# **ENERGY AUDIT REPORT**



Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGEOF EDUCATION,

APP Dumberward (Otur), Tar. Junnar, Dist. Pune 412 406.

Year: 2017-18

Prepared by:

# **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: structions/Egmail.com



Principal

Vilte: Tambe Womens College of Education (ILEd.) Combanwadi(Otur) Tal. Junnar, Dist. Plane. Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2017-18

### REGISTRATION CERTIFICATES



### BEE AUDITOR CERTIFICATE



### MEDA EMPANELMENT CERTIFICATE



Vilas Tainbe Womens College of Education (B.Ed.)

Dumbarand (Cor.) Tel. Spring, Dist. Acce.



Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi. 2017-18

# **Enrich Consultants**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enricheons Someil com



Ref. EC/VTWCOE/17-18/01

Date: 23/7/2018

# CERTIFICATE

This is to certify that we have conducted an Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409, in the Year 2017-18.

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 Energy Conservation.

For Enrich Consultants,

Mohandel

A Y Mehendale,

Certified Energy Auditor

EA-8192

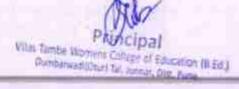
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Energy Audit Report: Vitas Tambe Womens College of Education, Dumbarwadi. 2017-18

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5	Study of Usage of Alternate Energy	12
6	Study of Usage of LED Lighting	13







Energy Audit Report: Vitas Tambe Womens College of Education, Dumbarwadi: 2017-18

### ACKNOWLEDGEMENT



We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwedi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Energy Audit of their Campus for the Year: 2017-18.

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

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Energy Audit Report: Wilas Tambe Womens College of Education, Dumbarwadi: 2017-18.

### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment

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

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	5351	4.28
2	Maximum	698	0.56
3	Minimum	215	0:17
4	Average	445.92	0.36

### 3. Various Measures Adopted for Energy Conservation:

- 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 10 kWp Roof Top Solar PV Plant
- . Energy generated by Solar PV Plant in 17-18 is 7200 kWh
- . Energy purchased from MSEDCL in 17-18 is 5351 kWh
- Total Energy Consumption in 17-18 is 12551 kWh
- % of Renewable Energy to Annual Energy Demand is 57.37 %

### 5. Usage of LED Lighting:

- The Total LED Lighting Load is 1.464 kW.
- The Total Lighting Load is 2.104 kW.
- . The % of LEDs to Total Lighting Load is 69.58 %.

### 6. Assumptions:

- 1. Energy Consumption is computed based on Load Utilization Factor
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
- 4 Annual Solar Energy generation Days: 180 Nos (System installed in Dec-17)

### 7. Reference:

· For Solar PV Energy generation, www.solarrooftop.gov.in

Wiles Tamble Womens College of Education (B.Ed.) Dumberward Court Tel, Names, Disc. Pune. Page 6

245 / 2006

Energy Audit Report: Villas Tambe Womens College of Education, Dumtisrwadi: 2017-18

### ABBREVIATIONS

PU/PN/ILED 245 / 2006

AC : Air conditioner

MSEDCL Maharashtra Electricity Distribution Company Limited

LED Light Emitting Diode

kWh kilo-Watt Hour

Qty Quantity W Watt

kW : Kilo Watt

PC : Personal Computer

MT : Metric Ton

Principal

Willias Tambe Womens Colores of Education (B.Ed.)

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Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2017-18

### CHAPTER-I INTRODUCTION

### 1.1 Objectives:

- 1. To study Connected Load
- 2. To study present level Energy Consumption.
- 3. To Study the present CO2 emissions
- 4. To study Usage of Alternate/Renewable Energy
- 5. To study usage of LED Lighting

### 1.2 Table No1: General Details of College:

No	Head	Particulars
ţ	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education
2	Address A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 405	
3	Year of Establishment	2005





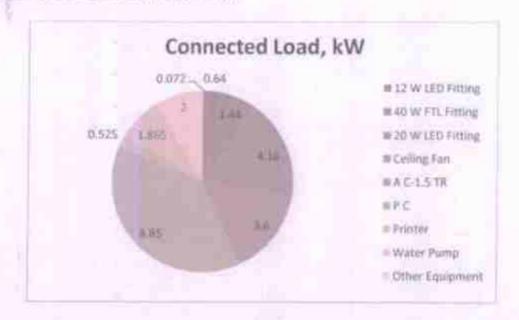
### CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
-1	12 W LED Fitting	6	12	0.072
2	40 W FTL Fitting	16	40	0.64
3	20 W LED Fitting	72	20	1.44
4	Ceiling Fan	64	65	4.16
5	A.C-1.5 TR	2	1800	3.6
6	PC	59	150	6.85
7.	Printer	3	175	0.525
8	Water Pump	1	1885	1.865
9	Other Equipment	8	250	2
10.	Total			23.15

Chart No 1: Details of Connected Load:



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### CHAPTER-III STUDY OF ENERGY CONSUMPTION

in this chapter, we present the analysis of Electricity Energy Consumption Table No 3: Electrical Energy Purchase Analysis- 2017-18:

No	Month	Energy Purchased, kWh
1	Jul-17	575
2	Aug-17	608
3	Sep-17	559
4	Oct-17	698
5	Nov-17	578
6	Dec-17	475
7	Jan-18	275
8	Feb-18	215
9	Mar-18	335
10	Apr-18	340
11	May-18	395
12	Jun-18	298
13	Total	5351
14	Maximum	698
15	Minimum	215
16	Average	445.92

Chart No 2: To study the variation of Month wise Energy Purchased, kWh:



Visin Tembe Womens College of Education (N.Ed.) Sumbarrand (Chur) Tel. Johnse, Dist. Pune.



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# CHAPTER-IV STUDY OF CARBON FOOT PRINTING

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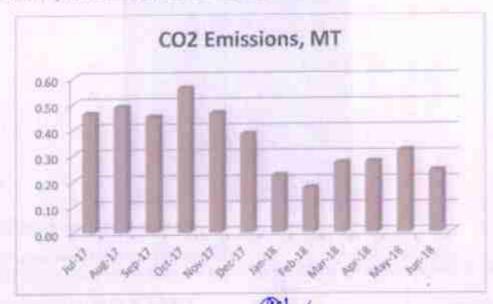
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

1 kWh of Electrical Energy releases 8.9 Kg of CO<sub>2</sub> into atmosphere

Table No 4: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
5	Jul-17	575	0.46
2	Aug-17	608	0.49
3	Sep-17	559	0.45
4	Oct-17.	696	0.56
5	Nov-17	578	0.46
6	Dec-17	475	0.38
7	Jan-18	275	0.22
8	Feb-18	215	0.17
9	Mar-18	335	0.27
10	Apr-18	340	0.27
11	May-18	395	0.32
12	Jun-18	298	0.24
13	Total	5351	4.28
14	Maximum	698	0.56
15	Minimum	215	0.17
16	Average	445.92	0.36

Chart No 3: Representation of Month wise CO2 emissions:



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### 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 5: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Annual Energy Purchased	5351	kVVh/Annum
2	Installed Capacity of Solar PV Plant	10	kWp
3	Average Energy Generated by Solar PV Plant	4	kWh/kWp
4	Annual Generation Days (System installed in December-2017)	180	Nos
5	Total Solar Energy Generated=2*3*4	7200	kVVh
6	Total Energy Demand= (1)+(5)	12551	kWh
7	% of Alternate Energy to Annual Requirement = (5)*100/(6)	57.37	%

### Photograph of Roof Top Solar PV Plant:



Vitas Tamoe Womens College of Education (U.Ed.)



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Enrich Consultants, Pune

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245/2000





in the following Table, we present the percentage of Total Lighting load met by LED lights.

Table No 6: Computation of Percent Usage of LEDs to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	18	Nos
2	Load of 40 W FTL Fitting	40	W/uni
3	Total Load of 40 W FTL Fittings	0.64	KW
4	No of 12 W LED Fittings	2	Nos
5	Load of 12 W LED Fitting	12	W/unit
6	Total Load of 12 W LED Fittings	0.024	kw:
7	No of 20 W LED Fittings	72	Nos
8	Load of 20 W LED Fitting	20	W/unit
9	Total Load of 20 W LED Fittings	1.44	kW:
10	Total LED Lighting Load = 6+9	1.464	kW
11	Total Lighting Load=3+6+9	2.104	kW
12	% of LED to Total Lighting Load=10*100/11	69.58	%

Principal
Vilas Tambe Womens College of Education (B.Ed.)
Oumbarwack/Districts Service, Data Pures



# **GREEN AUDIT REPORT**



Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGEOF EDUCATION,

A/P Oumbarwad (Olur), Tal: Junnar, Dist. Pune 412 409

Year: 2017-18

Prepared by

# **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society.

Near Muktangan English School, Parvati, Pune 411009

Phone: 09890444795 Email: enrichcons/flornall.com



Principal

Vilas Tambe Women Cobege of Education (B.Ed.)

Demographical Tall Summer, Old. Pure.

### REGISTRATION CERTIFICATES



### BEE AUDITOR CERTIFICATE



### MEDA EMPANELMENT CERTIFICATE

Principal

Villis Tambe Womens CoTege of Education (B.Ed.)

Enrich:Consultants: Pune

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Page 2

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Green Audit Report: Vitas Tambe Womens College of Education, Dumbarwadi: 2017-18

# **Enrich Consultants**

Yashashree, 26, Nirmal Bag Society. Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: annobson Engine Loom

Ref. EC/VTWCOE/17-18/02

PU/PS//3.25

Date: 23/7/2018

# CERTIFICATE

This is to certify that we have conducted Green Audit at Shri Gajanan Maharaj Shikshan. Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409, in the Year 2017-18.

The College has adopted following Green 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
- Segregation of Waste at source
- Provision of Septic Tank, for disposal of Liquid Waste
- Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation

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,

Michardoh

A Y Mehendale,

Certified Energy Auditor.

EA-8192

Villas Tambe Womens College of Education (B.Ed.) Dumbarwash (Charl Tel. Nature, Dist. Pame.



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5	Study of Waste Management	12
6	Study of Rain Water Management	13
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. Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi. 2017-18

### ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Green Audit of their Campus for the Year, 2017-18.

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

Reincipal

Villas Tambie Womens College of Education (B.Ed.) Dumbarward (Diar) Tel. survey, Dist. Punis.



PUPPLIES



### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

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

No.	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
4.	Total	5351	4.28
2	Maximum	698	0.56
3	Minimum	215	0.17
4	Average	445.92	0.36

### 3. Various Measures Adopted for Energy Conservation:

- · Usage of Energy efficient LED fittings.
- · Installation of 10 kWp Roof Top Solar PV Plant

### 4. Usage of Renewable Energy & CO2 Emission Reduction:

- The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 17-18 is 7200 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 17-18 is 6.48 MT.

### 5. Waste Management:

### 5.1 Solid Waste Management:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste

### 5.2 Liquid Waste Management:

The College has installed a Septic Tank for disposal of Liquid Waste.

### 5. Rain Water Management:

The Rain Water from the terrace is used to recharge the bore well.

### 7. Green Practices:

- · Well maintained internal road
- Well maintained Internal Tree Plantation.

### 8. Assumptions:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 2. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
- Annual Solar Energy generation Days: 180 Nos

### 9. Reference:

For Solar PV Energy generation: www.solarroofloo.gov.in

Principal

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Page 6

### ABBREVIATIONS

10/19/0.ED 245 / 2005

LED : Light Emitting Diode

kWh : kilo-Watt Hour

Qty Quantity

W Watt

kW Kilo Watt MT Metric Ton

Principal

Vilas Tambe Womens College of Education (B.Ed.) Dumbarwed Drurt No. Junear, Dist. Plane.



Green Audit Report, Vilas Tamba Womens College of Education, Dumbarwadi, 2017-18

### CHAPTER-I INTRODUCTION

# PU/FII/BED 3

### 1.1 Objectives:

- 1. To study present Energy Consumption
- 2. To Study the present CO2 emissions
- 3. To study Scope for usage of Renewable Energy.
- 4. To study Waste Management:
- 5. To study Rain Water Management.
- 6. To study Green Practices.

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

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409
3	Year of Establishment	2005



### CHAPTER-II STUDY OF ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption Table No 2: Electrical Energy Purchase Analysis - 2017-18:

No	Month	Energy Purchased, kWh
1	Jul-17	575
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10	Apr-18	340
11	May-18	395
12	Jun-18	298
13	Total	5351
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Chart No 1: To study the variation of Month wise Energy Purchased, kWh:



Villas Tambie Womens College of Education (B.Ed.) Symboles of College of Education (B.Ed.)

Enrich Consultants, Pune

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### CHAPTER-III STUDY OF CARBON FOOT PRINTING



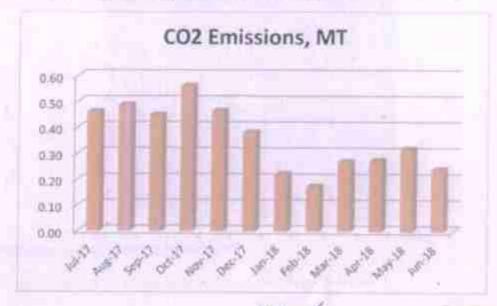
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Table No 3: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions,	
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11	May-18	395	0.32	
12	Jun-18	298	0.24	
13	Total	5351	4.28	
14	Maximum	698	0.56	
15	Minimum	215	0.17	
16	Average	445.92	0.36	

Chart No 2: Representation of Month wise CO2 emissions:



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Vides Tambe Withness College of Education (B.Ed.) Dumbarward (Bur) fal. Annae, Det. Pune.



Page 10

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

PU/PH/ILED 345 / 2005

The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.

Table No 4: Computation of Reduction in CO<sub>2</sub> Emission:

No	Particulars	Value	Unit
-1	Installed Roof Top Solar PV Plant Capacity	10	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	180	Nos
4	Annual Solar Energy Generated	7200	KW/s
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	6.48	MT

Photograph of Roof Top Solar PV Plant:



Principal

VAIS Tambe Womens College of Education IR Es.)
Comparison of the American Dec. Proc.



### CHAPTER V STUDY OF WASTE MANAGEMENT

### 5.1 Solid Waste Management:

The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

### Photograph of Waste Collection Bin:



### 5.2 Liquid Waste Management:

The College has installed a Septic Tank for disposal of Liquid Waste and is cleaned periodically.

### Photograph of Septic Tank:







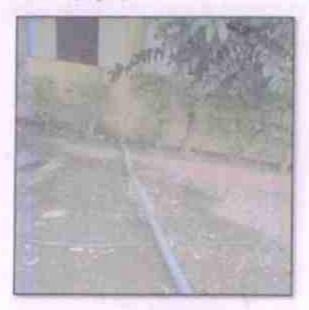
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# CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the terrace is used to increase the Underground Water Table.

Photograph of Rain Water Carrying Pipe:









even Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2017-18

# CHAPTER-VII STUDY OF GREEN PRACTICES



### 7.1 Pedestrian Friendly Internal Road:

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

Photograph of Internal Road:



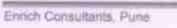
### 7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus. Photograph of Internal Tree Plantation:



Dumbarwadi (Dur) Tel. Jurnar, Onc. Pune





# **ENERGY AUDIT REPORT**

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarwadi (Otur), Tal Junnar, Dist. Pune 412 409



Year: 2018-19

Prepared by:

# **ENRICH CONSULTANTS**

Yashashree, 25, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enricheers (Jonal) com-



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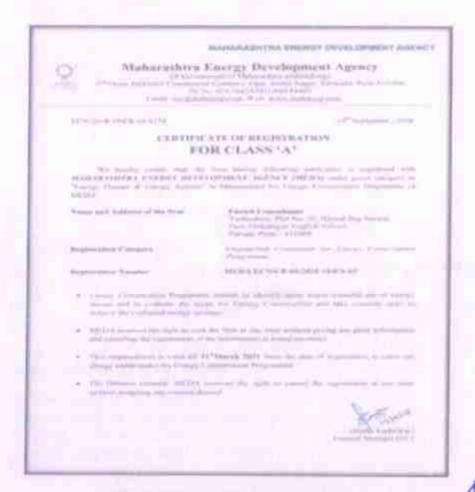
PU/PH/3.ED 245 / 2006 Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2018-19.

### REGISTRATION CERTIFICATES





### BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

Principal

Vertical Color of Education (II Id.

Energy Audit Report, Vilas Tambe Womens College of Education, Dumbarwadi: 2018-19

# **Enrich Consultants**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enricheons/Somail.com

Ref. EC/VTWCOE/18-19/01

PU/PN/8.ED 243 / 2005

Date: 20/7/2019

# CERTIFICATE

This is to certify that we have conducted an Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal-Junnar, Dist: Pune 412 409, in the Year 2018-19.

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 Energy Conservation.

For Enrich Consultants,

Mahamalde

A Y Mehendale,

Certified Energy Auditor

EA-8192

HRICH CONSULTATION OF STREET

Villas Tambe Womens College of Education (B.Ed.) Dumberwady College of Education (B.Ed.)



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6	Study of Usage of LED Lighting	13



Vilas Tambe Womans College of Education (6 Ed.)
Dumbarwed (Chur) Tel. Junnac, Dist. Pune.



Energy Audit Report: Vitas Tambe Womens Collège of Education, Dumbarwadi: 2018-19.

### ACKNOWLEDGEMENT

PU/FN/BLED 245 / 2006

We Enrich Consultants: Pune, express our sincere gratitude to the management of Shri-Gajarian Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, AP Dumbanwadi (Otur), Tal. Junnar, Dist: Pune 412 409, for awarding us the assignment of Energy Audit of their Campus for the Year: 2018-19.

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

Remeipal

Vitas Tambe Women Callings of Education (N.Ed.)

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### EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

### 2. Present Energy Consumption & CO, Emission:

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	4759	3.81
2	Maximum	502	0.40
3	Minimum	298	0.24
4	Average	390.58	0.32

### 3. Various Measures Adopted for Energy Conservation:

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

### 4. Usage of Alternata Energy:

- . The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 18-19 is 12000 kWh
- Energy purchased from MSEDCL in 18-19 is 4759 kWh
- Total Energy Consumption in 18-19 is 16769 kWh
- % of Renewable Energy to Annual Energy Demand is 71.60 %

### 5. Usage of LED Lighting:

- The Total LED Lighting Load is 1.504 kW.
- The Total Lighting Load is 2,104 kW.
- . The % of LEDs to Total Lighting Load is 71.48 %.

### 6. Assumptions:

- Energy Consumption is computed based on Load Utilization Factor
- 2 1 kWh of Electrical Energy releases 0.8 Kg of CO<sub>2</sub> into atmosphere
- Energy generated by Roof Top Solar PV Plant. 4 kWh/kWp per Day
- Annual Solar Energy generation Days: 300 Nos.

### 7. Reference:

For Solar PV Energy generation: www.solarroofing.gov.in

Villes Tarking Women's College of Education (B.Ed.)

Enrich Consultants, Pune

Page 6

PU/PH/8.ED

245 / 2005

### ABBREVIATIONS

190



AC Air conditioner

MSEDCL Maharashtra Electricity Distribution Company Limited

LED Light Emitting Diode

kWh kilo-Watt Hour

Qty Quantity W Watt

kW : Kilo Watt

PC Personal Computer

MT Metric Ton

Principal

Vilas Tambe Womens College of Education (B.Ed.) Dumberwick Chir) Tol. Junior, Oct. Pune.



### CHAPTER-I INTRODUCTION

# PU/PN/B.ED

### 1.1 Objectives:

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

### 1.2 Table No1: General Details of College:

No	Head	Particulars
4	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3	Year of Establishment	2005

Principal

Vitas Tambe Womens College of Education (II Ed.)

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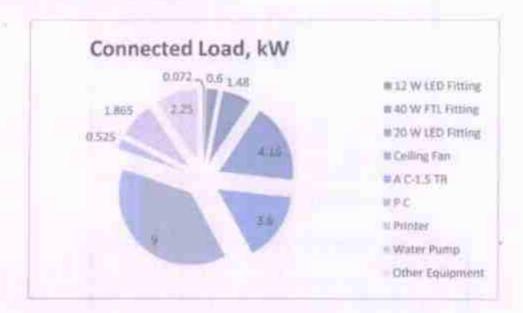
### CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Oty	Load, W/unit	Load, kW
1	12 W LED Fitting	6	12	0.072
2	40 W FTL Fitting	15	40	0.8
3	20 W LED Fitting	74	20	1.48
4.	Celling Fan	64	65	4.16
5	A C-1.5 TR	2	1800	3.6
6	PC	60	150	8
7	Printer	3	175	0.525
8	Water Pump	1-	1865	1.865
8	Other Equipment	9	250	2.25
10	Total			23.55

### Chart No 1: Details of Connected Load:



Villes Tambe Womens College of Education (B.Ed.)
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## CHAPTER-III STUDY OF ENERGY CONSUMPTION

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In this chapter, we present the analysis of Electricity Energy Consumption Table No 3: Electrical Energy Purchase Analysis- 2018-19:

No	Month	Energy Purchased, kWh
1	Jul-18	392
2	Aug-18	398
- 3	Sep-18	401
4	Oct-18	339
5	Nov-18	425
6	Dec-18	502
7	Jan-19	298
8	Feb-19	396
9	Mar-19	325
10	Apr-19	298
11.	May-19	498
12	Jun-19	487
13	Total	4759
14	Maximum	502
15	Minimum	298
16	Average	396.58

Chart No 2: To study the variation of Month wise Energy Purchased, kWh:



Villas Tambe Womens College of Education (B.Ed.)



## CHAPTER-IV STUDY OF CARBON FOOT PRINTING



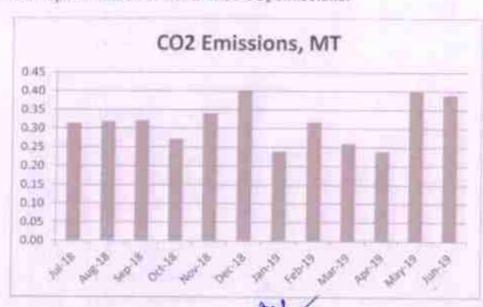
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>z</sub> Emissions:

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

Table No 4: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO, Emissions, MT
-1	Jul-18	392	0.31
2	Aug-18	398	0.32
3	Sep-18	401	0.32
4	Oct-18	339	0.27
5	Nov-18	425	0.34
6	Dec-18	502	0.40
7	Jan-19	298	0.24
8	Feb-19	396	0.32
9	Mar-19	325	0.26
10	Apr-19	298	0.24
11	May-19	498	0.40
12	Jun-19	487	0.39
13:	Total	4759	3.81
14	Maximum	502	0.40
15	Minimum	298	0.24
16	Average	396.58	0.32

Chart No 3: Representation of Month wise CO, emissions:



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## 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 5: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Annual Energy Purchased	4759	kWh/Annum
2	Installed Capacity of Solar PV Plant	10	kWp
3	Average Energy Generated by Solar PV Plant	4	kWh8kWp
4	Annual Generation Days	300	Nos
5	Total Solar Energy Generated≈2*3*4	12000	kWh
6	Total Energy Demand= (1)+(5)	16579	kWh
7	% of Alternate Energy to Annual Requirement = (5)*100/(5)	71.60	%

### Photograph of Roof Top Solar PV Plant:



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## CHAPTER VI STUDY OF USAGE OF LED LIGHTING



In the following Table, we present the percentage of Total Lighting load met by LED lights:

## Table No 6: Computation of Percent Usage of LEDs to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	15	Nos
2	Load of 40 W FTL Fitting	40	VV/unit
3	Total Load of 40 W FTL Fittings	0.6	KW
4	No of 12 W LED Fittings	2	Nos
5	Load of 12 W LED Fitting	12	VV/unit
6	Total Load of 12 W LED Fittings	0.024	kW
7	No of 20 W LED Fittings	74	Nos
8	Load of 20 W LED Fitting	26	W/anit
9	Total Load of 20 W LED Fittings	1.48	kVV
10	Total LED Lighting Load = 6+9	1.504	kW
11	Total Lighting Load=3+6+9	2.104	kVV
12	% of LED to Total Lighting Load=10*100/11	71.48	%





# **GREEN AUDIT REPORT**



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Shri Gajanan Maharaj Shikahan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

AIP Dumbarwad (Citur), Tal. Junnar, Dist. Pune 412 409



Year: 2018-19

Prepared by

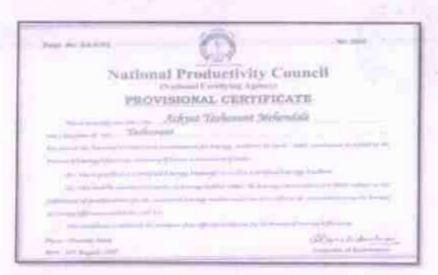
## **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411009 Phone: 09890444795 Email and shorter and com-



Principal
Was Tambe Women Coding of Education (B.Ed.)
Surdienscomment for Junear, Dat. Panc.

#### REGISTRATION CERTIFICATES



#### BEE ENERGY AUDITOR CERTIFICATE



#### MEDA EMPANELMENT CERTIFICATE



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Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2018-19

# **Enrich Consultants**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: apricheona@pmail.com \$100 PO CONTROL OF THE PARTY OF

Ref ECATWCOE/18-19/02

Date: 20/7/2019

## CERTIFICATE

This is to certify that we have conducted Green Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, in the Year 2018-19.

The College has adopted following Green 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
- Segregation of Waste at source
- Provision of Septic tank, for Disposal of Liquid Waste
- Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation

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

For Enrich Consultants,

A Y Mehendale,

Certified Energy Auditor,

EA-8192

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Vilas Tambe Women: College of Education (B.Ed.)

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Sr. No	Particulars	Page No
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3.	Study of Carbon Foot Printing	11
4	Study of Usage of Renewable Energy	12
5	Study of Waste Management	13
6	Study of Rain Water Management	15
7	Study of Green & Innovative Practices	16







Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2018-19

### ACKNOWLEDGEMENT

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We Errich Consultants, Pune, express our sincere gratifiede to the management of Shin Gajanan Maharaj Shikshan Prasarak Mandar's Vilas Tambe Womens College of Education, A.P. Dumbaward (Otur), Tal: Junnar, Dist. Pune 412 409, for awarding us the assignment of Green Audit of their Dampus for the Year: 2018-19.

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

Asiv/ Principal

Villas Tambe Victions College of Education (B.Ed.) Dumbareadiliber; Tal. Junuar, Dig. Ponc.



#### EXECUTIVE SUMMARY

Shri Gajanan Maharaj Shrishan Prasarak Mandal's Vitas Tambe Womens College of Education, AiP Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

#### 2. Present Energy Consumption & CO: Emission:

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions MT
1	Total	4759	3.81
2	Maximum	502	0.40
3	Minimum.	298	0.24
4	Average	396.58	0.32

### 3. Various Measures Adopted for Energy Conservation:

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

## 4. Usage of Renewable Energy & CO; Emission Reduction:

- . The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 18-19 is 12000 kWh.
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 18-19 is 10.8 MT.

#### 5. Waste Management:

## 5.1 Solid Waste Management:

There are Waste Collection Bins at various locations, to collect the Waste.

## 5.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste

## 6. Rain Water Management:

The Rain Water from the terrace is used to recharge bore well.

#### 7. Green Practices:

- Well maintained internal road
- Well maintained Internal Tree Plantation.

#### 8. Assumptions:

- 1 kWh of Electrical Energy releases 0.5 Kg of CO<sub>3</sub> into atmosphere
- 2. Energy generated by Roof Top Solar PV Plant: 4 kWk/kWp per Day
- Annual Solar Energy generation Days: 300 Nos

Principal

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Page 6

745 / 2006

Green Audit Report: Vilas També Womens College of Education, Dumbarwadi: 2018-19

### 9. References:

- . For CO<sub>2</sub> Emissions: www.latanower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in





What Tambe Womens College of Education (B.Ed.) Dumbarweel(Otar) Tel. Bunkar, Diss. Pune.



## ABBREVIATIONS

LED : Light Emitting Diode

kWh kilo-Watt Hour

Qty Quantity

W Watt

kW : Kilo Watt

MT Metric Ton



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## CHAPTER-I INTRODUCTION

## 1.1 Objectives:

- 1. To study present level of Energy Consumption
- 2. To Study the present CO<sub>2</sub> emissions
- 3. To study Scope for usage of Renewable Energy
- 4. To study Waste Management:
- 5. To study Rain Water Management
- 6. To study Green Practices.

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

No	to Head Particulars	
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3		

Principal

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## CHAPTER-II STUDY OF ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption Table No 2: Electrical Energy Purchase Analysis- 2018-19:

No	Month	Energy Purchased, kWh
1	Jul-18	392
2	Aug-18	398
3	Sep-18	401
4	Oct-18	339
5	Nov-18	425
- 6	Dec-18	502
7	Jan-19	298
9	Feb-19	396
9	Mar-19	325
10	Apr-19	298
11	May-19	498
1.2	Jun-19	487
13:	Total	4759
14	Maximum	502
15	Minimum	298
16	Average	396.58

Chart No 1: To study the variation of Month wise Energy Purchased, kWh;

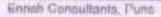


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## CHAPTER-III STUDY OF CARBON FOOT PRINTING



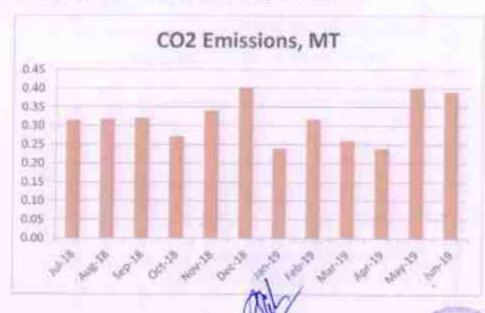
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

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

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

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Jul-18	392	0.31
2	Aug-18	398	0.32
3	Sep-18	401	0.32
4	Oct-18	339	0.27
5	Nov-18	425	0.34
6	Dec-18	502	0.40
7	Jan-19	298	0.24
8	Feb-19	396	0.32
9	Mar-19	325	0.26
10	Apr-19	298	0.24
11	May-19	498	0.40
12	Jun-19	487	0.39
13	Total	4759	3.81
14	Maximum	502	0.40
15	Minimum	298	0.24
16	Average	396.58	0.32

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



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Enrich Consultants, Pune

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## CHAPTER-IV STUDY OF USAGE OF RENEWABLE ENERGY

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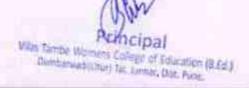
The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.

Table No 4: Computation of Reduction in CO2 Emission:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	10	kWp
2	Average Daily Energy Generated	-4	kWhikWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	12000	kWb
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	10.8	MT

### Photograph of Roof Top Solar PV Plant:







Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2018-19.

## CHAPTER V STUDY OF WASTE MANAGEMENT

#### 5.1 Segregation of Waste at Source:

The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

### Photograph of Waste Collection Bin:



#### 5.2 Liquid Waste Management:

The College has installed Septic Tank, for Disposal of Liquid Waste.

## Photograph of Septic Tank:







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## CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

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The Rain Water from the terrace is used to increase the Underground Water Table.

Photograph of Rain Water Carrying Pipe:



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## CHAPTER-VII STUDY OF GREEN PRACTICES

## 7.1 Pedestrian Friendly Internal Road:

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

Photograph of Internal Road:



#### 7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus. Photograph of Internal Tree Plantation:



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Ville Tambe Women College of Education (6-Ed.)
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# **ENERGY AUDIT REPORT**

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Shri Gajanan Maharaj Shikshan Prasarak Mandal's

## VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarwadi (Otur), Tai: Junnar, Dist. Pune 412 409



Year: 2019-20

Prepared by:

## **ENRICH CONSULTANTS**

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



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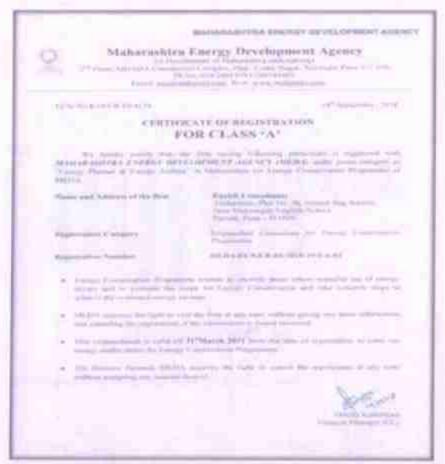
Energy Audit Report: Vilan Tambe Womens College of Education, Dumbarwadi: 2019-20

#### REGISTRATION CERTIFICATES





#### BEE ENERGY AUDITOR CERTIFICATE



#### MEDA EMPANELMENT CERTIFICATE

Reincipal

View Tambe Women's College of Education (S.Ed.)

Democracy Charl Tall Amour, Dist. Pune.

Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

# **ENRICH CONSULTANTS**

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



Ref. EC/VTWCOE/19-20/01

Date: 17/8/2020

## CERTIFICATE

This is to certify that we have conducted an Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otor), Tal: Junnar, Dist: Pune 412 409, in the Year 2019-20.

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 Energy Conservation.

For Enrich Consultants.

Mehenda

A Y Mehendale,

Certified Energy Auditor

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3	Study of Energy Consumption	10
4	Study of Carbon Foot Printing	11
5	Study of Usage of Alternate Energy	12
6	Study of Usage of LED Lighting	13







Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

### ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Sharman Gajanan Maharaj Shikshan Prasarak Mandar's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Energy Audit of their Campus for the Year, 2019-20.

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

Mr

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Diction (BEz.)



#### EXECUTIVE SUMMARY

Shri Gajanan Maharaj Shikahan Prasarak Mandal's Vilas Tambe Womens College of 2005
 Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

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

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions MT
1	Total	3428	3.09
2	Maximum	406	0.37
3	Minimum	112	0.10
4	Average	285.67	0.26

#### 3. Various Measures Adopted for Energy Conservation:

- · 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 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 19-20 is 12000 kWh
- Energy purchased from MSEDCL in 19-20 is 3428 kWh
- Total Energy Consumption in 19-20 is 15428 kWh
- % of Renewable Energy to Annual Energy Demand is 77.78 %.

## 5. Usage of LED Lighting:

- The Total LED Lighting Load is 1,584kW.
- The Total Lighting Load is 2.084 kW.
- . The % of LEDs to Total Lighting Load is 76.74 %.

## 6. Assumptions:

- Energy Consumption is computed based on Load Utilization Factor
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
- Annual Solar Energy generation Days: 300 Nos

#### 7. References:

- For CO<sub>2</sub> Emissions: www.hitaponer.com
- For Solar PV Energy generation: www.solarrooftop.gov.in



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## ABBREVIATIONS

AC Air conditioner

MSEDCL : Maharashtra Electricity Distribution Company Limited

LED : Light Emitting Diode

kWh kilo-Watt Hour

Oty : Quantity Watt

kW Kilo Watt

PC Personal Computer

MT : Metric Ton.

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## CHAPTER-I INTRODUCTION

### 1.1 Objectives:

- 1. To study Connected Load
- 2. To study present level Energy Consumption
- 3. To Study the present CO2 emissions
- 4. To study Usage of Alternate/Renewable Energy
- 5. To study usage of LED Lighting

#### 1.2 Table No1: General Details of College:

No	No Head Particulars		
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education	
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409	
3	Year of Establishment	2005	



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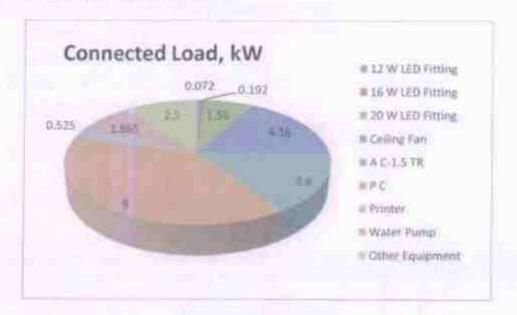
## CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	12 W LED Fitting	6	12	0.072
2	40 W FTL Fitting	12	40	0.48
3	20 W LED Fitting	78	20	1,56
4	Cetting Fan	64	65	4.16
5	A C-1.5 TR	2	1800	3.6
6	PC	60	150	9
7	Printer	3	175	0.525
8	Water Pump	1	1885	1.865
9	Other Equipment	10	250	2.5
10	Total			23.76

#### Chart No 1: Details of Connected Load:



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## CHAPTER-III STUDY OF ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption Table No 3: Electrical Energy Purchase Analysis - 2019-20:

No	Month	Energy Purchased, kWh
1	Jul-19	338
2	Aug-19	298
3	Sep-19	354
4	Oct-19	365
5	Nov-19	401
6	Dec-19	235
7	Jan-20	398
8	Feb-20	406
9	Mar-20	297
10	Apr-20	112
11	May-20	112
12	Jun-20	112
13	Total	3428
14	Maximum	406
15	Minimum	112
16	Average	285,67

Chart No 2: To study the variation of Month wise Energy Purchased, kWh:



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## CHAPTER-IV STUDY OF CARBON FOOT PRINTING

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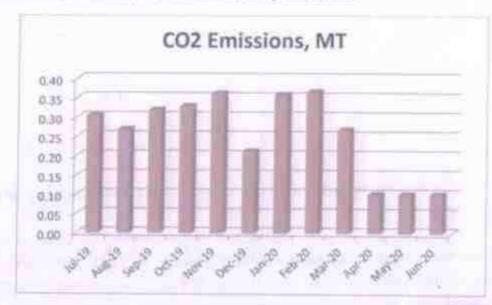
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions;

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

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

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Jul-19	338	0.30
2	Aug-19	298	0.27
3	Sep-19	354	0.32
4	Oct-19	385	0.33
5	Nov-19	401	0.38
6	Dec-19	235	0.21
7	Jan-20	398	0.36
8	Feb-20	406	0.37
9	Mar-20	297	0.27
10	-Apr-20	112	0.10
11	May-20	112	0.10
12	Jun-20	112	0.10
13	Total	3428	3.09
14	Maximum	406	0.37
15	Minimum	112	0.10
16	Average	285.67	0.26

Chart No 3: Representation of Month wise CO2 emissions:



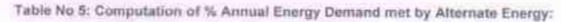
Principal



## 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.



No.	Particulars	Value	Unit
1	Annual Energy Purchased	3428	kWh/Annum
2	Installed Capacity of Solar PV Plant	10	kWp
3	Average Energy Generated by Solar PV Plant	4:	kWh/kWp
4	Annual Generation Days	300	Nos
5	Total Solar Energy Generated=2*3*4	12000	kWh
6	Total Energy Demand≈ (1)+(5)	15428	kWh
7	% of Alternate Energy to Annual Requirement = (5)*100/(6)	77.78	%

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



Principal
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## CHAPTER VI STUDY OF USAGE OF LED LIGHTING

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in the following Table, we present the percentage of Total Lighting load met by LED lights:

Table No 6: Computation of Percent Usage of LEDs to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 40 W FTL Fittings	12	Nos
2	Load of 40 W FTL Fitting	40	W/unit
3	Total Load of 40 W FTL Fittings	0.48	kW
4	No of 12 W LED Fittings	2	Nos
5	Load of 12 W LED Fitting	12	W/unit
6	Total Load of 12 W LED Fittings	0.024	kW
7	No of 20 W LED Fittings	78	Nos
8	Load of 20 W LED Fitting	20	W/unit
9	Total Load of 20 W LED Fittings	1.56	kW
10	Total LED Lighting Load = 6+9	1.584	kW
11	Total Lighting Load=3+6+9	2.064	kW
12	% of LED to Total Lighting Load=10*100/11	76.74	96.

AWAY ----

# **GREEN AUDIT REPORT**

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

## VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarwadi (Otur): Tal: Junnar: Dist: Pune 412 409



Year: 2019-20

Prepared by

## **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411009 Phone, 09890444795 Email, professional, com



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Green Audit Report: Vitas Tambe Womens College of Education, Dumbarwadi. 2019-20

#### REGISTRATION CERTIFICATES



# PU/FN/8.ED 245 / 2006

#### BEE ENERGY AUDITOR CERTIFICATE



#### MEDA EMPANELMENT CERTIFICATE

Principal

Vilas Tambe Women's College of Education (8.5d) Burnaries out at terriary, Oct. Funds Page 2

Green Audit Report. Vilas Tambe Womens College of Education, Dumbarwadi. 2019-20

## **ENRICH CONSULTANTS**

Near Muktangan English School, Parvati, Pune 411 009

Yashashree, 28, Nirmal Bag Society, Tel: 09890444795 Email: emilliona@gmust.com



Date: 17/8/2020

## CERTIFICATE

This is to certify that we have conducted Green Audit at Shn Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otur). Tat: Junnar, Dist: Pune 412 409, in the Year 2019-20.

The College has adopted following Green 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
- Segregation of Waste at source
- Provision of Septic Tank, for Disposal of Liquid Waste
- Implementation of Rain Water Management Project
- Good Internal Road

Ref ECNTWCOE/19-20/02

- Internal Tree Plantation
- Provision of Ramp for Divyangajan

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

For Enrich Consultants.

Melombele

A Y Mehendale,

Certified Energy Auditor.

EA-8192

Villas Tambe Womens College of Education (B.Ed.) Dumparwagil(bur) fall Junear, Dist. Pune.

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4	Study of Usage of Renewable Energy	12
5	Study of Waste Management	13
6	Study of Rain Water Management	14
7	Study of Green & Sustainable Practices	15



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Green Audit Risport: Vitas Tambe Womens College of Education, Dumbarwadi: 2019-20

#### ACKNOWLEDGEMENT

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We Enrich Consultants, Pune, express our sincere gratitude to the management of Shiri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Green Audit of their Campus for the Year, 2019-20.

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

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Vitas Tambe Wilmans College of Education (B.Ed.)
Dimensional Tal Annual, Dec. Page.

#### EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandai's Vilas Tambe Womens & Mage of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Precept in the form of Electrical Energy: used for various Electrical Equipment.

#### 2. Present Energy Consumption & CO, Emission:

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	3428	3.09
2:	Maximum	406	0.37
3	Minimum	112	0.10
4	Average	285.67	0.26

#### 3. Various Measures Adopted for Energy Conservation:

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

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

- . The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 19-20 is 12000 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 19-20 is 10.8 MT.

#### 5. Waste Management:

#### 5.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

#### 5.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste

#### 6. Rain Water Management:

The Rain Water from the terrace is used to recharge the bore well.

#### 7. Green & Sustainable Practices:

- Well maintained internal road
- Well maintained Internal Tree Plantation.
- Provision of Ramp for Divyangajan

Principal

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Page 6

Green Audit Report: Visas Tambe Womens College of Education, Dumbarwadi: 2019-20.

#### 8. Assumptions:

- 1. Energy Consumption is based on Load Utilization Factor
- 2. 1 kWh of Electrical Energy releases 0.9 Kg of CO; into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day.
- 4. Annual Solar Energy generation Days: 300 Nos

#### B. References:

- For CO<sub>3</sub> Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in



Principal
Vilas Tambe Womens College of Education (8.64.)
Dumbarwati-One) Tal, Juriar, Dist. Pure.

Enrich Consultants, Pune

Page 7

#### ABBREVIATIONS

LED : Light Emitting Diode

kWh kito-Watt Hour

Qty Quantity

W: Watt

MT : Metric Ton





Villas Tambe Womens College of Education (B Est.).
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# CHAPTER-I INTRODUCTION

#### 1.1 Objectives:

- 1. To study present level of Energy Consumption
- 2. To Study the present CO2 emissions
- 3. To study Scope for usage of Renewable Energy
- 4. To study Waste Management:
- 5. To study Rain Water Management
- 6. To study Green & Sustainable Practices.

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

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409
3	Year of Establishment	2005



Principal
Wiles Tambe Womens College of Education (ILEE)
Domographisms Tax Bones, Dist. Pure.



# CHAPTER-II STUDY OF ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption Table No 2: Electrical Energy Purchase Analysis - 2019-20:

No	Month	Energy Purchased, kWh
5	Jul-19	338
2	Aug-19	298
3	Sep-19	354
-4	Oct-19	365
- 5	Nov-19	401
6	Dec-19	235
7	Jan-20	398
8	Feb-20	406
9	Mar-20	297
10	Apr-20	112
11	May-20	112
12	Jun-20	112
13	Total	3428
14	Maximum	405
15	Minimum	112
16	Average	285.67

Chart No 1: To study the variation of Month wise Energy Purchased, kWh:



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# CHAPTER-III STUDY OF CARBON FOOT PRINTING



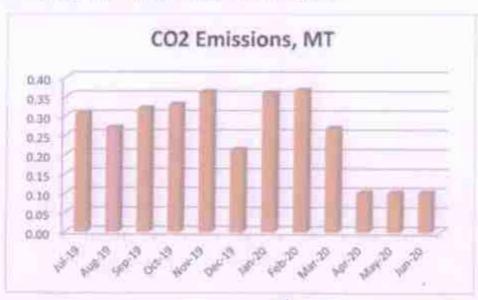
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

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

Table No 3: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Jul-19	338	0.30
2	Aug-19	298	0.27
3	Sep-19	354	0.32
4	Oct-19	365	0.33
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9	Mar-20	297	0.27
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12	Jun-20	112	0.10
13	Total	3428	3.09
14	Maximum	406	0.37
15	Minimum	112	0.10
16	Average	285.67	0.26

Chart No 2: Representation of Month wise CO2 emissions:



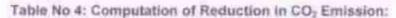
Enrich Consultants, Pune

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# CHAPTER-IV STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant



No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	10	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	12000	k5/Vbi
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	10.8	MT

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



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Page 12

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### CHAPTER V STUDY OF WASTE MANAGEMENT

#### 5.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

#### Photograph of Waste Collection Bin:



#### 5.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste.

#### Photograph of Septic Tank:







PU/FN/B.ED

# CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the terrace is used to recharge the bore well.

Photograph of Bore well recharge Point:





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Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

# CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

# 245 / 2006 PM

#### 7.1 Pedestrian Friendly Internal Road:

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

Photograph of Internal Road:



#### 7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus. Photograph of Internal Tree Plantation:





Villas Tambe Womens College of Education (B.Ed.)



Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

#### 7.3 Provision of Ramp for Divyangajan:

The College has made provision of Ramp for easy movement of Divyangajan.

#### Photograph of Ramp:





Vilas També Womens College of Education (B.Ed.)

Duest area (ICL)



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# ENVIRONMENTAL AUDIT REPORT/

al

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGE OF EDUCATION.

AP Dumbiewad (Otur), Tat. Junnar, Dist. Pune 412 409



Year: 2019-20

Prepared by

# **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411009 Phone: 09890444795 Email applicate from 10000





PU/PH/8\_ED 245 / 2006

Vilas Tambe Womens College of Education (B.Ed.) Dumbarkadi(Otar) Tat Juniar, Disc. Fune.

#### REGISTRATION CERTIFICATES





#### BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

Enrich Consultants, Pune

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Page 2

# **ENRICH CONSULTANTS**

Yashashree, 25, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: enricheona/flormail.com PU/MI/S.ED 245 / 2006

Ref. EC/VTWCOE/19-20/03

Date 17/8/2020

# CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, in the Year 2019-20.

The College has adopted following Environment Friendly 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
- Segregation of Waste at source
- > Provision of Septic Tank, for Disposal of Liquid Waste
- > Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation

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

For Enrich Consultants,

Anchestel

A Y Mehendale,

Certified Energy Auditor,

EA-8192

Vilas Tambe Womens Epings of Education (B.Ed.)
Burnaraus (Coar) Sal Americans, Paris

Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi. 2019-20.

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5	Study of Rain Water Management	15
6	Study of Environment Friendly Initiatives	16



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Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

#### ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education.

A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2019-20.

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



Villas Tambe Witness Common of Education (8.6d.)

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PU/PN/B ED



Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

#### EXECUTIVE SUMMARY

PU/PN/BID 245 / 2006

Shri Gajanan Maharaj Shikahan Prasarak Mandal'a Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy: used for various Electrical Equipment.

#### 2. Pollution caused due to College Activities:

- Air pollution: Mainly CO<sub>2</sub> on account of Electricity Consumption
- . Solid Wante: Bio degradable Garden Waste, Recyclable Waste and Human Waste
- Liquid Waste: Human liquid waste

#### 3. Present Energy Consumption & CO, Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>2</sub> emissions, MT
4	Total	3428	3.09
2	Maximum	406	0.37
3	Minimum:	112	0.10
4	Average	285.67	0.26

#### 4. Projects implemented for Environmental Conservation:

- · Usage of Energy efficient LED fittings
- Installation of 10 kWp Roof Top Solar PV Plant
- Provision of Bio Composting Bed & Sanitary Waste Incinerator

#### 5. Usage of Renewable Energy & Reduction in CO, Emissions:

- The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 19-20 is 12000 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 19-20 is 10.8 MT.

#### 6. Waste Management:

#### 5.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

#### 5.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste

#### 6. Rain Water Management:

The Rain Water from the terrace is used to recharge the bore well.

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Dumbarwad (Chin) Tat, Timner, Skit. Pune



#### 10. Environment Friendly Initiatives:

Internal Tree Plantation

#### 11. Assumptions:

- 1. Energy Consumption is based on Load Utilization Factor
- 2. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant. 4 kWh/kWp per Day
- 4. Annual Solar Energy generation Days: 300 Nos

#### 12. References:

- For CO<sub>2</sub> Emission computation, www.tstapperst.com
- For Solar PV Energy generation: www.solarrooflon.pov.in.







Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

#### ABBREVIATIONS

kWh kilo-Watt Hour

Oty Quantity
MT Metric Ton

CO<sub>2</sub> Carbon Di Oxide

CPCB Central Pollution Control Board





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# CHAPTER-I INTRODUCTION

- 1.1. Important Definitions:
- 1.1.1Environment: Definition as per environment Protection Act: 1986

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

# 1.1.2. Environmental Audit: Definition:

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

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

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

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

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

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

1988	Hazardous Waste (Management and Handling) Rules
1989	Manufacture. Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Roles
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

Enrich Consultants, Pune

Villa Tambe Women College of Education (A Dumperwed Ohin) Tall Ameni, Dist. Rene. Page 9

Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2019-20

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



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

1.1.	National Forest Policy, 1988
1025	National Water Policy, 2002
- 3.	National Environment Policy or NEP (2008)
15,	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5	Policy Statement for Abatement of Pollution (1992)
6.	
- T.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research College)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency
10	The Road to Copenhagen: India's Position on Climate Change Issues (MoEF)

#### 1.2 Audit Methodology:

- 1. Study of present Resource Consumption & CO2 Emissions
- 2. Study of Usage of Renewable Energy
- 3 Study of Waste Management
- 4. Study of Rain Water Management
- 5. Study of Environmental Friendly Initiatives.

# 1.3 General Details of College: Table No: 4:

No	Head	Particulars
4	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3	Year of Establishment	2005

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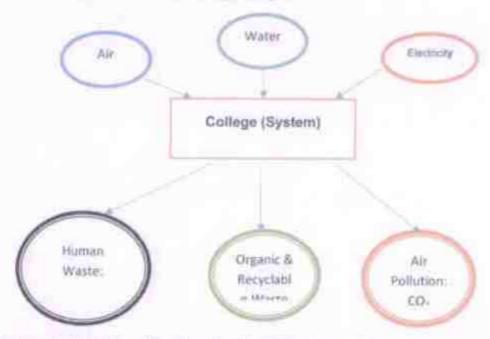
# CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO. EMISSION

The College consumes following Natural/derived Resources:

- 1. Air.
- 2. Water
- 3. Electrical Energy

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

Chart No 1: Representation of College as System:



A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here we compute the emissions of Carbon-Di-Oxide, by usage of Electrical Energy. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere.

Table No 5: Study of Energy Purchased & CO<sub>2</sub> Emission: 2019-20:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
- 1	Jul-19	338	0.30
2	Aug-19	298	0.27
3	Sep-19	354	0.32
4	Oct-19	365	0.33
5	Nov-19	401	0.36
6	Dec-19	235	0.21
F	Jan-20	398	0.36
8	Feb-20	406	0.37

Enrich Consultants, Pune

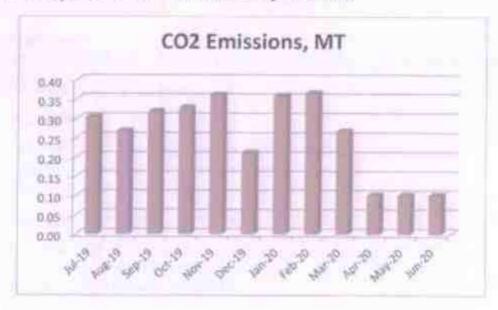




9	Mar-20	297	0.27
10	Apr-20	112	0.10
11	May-20	112	0.10
12	Jun-20	112	0.10
13	Total	3428	3.09
14	Maximum	406	0.37
15	Minimum	112	0.10
16	Average	285.67	0.26



Chart No 2: Representation of Month wise CO2 emissions;



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# CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.



#### Table No 6: Computation of Reduction in CO2 Emission:

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	10	kWp
2.	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	12000	kWh
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg at CO;
6	Annual Reduction in CO2 Emission = (4) * (5) /1000	10.8	MT

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



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# CHAPTER IV STUDY OF WASTE MANAGEMENT

# 245 / 2006

#### 4.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

#### Photograph of Waste Collection Bin:



#### 4.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste.

#### Photograph of Septic Tank:



Principal

Villas També (Comero College of Education (B.Ed.)

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CHRUCA

Page 14

# CHAPTER-V STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the terrace is used to recharge the bore well.

Photograph of Bore well recharge Point:







Vites Tambe Womens College of Education (8.Ed.) Dumberwool (Days Yal. Juniar, Dist. Plane.



Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi. 2019-20.

# CHAPTER-VI STUDY OF ENVIRONMENT FRIENDLY PRACTICES

6.1Tree Plantation in the Campus:

The College has landscaped Lawn and well maintained Tree Plantation in the campus.

Photograph of Tree Plantation:



Principal

Vilas Tambe Womens College of Education (9.Ed.)

Dombarwedy Charl Tel. Survey, Old. Pane.



# **ENERGY AUDIT REPORT**

o

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

AP Dumbarwadi (Otur), Tal Junnar, Dait Pune 412 409



Year: 2020-21

Prepared by:

# **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: emitthcore Formal com



Principal
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Villas Tambe Womens College of Education (6.64.)

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Energy Audit Report: Vilus Tambe Womens College of Education, Dumbarwadi. 2020-21

#### **REGISTRATION CERTIFICATES**



# PU/PM/B.6D 245 / 2006

#### BEE ENERGY AUDITOR CERTIFICATE



#### MEDA REGISTRATION CERTIFICATE



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Energy Audit Report. Vilas Tambe Womens College of Education. Dumbarwadi. 2020-21

# ENRICH CONSULTANTS

Yashashree, 26, Nirmal Bag Society.

Near Muktangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrich une Bornal com



Ref. EC/VTWCOE/20-21/01

Date: 13/7/2021

# CERTIFICATE

This is to certify that we have conducted an Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist; Pune 412 409, in the Year 2020-21.

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 Energy Conservation.

For Enrich Consultants,

A Y Mehendale,

Certified Energy Auditor

EA-8192

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Vilas Tambe Women (clings of Education (E.Ed.)
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Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2020-2

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3	Study of Energy Consumption	10
4	Study of Carbon Foot Printing	11
5	Study of Usage of Alternate Energy	12
6	Study of Usage of LED Lighting	13







Energy Audit Report, Vitas Tambe Womens College of Education, Dumbarwadi: 2020-21

#### ACKNOWLEDGEMENT

PU/PH/0.ED 245 / 2005

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Energy Audit of their Campus for the Year: 2020-21.

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





#### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shikahan Prasarak Mandal's Vilas Tambe Womens College of Education, AIP Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

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

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions. MT
1	Total	2657	2.39
2.	Maximum	767	0.69
3	Minimum	99	0.09
4	Average	221.42	0.20

#### 3. Various Measures Adopted for Energy Conservation:

- 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 10 kWp Roof Top Solar PV Plant
- . Energy generated by Solar PV Plant in 20-21 is 12000 kWh
- Energy purchased from MSEDCL in 20-21 is 2657 kWh
- Total Energy Consumption in 20-21 is 14657 kWh
- % of Renewable Energy to Annual Energy Demand is \$1.87 %

## 5. Usage of LED Lighting:

- . The Total LED Lighting Load is 1.824 kW.
- . The Total Lighting Load is 1.824 kW.
- . The % of LEDs to Total Lighting Load is 100 %.

#### 6. Assumptions:

- Energy Consumption is computed based on Load Utilization Factor
- 2. 1 kWh of Electrical Energy releases 0.9 Kg of CO2 into atmosphere
- Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
- 4. Annual Solar Energy generation Days: 300 Nos

#### 7. References:

- For CO<sub>2</sub> Emissions: www.tabipower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in

Vilas Tembe Womens College of a succision (8.5d.)
Dumbarward (One) Tall Junes, Date Junes



SPECIFICAL PROPERTY.

#### ABBREVIATIONS

AC : Air conditioner

MSEDCL : Maharashtra Electricity Distribution Company Limited

LED : Light Emitting Diode

kWh kilo-Watt Hour

Qty Quantity W Watt

kW Kilo Watt

PC Personal Computer

MT Metric Ton





ENT

# CHAPTER-I INTRODUCTION

#### 1.1 Objectives:

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

#### 1.2 Table No1: General Details of College:

No	Head	Particulars
Ť	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandai's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409
3	Year of Establishment	2005

Principal

Vitas Tambe Womens Callage of The Wine (8 Ed.)

Demographical Tall Johnson, Clerk Falle.







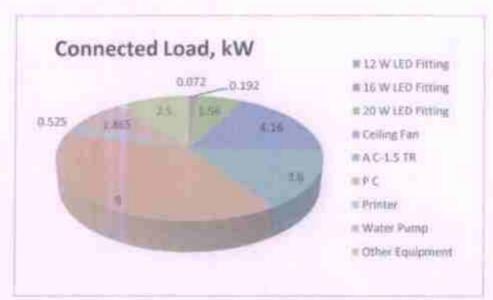
# CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	12 W LED Fitting	6	12	0.072
2	16 W LED Fitting	12	16	0.192
3	20 W LED Fitting	78	20	1.56
4	Ceiling Fan	64	65	4.16
5	AC-15TR	2	1800	3.6
6	PC	60	150	9
7	Printer.	3	175	0.525
8	Water Pump	1	1865	1 865
9	Other Equipment	10	250	2.5
10	Total			23.47

#### Chart No 1: Details of Connected Load:



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E.A. P. Page 9.

PUZEN/BLES

# CHAPTER-III STUDY OF ENERGY CONSUMPTION

In this chapter, we present the analysis of Electricity Energy Consumption Table No 3: Electrical Energy Purchase Analysis - 2020-21:

No	Month	Energy Purchased, kWh
1	Jul-20	767
2	Aug-20	119
3	Sep-20	120
4	Oct-20	99
5	Nov-20	113
8	Dec-20	125
7	Jan-21	135
8	Feb-21	198
9	Mar-21	225
10	Apr-21	212
11	May-21	309
12	Jun-21	235
13	Total	2657
14	Maximum	767
15	Minimum	99
16	Average	221.42

Chart No 2: To study the variation of Month wise Energy Purchased, kWh:



Vilas Tambe Women Coling (Surger (B.Ed.)





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# CHAPTER-IV STUDY OF CARBON FOOT PRINTING

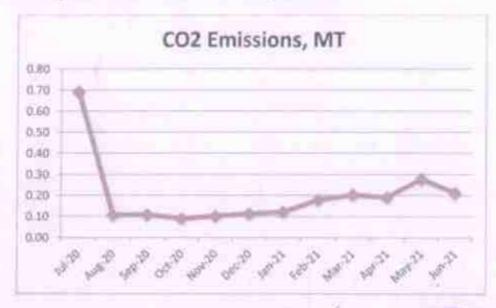
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

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

Table No 4: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO, Emissions, MT
1	Jul-20	767	0.69
2	Aug-20	119	0,11
3	Sep-20	120	0.11
4	Oct-20	99	0.09
5	Nov-20	113	0.10
6	Dec-20	125	0.11
7	Jan-21	135	0.12
8	Feb-21	198	0.18
9	Mar-21	225	0.20
10	Apr-21	212	0.19
11	May-21	309	0.28
12	Jun-21	235	0.21
13	Total	2657	2.39
14	Maximum	767	0.69
15	Minimum	99	0.09
16	Average	221.42	0.20

Chart No 3: Representation of Month wise CO2 emissions:



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Enrich Consultants, Pune

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# 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 Association Energy Demand of the College.

Table No 5: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1.	Annual Energy Purchased	2657	kWh/Annum
2	Installed Capacity of Solar PV Plant	10	kWp
3	Average Energy Generated by Solar PV Plant	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Total Solar Energy Generated=2*3*4	12000	kWh.
6	Total Energy Demand= (1)+(5)	14657	kWh
7	% of Alternate Energy to Annual Requirement = (5)*100/(6)	81.87	%

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





PU/VIL/D.ED

# CHAPTER VI STUDY OF USAGE OF LED LIGHTING

In the following Table, we present the percentage of Total Lighting load met by LED total

Table No 6: Computation of Percent Usage of LEDs to Total Lighting Load:

Na	Particulars	Value	Unit
1	No of 12 W LED Fittings	6	Nos
2	Load of 12 W LED Fitting	12	W/unit
3	Total Load of 12 W LED Fittings	0.072	KVV
4	No of 16 W LED Fittings	12	Nos
5	Load of 16 W LED Fitting	16	VV/uni
6	Total Load of 16 W LED Fittings	0.192	kW
7	No of 20 W LED Fittings	78	Nos
8	Load of 20 W LED Fitting	20	W/uni
9	Total Load of 20 W LED Fittings	1.56	KVV
10	Total LED Lighting Load=3+6+9	1.824	kW
11	Total Lighting Load≈3+6+9	1.824	kW
12	% of LED to Total Lighting Load=10*190/11	100	96

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Viles Tambe Womens College of Education (II Ed.)
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# **GREEN AUDIT REPORT**

at

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGE OF EDUCATION.

A/P Dumbarwadi (Otur), Tal. Junnar, Dist. Puna 412 409



Year: 2020-21

Prepared by

# **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411009 Phone: 09800444795 Email: enricheonalitigmeil.com\*



Vilas Farrèse Womens College of Education (B.Ed.)

Dumbarrand (Dish) Tal. Jonnas, Dist. Fune.

PU/PN/DED 245 / 2005

#### REGISTRATION CERTIFICATES



# PU/PH/D.EQ 245 / 2005

#### BEE ENERGY AUDITOR CERTIFICATE



#### MEDA EMPANELMENT CERTIFICATE

Vital Jambe Womens College of Education (B.Ed.) Dumparwack (Charl Tel. Johney, Dist. Filme.



Green Audit Report: Vilas Tambe Womens College of Education, Dumbarward: 2020-21

# **ENRICH CONSULTANTS**

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

Ref: EC/VTWCOE/20-21/02

PU/MU/B.E0 245 / 2005

Date: 13/7/2021

# CERTIFICATE

This is to certify that we have conducted Green Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tat Junnar, Dist. Pune 412 409. In the Year 2020-21.

The College has adopted following Green & Sustainable 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
- Segregation of Waste at source
- Provision of Bio Composting Bed, for conversion of Organic Waste
- Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Creation of awareness about Energy Conservation by Display of Posters

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

For Enrich Consultants,

Mahendel

A Y Mehendale,

Certified Energy Auditor.

EA-8192

Vilas Tambe Women: College of Education (B.Ed.)
Dumbarweb (Ottor) for Junior, Dist. Fune.

Enrich Consultants, Pune

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4	Study of Usage of Renewable Energy	12
5	Study of Waste Management	13
6	Study of Rain Water Management	14
7	Study of Green & Sustainable Practices	15

Principal
Vilas Timba Womens College of Education (B.Ed.)
Ovenbaneas(Otur) Tel. Junior, Dist. Para.



Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi. 2020-21

#### ACKNOWLEDGEMENT



We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tat. Junnar, Dist. Pune 412 409, for awarding us the assignment of Green Audit of their Campus for the Year: 2020-21

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

Peincipal

Volum Tambe Witness College of Education (B.Ed.)

Dumbarwed Dony Tel, Junear, Dec. Pane.





#### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shikahan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

#### 2. Present Energy Consumption & CO, Emission:

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions MT
1	Total	2657	2.39
2	Maximum	767	0.69
3	Minimum	99	0.09
14.	Average	221.42	0.20

#### 3. Various Measures Adopted for Energy Conservation:

- Usage of Energy efficient LED fittings.
- . Installation of 10 kWp Roof Top Solar PV Plant

#### 4. Usage of Renewable Energy & CO, Emission Reduction:

- Energy generated by Solar PV Plant in 20-21 is 12000 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 20-21 is 10.8 MT.

#### 5. Waste Management:

#### 5.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

#### 5.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste

#### 6. Rain Water Management:

The Rain Water from the terrace is used to recharge the bore well.

#### 7. Green & Sustainable Practices:

- Well maintained internal road
- Well maintained Internal Tree Plantation.
- Provision of Ramp for Divyangajan
- Creation of Awareness in respect of Energy Conservation by display of Posters

Principal

Villas Tambe Womens College of Education (8.39).

Page 6

#### 8. Assumptions:

- 1. Energy Consumption is computed based on Load Utilization Factor
- 2. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
- 4. Annual Solar Energy generation Days: 300 Nos

#### 9. References:

- For CO<sub>2</sub> Emissions: www.tatagower.com
- For Solar PV Energy generation: www.solamoofine.cov.in



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Vilas També Womens College of Education (B.Ed.) Dombarwad (Otur) Tal. Junear, Dist. Plans.



Efficie Consultants, Pune

Page 7

Green Audit Report: Vias Tambe Womens College of Education, Dumbarwadi 2020-21

#### ABBREVIATIONS

240 / 2005

LED

Light Emitting Diode

KWh:

kilo-Watt Hour

**Qty** 

Quantity

VV:

Watt

**KVV** 

Kilo Watt

MT

Metric Ton

Principa

Villas Tambe Womens College of Education (R.Ed.) Dumbarwad Otor) Tal. Jurnat, Opt. Funn.



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## CHAPTER-I INTRODUCTION

# 

#### 1.1 Objectives:

- 1. To study present level of Energy Consumption
- 2. To Study the present CO2 emissions
- 3. To study Scope for usage of Renewable Energy
- 4. To study Waste Management:
- 5. To study Rain Water Management
- 6. To study Green & Sustainable Practices.

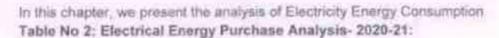
#### 1.2 Table No 1: General Details of College:

No:	Head	Particulars
τ	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409
3	Year of Establishment	2005

Villa Tamber Womans College of Education (8.2d.)
Dumbarwad Count for Juneary (84) Page



# CHAPTER-II STUDY OF ENERGY CONSUMPTION



No	Month	Energy Purchased, kWh
.1	Jul-20	767
2	Aug-20	119
3	Sep-20	120
4	Oct-20	99
5	Nov-20	113
8	Dec-20	125
7	Jan-21	135
8	Feb-21	198
9	Mar-21	225
10	Apr-21	212
11	May-21	309
12	Jun-21	235
13:	Total	2857
14	Maximum	767
15	Minimum	99
16	Average	221.42

Chart No 1: To study the variation of Month wise Energy Purchased, kWh:



Villas Tambe Womens College of Education (6.Ed.)

Dambarwads Dout Tel. Homer, Dec. Pure.



PU/PN/BED

# CHAPTER-III STUDY OF CARBON FOOT PRINTING



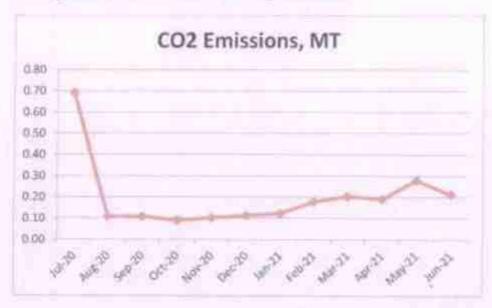
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

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

Table No 3: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions,
1	Jul-20	767	0.69
2	Aug-20	119	0,11
.3	Sep-20	120	0.11
-4	Oct-20	99	0.09
5	Nov-20	113	0.10
6	Dec-20	125	0.11
7	Jan-21	135	0.12
8	Feb-21	198	0.18
9	Mar-21	225	0.20
10	Apr-21	212	0.19
11	May-21	309	0.28
12	Jun-21	235	0.21
13	Total	2657	2.39
14	Maximum	767	0.69
15	Minimum	99	0.09
16	Average	221.42	0.20

Chart No 2: Representation of Month wise CO2 emissions:



Enrich Consultants: Pune

Principal
Ville Tambe Warners College of Education (ILEA)

Cumperwad Otor; Tel. surrur, Dist. Pure.

HARCH CO

# CHAPTER-IV STUDY OF USAGE OF RENEWABLE ENERGY



The College has installed Roof Top Solar PV Plant of Capacity 19 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.

Table No 4: Computation of Reduction in CO<sub>2</sub> Emission:

No	Particulars	Value	Unit
Ť	Installed Roof Top Solar PV Plant Capacity	10	КWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	12000	kWh
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	10.8	MT

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



Villas Tambe Womens College of Education (ILEd.)
Dumbarwage Tay, Tay, Amazy, Ont. Proc.



# CHAPTER V STUDY OF WASTE MANAGEMENT

#### 5.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

#### Photograph of Waste Collection Bin:



#### 5.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste.

#### Photograph of Septic Tank:



Vilas famba Womens College of Education (B.Ed.) Dumos condiction (B.E. according to according to



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# CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the terrace is used to recharge the bore well.

Photograph of Rain Water Carrying Pipe:







Villa Tamber Women's College of Education (8-Ed QLGH Damber and Ulber 1 feb Americk, Date Purise

# CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES



#### 7.1 Pedestrian Friendly Internal Road:

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

Photograph of Internal Road:



#### 7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus. Photograph of Internal Tree Plantation:





#### 7.3 Provision of Ramp for Divyangajan:

The College has made provision of Ramp for easy movement of Divyangajan. Photograph of Ramp:

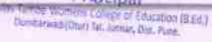




# 7.4 Creation of Awareness about Energy Conservation: The College has displayed Posters on Importance of Energy Conservation. Photograph of Poster on Importance of Energy Conservation:









# **ENVIRONMENTAL AUDIT REPORT**

nř

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

# VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarwadi (Otor), Tat. Junnar, Dist. Pune 412 409



Year: 2020-21

Prepared by

# **ENRICH CONSULTANTS**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411009 Phone, 09890444795 Email, protoported com-

THE THE PLANT

Value Tambe Womens College of Education (8.66.) Dumbarway (pt.s) La, Jennar, Dok. April.

#### REGISTRATION CERTIFICATES





#### BEE ENERGY AUDITOR CERTIFICATE



#### MEDA EMPANELMENT CERTIFICATE

Enrich Consultants, Pune

Phincipal

Villas Tambo (III Ed.)



Page 2

# **ENRICH CONSULTANTS**

Yashashree, 25, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tet: 09890444795 Email: emichecons/Domail.com

Ref. EC/VTWCOE/20-21/03



Date: 13/7/2021

# CERTIFICATE

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The College has adopted following Environment Friendly 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
- Segregation of Waste at source
- > Provision of Bio Composting Bed, for conversion of Organic Waste
- Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation
- Creation of awareness about Energy Conservation by Display of Posters

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

For Enrich Consultants,

Michandel

A Y Mehendale,

Certified Energy Auditor,

EA-8192

ANICH CONSULTY

Enrich Consultants, Pune

Principal

Page 3

Villa Tambe Women ("Silver of Louision (6.64)) Europeauty unit for some , stell from

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3	Study of Usage of Renewable Energy	13
4	Study of Indoor Air Quality	34
5	Study of Waste Management	15
6	Study of Rain Water Management	16
7	Study of Environment Friendly Initiatives	17
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1	Indoor Air Quality Standards	18





Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2020-21

#### ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management 30rt Gajanan Maharaj Shikahan Prasarak Mandal's Vilas Tambe Womens College of Education. A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2020-21.

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

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#### EXECUTIVE SUMMARY

Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otor), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

#### 2. Pollution caused due to College Activities:

- Air pollution: Mainly CO<sub>2</sub> on account of Electricity Consumption
- Solld Wante: Bio degradable Garden Waste, Recyclable Waste and Human Waste.
- Liquid Waste: Human liquid waste

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

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>z</sub> emissions, MT
4	Total	2657	2.39
2	Maximum	767	0.69
3	Minimum	99	0.09
4	Average	221.42	0.20

#### 4. Projects implemented for Environmental Conservation:

- Usage of Energy efficient LED fittings
- . Installation of 10 kWp Roof Top Solar PV Plant
- Rain water Management Project

#### Usage of Renewable Energy & Reduction in CO<sub>3</sub> Emissions:

- The College has installed 10 kWp Roof Top Solar PV Plant
- . Energy generated by Solar PV Plant in 20-21 is 12000 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 20-21 is 10.8 MT.

### 6. Indoor Air Quality:

No	Parameter/Value	AQI	PM-2.5	PM-10
-1	Maximum	121	68	81
2	Minimum	106	62	79

### 7. Waste Management:

#### 7.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

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Page 6

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Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi. 2020-20

#### 7.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste

#### 5. Rain Water Management:

The Rain Water from the terrace is used to recharge the bore well.

#### 9. Environment Friendly Initiatives:

- Well maintained Internal Tree Plantation.
- Creation of Awareness in respect of Energy Conservation by display of Posters

#### 10. Assumptions:

- 1. Energy Consumption is computed based on Load Utilization Factor.
- 2. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant 4 kWh/kWp per Day
- 4. Annual Solar Energy generation Days: 300 Nos

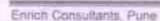
#### 11. References:

- For CO<sub>2</sub> Emission computation: www.tutapower.com
- For Solar PV Energy generation: www.solarrooflon.gov.in.
- For AQI Standards: www.cpcb.com

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Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2020-21

#### ABBREVIATIONS

kWh : kilo-Watt Hour

Qty : Quantity
MT : Metric Ton

CO<sub>2</sub> Garbon Di Oxide

LPD : Liters per Day
AQI : Air Quality Index

PM2.5 : Particulate Matter of Size 2.5 microns
PM 10 : Particulate Matter of Size 10 microns

CPC8 Central Pollution Control Board





# CHAPTER-I INTRODUCTION

#### 1.1. Important Definitions:

1.1.1Environment: Definition as per environment Protection Act; 1986

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

#### 1.1.2. Environmental Audit: Definition:

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

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

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

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

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

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

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

Enrich Consultants, Pune

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Page 9

PL/PW/EXI

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

# 245 / 2006

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

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

#### 1.2 Audit Methodology:

- 1. Study of present Resource Consumption & CO2 Emissions
- 2 Study of Usage of Renewable Energy
- 3 Study of Indoor Air Quality
- 4. Study of Waste Management
- 5. Study of Rain Water Management
- 6. Study of Environmental Friendly Initiatives.

#### 1.3 General Details of College: Table No: 4:

No	Head	Particulars	
Name Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vi Tambe Womens College of Education			
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409	
3	Year of Establishment	2005	

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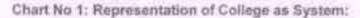


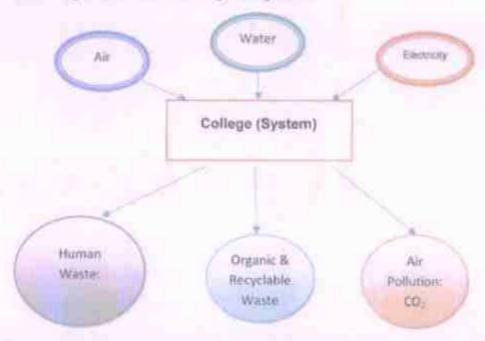
# CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO. EMISSION

The College consumes following Natural/derived Resources:

- 1. Air.
- Water
- Electrical Energy

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





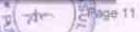
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here we compute the emissions of Carbon-Di-Oxide, by usage of Electrical Energy. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere.

Table No 5: Study of Energy Purchased & CO<sub>2</sub> Emission: 2020-21:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
4	Jul-20	767	0.69
2	Aug-20	119	0.11
3	Sep-20	120	0.11
4	Oct-20	99	0.09
5	Nov-20	113	0.10
6	Dec-20	125	0.11
7	Jan-21	135	0.12
8	Feb-21	198	0.18 NR

Enrich Consultants, Pune

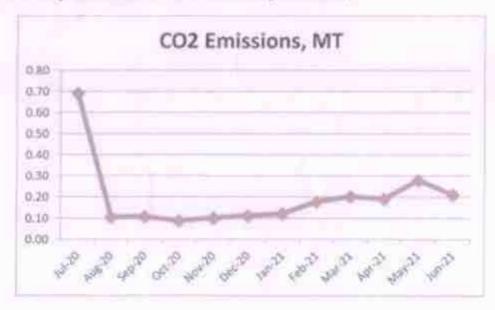
Villas Tarrele Union (1966)



9	Mar-21	225	0.20
10	Apr-21	212	0.19
11	May-21	309	0.28
12	Jun-21	235	0.21
13	Total	2657	2.39
14	Maximum.	767	0.69
15	Minimum	99	0.09
16	Average	221.42	0.20



#### Chart No 2: Representation of Month wise CO2 emissions:

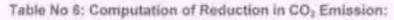


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# CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.

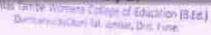


No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Plant Capacity	10	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	12000	kWh
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO;
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	10.8	MT

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









HUMBIG.



# CHAPTER IV STUDY OF INDOOR AIR QUALITY

#### 4.1 Importance of Air Quality:

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

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

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

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

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

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

#### 4.2 Air Quality Index:

An Air Quality Index (AQI) is a number used by government agencies to measure the air pollution levels and communicate it to the population.

We present herewith following important Parameters.

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

#### Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
310	Principal's Cabin	113	61	61
2	Admin Office	120	66	81
3	Faculty Room	110	53	80
4	Science Lab	108	62	79
5	Library	114	64	79
6	Method Room	121	68	81
	Maximum	121	68	81
	Minimum	106	62	79

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Page 14

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# CHAPTER VI STUDY OF WASTE MANAGEMENT

#### 6.1 Segregation of Waste at Source:

The College has good housekeeping practices. The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

#### Photograph of Waste Collection Bin:



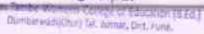
#### 6.2 Liquid Waste Management:

The College has installed a Septic Tank, for Disposal of Liquid Waste.

#### Photograph of Septic Tank:









#### CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

The Rain Water from the terrace is used to recharge the bore well.

Photograph of Rain Water Carrying Pipe:





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Page 16

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### CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1Tree Plantation in the Campus:

The College has landscaped Lawn and well maintained Tree Plantation in the campus Photograph of Tree Plantation:





8.2 Creation of Awareness about Energy Conservation: The College has displayed Posters on Importance of Energy Conservation. Photograph of Poster on Importance of Energy Conservation:





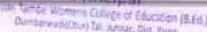
#### ANNEXURE-I: INDOOR AIR QUALITY STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
5	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +







#### **ENERGY AUDIT REPORT**

PU/PH/ILED 345 / 2006

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's

#### VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarward (Otur). Tat: Junnar, Dist. Pune 412 409



Year: 2021-22

Prepared by:

#### **ENGRESS SERVICES**

Yashashree, 26, Nirmal Bag Society
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: progress123@gmail.com



Vilas Tambre Womens College of Education (8.64.)
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# 245 / 2006

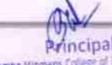
#### REGISTRATION CERTIFICATES



#### DEE AUDITOR CERTIFICATE



#### MEDA EMPANELMENT CERTIFICATE



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Energy Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2021-22.

#### **ENGRESS SERVICES**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: engress12360gmail.com

Ref: ES/VTWC0E/21-22/01



Date: 15/7/2022

#### CERTIFICATE

This is to certify that we have conducted an Energy Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal. Junnar, Dist. Puns 412 409, in the 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 Energy Conservation.

For Engress Services,

A Y Mehendale,

Certified Energy Auditor

EA-8192

Vitas Tembe Womens College of Education (B.Ed.)
Dumbarwadi Otari Na. Januar, Dia. Pana.



#### INDEX

Sr. No	Particulars	Page No
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III	Abbreviations	7.
1.	Introduction	8
2	Study of Connected Load	9
3	Study of Energy Consumption	10
4	Study of Carbon Foot Printing	51
5	Study of Usage of Alternate Energy	12
6	Study of Usage of LED Lighting	13





### PU/MI/B.ED 245 / 2005

#### ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Energy Audit of their Campus for the Year: 2021-22

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



Villa: Tambe Womens College of Education (B.Ed.) Dumberway (Dur) 14: Juntary, Dist. Purps





#### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shikshan Proserak Mandal's Vitas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

#### 2. Present Energy Consumption & CO2 Emission:

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Total	3018	2.72
2	Maximum	369	0.33
3	Minimum	112	0.10
4	Average.	251.50	0.23

#### 3. Various Messures Adopted for Energy Conservation:

- 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 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 21-22 is 12000 kWh.
- Energy purchased from MSEDCL in 21-22 is 3018 kWh
- Total Energy Consumption in 21-22 is 15018 kWh
- % of Renewable Energy to Annual Energy Demand is 80 %

#### 5. Usage of LED Lighting:

- The Total LED Lighting Load is 1.884 kW.
- . The Total Lighting Load is 1.884 kW.
- The % of LEDs to Total Lighting Load is 100 %.

#### 6. Assumptions:

- 1. Energy Consumption is computed based on Load Utilization Factor
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
- 4. Annual Solar Energy generation Days: 300 Nos

#### 7. References:

- For CO<sub>2</sub> Emissions, www.lifepower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in



Ourbarwadu(Char) Tal. sansar, Dist. Piece.



#### ABBREVIATIONS

PU/MI/ILED 245 / 2005

AC I Air conditioner

MSEDCL : Maharashtra Electricity Distribution Company Limited

LED Light Emitting Diode

kWh kilo-Watt Hour

Qty Quantity

W : Watt

kW : Kilo Watt

PC Personal Computer

MT Metric Ton



Villas Tambe Womens Collège of Education (B.Ed.) Demparkadi (Char) Tel. January, Dist. Plane.



#### CHAPTER-I INTRODUCTION

## PU/PH/BLED 245 / 2006

#### 1.1 Objectives:

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

#### 1.2 Table No1: General Details of College:

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3	Year of Establishment	2005

#### 1.3 Google Earth Location Image:



College Campus

Principal

Vilas Tambe Womens College of Educación (E.Ed.)

Dumbarwadi@buri las. burnar, Oxe. Pure.

Engress Services, Pune

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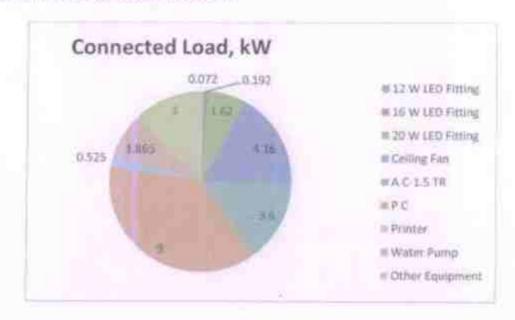
#### CHAPTER-II STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load, W/unit	Load, kW
1	12 W LED Fitting	8	12	0.072
2	16 W LED Fitting	12	16	0.192
3	20 W LED Fitting	81	20	1.62
4	Celling Fan	64	65	4.16
5	A C-1.5 TR	2	1800	3.6
6	PC	60	150	9
7	Printer	3	175	0.525
В	Water Pump	1	1865	1.865
9	Other Equipment	12	250	3
10	Total			24.03

Chart No 1: Details of Connected Load:



Vilas Tambe Womens College of Education (B.Ed.)



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#### CHAPTER-III STUDY OF ENERGY CONSUMPTION

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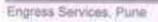
In this chapter, we present the analysis of Electricity Energy Consumption Table No 3: Electrical Energy Purchase Analysis - 2021-22:

No	Month	Energy Purchased, kWh
4	Jul-21	475
2	Aug-21	539
3	Sep-21	812
4	Oct-21	696
5.	Nov-21	739
6	Dec-21	830
7	Jan-22	712
8	Feb-22	635
9	Mar-22	598
10	Apr-22	698
11	May-22	709
12	Jun-22	819
13.	Total	8062
14 Maximum 830		830
15	Minimum	475
16	Average	671.83

Chart No 2: To study the variation of Month wise Energy Purchased, kWh:



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#### CHAPTER-IV STUDY OF CARBON FOOT PRINTING

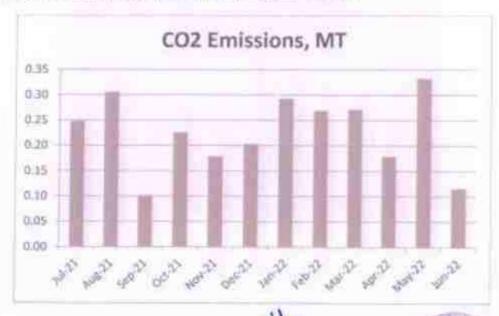
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

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

Table No 4: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO, Emissions, MT
4	Jul-21	275	0.25
2	Aug-21	339	0.31
3	Sep-21	112	0.10
4	Oct-21	250	0.23
5	Nov-21	198	0.18
6	Dec-21	225	0.20
7	Jan-22	325	0.29
8	Feb-22	298	0.27
9	Mar-22	301	0.27
10	Apr-22	198	0.18
11	May-22	369	0.33
12	Jun-22	128	0.12
13	Total	3018	2.72
14	Maximum	369	0.33
15	Minimum	112	0.10
16	Average	251.50	0.23

Chart No 3: Representation of Month wise CO2 emissions:



Engrass Services, Pune

Vilas Tambe Womens College of Education (B.Ed.)
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#### 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 5: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Annual Energy Purchased	3018	kWh/Annum
2	Installed Capacity of Solar PV Plant	10	kWp
3	Average Energy Generated by Solar PV Plant	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Total Solar Energy Generated=2*3*4	12000	83/91
6	Total Energy Demand= (1)+(5)	15018	kWh
7	% of Alternate Energy to Annual Requirement = (5)*100/(6)	80	%

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



"Ilin Tambe Women's College of Education (8.Ed.)

Dumbarwad (Otar) Tal, James, Crist, Parke.



#### CHAPTER VI STUDY OF USAGE OF LED LIGHTING



in the following Table, we present the percentage of Total Lighting load met by LED lights.

Table No 6: Computation of Percent Usage of LEDs to Total Lighting Load:

No	Particulars	Value	Unit
4	No of 12 W LED Fittings	ő	Nos
2	Load of 12 W LED Fitting	12	W/unit
3	Total Load of 12 W LED Fittings	0.072	RVV
4	No of 16 W LED Fittings	12	Nos.
5	Load of 16 W LED Fitting	16	W/unit
6	Total Load of 16 W LED Fittings	0.192	kW
7	No of 20 W LED Fittings	81	Nos
8	Load of 20 W LED Fitting	20	W/unit
9	Total Load of 20 W LED Fittings	1.62	kVV
10	Total LED Lighting Load=3+6+9	1.884	kvv
11	Total Lighting Load=3+6+9	1.884	kvv
12	% of LED to Total Lighting Load=10*100/11	100	%



Vilas Tombe Women's College of Education (R.Ed.)



#### **GREEN AUDIT REPORT**



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Shri Gajanan Maharaj Shikshan Prasarak Mandal's

#### VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarwadi (Ofur), Tal: Junnar, Dist. Pune 412 409



Year: 2021-22

Prepared by

#### **ENGRESS SERVICES**

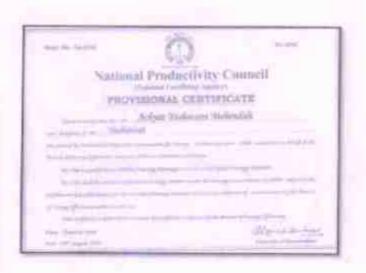
Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411009 Phone. 09890444795 Email: engrees 123 Sturnal com



Villas Tambe Womens College of Education (9.Ed.) Demographic Tel. Benner, Con. Pune.

#### REGISTRATION CERTIFICATES







#### BEE AUDITOR CERTIFICATE

#### MEDA EMPANELMENT CERTIFICATE



ASSOCHAM GEM CP CERTIFICATE



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Page 2

Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2021-22.

#### **ENGRESS SERVICES**

Yashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: engress 123 @gmail.com

Ref. ES/VTWCOE/21-22/02



Date: 15/7/2022

#### CERTIFICATE

This is to certify that we have conducted Green Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal Junnar, Dist: Pune 412 409, in the Year 2021-22

The College has adopted following Green & Sustainable 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
- Segregation of Waste at source
- Provision of Bio Composting Bed, for conversion of Organic Waste.
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Provision of Septic Tank, for liquid Waste Management
- Implementation of Rain Water Management Project
- Good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Creation of Awareness in respect of 3 R's: Reduce, Reuse and Recycle

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

For Engress Services,

Mahandele

A Y Mehendale,

Cartified Energy Auditor, EA-8192

ASSOCHAM GEM Certified Professional: GEM: 22/788

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Engress Services, Pune

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3	Study of Carbon Foot Printing	117
4.	Study of Usage of Renewable Energy	12
5	Study of Waste Management	13
f)	Study of Rain Water Management	15
7	Study of Green & Innovative Practices	16



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#### ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere grafitude to the management of Shin Gajanan Maharaj Shikshan Prasarak Mandai's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409, for awarding us the assignment of Green Audit of their Campus for the Year: 2021-22.

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

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#### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

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

No	Parameter /Value	Energy Purchased, kWh	CO <sub>2</sub> Emissions MT
1	Total	3018	2.72
2	Maximum	369	0.33
3	Minimum	112	0.10
4	Average	251.50	0.23

#### 3. Various Measures Adopted for Energy Conservation:

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

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

- The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 21-22 is 12000 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 21-22 is 10.8 MT.

#### 5. Waste Management:

#### 5.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

#### 5.2 Organic Waste Management:

The College has installed a Bio Composting Bed, for conversion of Organic Waste

#### 5.3 Sanitary Waste Management:

The College has installed a Sanitary Waste Incinerator to dispose of the Sanitary Waste.

#### 5.4 Liquid Waste Management:

For Liquid Waste, the College has installed a Septic Tank and is cleaned periodically.

#### 6. Rain Water Management:

The Rain Water from the terrace is collected through Pipes and is used to recharge the bore well.

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#### 7. Green & Sustainable Practices:

- · Well maintained internal road
- . Well maintained Internal Tree Plantation.
- Provision of Ramp for Divyangajan
- Creation of Awareness in respect of 3 R's. Reduce, Reuse and Recycle.

#### 8. Assumptions:

- 1. Energy Consumption is computed based on Load Utilization Factor
- 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- 3. Energy generated by Roof Top Solar PV Plant. 4 kWh/kWp per Day
- Annual Solar Energy generation Days: 300 Nos

#### 9. References:

- For CO<sub>2</sub> Emissions: www.tstapower.com
- For Solar PV Energy generation: www.solarronfloo.gov.in

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Green Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi 2021-22

#### ABBREVIATIONS

PUPPLY DED

LED Light Emitting Diode

kWh kilo-Watt Hour

Qty Quantity

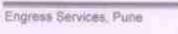
W : Watt

kW Kilo Watt

MT Metric Ton

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Wiles Tambe Women's College of Education (B.Ed.)





#### CHAPTER-I INTRODUCTION

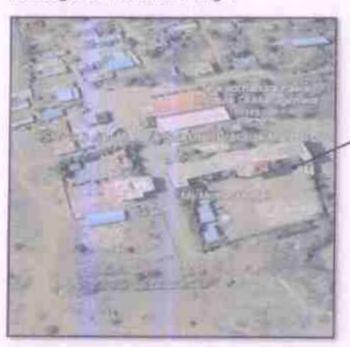
#### 1.1 Objectives:

- To study present level of Energy Consumption
- 2 To Study the present CO2 emissions
- 3. To study Scope for usage of Renewable Energy
- 4. To study Waste Management:
- 5. To study Rain Water Management
- 6: To study Green & Sustainable Practices.

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

No	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tat. Junnar, Dist. Pune 412 409
3	Year of Establishment	2005

#### 1.3 Google Earth Location Image:



College Campus

Villas Taimbe Womens College of Education (B.S.

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#### CHAPTER-II STUDY OF ENERGY CONSUMPTION

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In this chapter, we present the analysis of Electricity Energy Consumption Table No 2: Electrical Energy Purchase Analysis- 2021-22:

No	Month	Energy Purchased, kWh 475		
1	Jul-21			
2	Aug-21 539			
- 3	Sep-21	612		
4	Oct-21	696		
5	Nov-21	739		
6	Dec-21	830		
7	Jan-22	712		
8	Feb-22 635			
9	Mar-22	598		
10	Apr-22	698		
31	May-22 709			
12	2 Jun-22 819			
13	Total	8062		
14	Maximum	m 830		
15	Minimum	475		
16 Average		671.83		

Chart No 1: To study the variation of Month wise Energy Purchased, kWh:



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#### CHAPTER-III STUDY OF CARBON FOOT PRINTING



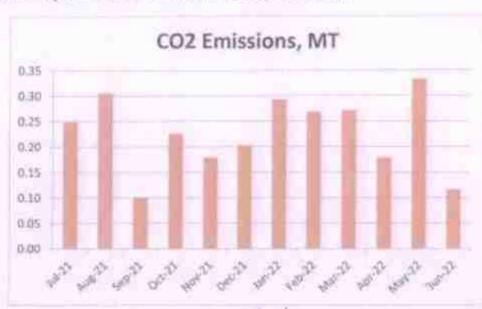
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO<sub>2</sub> Emissions:

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

Table No 3: Month wise CO2 Emissions:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT 0.25	
1	Jul-21	275		
2	Aug-21	339	0.31	
3	Sep-21	112	0.10	
4	Oct-21	250	0.23	
5	Nov-21	198	0.18	
6	Dec-21	225	0.20	
7	Jan-22	325	0.29	
8	Feb-22	298	0.27	
9	Mnr-22	301	0.27	
10	Apr-22	198	0.18	
11	May-22	369	0.33	
12	Jun-22	128	0.12	
13	Total	3018	2.72	
14	Maximum	369	0.33	
15	Minimum.	112	0.10	
16	Average	251.50	0.23	

Chart No 2: Representation of Month wise CO2 emissions:



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

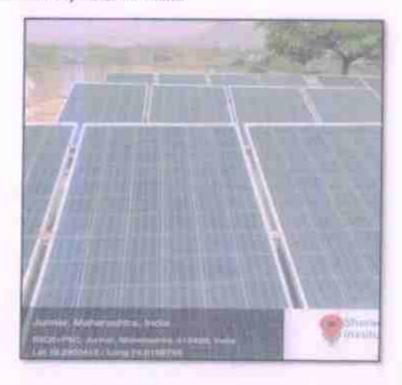
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The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.

Table No 4: Computation of Reduction in CO, Emission:

No:	Particulars	Value	Unit	
1	Installed Roof Top Solar PV Plant Capacity	10	kWp	
2	Average Daily Energy Generated	4	kWh/kWp	
3	Annual Generation Days	300	Nos	
4	Annual Solar Energy Generated	12000	KWh:	
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO	
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	10.8	MT	

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







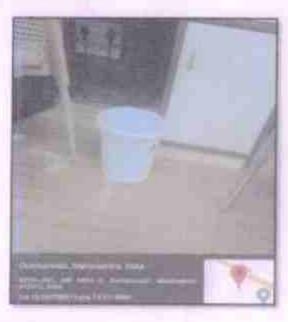


#### CHAPTER V STUDY OF WASTE MANAGEMENT

#### 5.1 Segregation of Waste at Source:

The Waste is segregated at source. Waste collection Bins are placed at strategic locations.

Photograph of Waste Collection Bin:



#### 5.2 Organic Waste Management:

The College has made provision of a Bio Composting Bed, for conversion of Organic Waste.

#### Photograph of Bio Composting Bed:









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#### 5.3 Sanitary Waste Management:

The College has installed a Sanitary Waste Incinerator to dispose of the Sanitary Waste.

#### Photograph of Sanitary Waste Incinerator:





#### 5.4 Liquid Waste Management:

For Liquid Waste, the College has installed a Septic Tank and is cleaned periodically

#### Photograph of Septic Tank:





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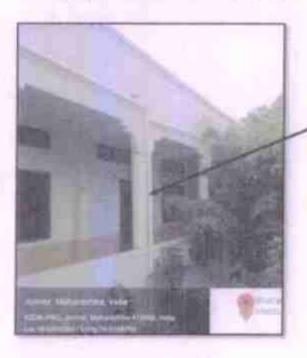


#### CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

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The Rain Water from the terrace is collected through Pipes and is used to recharge the bore well.

Photograph of Rain Water Carrying Pipe:



Rain Water Carrying Piper

Bore well recharge point:



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#### CHAPTER-VII STUDY OF GREEN & SUSTAINABLE PRACTICES

## PU/PN/ILED 245 / 2005

#### 7.1 Pedestrian Friendly Internal Road:

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

Photograph of Internal Road:



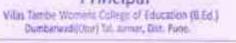
#### 7.2 Internal Tree Plantation:

The College has well maintained Tree Plantation in the campus.

Photograph of Internal Tree Plantation:









#### 7.3 Provision of Ramp for Divyangajan:

The College has made provision of Ramp for easy movement of Divyangajan. Photograph of Ramp:

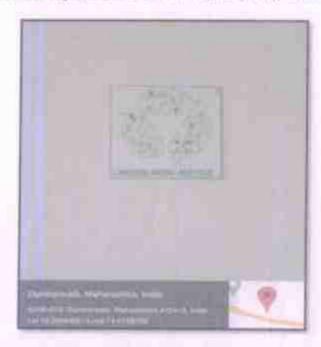


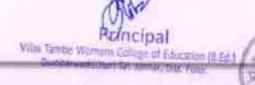


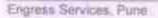
#### 7.4 Creation of Awareness about 3 R's; Reduce, Reuse and Recycle:

The College has displayed Posters on Importance of 3 R's, namely Reduce, Reuse and Recycle.

Photograph of Poster on importance of 3 R's: Reduce, Reuse and Recycle:







#### **ENVIRONMENTAL AUDIT REPORT**

ol

Shri Gajenan Maharaj Shikshan Prasarak Mandal's

#### VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbarwadi (Otor), Tal. Junnar, Dist. Pune 412 409



Year: 2021-22

Prepared by

#### **ENGRESS SERVICES**

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



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Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2021-23

PU/PN/BLED 245 / 2006

#### REGISTRATION CERTIFICATES





#### BEE AUDITOR CERTIFICATE

#### MEDA EMPANELMENT CERTIFICATE



#### ASSOCHAM GEM CP CERTIFICATE



Vilas Tambe Womens College of Education (6 5d.)

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Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2021-22

#### **ENGRESS SERVICES**

Vashashree, 26, Nirmal Bag Society, Near Muktangan English School, Parvati, Pune 411 009 Tel: 09890444795 Email: engress 12363 email cons PU/PN/D.ED 245 / 2006

Ref. ES/VTWCOE/21-22/03

Date: 15/7/2022

#### CERTIFICATE

This is to certify that we have conducted Environmental Audit at Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbanwadi (Otur), Tal: Junnar, Dist. Pune 412 409, in the Year 2021-22

The College has adopted following Environment Friendly 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
- Segregation of Waste at source
- Provision of Bio Composting Bed, for conversion of Organic Waste
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Provision of Septic Tank, for liquid Waste Management
- Implementation of Rain Water Management Project
- Internal Tree Plantation
- Creation of Awareness in respect of 3 R's. Reduce, Reuse and Recycle.

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

For Engress Services,

A Y Mehendale,

Certified Energy Auditor, EA-8192

Michaeld

ASSOCHAM GEM Certified Professional: GEM: 22/788

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Villas Tombe Womens College of Education (B.Ed.) Dumparwasi(Dtur) Int. Junior, Dat. Russ

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Sr. No	Particulars	Page No
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3	Study of Usage of Renewable Energy	14
4	Study of Indoor Air Quality	15
5	Study of Indoor Comfort Condition	16
6	Study of Waste Management	17
7	Study of Rain Water Management	19
8	Study of Environment Friendly Initiatives	20
	Annexure	
F	Indoor Air Quality, Noise & Indoor Comfort Standards	21







Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi: 2021-22

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### ACKNOWLEDGEMENT

We Engress Services. Pune, express our sincere gratitude to the management Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist. Pune 412 409, for awarding us the assignment of Environmental Audit of their Campus for the Year: 2021-22.

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

Vilas Tambe Womens Cellings of Education (B.Ed.)

Dumbarwads(Char) Tal. Annuar, Dist. Pure.

### EXECUTIVE SUMMARY

 Shri Gajanan Maharaj Shiirshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409 consumes Energy in the form of Electrical Energy; used for various Electrical Equipment.

### 2. Pollution caused due to College Activities:

- Air pollution: Mainly CO<sub>2</sub> on account of Electricity Consumption
- Solid Waste: Bio degradable Garden Waste, Recyclable Waste and Human Waste
- Liquid Waste: Human liquid waste

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

No	Parameter/ Value	Energy Purchased, kWh	CO <sub>2</sub> emissions, MT
. 1.	Total	3018	2.72
2	Maximum	369	0.33
3	Minimum.	112	0.10
4	Average	251.50	0.23

### 4. Projects implemented for Environmental Conservation:

- Usage of Energy efficient LED fittings
- Installation of 10 kWp Roof Top Solar PV Plant
- Provision of Bio Composting Bed & Sanitary Waste Incinerator

#### 5. Usage of Renewable Energy & Reduction in CO, Emissions:

- The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 21-22 is 12000 kWh
- Reduction in CO<sub>2</sub> Emissions by usage of Solar Energy in 21-22 is 10.8 MT.

#### 6. Indoor Air Chality:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	70	42	49
2	Minimum	60	32	37

#### 7. Indoor Comfort Condition Parameters:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux	Noise Level, dB
3	Maximum	26.5	60	147	45
2	Minimum	26.3	59	117 -	42

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74/714/0.EL 245 / 2006 Environmental Audit Report: Vilas Tambe Womans College of Education, Dumbarwadi: 2021-22.

### 8. Wasto Management:

### 8.1 Segregation of Waste at Source:

The waste is segregated at the source. There are Waste Collection Bins at various locations, to collect the Waste.

#### 8.2 Organic Waste Management:

The College has installed a Bio Composting Bed, for conversion of Organic Waste

### 8.3 Sanitary Waste Management:

The College has installed a Sanitary Waste Incinerator to dispose of the Sanitary Waste.

### 8.4 Liquid Waxte Management:

For Liquid Waste, the College has installed a Septic Tank and is cleaned periodically.

#### 9. Rain Water Management:

The Rain Water from the terrace is collected through Pipes and is used to recharge the bore well.

### 10. Environment Friendly Initiatives:

- Internal Tree Plantation
- Creation of Awareness in respect of 3 R's: Reduce, Reuse and Recycle

#### 11. Assumptions:

- 1. Energy Consumption is computed based on Load Utilization Factor
- 2. 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere
- Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day.
- 4. Annual Solar Energy generation Days: 300 Nos

#### 12. References:

- For CO<sub>2</sub> Emission computation: www.talapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.io
- For Various Indoor Air Parameters: www.isfirme.com
- For AQI Standards: www.cocb.com

Villas Tambe Womens College of Education (B.Ed.) Dumbarward (Otar) Tal. Januar, Okt. Plane.



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## ABBREVIATIONS

kWh : kilo-Watt Hour

Qty : Quantity MT : Metric Ton

CO<sub>2</sub> : Carbon Di Oxide
LPD : Liters per Day
AQI : Air Quality Index

PM2.5 Particulate Matter of Size 2.5 microns
PM 10 Particulate Matter of Size 10 microns

CPCB Central Pollution Control Board

ISHARE : The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

Principal
Vilas Tumbe Women's College of Education (B.Ed.)
Company College of Education (B.Ed.)



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## CHAPTER-I INTRODUCTION

# PU/991/3.5D 245 / 2006

### 1.1. Important Definitions:

### 1.1.1 Environment: Definition as per environment Protection Act: 1986

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

#### 1.1.2. Environmental Audit: Definition:

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

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

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

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

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

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

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

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Page 9

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



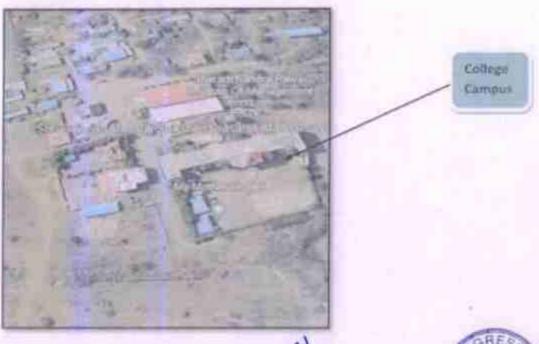
## 1.1.6 National Environmental Plans & Policy Documents: Table No-3:

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

## 1.2 Audit Methodology:

- 1. Study of present Resource Consumption & CO2 Emissions
- 2 Study of Usage of Renewable Energy
- 3. Study of Indoor Air Quality.
- 4. Study of Indoor Comfort Conditions
- 5. Study of Waste Management
- 6. Study of Rain Water Management
- 7. Study of Environmental Friendly Initiatives.

## 1.3 Google Earth Location Image:



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Vilus Tambe Womens College of Education (B.Ed.)

Dumbatward Charle Sel. James, Dist. Pune.



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PU/PN/3.ED 345 / 2005

## 1.3 General Details of College; Table No: 4:

No:	Head	Particulars
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address.	A/P Dumbarwadi (Otur), Tal. Junnar, Dist. Pune 412 409
3	Year of Establishment	2005

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## CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO. EMISSION

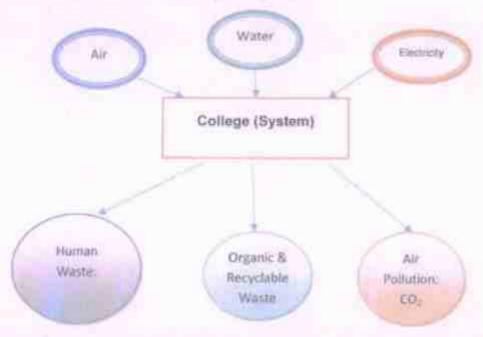
PU/PN/BUED 225 / 2006 3

The College consumes following Natural/derived Resources.

- 1. Air
- Water
- Electrical Energy

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

### Chart No 1: Representation of College as System:



A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Here we compute the emissions of Carbon-Di-Oxide, by usage of Electrical Energy. The basis of Calculation for CO<sub>2</sub> emissions due to Electrical Energy is 1 kWh of Electrical Energy releases 0.9 Kg of CO<sub>2</sub> into atmosphere.

Table No 5: Study of Energy Purchased & CO2 Emission: 2021-22:

No	Month	Energy Purchased, kWh	CO <sub>2</sub> Emissions, MT
1	Jul-21	275	0.25
2	Aug-21	339	0.31
3	Sep-21	112	0.10
4	Oct-21	250	0.23
5	Nov-21	198	0.18
6	Dec-21	225	0.20
7	Jan-22	325	0.29
8	Feb-22	298	0.27

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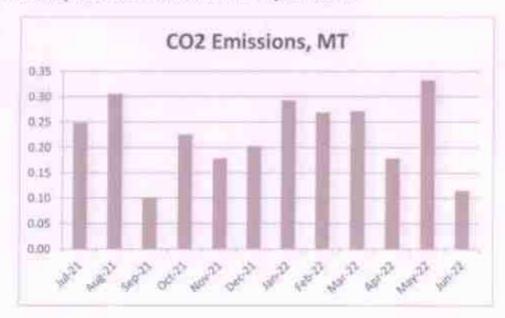
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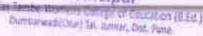
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9	Mar-22	301	0.27
10	Apr-22	198	0.18
11	May-22	369	0.33
12	Jun-22	128	0.12
13	Total	3018	2.72
14	Maximum	369	0.33
15	Minimum	112	0.10
16	Average	251.50	0.23

Chart No 2: Representation of Month wise CO2 emissions:









## PU/MI/B.ED 245 / 2006

## CHAPTER-III STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed Roof Top Solar PV Plant of Capacity 10 kWp We now calculate the reduction in CO<sub>2</sub> Emission due to Solar PV Plant.

Table No 6: Computation of Reduction in CO2 Emission:

No	Particulars	Value	Unit
30	Installed Roof Top Solar PV Plant Capacity	10	kWp
2	Average Daily Energy Generated	4	kWh/kWp
3	Annual Generation Days	300	Nos
4	Annual Solar Energy Generated	12000	kWh
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO
6	Annual Reduction in CO <sub>2</sub> Emission = (4) * (5) /1000	10.8	MT

## Photograph of Roof Top Solar PV Plant:







## CHAPTER IV STUDY OF INDOOR AIR QUALITY

## PU/PH/ILED 245 / 2006

### 4.1 Importance of Air Quality:

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

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

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

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

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

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

### 4.2 Air Quality Index:

An Air Quality Index (AQI) is a number used by government agencies to measure the air pollution levels and communicate it to the population.

We present herewith following important Parameters.

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

### Table No 7: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
1	Meeting Room	61	37	38
2	Language Lab	63	38	42
3	Classroom-2	70	42	49
4	Method Room-3	60	36	37
5	Sports Room	65	39	46
6	Tutorial Room	60	32	40
	Maximum	70	42	49
	Minimum:	60	32	37







## CHAPTER V STUDY OF INDOOR COMFORT CONDITION PARAMETERS

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

The Parameters include:

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

## Table No 8: Study of Indoor Comfort Parameters:

No	Location	Temperature, 0C	Humidity,	Lux Level	Noise Level, dB
1	Meeting Room	26.3	60	123	45
2	Language Lab	26.3	60	119	42
3	Classroom-2	26.4	59	123	43
4	Method Room-3	26.4	59	147	45
5	Sports Room	26.5	60	123	:44
6	Tutorial Room	26.5	60	117	44.3
	Maximum	26,5	60	147	45
	Minimum	26.3	59	117	42

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Visio Tambe Womens College of Education (6 Ed.)

Environmental Audit Report: Vilas Tambe Womens College of Education, Dumbarwadi 2021-22

## 6.3 Sanitary Waste Management:

The College has installed a Sanitary Waste Incinerator to dispose of the Sanitary Waste.

## Photograph of Sanitary Waste Incinerator:



### 6.4 Liquid Waste Management:

For Liquid Waste, the College has installed a Septic Tank and is cleaned periodically.

## Photograph of Septic Tank:







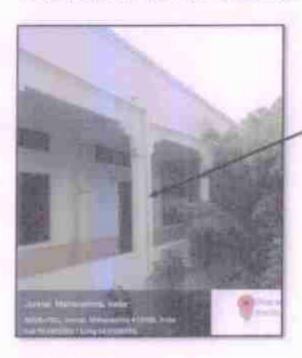
245 / 2006

## CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

PU/PN/A.FE 245 / 2006

The Rain Water from the terrace is collected through Pipes and is used to recharge the bore well.

## Photograph of Rain Water Carrying Pipe:



RINK Water Carryong Pape

## Bore well recharge point:



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## CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY PRACTICES

PU/PM/B.EC 245/2009

## 8.1Tree Plantation in the Campus:

The College has landscaped Lawn and well maintained Tree Plantation in the campus. Photograph of Tree Plantation:



## 8.2 Creation of Awareness about 3 R's: Reduce, Reuse and Recycle:

The College has displayed Posters on Importance of 3 R's, namely Reduce, Reuse and Recycle.

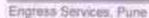
Photograph of Poster on importance of 3 R's: Reduce, Reuse and Recycle:

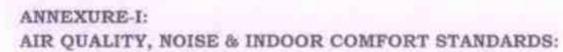














## 1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

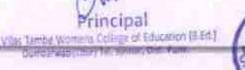
No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

### 2. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	.55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

## 3. Thermal Comfort Conditions: For Non-conditioned Buildings:

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









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7.1 Institutional Values and Social Responsibilities

## 7.1.1 Institution has a stated energy policy streamlining ways of energy conservation, use of alternate sources of energy for meeting its power requirements

Saving Energy-



The infrastructure of the institute building has adopted passive design principles. The college building is constructed parallel to the south- north directions which results in abundant light and thus energy is saved.

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#### # SAVING ENERGY POLICY STICKER-





Dumbarwadi, Maharashtra, India 62R8+396, Dumbarwadi, Maharashtra 412412, India Lat 19.240353° Long 74.015852°

31/10/23 11:43 AM GMT +05:30



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💹 GPS Map Camera





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Solar Panel –



The Institute has carefully considered its specific needs and goals when planning solar panel installations on the campus. It's a long term investment with environmental, financial and educational benefits.



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## Solar panel-Bill





Principal

Principal

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Generator-



Generator is a critical part of institution's infrastructure, providing resilience and reliability in the face of power disruptions. Institute is carefully planning, maintaining, and managing its generator to ensure it is serving its intended purpose effectively.

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LED Lamps-



The institute is increasingly adopting LED lighting as a cost- effective and sustainable solution to illuminate its campus while simultaneously improving the quality of lighting and contributing to its environmental and financial goals.



(Day

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#### Master Switches-



The master switch in institutional campus plays a crucial role in ensuring the efficient and secure operation of various systems and services, contributing to the well-being of the campus community and the effective use of resources.



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Principal

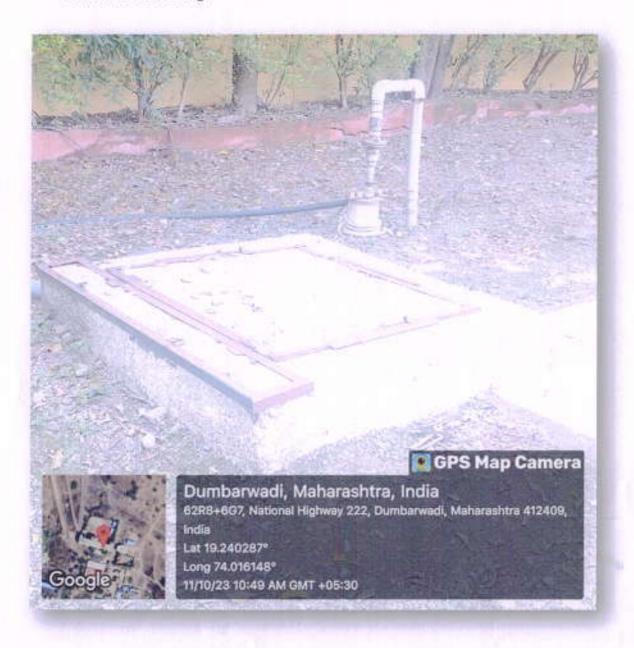
Villas Tambe Womens College of Education (8 Ed.) Dumbarwed (Ctur) Tall Junnar, Dist. Pune.





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Rain water harvesting-



Rainwater harvesting is an effective and sustainable way for Institute to manage water resources, reduce costs and promote environmental responsibility. It's an excellent example of how educational institution can lead by example in sustainable practices.



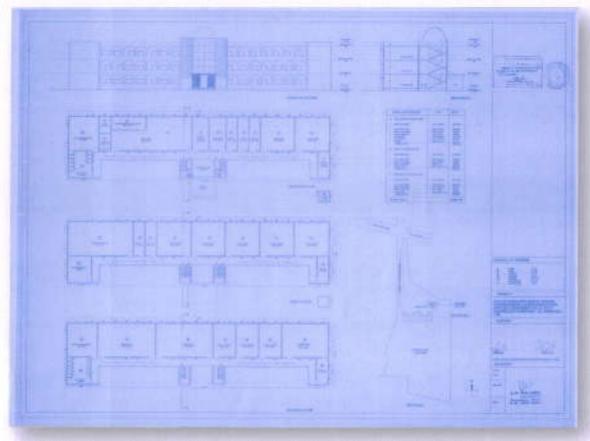
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Map-



The college campus map is an essential tool for students, staff, and visitors, providing valuable information about the layout and resources available on campus. A well-designed campus map is an indispensable resource for all members of the college community and visitors, ensuring efficient navigation, safety, and a positive experience on campus.

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#### Borewell-



Borewell on institution campus play a vital role in water supply and sustainability efforts. Borewell is an essential component of Institution campuse, ensuring a reliable and sustainable water source for various needs, promoting environmental responsibility, and contributing to cost savings in water management.



Object

Principal
Vilas Tambe When - College of Education (B.Ed.)
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### Compost Pit-



Compost pits on college campus serve as eco-friendly solutions for waste reduction and soil enrichment. They promote sustainability, educate the campus community about environmental responsibility, and produce valuable compost for use in landscaping and gardening projects.



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Vermicompost –



## What is Vermicomposting?

- The raising and production of earthworms and harvesting worm castings
- Using worms to decompose organic food waste, turning the waste into a nutrient-rich material capable of supplying necessary nutrients to help sustain plant growth.
- Vermicompost is similar to regular compost, except that worms take part in the composting process.





Principal

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Invoice Number: AB200913/2022/202806HO

Invoice Date: 07/01/2022 03:08:59

Sr. No	Product Name	Unit Price	Oty	Tax Rate	Tax Type	Tax Amount	Total Amount
1	Mipatax HDPE Organic Vermi Compost Bed, 8ft x 4ft x 2ft (Green), High Quality Material - 1 No (250 GSM)	Rs. 1,230.50	2.00	9%. 9%	SGST	221.50 221.50	Rs. 2904.00
TOTAL						Rs. 2904.00 v	

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Ban on Use of Plastic-





Dumbarwadi, Mahareshtra, India 8288+398, Dumbarwadi, Maharashtra 412412, India Lat 19.240353\* Long 74.015953\* 21/10/23 11:36 AM (MIT+05:30



The ban of plastics on college campuses is a proactive step toward addressing plastic pollution and fostering a culture of sustainability.



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