

**ENERGY AUDIT REPORT**  
of  
**NBN SINHGAD SCHOOL OF ENGINEERING,**  
**S. 10/1, Ambegaon (Bk.), Pune 411 041**

Year: 2018-19

Prepared by

**Enrich Consultants**

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



**MAHARASHTRA ENERGY DEVELOPMENT AGENCY**



**Maharashtra Energy Development Agency**

(A Government of Maharashtra undertaking)  
2<sup>nd</sup> Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,  
Ph No: 020-26614393/26614403  
Email: [ec@mahaurja.com](mailto:ec@mahaurja.com), Web: [www.mahaurja.com](http://www.mahaurja.com)

ECN/2018-19/CR-05/4174

19<sup>th</sup> September, 2018

**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** : **Enrich Consultants**  
Yashashree, Plot No. 26, Nirmal Bag Society,  
Near Mukangan English School,  
Parvati, Pune - 411009.

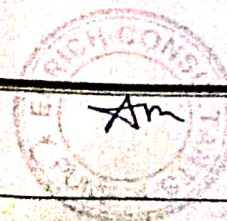
**Registration Category** : *Empanelled Consultant for Energy Conservation Programme*

**Registration Number** : **MEDA/ECN/CR-05/2018-19/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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31<sup>st</sup> March 2021** 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.

  
19/9/18

(Smita Kudarikar)  
General Manager (EC)





MAHARASHTRA ENERGY DEVELOPMENT AGENCY



**Maharashtra Energy Development Agency**

(A Division of Maharashtra Government)  
3<sup>rd</sup> Floor, MEDA Commercial Complex, Opp. Tribal College, Yerwade, Pune-411 006.  
Phone: 020-26109100, 26109101  
Email: [general@maharashtra.gov](mailto:general@maharashtra.gov) Web: [www.maharashtra.gov](http://www.maharashtra.gov)

LYN/2018-19/EA-03/1174

17<sup>th</sup> September 2018

**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	Enrich Consultants Vashishta, Plot No. 26, Nirmal Bag Society, Near Mulungan English School, Parvati, Pune - 411009
Registration Category	Empanelled Consultant for Energy Conservation Programme
Registration Number	MEDA/LC/CR-05/2018-19/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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till 31<sup>st</sup> March 2021 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.

  
(Smita Kusumkar)  
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/NBNSSOE/18-19/01

Date: 22/5/2019

## CERTIFICATE

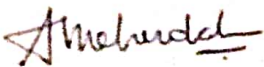
This is to certify that we have conducted Energy Audit at NBN Sinhgad School of Engineering, S. No. 10/1, Ambegaon (Bk.), Pune 411 041 in the year 18-19.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED Fittings
- Installation of Solar Thermal Water Heating System at Hostel blocks.
- Usage of BEE STAR Rated Equipment
- 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

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 Carbon Foot printing	12
5	Study of Usage of Alternate Energy	14
6	Study of Usage of LED Lights	15



## ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of NBN Sinhgad School of Engineering, Vadgaon (Bk.), Pune, for awarding us the assignment of Energy Audit of their Ambegaon (Bk.) Campus for the Year: 18-19.

We are thankful to the Head of the Departments and staff members for helping us during the field study.



## EXECUTIVE SUMMARY

1. NBN Sinhgad School of Engineering, Ambegaon (Bk.) Pune 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	CO <sub>2</sub> Emissions, MT
1	Total	476864	381.49
2	Maximum	56010	44.81
3	Minimum	9698	7.76
4	Average	39739	31.79

### 3. Various measures adopted for Energy Conservation:

- Usage of LED Lights
- Installation of Solar Thermal Water Heating System.

### 4. Usage of Alternate Energy Source:

1. The College has installed Solar Thermal Water Heating System at the Hostel

### 5. Percentage of Lighting Power Requirements met by LED bulbs:

- The total lighting Load is 35.2 kW.
- The total LED Lighting Load is 2 kW.
- The percentage of usage of LED to the total lighting load is 5.68 %

### 6. Notes & Assumptions:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere

## ABBREVIATIONS

AC	:	Air conditioner
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
kW	:	Kilo Watt
PC	:	Personal Computer
MT	:	Metric Ton
LPD	:	Liters Per Day





## CHAPTER-I INTRODUCTION

### 1.1 Objectives:

1. To study the Connected Load
2. To Study present Energy Consumption
3. To compute CO<sub>2</sub> emissions
4. To study usage of Renewable Energy
5. To study usage of LED Lighting

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

No	Head	Particulars
1	Name of Institution	NBN Sinhgad School of Engineering
2	Address	S. No. 10/1, Ambegaon (Bk.), Pune 411 041
3	Affiliation	Savitribai Phule Pune University

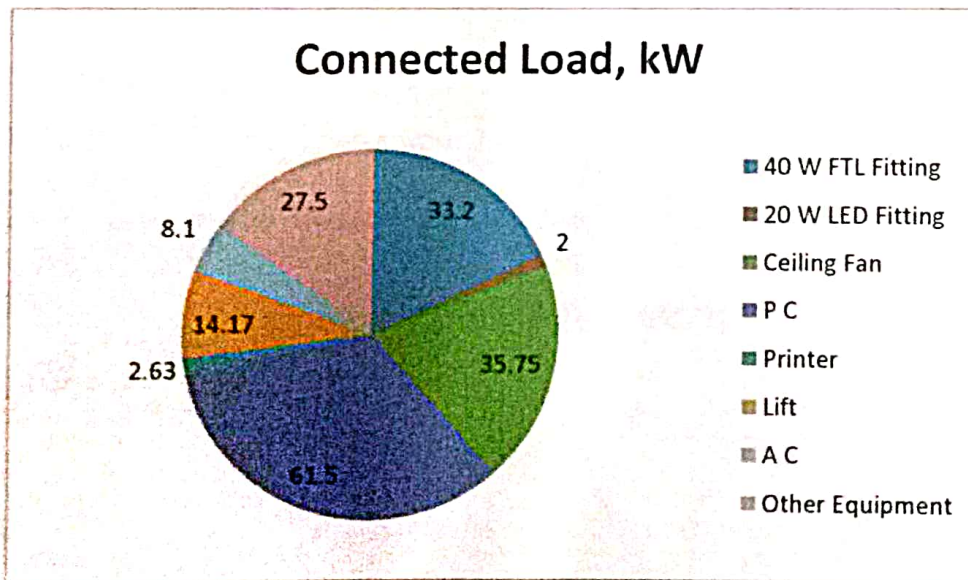
## CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Details of Overall Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	40 W FTL Fitting	830	40	33.2
2	20 W LED Fitting	100	20	2
3	Ceiling Fan	550	65	35.75
4	P C	410	150	61.5
5	Printer	15	175	2.63
6	Lift	2	7087	14.17
7	A C	4	2025	8.1
8	Other Equipment	110	250	27.5
9	<b>Total</b>			<b>185</b>

Chart No-1: Overall 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- 2018-19:

No	Month	Energy Consumed, kWh
1	Apr-18	56010
2	May-18	52680
3	Jun-18	37815
4	Jul-18	44301
5	Aug-18	48053
6	Sep-18	47498
7	Oct-18	52399
8	Nov-18	24750
9	Dec-18	24353
10	Jan-19	9698
11	Feb-19	32073
12	Mar-19	47246
13	Total	476864
14	Maximum	56010
15	Minimum	9698
16	Average	39739

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

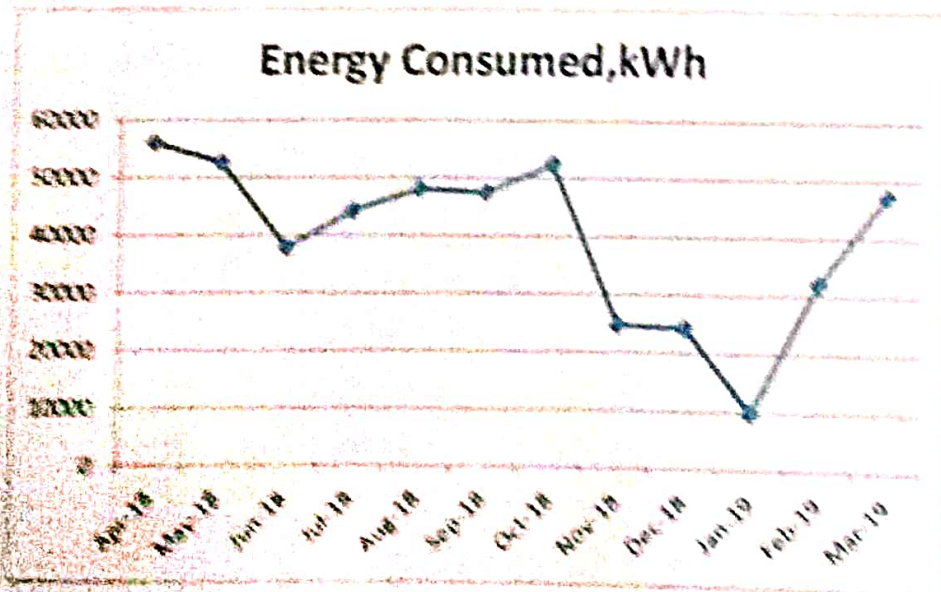
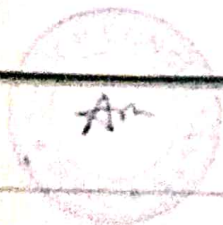




Table No 4: Various Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh
1	Total	476864
2	Maximum	56010
3	Minimum	9698
4	Average	39739



## 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<sub>2</sub> Emissions:

- 1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere

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

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-18	56010	44.81
2	May-18	52680	42.14
3	Jun-18	37815	30.25
4	Jul-18	44301	35.44
5	Aug-18	48053	38.44
6	Sep-18	47498	38.00
7	Oct-18	52389	41.91
8	Nov-18	24750	19.80
9	Dec-18	24353	19.48
10	Jan-19	9698	7.76
11	Feb-19	32073	25.66
12	Mar-19	47246	37.80
13	Total	476864	381.49
14	Maximum	56010	44.81
15	Minimum	9698	7.76
16	Average	39739	31.79

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

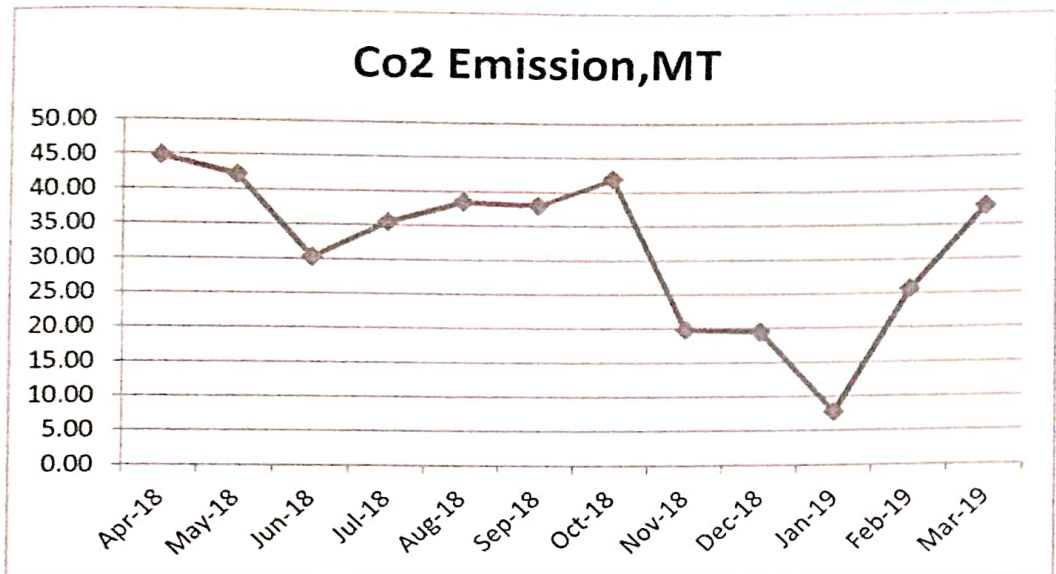
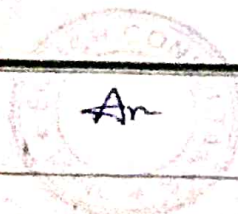


Table No 6: Various Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	476864	381.49
2	Maximum	56010	44.81
3	Minimum	9698	7.76
4	Average	39739	31.79



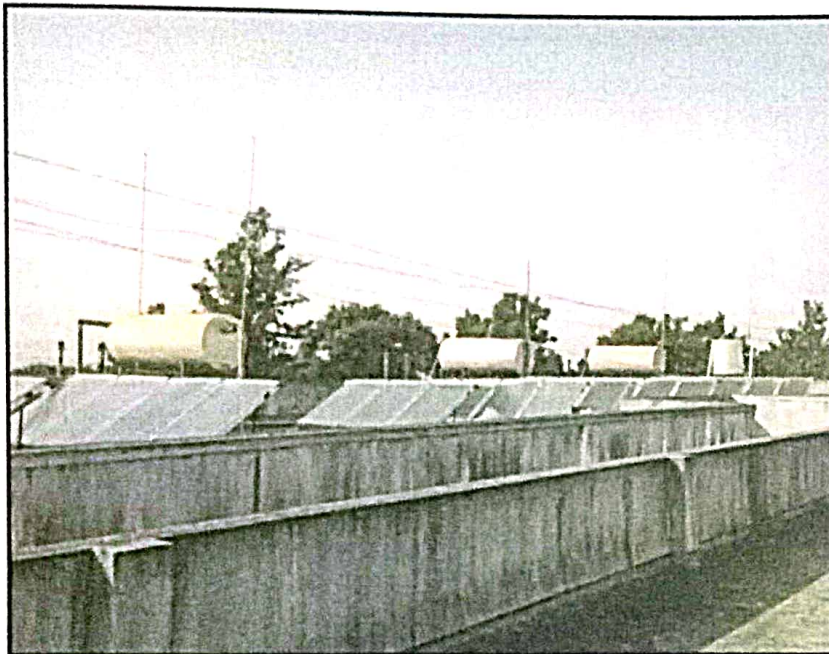


## **CHAPTER-V**

### **STUDY OF USAGE OF ALTERNATE ENERGY**

The College has installed Solar Thermal Water Heating System.

Photograph of Solar Thermal Water Heating System:



## CHAPTER VI STUDY OF USAGE OF LED LIGHTS

In the following Table, we present the percentage of annual Lighting load met by LED lights.

Table No 7: Computation of % of Annual LED Lighting Load:

No	Particulars	Value	Unit
1	Qty of 40 W FTL Fittings	830	Nos
2	Qty of 20 W LED Fittings	100	Nos
3	Electrical Load of 40 W FTL Fitting	40	W/Unit
4	Electrical Load of 20 W LED Fitting	20	W/Unit
5	Total Load of 40 W FTL Fittings	33.2	kW
6	Total Load of 20 W LED Fittings	2	kW
7	Total Lighting Load = 5+6	35.2	kW
8	Total LED Lighting Load = 6	2	kW
9	% of LED Lighting to Annual Lighting Load = $8 \times 100 / 7$	5.68	%



**GREEN AUDIT REPORT**  
of  
**NBN SINHGAD SCHOOL OF ENGINEERING,**  
**S. 10/1, Ambegaon (Bk.), Pune 411 041**

Year: 2018-19

Prepared by

**Enrich Consultants**

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





MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)  
2<sup>nd</sup> Floor, MHIADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,  
Ph No: 020-26614393/266144403  
Email: eec@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19<sup>th</sup> September, 2018

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 : Enrich Consultants  
Yashashree, Plot No. 26, Nirmal Bag Society,  
Near Multangan English School,  
Parvati, Pune - 411009.
- Registration Category : Empanelled Consultant for Energy Conservation Programme
- Registration Number : MEDA/ECN/CR-05/2018-19/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 the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till 31<sup>st</sup> March 2021 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.

(Smita Kudarikar)  
General Manager (EC)



# Enrich Consultants

Yashashree, 28, Nirmal Bag Society,  
Near Muktarangan English School, Parvat, Pune 411 009  
Tel: 09660444795 Email: [enrich2012@gmail.com](mailto:enrich2012@gmail.com)

Ref: EC/NEBISSEOE/18-19/02

Date: 22/5/2019

## CERTIFICATE

This is to certify that we have conducted Green Audit at NEBI School of Engineering, S. No 10/1, Ambegaon (Bk.), Pune 411 041 in the year 2018-19

The College has adopted following Green practices:

- Usage of Energy Efficient LED Fittings
- Installation of Solar Thermal Water Heating System
- Segregation of Waste at source
- Installation of 275 KLPD Sewage Treatment Plant
- Installation of Rain Water Management Project
- Maintenance of good internal roads 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-2162





## INDEX

No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Present Energy Consumption	9
3	Study of Carbon Foot printing	11
4	Study of Usage of Renewable Energy	13
5	Study of Waste Management	14
6	Study of Rain Water Management	15
7	Study of Green Practices	16



## ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of NBN Sinhgad School of Engineering, Ambegaon (Bk.), Pune, for awarding us the assignment of Green Audit of their Vadgaon Campus for the Year: 2018-19.

We are thankful to the Head of Departments & staff members for helping us during the field study.



## EXECUTIVE SUMMARY

1. NBN Sinhgad School of Engineering, Vadgaon (Bk.) Pune consumes Energy in the form of Electrical Energy used for various gadgets, Office & other facilities.

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

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	532511	426.01
2	Maximum	49157	39.33
3	Minimum	31331	25.06
4	Average	44376	35.50

3. Various measures adopted for Energy Conservation:

- Usage of LED Lights
- Installation of Solar Thermal Water Heating System

4. Usage of Renewable Energy & Reduction in CO<sub>2</sub> Emission:

The College has installed Solar Thermal Water Heating System at the Hostel Blocks.

5. Waste Management:

5.1 Solid Waste Management:

The Dry and Wet waste is segregated at the source and is handed over to Authorized Agency for further disposal/recycling.

5.2 Liquid Waste Management:

The College has installed 275 KLPD Sewage Treatment Plant. The treated Water is used for Gardening purpose.

6. Rain Water Management:

The Rain water collected is used to increase the underground Water level.

7. Green & Sustainable Practices:

- Good internal roads for easy movement of commuters
- Internal tree plantation in the campus

8. Assumption:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere



## ABBREVIATIONS

LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
MT	:	Metric Ton
CO <sub>2</sub>	:	Carbon Di Oxide
LPD	:	Liters Per Day



## CHAPTER-I INTRODUCTION

### 1.1 Objectives:

1. To study present Energy Consumption
2. To compute CO<sub>2</sub> emissions
3. To Study Usage of Renewable Energy
4. To Study Waste Management
5. To Study Rain Water Management
6. To Study Green Initiatives

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

No	Head	Particulars
1	Name of Institution	NBN Sinhgad School of Engineering
2	Address	S. No. 10/1, Ambegaon (Bk.), Pune 411 041
3	Affiliation	Savitribai Phule Pune University



## CHAPTER-II STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Bill Analysis- 2018-19:

No	Month	Energy Consumed, kWh
1	Apr-19	47780
2	May-19	43658
3	Jun-19	31331
4	Jul-19	43556
5	Aug-19	47661
6	Sep-19	49157
7	Oct-19	46886
8	Nov-19	45812
9	Dec-19	44144
10	Jan-20	44378
11	Feb-20	44075
12	Mar-20	44076
13	Total	532511
14	Maximum	49157
15	Minimum	31331
16	Average	44376

Chart No 1: To study the variation of Monthly Energy Consumption, kWh:

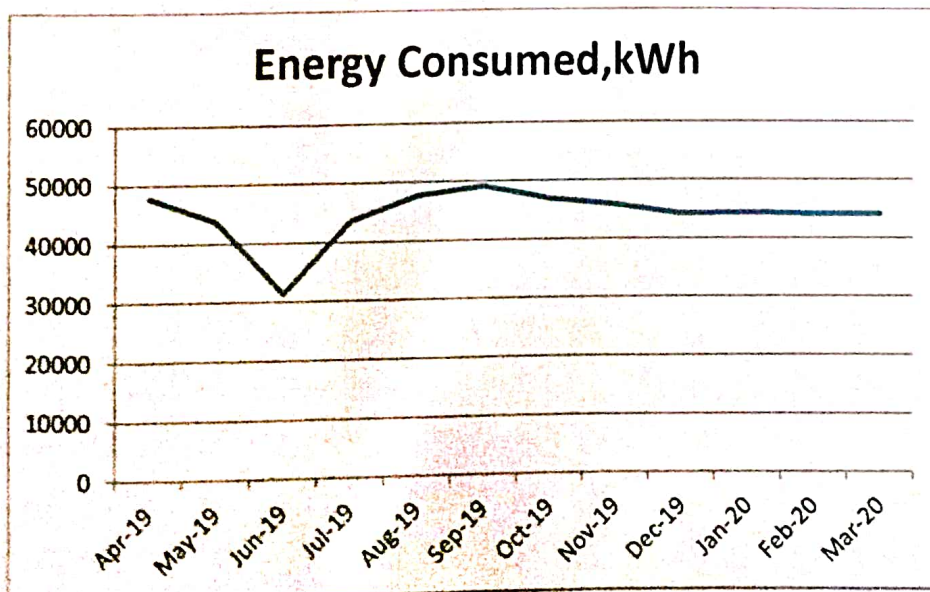


Table No 3: Various Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh
1	Total	532511
2	Maximum	49157
3	Minimum	31331
4	Average	44376



## CHAPTER III 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<sub>2</sub> Emissions:**

- 1 Unit (kWh) of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere

**Table No 4: Month wise CO<sub>2</sub> Emissions:**

No	Month	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Apr-19	47780	38.22
2	May-19	43658	34.93
3	Jun-19	31331	25.06
4	Jul-19	43556	34.84
5	Aug-19	47661	38.13
6	Sep-19	49157	39.33
7	Oct-19	46886	37.51
8	Nov-19	45812	36.65
9	Dec-19	44144	35.32
10	Jan-20	44378	35.50
11	Feb-20	44075	35.26
12	Mar-20	44076	35.26
13	Total	532511	426.01
14	Maximum	49157	39.33
15	Minimum	31331	25.06
16	Average	44376	35.50

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

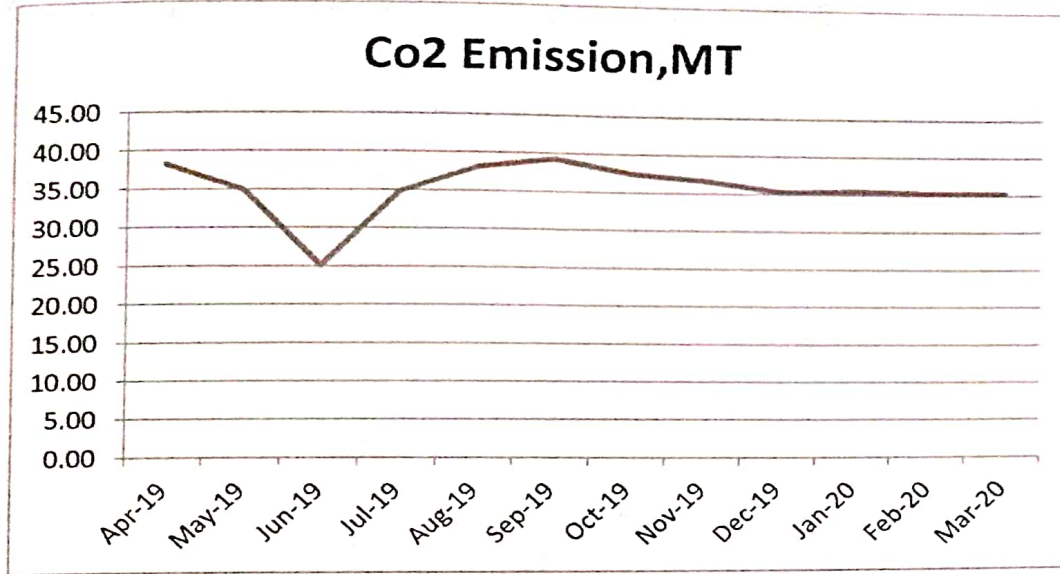


Table No 5: Various Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO <sub>2</sub> Emissions, MT
1	Total	532511	426.01
2	Maximum	49157	39.33
3	Minimum	31331	25.06
4	Average	44376	35.50



## **CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY**

The College has installed Solar Thermal Water Heating System at the hostel block.

Photograph of Solar Thermal Water Heating System:



## CHAPTER V STUDY OF WASTE MANAGEMENT

### 5.1 Solid Waste Management:

The Dry recyclable Waste & Wet Waste are collected on daily basis, and further given to Authorized Waste Collector for further disposal/Recycling.

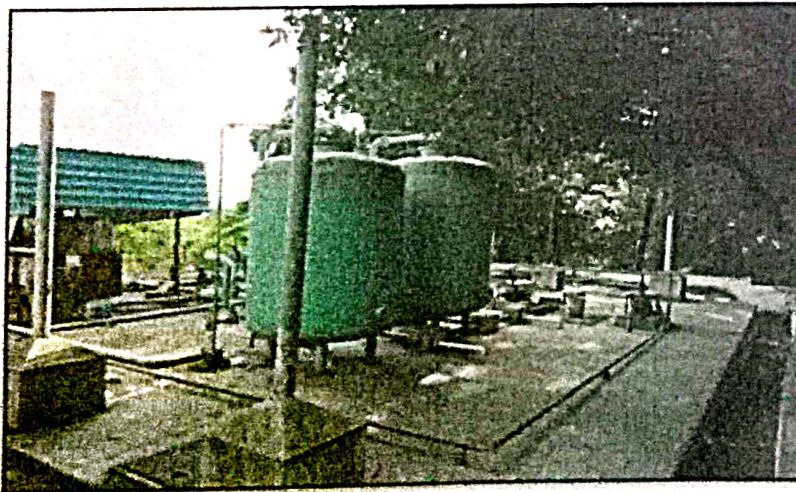
Photograph of Waste Collection Bin:



### 5.2 Liquid Waste Management:

The College has installed a 275 KLPD Capacity Sewage Treatment Plant, to handle the human waste generated in the College.

Photograph of Sewage Treatment Plant:

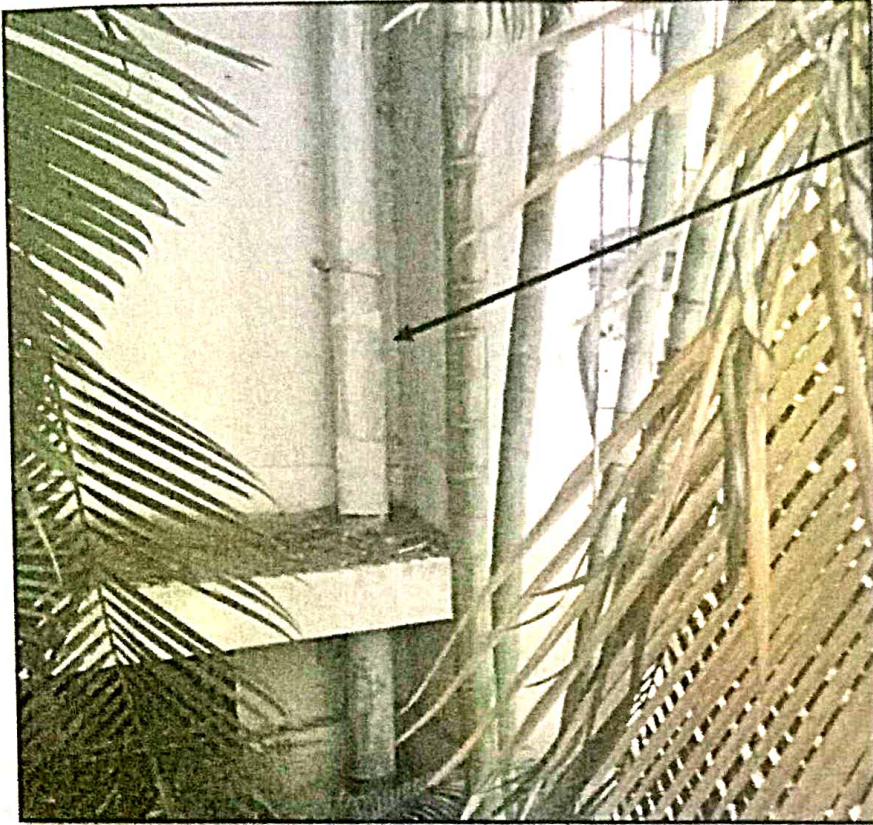




# CHAPTER VI STUDY OF RAIN WATER MANAGEMENT

The water falling on terrace is used to increase the underground water table.

Photograph of Rain Water Harvesting Pipe from Terrace:



Rain Water carrying Pipe



## **CHAPTER VII STUDY OF GREEN PRACTICES**

### **7.1 Pedestrian Friendly Roads:**

The College has well maintained internal roads to facilitate the easy movement of the students within the campus.

**Photograph of Internal Road inside the College Campus:**



### **7.2 Green Landscaping with Trees and Plants:**

The College has maintained plantation in the campus.

**Photograph of Garden in the College campus:**

