.4</b>	kW
4	No of 18 W LED Fittings	15	Nos
5	Load of 18 W LED Fitting	18	W/unit
6	Total Load of 18 W LED Fittings	<b>0.27</b>	kW
7	Total LED Lighting Load =6	<b>0.46</b>	kW
8	Total Lighting Load =3+6	<b>7.868</b>	kW
9	% Usage of LED to Total Lighting Load= $7 \times 100 / 8$	<b>5.95</b>	%

