

ENERGY AUDIT REPORT



of
Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

W.Ed. Dumberwad (Dist. Junnar), Tal. Junnar, Dist. Pune 412 406.

Year: 2017-18

Prepared by:

ENRICH CONSULTANTS

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




Principal

Vilas Tambe Women's College of Education (W.Ed.)
Dumberwad (Dist. Junnar), Tal. Junnar, Dist. Pune.

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
Near Mukangan English School, Parvati, Pune 411 009
Tel: 09890444795 E-mail: enrichcont@gmail.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 Mandali's Vilas Tambe Womens College of Education, A/P Dumberwadi (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,

A Y Mehendale,
Certified Energy Auditor
EA-8192



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otur) Tal. Junnar, Dist. Pune.



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Principal

Vilas Tambe Womens College of Education (W.E.C.E.)
Dumberwad (Dist. Tal. Junnar, Dist. Pune)





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 Dumberwadi (Qur), 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.

4-08


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi(Qur) Tal: Junnar, Dist: Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Otar), 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 ₂ Emissions, MT
1	Total	5351	4.28
2	Maximum	898	0.58
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
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ 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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otar) Tal: Junnar, Dist: Pune





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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Dist) Tal. Anwar, Dist. Pune





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
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumberwad (Otur), Tal: Junnar, Dist: Pune-412 409
3	Year of Establishment	2005


Principal

Vilas Tambe Womens College of Education
Dumberwad (Otur) Tal: Junnar, Dist: Pune.





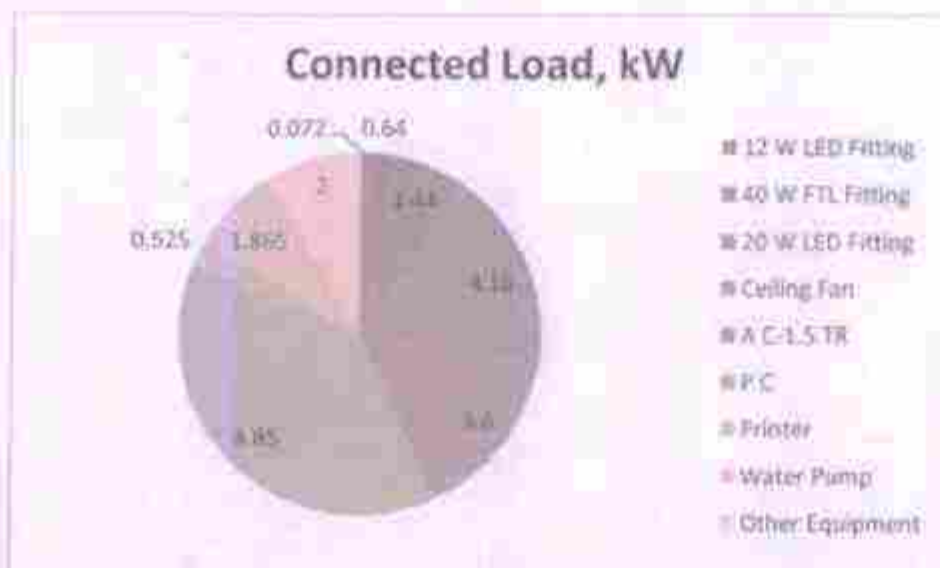
CHAPTER-II STUDY OF CONNECTED LOAD

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	P C	59	150	8.85
7	Printer	3	175	0.525
8	Water Pump	1	1885	1.885
9	Other Equipment	8	250	2
10	Total			23.15

Chart No 1: Details of Connected Load:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad (Dist) Tal. Amravati, Dist. Pune.





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	288
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:



(Signature)
Principal

Vilas Tambe Womens College of Education (W.Ed)
Dumberwad (Dist. Pune)





CHAPTER-IV STUDY OF CARBON FOOT PRINTING

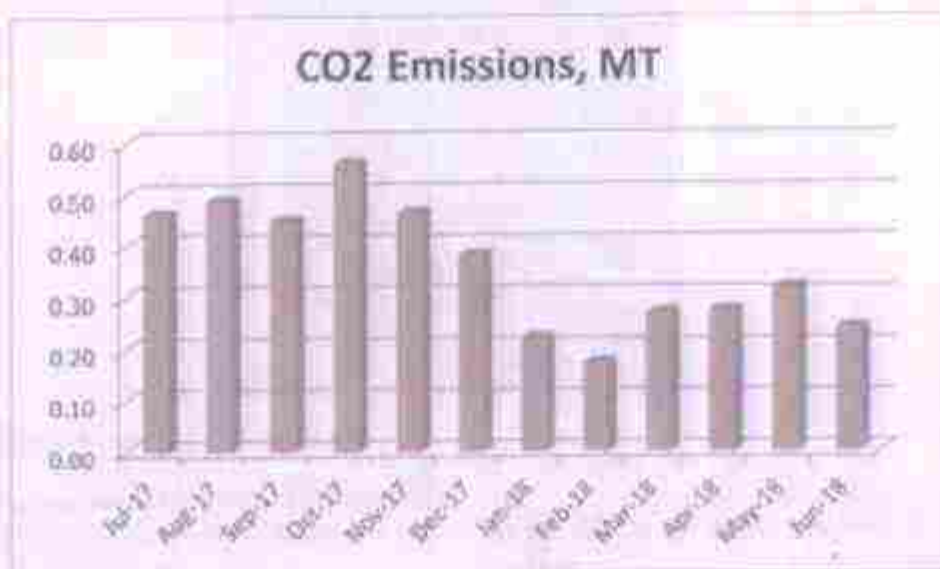
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO₂ Emissions:**

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 ₂ Emissions, MT
1	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	305	0.32
12	Jun-18	298	0.24
13	Total	5351	4.28
14	Maximum	696	0.56
15	Minimum	215	0.17
16	Average	445.92	0.36

Chart No 3: Representation of Month wise CO₂ emissions:



[Signature]
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.

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

No	Particulars	Value	Unit
1	Annual Energy Purchased	6351	kWh/Annurn
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= $2 \times 3 \times 4$	7200	kWh
6	Total Energy Demand= (1)+(5)	12551	kWh
7	% of Alternate Energy to Annual Requirement = $(5) \times 100 / (6)$	57.37	%

Photograph of Roof Top Solar PV Plant:




Principal

Vilas Tambe Womens College of Education (U.G.)
Dumburwadi, Pune - 411 004





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	18	Nos
2	Load of 40 W FTL Fitting	40	W/unit
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= $10 \times 100 / 11$	69.58	%


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad/Dunt Tal. Laxar, Dist. Pune.



GREEN AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

AP Dumberwad (Otur), Tal: Junnar, Dist: Pune-412 409



Year: 2017-18

Prepared by

ENRICH CONSULTANTS

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




Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwad(Otur) Tal: Junnar, Dist: Pune.



REGISTRATION CERTIFICATES



BEE AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

(Signature)
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbawadi, Pune





Enrich Consultants

Yashashree, 26, Nimai Bag Society,
Near Muktagan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichsonline@gmail.com

Ref: EC/VTWCDE/17-18/02

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 (Old), 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,

A Y Mohendale,
Certified Energy Auditor,
EA-8192



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Old) Tal: Junnar, Dist: Pune.



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Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwadi (Dist) Tal. Junner, Dist. Pune.





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.


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Otur) Tal. Junnar, Dist. Pune.





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 & CO₂ Emission:

No	Parameter /Value	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	5351	4.28
2	Maximum	698	0.56
3	Minimum	216	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 CO₂ 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.

6. 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. 1 kWh of Electrical Energy releases 6.9 Kg of CO₂ into atmosphere
2. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
3. Annual Solar Energy generation Days: 180 Nos

9. Reference:

- For Solar PV Energy generation: www.solarcelloffice.gov.in



ABBREVIATIONS

- 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.)
Dumberwadi (Dist. Tal. Junnar, Dist. Pune)





CHAPTER-I INTRODUCTION

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


Principal

Vilas Tambe Womens College of Education (P. Ed.)
Dumbarwadi (Otur) Tal. Junnar, Dist. Pune.





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
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 1: To study the variation of Month wise Energy Purchased, kWh:




 Principal

Vilas Tambhe Womens College of Education (B.Ed)
 Dumburwadi (Dist. Tal. Junnar, Dist. Pune)





CHAPTER-III STUDY OF CARBON FOOT PRINTING

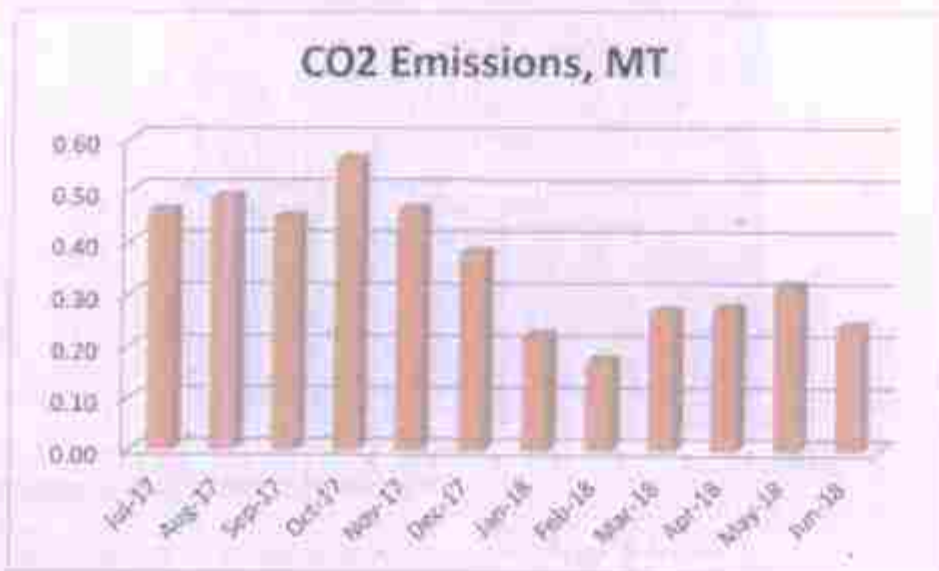
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions:

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

Table No 3: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Jul-17	575	0.46
2	Aug-17	608	0.49
3	Sep-17	559	0.45
4	Oct-17	698	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 2: Representation of Month wise CO₂ emissions:





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 CO₂ 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	kWh/kWp
3	Annual Generation Days	180	Nbs
4	Annual Solar Energy Generated	7200	kWh
5	1 kWh of Electrical Energy is equivalent to	0.9	Kg of CO ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	6.48	MT

Photograph of Roof Top Solar PV Plant:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Domburwad (Dist) Tal. Dombur, Dist. Raol.





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:





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:



Principal





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:




Principal



ENERGY AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

AP Dumberwadi (Olur), Tal. Anjar, Dist. Pune-412-409



Year: 2018-19

Prepared by:

ENRICH CONSULTANTS

Yashastree, 26, Nirmai Bag Society
Near Muktagan English School, Parvati, Pune-411009
Phone: 09890444795 Email: enrichcons@gmail.com




Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwadi (Olur) Tal. Anjar, Dist. Pune.

Enrich Consultants

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Tel: 09890444795 Email: enrichcons@gmail.com



Ref: EC/VWCOE/18-19/01

Date: 20/7/2019

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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-6192



Principal
Vilas Tambe Womens College of Education (B.E.)
Dumbarwadi(Otur) Tal: Junnar, Dist. Pune.



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


Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwad(Chur) Tal. Junner, Dist. Pune.





ACKNOWLEDGEMENT

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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otur) Tal. Junnar, Dist. Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Dist), Tal: Junnar, Dist: Pune #12 409 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 ₂ Emissions, MT
1	Total	4759	3.81
2	Maximum	502	0.40
3	Minimum	298	0.24
4	Average	385.58	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 Alternate 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 MSEDCCL in 18-19 is 4759 kWh
- Total Energy Consumption in 18-19 is 16759 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:

1. Energy Consumption is computed based on Load Utilization Factor
2. 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere
3. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
4. Annual Solar Energy generation Days: 300 Nos

7. Reference:

- For Solar PV Energy generation: www.solarindia.gov.in


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist), Tal: Junnar, Dist: Pune.





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


Principal

Vilas Tambe Womens College of Education (WCE)
Dumburwadi (Dist) Tal. Junnar, Dist. Pune.





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
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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Otur) Tal. Junnar, Dist. Pune.





CHAPTER-II

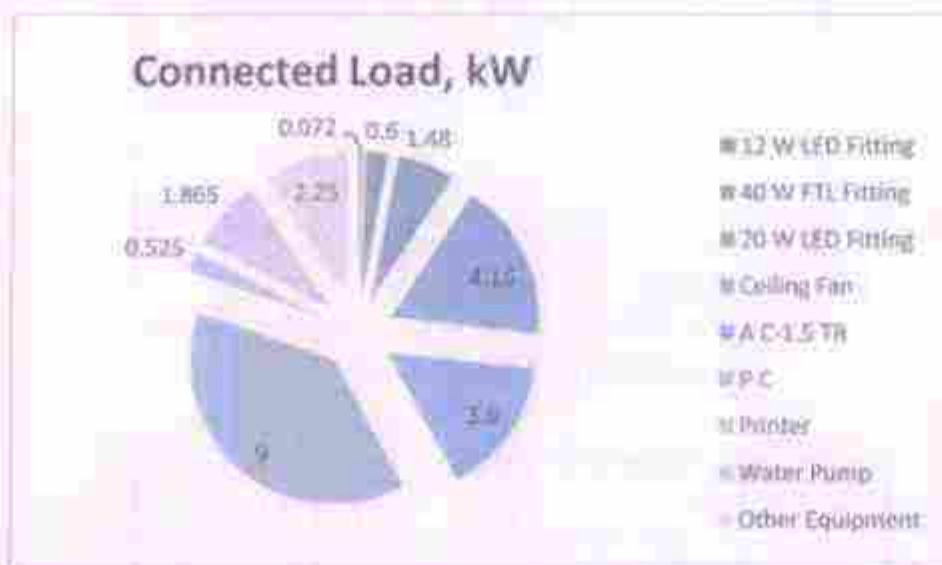
STUDY OF CONNECTED LOAD

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	15	40	0.6
3	20 W LED Fitting	74	20	1.48
4	Ceiling Fan	64	65	4.16
5	A C-1.5 TR	2	1800	3.8
6	P C	60	150	9
7	Printer	3	175	0.525
8	Water Pump	1	1865	1.865
9	Other Equipment	9	250	2.25
10	Total			23.56

Chart No 1: Details of Connected Load:




Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwadi (Dist) Tal. Hingur, Dist. Pune.





CHAPTER-III STUDY OF ENERGY CONSUMPTION

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	398
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:



[Signature]
Principal

Vilas Tambe Womens College of Education (Pvt.)
Dumburwadl, Pune





CHAPTER-IV STUDY OF CARBON FOOT PRINTING

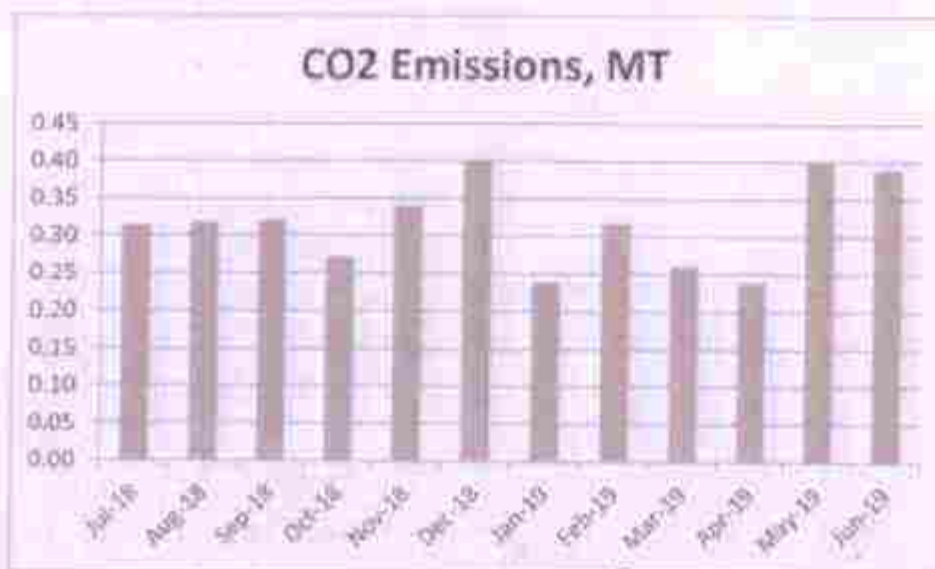
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO₂ Emissions:**

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 ₂ Emissions, MT
1	Jul-18	392	0.31
2	Aug-18	399	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	326	0.26
10	Apr-19	298	0.24
11	May-19	498	0.40
12	Jun-19	467	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 CO₂ emissions:



[Signature]
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.

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	kWh/kWp
4	Annual Generation Days	300	Nos
5	Total Solar Energy Generated= $2 \times 3 \times 4$	12000	kWh
6	Total Energy Demand= (1)+(5)	16579	kWh
7	% of Alternate Energy to Annual Requirement = $(5) \times 100 / (6)$	71.80	%

Photograph of Roof Top Solar PV Plant:



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi, Pune 411 004, Dist. Pune.





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 8: 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	W/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	W/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	20	W/unit
9	Total Load of 20 W LED Fittings	1.48	kW
10	Total LED Lighting Load = 6+9	1.504	kW
11	Total Lighting Load=3+8+9	2.104	kW
12	% of LED to Total Lighting Load= $10 \times 100/11$	71.48	%


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi, Dist: Dhule, Dist: Dhule, Dist: Dhule



GREEN AUDIT REPORT



of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumberwadi (Citur), Tal. Junnar, Dist. Pune 412 409



Year: 2018-19

Prepared by

ENRICH CONSULTANTS

Yashashree, 28, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@vsnl.com



Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwadi (Citur) Tal. Junnar, Dist. Pune



REGISTRATION CERTIFICATES



BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

[Signature]
Principal





Enrich Consultants

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

Ref: ECA/TWCOE/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 Dumberwadi (Olur), 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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Olur) Tal: Junnar, Dist: Pune.



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5	Study of Waste Management	13
6	Study of Rain Water Management	15
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Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbawadi (Chur) Tal. Junnar, Dist. Pune.





ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri Gajanan Mahara; Shikshan Prasarak Mandals Vilas Tambe Womens College of Education, A/P Dumburwadi (Otur), Tal: Junnar, Dist: Pune 412 409, for awarding us the assignment of Green Audit of their Campus for the Year: 2018-19.

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




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwadi (Otur) Tal: Junnar, Dist: Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Osar), Tal: Junner, 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 ₂ Emissions, MT
1.	Total	4759	3.81
2.	Maximum	502	0.40
3.	Minimum	298	0.24
4.	Average	386.58	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 & CO₂ 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 CO₂ Emissions by usage of Solar Energy in 18-19 is 10.6 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. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.
2. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
3. Annual Solar Energy generation Days: 300 Nos



9. References:

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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist. Tal. Pune), Pune.





ABBREVIATIONS

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.)
Dumberwadri(Dur) Tal. Junnar, Dist. Pune.





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 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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Otur) Tal, Junnar, Dist. Pune.





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
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 1: To study the variation of Month wise Energy Purchased, kWh:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist. Pune)





CHAPTER-III

STUDY OF CARBON FOOT PRINTING

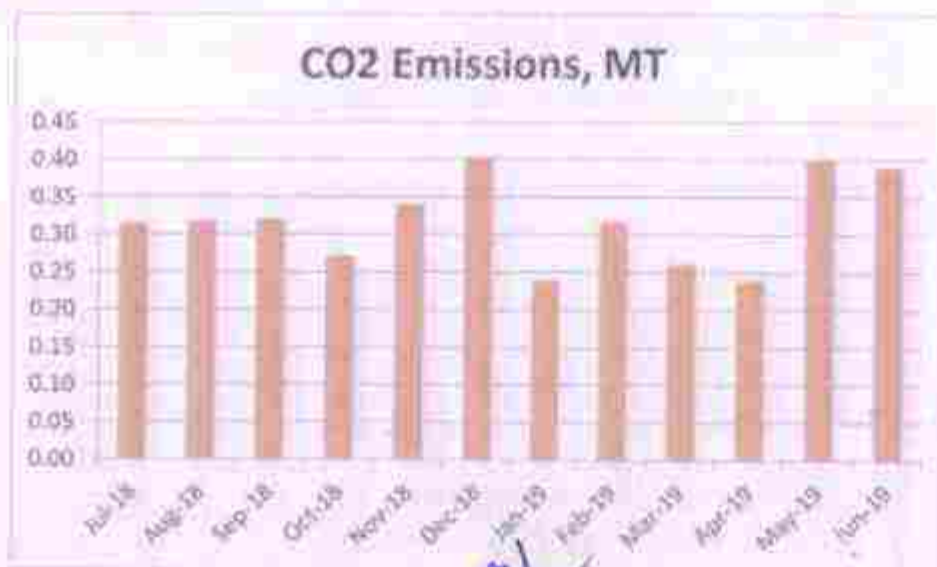
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions:

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

Table No 3: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ 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	296	0.24
8	Feb-19	396	0.32
9	Mar-19	325	0.26
10	Apr-19	296	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	296	0.24
16	Average	396.58	0.32

Chart No 2: Representation of Month wise CO₂ emissions:



Principal





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 CO₂ 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	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 ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (W) Tal. Umbar, Dist. Pune.



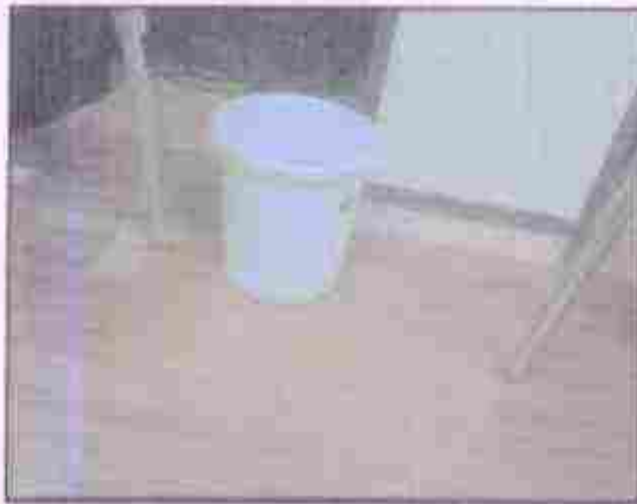


CHAPTER V STUDY OF WASTE MANAGEMENT

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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbanwadi (Dist. Pune)





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:




Principal

Vitas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Dist.) Solapur, Dist. Pune





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:




Principal

Vilas Tambe Womens College of Education (W.E.C.)
Dumbarwadi (Dist.) Tal. Aundh, Dist. Pune.



ENERGY AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumberwadi (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: enrichicons@gmail.com




Principal

Vilas Tambe of Education (B.Ed)
Dumberwadi (Otur), Tal. Junnar, Dist. Pune.

REGISTRATION CERTIFICATES



BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad (Dist) Tal. Amravati, Dist. Pune.



ENRICH CONSULTANTS

Yashashree, 26, Nirmal Bag Society,
Near Muktagan English School, Parvati, Pune-411 009.
Tel: 09890444795 Email: enrichcons@rediffmail.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 Dumberwadi (Otur), 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,

A Y Mehendale,
Certified Energy Auditor
EA-8192


Principal

Vitas Tambe Womens College of Education (CoE)
Dumberwadi, Tal. Junnar, Dist. Pune.

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




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad, D. Umeshwar Park.





ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Shri. Gajanan Maharaj Shikshan Prasarak Mandals 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.


Principal

Vilas Tambe
Womens College of Education, A/P, Pune.

B.A. Hon. (B.Ed.)





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 & CO₂ Emission:

No	Parameter /Value	Energy Purchased, kWh	CO ₂ 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 77.76 %

5. Usage of LED Lighting:

- The Total LED Lighting Load is 1.584kW.
- The Total Lighting Load is 2.064 kW.
- The % of LEDs to Total Lighting Load is 76.74 %.

6. Assumptions:

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

7. References:

- For CO₂ Emissions: www.befapower.com
- For Solar PV Energy generation: www.solarrtoftop.gov.in


Principal

Vilas Tambe Womens College of Education, Dumbarwadi, Tal: Junnar, Dist: Pune.



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.



Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad, Dist. Pune



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
1	Name	Shri Gajanan Maharaaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumberwadi (Qtur), Tal: Junnar, Dist: Pune-412 409
3	Year of Establishment	2005


Principal

Vilas Tambe
Principal

Vilas Tambe
Principal



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	Ceiling Fan	64	65	4.16
5	A/C-1.5 TR	2	1800	3.6
6	P.C	60	150	9
7	Printer	3	175	0.525
8	Water Pump	1	1885	1.885
9	Other Equipment	10	250	2.5
10	Total			23.76



Chart No 1: Details of Connected Load:



Vilas Tambe Womens College of Education (W.E.C.)
Dumbanwad (Dist.) Tal. Dumbur, Dist. Pune.





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-18	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	405
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 2: To study the variation of Month wise Energy Purchased, kWh:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Chur) Tal. Jambur, Dist. Raichur





CHAPTER-IV STUDY OF CARBON FOOT PRINTING

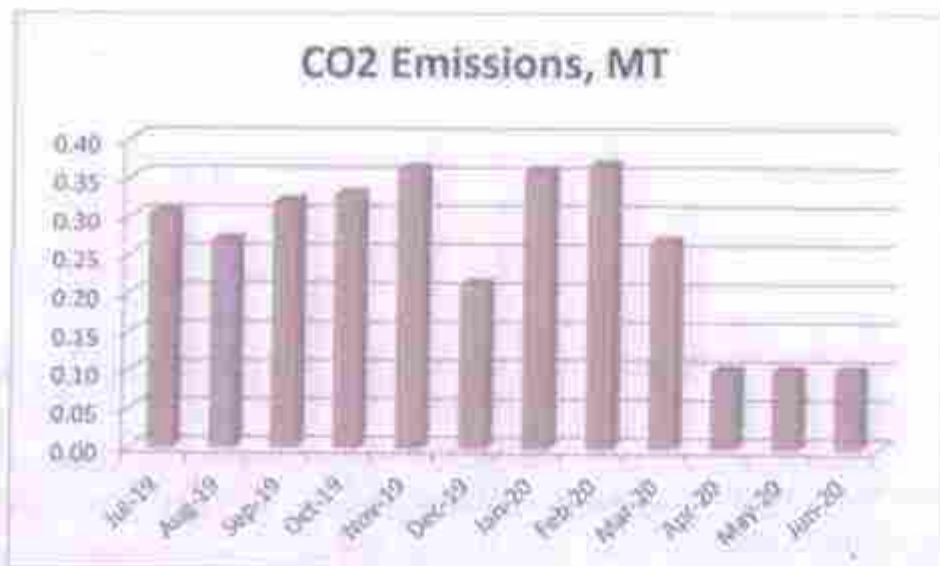
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions;

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 ₂ 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
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	285.87	0.26

Chart No 3: Representation of Month wise CO₂ emissions;





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	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= $2 \times 3 \times 4$	12000	kWh
6	Total Energy Demand= (1)+(5)	15428	kWh
7	% of Alternate Energy to Annual Requirement = $(5) \times 100 / (6)$	77.78	%

Photograph of Roof Top Solar PV Plant:



[Signature]
Principal

Vitas Tambe Womens College of Education (W.E.C)
Dumberwadi, D. Umberwadi, Dist. Solapur, Maharashtra





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	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= $10 \times 100/11$	76.74	%

[Signature]
Principal

Vias Tambe Womens College of Education, Dumbarwadi



GREEN AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

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



Year: 2019-20

Prepared by

ENRICH CONSULTANTS

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




Principal

Vilas Tambe Women's College of Education (W.Ed.)
Dumberwadi (Otur), Tal. Junnar, Dist. Pune.



REGISTRATION CERTIFICATES



BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

ENRICH CONSULTANTS

Yashashree, 26, Nirmla Bag Society,
Near Muktagan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichcoona@gmail.com



Ref: ECA/VWCOE/19-20/02

Date: 17/8/2020

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 Dumberwadi (Otur), Tal: 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
- 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,

A Y Mehendale,
Certified Energy Auditor,
EA-8192



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otur) Tal: Junnar, Dist: Pune.

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[Signature]
Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumbarwadi, Pune





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 Dumberwadi (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.


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi, Tal: Junnar, Dist: Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Ofur), 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 ₂ Emissions, MT
1	Total	3428	3.09
2	Maximum	406	0.37
3	Minimum	112	0.10
4	Average	265.67	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 & CO₂ 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 CO₂ 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

Vilas Tambe Womens College of Education (B.Ed.)
Junnar, Dist. Pune.





B. Assumptions:

1. Energy Consumption is based on Load Utilization Factor
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ 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 CO₂ Emissions: www.tafapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in

Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbharwadl (Dist. Solapur, Dist. Pune).



ABBREVIATIONS

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.)
Dumberwadl (Dist. Tal. Junnar), Dist. Pune.



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 Vilas Tambe Womens College of Education
2.	Address	A/P Dumberwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3.	Year of Establishment	2005


Principal
Vilas Tambe Womens College of Education (W.E.E.)
Dumberwadi (Otur) Tal. Junnar, Dist. Pune.





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
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 1: To study the variation of Month wise Energy Purchased, kWh:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dymburwad (W) Tal. Jumeir, Dist. Pune.





CHAPTER-III STUDY OF CARBON FOOT PRINTING

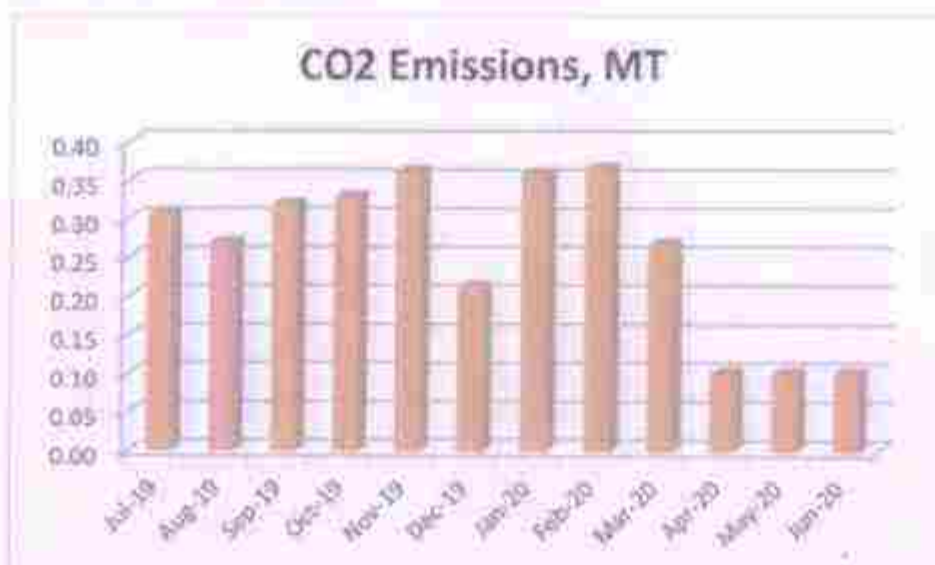
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions:

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

Table No 3: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ 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
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	3.08
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:





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 CO₂ 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	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 ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:




Principal

Vilas Tambhe
Dumberwadi





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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwadi, Pune





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:




Principal

Vilas Tambe
Dumburwadi, Pune (Dist. Solapur)





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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist. Solapur, Dist. Pune)





7.3 Provision of Ramp for Divyangajan:

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

Photograph of Ramp:




Principal

Vilas Tambe Womens College of Education (W.Ed.)
Dumbarwadi, Pune - 411 004



ENVIRONMENTAL AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

AP, Dumberwad (Otur), Tal. Junnar, Dist. Pune-412 409



Year: 2019-20

Prepared by

ENRICH CONSULTANTS

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




Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwad(Otur) Tal. Junnar, Dist. Pune.

REGISTRATION CERTIFICATES



BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE



ENRICH CONSULTANTS

Yashashree, 25, Nirmla Bag Society,
Near Mukangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: enrichuons@gmail.com



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 (Our), 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,

A Y Mehendale,
Certified Energy Auditor,
EA-8192



Principal
Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi(Our) Tal: Junnar, Dist: Pune.



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Principal

Vilas Tambe Womans College of Education (B.Ed.)
Dumburwadi (W), Dumbur, Dist. Pune.





ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management, Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (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.


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi(Otur) Tal: Junnar, Dist. Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Women's College of Education, A/P Dumburwadi (Dist), 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 CO₂ 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 & CO₂ Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ emissions, MT
1	Total	3428	3.09
2	Maximum	408	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 CO₂ 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 CO₂ 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.


Principal

Vilas Tambe Women's College of Education (S.E.D.)
Dumburwadi (Dist), Tal, Junnar, Dist: 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 CO₂ 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 CO₂ Emission computation: www.fairpower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in




Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumbarwadi (Dist. Jalgaon, Dist. Pune)



ABBREVIATIONS

kWh	:	Kilo-Watt Hour
Qty	:	Quantity
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide
CPCB	:	Central Pollution Control Board




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist.) Tal. Junnar, Dist. Pune.



CHAPTER-I INTRODUCTION



1.1. Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

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

1.1.2. Environmental Audit: Definition:

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

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

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

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

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

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

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



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



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

1	National Forest Policy, 1988
2	National Water Policy, 2002
3	National Environment Policy or NEP (2006)
4	National Conservation Strategy and Policy Statement on Environment and Development, 1982.
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 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
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vias Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3	Year of Establishment	2005


Principal

Vias Tambe Womens College of Education (B.Ed.)
Dumbarwadi, Tal: Junnar, Dist: Pune.



CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

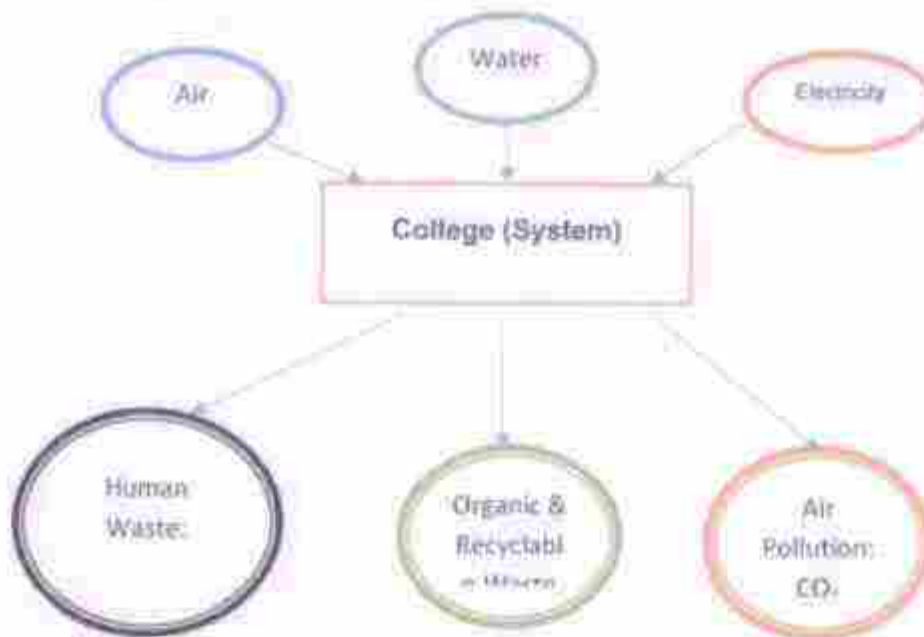


The College consumes following Natural/derived Resources:

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 CO₂ emissions due to Electrical Energy is 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.

Table No 5: Study of Energy Purchased & CO₂ Emission: 2019-20:

No.	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Jul-19	338	0.30
2	Aug-19	298	0.27
3	Sep-19	354	0.32
4	Oct-19	368	0.33
5	Nov-19	401	0.38
6	Dec-19	235	0.21
7	Jan-20	398	0.36
8	Feb-20	408	0.37

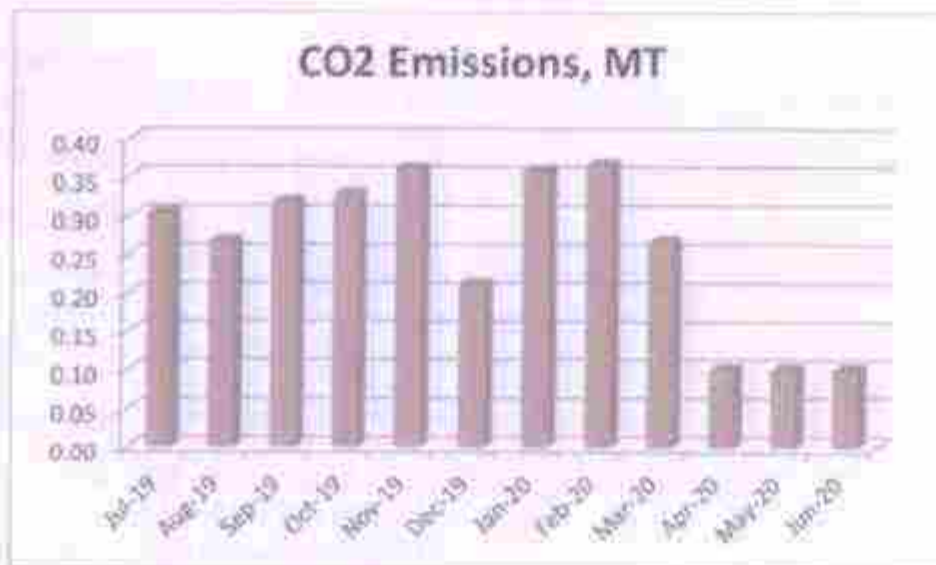
[Signature]
Principal
Vilas Tambe Womens College of Education (B. Ed.)
Dombivadi (E) Dist. Thane (M.S.)



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:



[Handwritten Signature]
Principal



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 CO₂ 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 of CO ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:



(Signature)
Principal

Vilas Tambe
Principal



CHAPTER IV STUDY OF WASTE MANAGEMENT



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

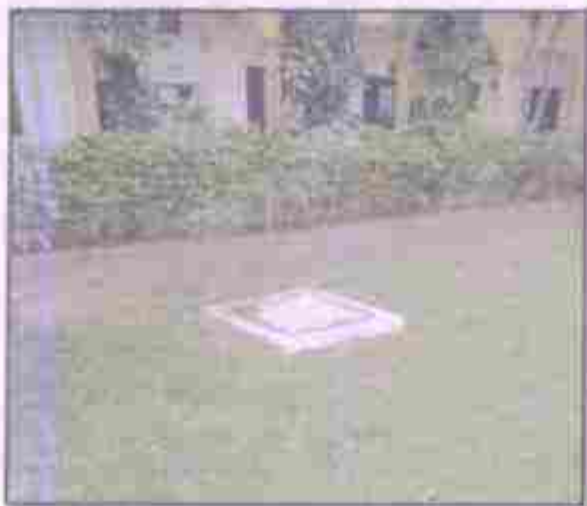
Vilas Tambe Womens College of Education (B.Ed.)
Gururaniwadi, Durrbanwadi, Kharar, Dist. Pune.



CHAPTER-V STUDY OF RAIN WATER MANAGEMENT

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

Photograph of Bore well recharge Point:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist. Junnar), Dist. Pune.



CHAPTER-VI STUDY OF ENVIRONMENT FRIENDLY PRACTICES

6.1 Tree 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 (B.Ed.)
Dumberwadi (Dist. Tal. sunwar, Dist. Pune.



ENERGY AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

VP Dumbawadi (Olur), Tal. 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: enrichcons@gmail.com




Principal

Vilas Tambe Women's College of Education (044)
Dumbawadi (Olur) Tal. Junnar, Dist. Pune

REGISTRATION CERTIFICATES



BEE ENERGY AUDITOR CERTIFICATE



MEDA REGISTRATION CERTIFICATE

[Signature]
Principal



ENRICH CONSULTANTS

Yashashree, 26, Nirnal Bag Society,
Near Mukangan English School, Parvat, Pune 411 009
Tel: 09890444795 Email: enrichcons@gmail.com



Ref: EC/VTWGOE/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 Vilas 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



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi (Otur) Tal: Junnar, Dist: Pune

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Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwadi (Dist.) Tal. Jambur, Dist. Pune.





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 412 408, 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.


Principal

Vilas Tambe Womens College of Education (A/P)
Dumbarwadi (Otur) Tal: Junnar, Dist: Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Otar), 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 ₂ 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 81.87 %

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:

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

7. References:

- For CO₂ Emissions: www.tatrapower.com
- For Solar PV Energy generation: www.solartooltop.com.in


Principal

Vilas Tambe Womens College of Education (B.Ed)
Dumberwadi(Otar) Tal: Junnar, Dist: Pune



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




Principal

Vilas Tambe Womens College of Education (WCE)
Dumburwad, Dist. Jalgaon, (GJ)





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
1	Name	Shri Gejanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune 412 408
3	Year of Establishment	2005


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi(Otur) Tal. Junnar, Dist. Pune.





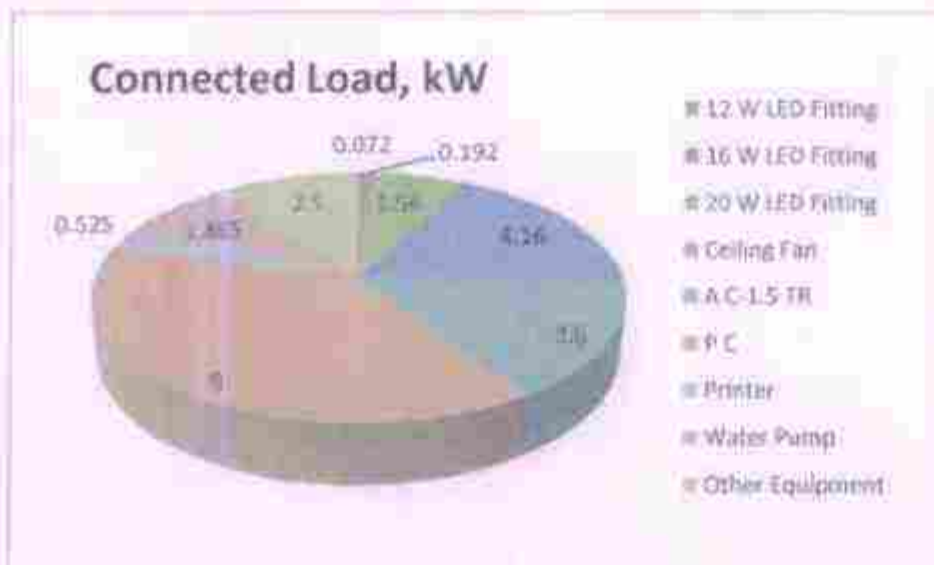
CHAPTER-II STUDY OF CONNECTED LOAD

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	78	20	1.56
4	Ceiling Fan	64	65	4.16
5	A C-1.5 TR	2	1800	3.6
6	P C	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:



(Signature)
Principal
Vfas Tambe Womens College of Education (B.Ed.)
Dumberwad (Dist) Tal. Amravati.





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
6	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:



[Signature]
Principal

Vilas Tambhe Womens College of Education (B.Ed.)
 Durnbarwadi (Dist. Jalgaon, Gujarat)





CHAPTER-IV STUDY OF CARBON FOOT PRINTING

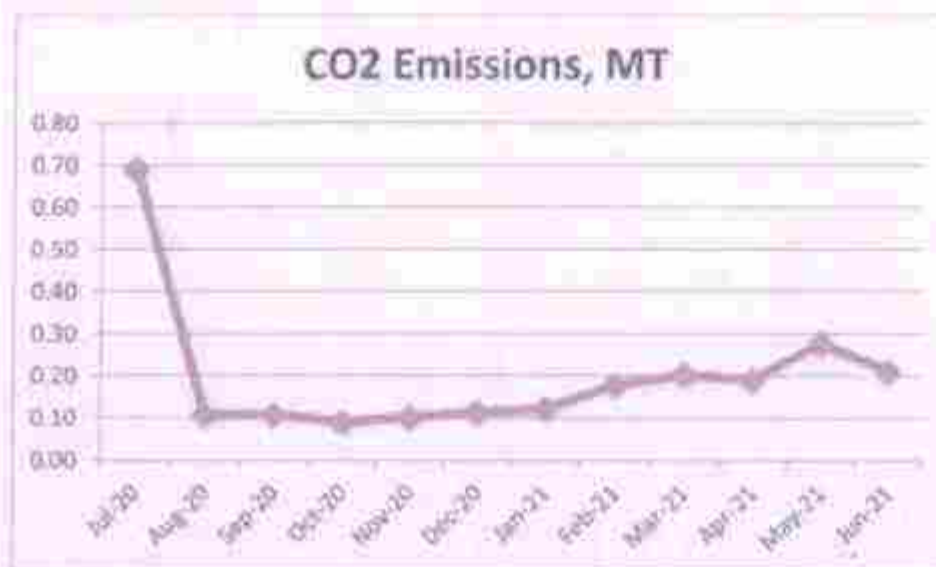
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions:

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 ₂ 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:





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	2657	kWh/Annun
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= $2 \times 3 \times 4$	12000	kWh
6	Total Energy Demand= (1)+(5)	14657	kWh
7	% of Alternate Energy to Annual Requirement = $(5) \times 100 / (6)$	81.87	%

Photograph of Roof Top Solar PV Plant:



CHAPTER VI STUDY OF USAGE OF LED LIGHTING

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

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

No	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	kW
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	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=3+6+9	1.824	kW
11	Total Lighting Load=3+6+9	1.824	kW
12	% of LED to Total Lighting Load= $10 \times 100 / 11$	100	%



Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumberwadi, Dist. Solapur, Maharashtra, India.



GREEN AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

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



Year: 2020-21

Prepared by

ENRICH CONSULTANTS

Yashastree, 26, Nirmal Bag Society,
Near Muktangan English School, Parvati, Pune-411009
Phone: 09880444795 Email: enrichconsul@gmail.com




Principal

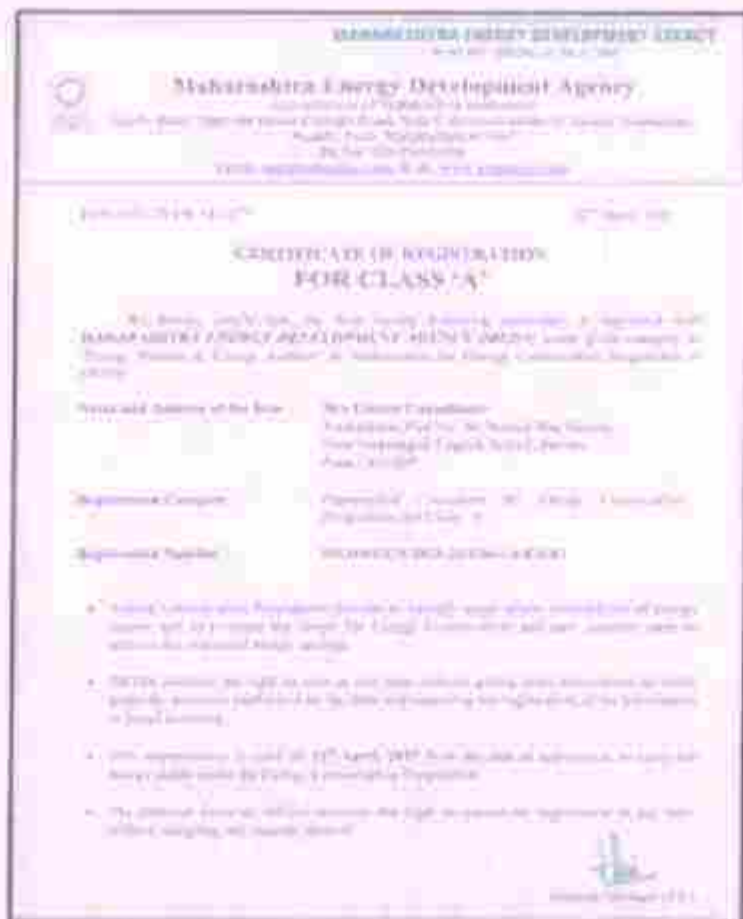
Vilas Tambe Women's College of Education (B.Ed.)
Dumberwadi (Otur) Tal. Junnar, Dist. Pune.



REGISTRATION CERTIFICATES



BEE ENERGY AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

[Signature]
Principal





ENRICH CONSULTANTS

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

Ref: EG/VTWCOE/20-21/02

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, VP Dumberwadi (Otur), Tal: 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,

A Y Mehendale,
Certified Energy Auditor,
EA-8192



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otur) Tal: Junnar, Dist: Pune.



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Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad(Dist) Tal. Dumber, Dist. Pune.





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 Dumberwadi (Otur), Tal: 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.

Principal

Vilas Tambe Womens College of Education (W.E.E.)
Dumberwadi(Otur) Tal, Junnar, Dist. Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (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 ₂ 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
- Installation of 10 kWp Roof Top Solar PV Plant

4. Usage of Renewable Energy & CO₂ Emission Reduction:

- Energy generated by Solar PV Plant in 20-21 is 12000 kWh
- Reduction in CO₂ 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





8. Assumptions:

1. Energy Consumption is computed based on Load Utilization Factor
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ 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 CO₂ Emissions: www.tatapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in


Principal





ABBREVIATIONS

LED	: Light Emitting Diode
KWh	: kilo-Watt Hour
Qty	: Quantity
W	: Watt
kW	: Kilo Watt
MT	: Metric Ton

Principal

Vias Tambe Womens College of Education (B.Ed.)
Dumburwad (Dist) Tal. Jambh. Dist. Pune.





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 Vilas Tambe Womens College of Education
2	Address	A/P Dumberwadi (Ghur), Tal: Junnar, Dist: Pune 412 409
3	Year of Establishment	2005

Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi(Ghur) Tal. Junnar, Dist. Pune.





CHAPTER-II STUDY OF ENERGY CONSUMPTION

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

Table No 2: 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
6	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:




 Principal

Vilas Tambe Womens College of Education (S.Ed.)
 Dumburwad (Dist. Pune)





CHAPTER-III STUDY OF CARBON FOOT PRINTING

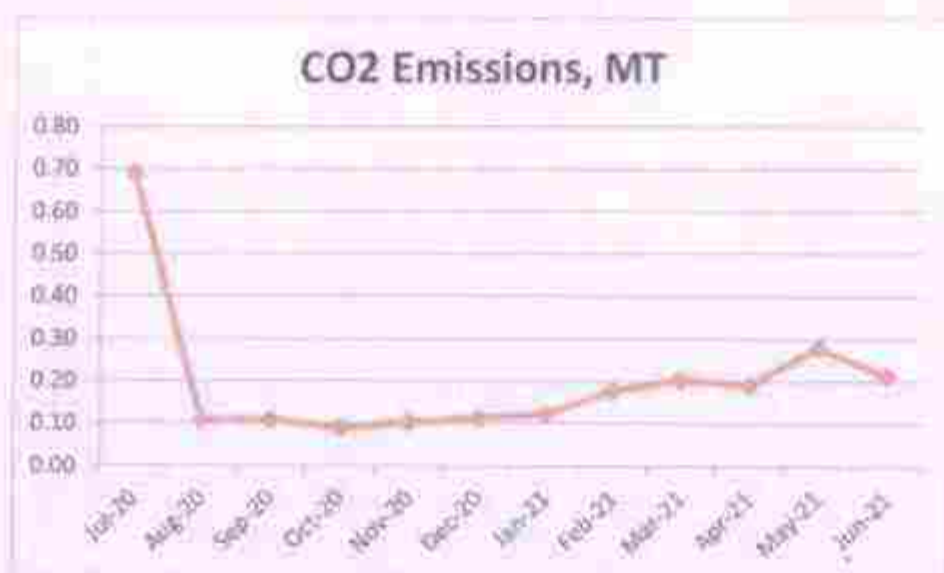
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. Basis for computation of CO₂ Emissions:

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

Table No 3: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ 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 2: Representation of Month wise CO₂ emissions:




 Principal





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 CO₂ 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	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 ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Tq. - Amalgaon, Dist. - Pune)





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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Dist. Solapur, Dist. Pune)





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:




Principal

Vilas Tambe Womens College of Education (B.Ed)
Dumbarwad (Dist. Tal. Junnir), Dist. Pune





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:




Principal



ENVIRONMENTAL AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

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



Year: 2020-21

Prepared by

ENRICH CONSULTANTS

Yashashree, 28, Nirmal Bag Society,
Near Mukfangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@gmail.com




Principal

Vilas Tambe Womens College of Education (S.E.)
Dumberwadi (Otur) Tal. Junnar, Dist. Pune.

ENRICH CONSULTANTS

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



Ref: EC/VTCOE/20-21/03

Date: 13/7/2021

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 Dumberwadi (Otur), Tal: Junnar, Dist: Pune 412 408, in the Year 2020-21.

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,

A Y Mohendale,
Certified Energy Auditor,
EA-8192


Principal

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Principal





ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management Sri 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: 2020-21.

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


Principal

Vilas Tambe Womens College of Education (Pvt.)
Dumbarwadi (Otur), Tal: Junnar, Dist. Pune.





EXECUTIVE SUMMARY

1. **Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Dist), Tal: Junnar, Dist: Pune 412 408** consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment.

2. Pollution caused due to College Activities:

- **Air pollution:** Mainly CO₂ 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 & CO₂ Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ emissions, MT
1	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

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

- The College has installed 10 kWp Roof Top Solar PV Plant
- Energy generated by Solar PV Plant in 20-21 is 12050 kWh
- Reduction in CO₂ 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.


Principal





7.2 Liquid Waste Management:

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

8. 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 CO₂ 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 CO₂ Emission computation: www.titapower.com
- For Solar PV Energy generation: www.solarrooftop.gov.in
- For AQI Standards: www.cpcb.com



ABBREVIATIONS

kWh	: kilo-Watt Hour
Qty	: Quantity
MT	: Metric Ton
CO ₂	: 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




Principal





CHAPTER-I INTRODUCTION

1.1. Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act; 1986

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

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are complied 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
1998	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules

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



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

1.	National Forest Policy, 1986
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research 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
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 RESOURCE CONSUMPTION & CO₂ EMISSION

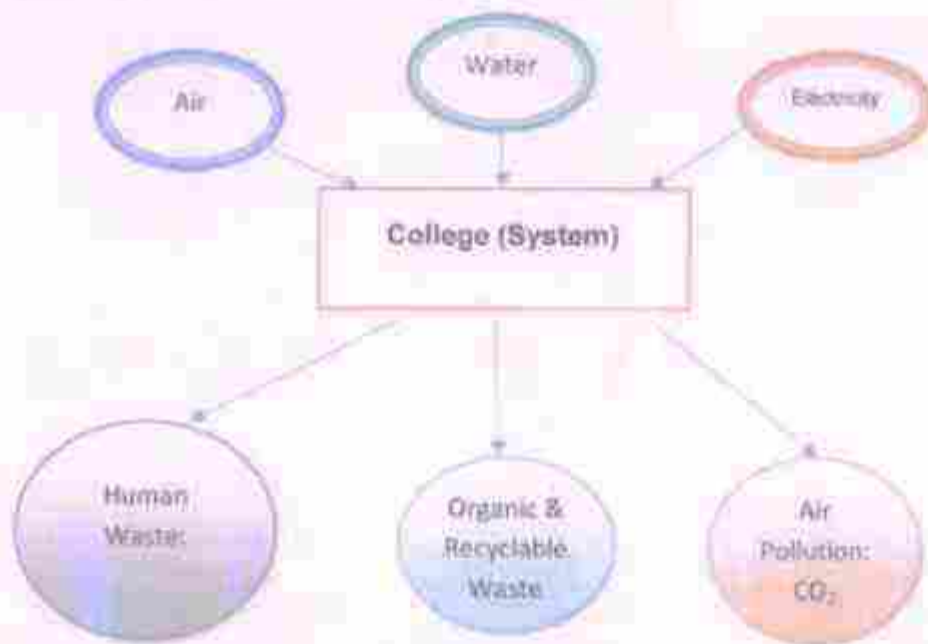


The College consumes following Natural/derived Resources:

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 CO₂ emissions due to Electrical Energy is 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.

Table No 5: Study of Energy Purchased & CO₂ Emission: 2020-21:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Jul-20	787	0.89
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

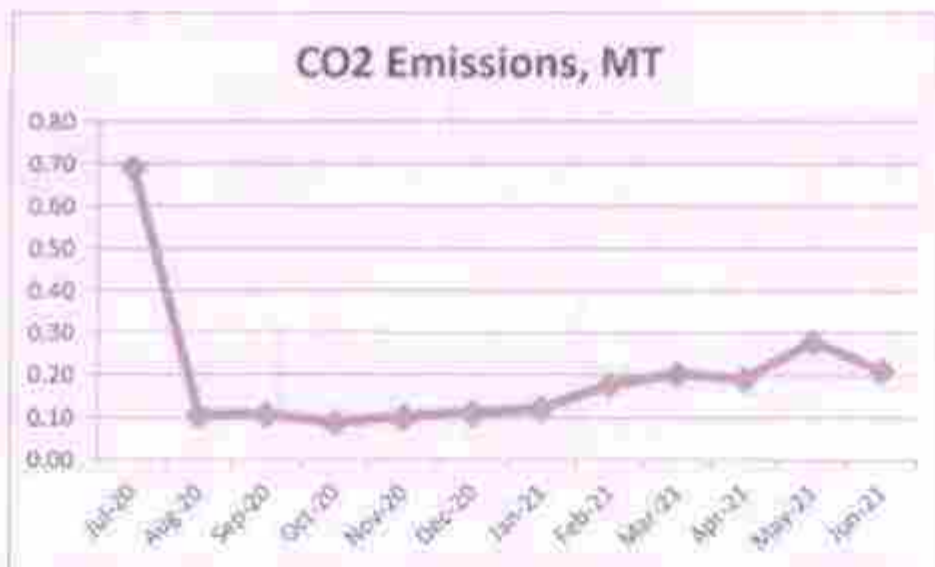
[Signature]
Principal



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:



[Signature]
Principal



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 CO₂ 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 of CO ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:




Principal





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
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.	Principal's Cabin	113	61	81
2.	Admin Office	120	66	81
3.	Faculty Room	110	63	80
4.	Science Lab	106	62	79
5.	Library	114	64	79
6.	Method Room	121	68	81
	Maximum	121	68	81
	Minimum	106	62	79

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:




Principal



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:




Principal

Vilas Tambe Womens College of Education (W.E.C.)
Dumbarwadi (B.) Tal. Solapur, Dist. Solapur.



CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1 Tree 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
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 +

Principal



ENERGY AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbawadi (Dist), Tal: Junnar, Dist: Pune-412 409



Year: 2021-22

Prepared by:

ENGRESS SERVICES

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




Principal

Vilas Tambe Women's College of Education (B.Ed)
Dumbawadi (Dist) Tal. Junnar, Dist. Pune.



REGISTRATION CERTIFICATES



BEE AUDITOR CERTIFICATE



MEDA EMPANELMENT CERTIFICATE

[Signature]
Principal





ENGRESS SERVICES

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

Ref: ES/VWCOE/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 (Or), Tal: Junnar, Dist: Pune-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



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi(Or) Tal: Junnar, Dist: Pune.



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6	Study of Usage of LED Lighting	13


Principal

Vilas Tambe Womens College of Education [B Ed]
Dumbarwadi (Dist. Solapur, Dist. Pune)





ACKNOWLEDGEMENT

We Engross Services, Pune, express our sincere gratitude to the management of Smti Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (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.


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi(Otur) Tal:Junnar, Dist: Pune.



EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (Chur), 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 ₂ 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 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 MSEDCCL 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
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere
3. Energy generated by Roof Top Solar PV Plant: 4 kWh/kWp per Day
4. Annual Solar Energy generation Days: 300 Nos

7. References:

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


Principal

Vilas Tambe Womens College of Education (WCE)
Dumberwadi(Chur) Tal: Junnar, Dist: Pune.





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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi(Dae) Tel: sunnar, Dist. Pune.





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
1	Name	Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education
2	Address	A/P Dumberwadi (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 Education (B.Ed.)
Dumberwadi(Otur) Tal. Junnar, Dist. Pune.





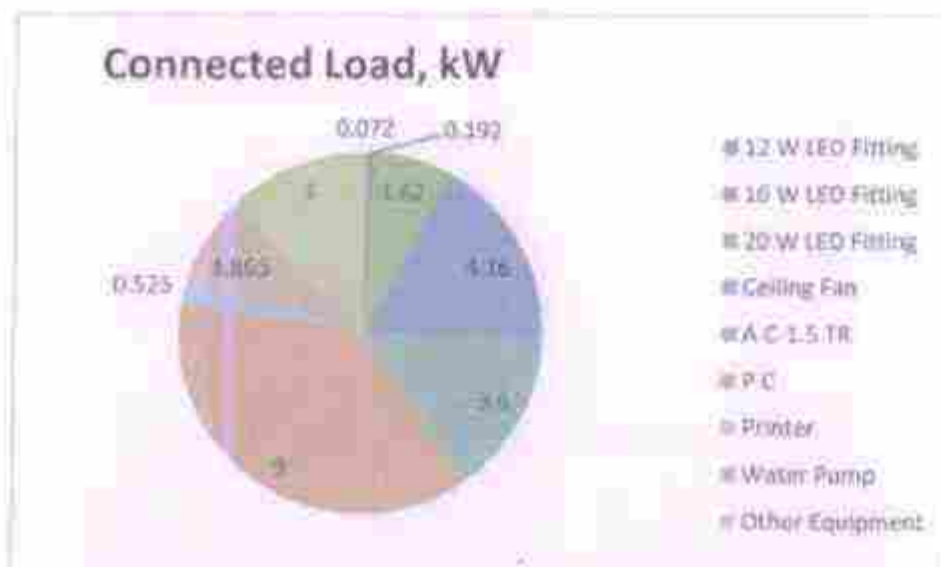
CHAPTER-II STUDY OF CONNECTED LOAD

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	81	20	1.62
4	Ceiling Fan	64	65	4.16
5	A C-1.5 TR	2	1800	3.6
6	P C	60	150	9
7	Printer	3	175	0.525
8	Water Pump	1	1865	1.865
9	Other Equipment	12	250	3
10	Total			24.03

Chart No 1: Details of Connected Load:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwad, Pune - 411 004, Pune





CHAPTER-III STUDY OF ENERGY CONSUMPTION

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
1	Jul-21	475
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
11	May-22	709
12	Jun-22	819
13	Total	8062
14	Maximum	830
15	Minimum	475
16	Average	671.83

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




Principal

Vilas Tambe Women's College of Education (W.C.E.)
Dombivadi (W) Tal. Jambha, Dist. Pune.





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 CO₂ 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 ₂ 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
9	Mar-22	301	0.27
10	Apr-22	198	0.18
11	May-22	369	0.33
12	Jun-22	126	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:





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= $2 \times 3 \times 4$	12000	kWh
6	Total Energy Demand= (1)+(5)	15018	kWh
7	% of Alternate Energy to Annual Requirement = $(5) \times 100 / (6)$	80	%

Photograph of Roof Top Solar PV Plant:




Principal

Vilas Tambhe Womens College of Education (B.Ed.)
Dumberwad (Dist) Tal. Dumber, Dist. Pune.





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 8: Computation of Percent Usage of LEDs to Total Lighting Load:

No	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	kW
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	kW
10	Total LED Lighting Load=3+6+9	1.884	kW
11	Total Lighting Load=3+6+9	1.884	kW
12	% of LED to Total Lighting Load= $10 \times 100 / 11$	100	%


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadl, Pune



GREEN AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumbawadi (Otar), Tal: Junnar, Dist: Pune 412 409



Year: 2021-22

Prepared by

ENGRESS SERVICES

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




Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumbawadi (Otar) Tal: Junnar, Dist: Pune.



REGISTRATION CERTIFICATES



BEE AUDITOR CERTIFICATE

MEDA EMPANELMENT CERTIFICATE



ASSOCHAM GEM CP CERTIFICATE

[Signature]
Principal





ENGRESS SERVICES

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

A Y Mehendale,
Certified Energy Auditor, EA-8192.
ASSOCHAM GEM Certified Professional, GEM: 22/788


Principal

Vilas Tambe Womens College of Education (U.Ed.)
Dumberwadi (Otur) Tal: Junnar, Dist: Pune



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4	Study of Usage of Renewable Energy	12
5	Study of Waste Management	13
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Principal





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, AP Dumberwadi (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.

Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otur) Tal. Junnar, Dist. Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwadi (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 ₂ 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 & CO₂ 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 CO₂ 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.


Principal





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
2. 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ 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 CO₂ Emissions: www.brfapower.com
- For Solar PV Energy generation: www.solarofficial.gov.in


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad Dist. Latur, Dist. Pune.





ABBREVIATIONS

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.)
Dumberwadi (Dist) Tal. Junnar, Dist. Pune





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 Vilas Tambe Womens College of Education
2	Address	A/P Dumbarwadi (Otur), Tal: Junnar, Dist: Pune-412 409
3	Year of Establishment	2006

1.3 Google Earth Location Image:



College
Campus


Principal

Vilas Tambe Womens College of Education (B.E.)
Dumbarwadi(Otur) Tal: Junnar, Dist: Pune.





CHAPTER-II STUDY OF ENERGY CONSUMPTION

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
1	Jul-21	475
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	696
11	May-22	709
12	Jun-22	619
13	Total	8062
14	Maximum	830
15	Minimum	475
16	Average	671.83

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



(Signature)
Principal

Vilas Tambe Womens College of Education (B Ed)
Dumberwad (Dist) Tal. Sumar, Dist. Pune





CHAPTER-III STUDY OF CARBON FOOT PRINTING

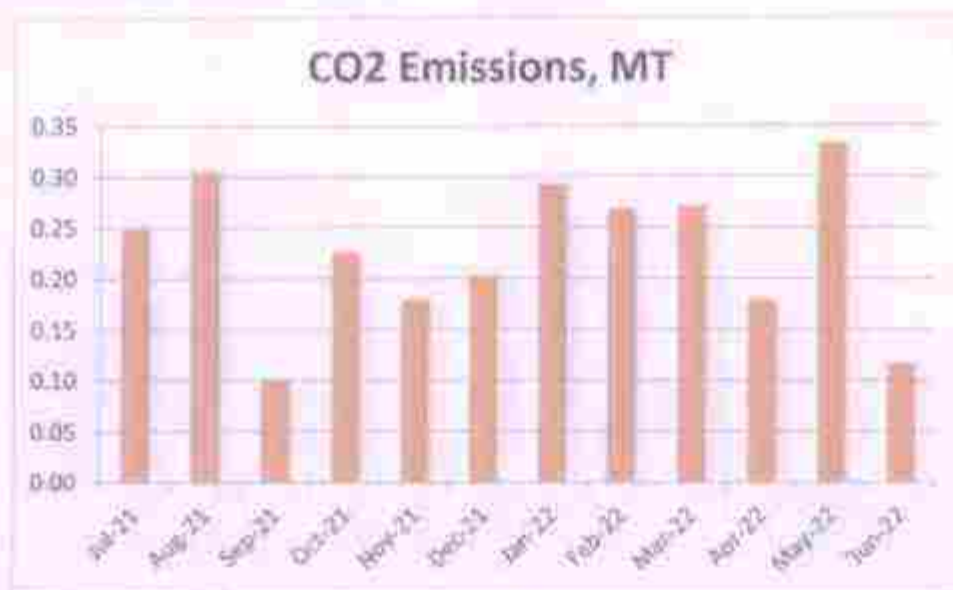
A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. **Basis for computation of CO₂ Emissions:**

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

Table No 3: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Jul-21	275	0.25
2	Aug-21	339	0.31
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4	Oct-21	250	0.23
5	Nov-21	108	0.18
6	Dec-21	225	0.20
7	Jan-22	325	0.29
8	Feb-22	288	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	389	0.33
15	Minimum	112	0.10
16	Average	251.50	0.23

Chart No 2: Representation of Month wise CO₂ emissions:





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 CO₂ 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	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 ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:




Principal

Vilas Tambe Womens College of Education (R.G.)
Dumburwadi, Pune - 411 004





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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad (City) Tel. Jambh, Dist. Pune.





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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad, Pune

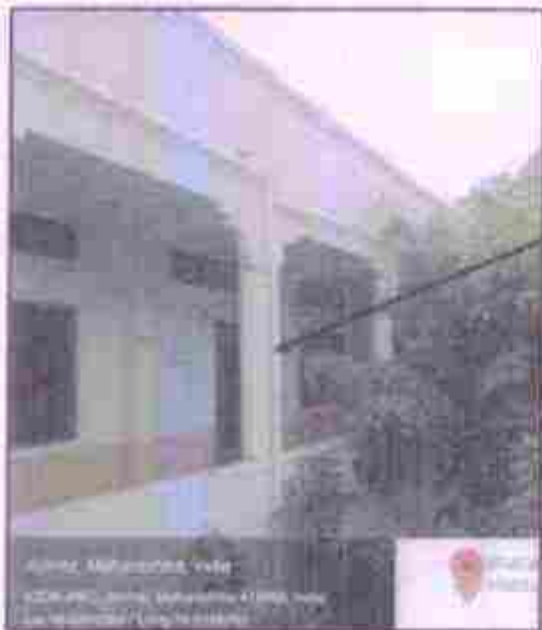




CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

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 Pipe

Bore well recharge point:




Principal

Vilas Tambe Womens College of Education (W.Ed.)
Dumberwadi (Dist) Solapur, Dist. Wate.





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:




Principal





7.3 Provision of Ramp for Divyangajan:

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

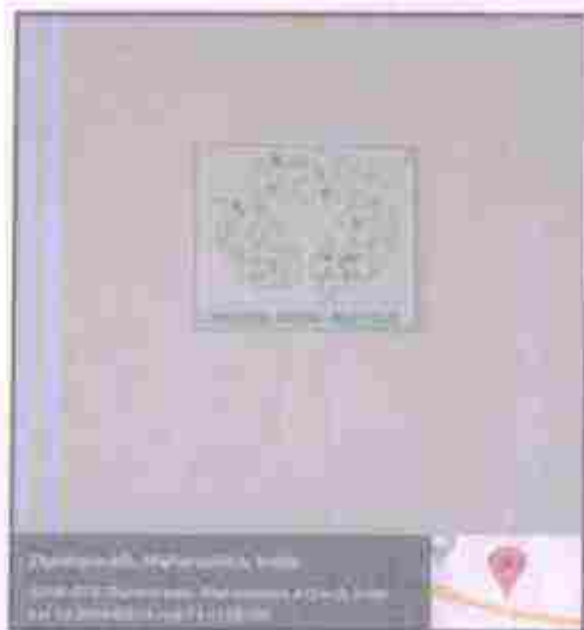
Photograph of Ramp:



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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwad, Pune



ENVIRONMENTAL AUDIT REPORT

of

Shri Gajanan Maharaj Shikshan Prasarak Mandal's
VILAS TAMBE WOMENS COLLEGE OF EDUCATION,

A/P Dumberwadi (Gtor), Tal. Junnar, Dist. Pune 412-408



Year: 2021-22

Prepared by

ENGRESS SERVICES

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




Principal

Vilas Tambe Womens College of Education (Co-Ed.)
Dumberwadi(Gtor) Tal. Junnar, Dist. Pune.



REGISTRATION CERTIFICATES



BEE AUDITOR CERTIFICATE

MEDA EMPANELMENT CERTIFICATE



ASSOCHAM GEM CP CERTIFICATE

[Signature]
Principal

Vilas Tambe Womens College of Education (W.Ed)
Dumbarwadi (Dist.) Tal. Junnar, Dist. Pune.





ENGRESS SERVICES

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

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 Dumberwadi (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
ASSOCHAM GEM Certified Professional: GEM: 22/788



Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwadi (Otur), Tal: Junnar, Dist. Pune



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Principal

Vilas Tambe Womens College of Education (B.Ed.)
 Dumbarwadi (Dist: Sat. Jirga, Dist: Pune)





ACKNOWLEDGEMENT

We Engrass Services, Pune, express our sincere gratitude to the management Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, AP Dumberwadi (Old), 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.


Principal

Vilas Tambe Womens College of Education (BEd)
Dumberwadi (Old) Tal. Junnar, Dist. Pune.





EXECUTIVE SUMMARY

1. Shri Gajanan Maharaj Shikshan Prasarak Mandal's Vilas Tambe Womens College of Education, A/P Dumberwad (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 Collage Activities:

- Air pollution: Mainly CO₂ 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 & CO₂ Emissions:

No	Parameter/ Value	Energy Purchased, kWh	CO ₂ emissions, MT
1	Total	3018	2.72
2	Maximum	389	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 CO₂ 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 CO₂ Emissions by usage of Solar Energy in 21-22 is 10.8 MT.

6. Indoor Air Quality:

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 Level	Noise Level, dB
1	Maximum	26.5	60	147	45
2	Minimum	26.3	59	117	42





8. Waste 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 Waste 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 CO₂ 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 CO₂ Emission computation: www.tatapower.com
- For Solar PV Energy generation: www.solarworldsolar.com
- For Various Indoor Air Parameters: www.ustrae.com
- For AQI Standards: www.cpcb.com


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumberwad (Dist. Tal. Amrav. Dist. Pune)





ABBREVIATIONS

kWh	: Kilo-Watt Hour
Qty	: Quantity
MT	: Metric Ton
CO ₂	: 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

Vile Parle Women's College of Education (B.Ed.)
Dumburwadi (Old) Tal. Anwar, Dist. Pune





CHAPTER-I INTRODUCTION

1.1. Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

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

1.1.2. Environmental Audit: Definition:

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

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

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

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

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

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

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



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

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

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



College
Campus



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 Dumberwadi (Otur), Tal: Junnar, Dist: Pune 412 409
3	Year of Establishment	2005


Principal

Vilas Tambe Womens College of Education (3.Ed.)
Dumberwadi (Otur), Tal: Junnar, Dist: Pune





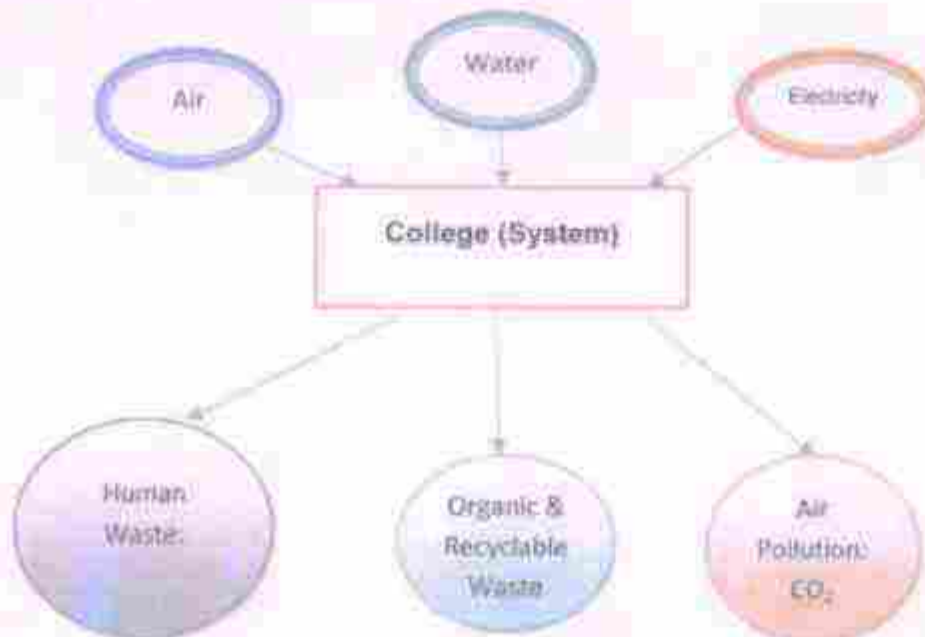
CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

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 CO₂ emissions due to Electrical Energy is 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere.

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

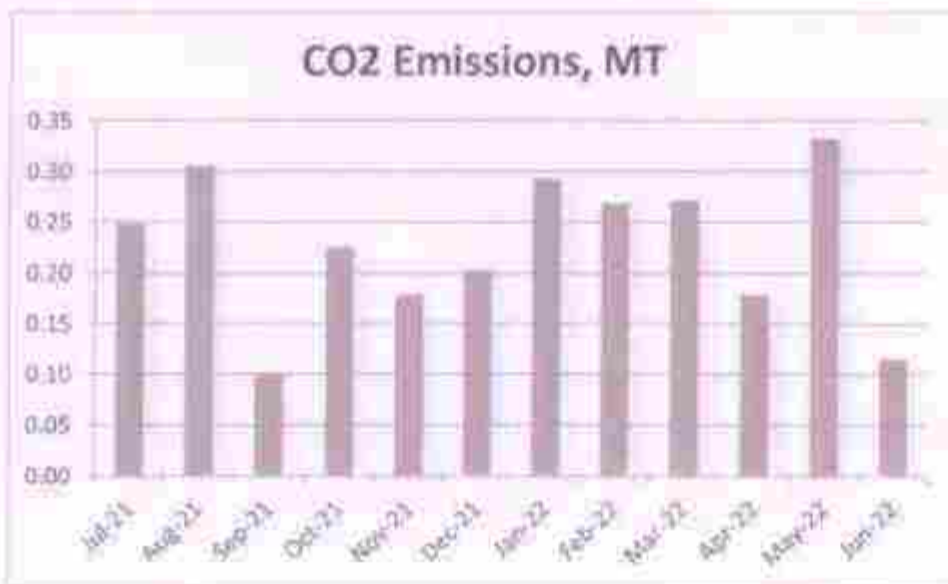
No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Jul-21	275	0.25
2	Aug-21	339	0.31
3	Sep-21	112	0.10
4	Oct-21	250	0.23
5	Nov-21	198	0.18
6	Dec-21	225	0.20
7	Jan-22	325	0.29
8	Feb-22	298	0.27





9	Mar-22	301	0.27
10	Apr-22	198	0.18
11	May-22	389	0.33
12	Jun-22	128	0.12
13	Total	3018	2.72
14	Maximum	389	0.33
15	Minimum	112	0.10
16	Average	251.50	0.23

Chart No 2: Representation of Month wise CO₂ emissions:



[Signature]
Principal





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 CO₂ 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 of CO ₂
6	Annual Reduction in CO ₂ Emission = (4) * (5) /1000	10.8	MT

Photograph of Roof Top Solar PV Plant:



[Signature]
Principal

Vilas Tambe Womens College of Education (B.Ed.)
Durnbarwadi, Dist. Solapur, Maharashtra, India





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
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, °C	Humidity, %	Lux Level	Noise Level, dB
1	Meeting Room	26.3	60	123	45
2	Language Lab	26.3	80	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


Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumburwadi, Pune



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:




Principal

Vilas Tambe Womens College of Education (B.Ed.)
Dumbarwadi, Vilas Tambe, Pune





CHAPTER-VII STUDY OF RAIN WATER MANAGEMENT

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 Pipe

Bore well recharge point:



Principal
Principal





CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY PRACTICES

8.1 Tree 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:




Principal

Vilas Tambe Womens College of Education (B.Ed.),
Dumberwadi, Dist. Tal. Ulhas, Dist. Pune.





ANNEXURE-I: AIR QUALITY, NOISE & INDOOR COMFORT STANDARDS:

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

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

2. Recommended Noise Level Standards:

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

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

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


Principal

Vilas Tambe Women's College of Education [E-Ed]
Dumburwadi, Pune - 411 004





❖ 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.



Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumbarwadi(Otur) Tal:Junnar, Dist: Pune.



SAVING ENERGY POLICY STICKER-



GPS Map Camera

Dumbarwadi, Maharashtra, India
62R8+396, Dumbarwadi, Maharashtra 412412, India
Lat 19.240353°
Long 74.015852°
31/10/23 11:43 AM GMT +05:30




Principal



VILAS TAMBE WOMEN'S COLLEGE OF EDUCATION (B.ED.)



Dumbarwadi, Otur, Tal - Junnar, Dist - Pune - 412409

- 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.



Principal

Vilas Tambe Women's College of Education (B.Ed.)
Dumbarwadi(Otur) Tal. Junnar, Dist. Pune.




VILAS TAMBE WOMEN'S COLLEGE OF EDUCATION (B.ED.)



Dumbarwadi, Otur, Tal - Junnar, Dist - Pune - 412409

Solar panel- Bill

TAX INVOICE

 JSC Energy Marketers Pvt Ltd Plot No. 20, Sector 10, Gurgaon, Haryana Gurgaon - 122002, India Phone: +91 122 412 2222 Email: info@jscenergymarketers.com		Invoice No: IN/24/17-0101 Invoice Date: 27-Dec-2024 Invoice Type: Actual Terms of Payment Customer Ref: Order Reference No. PRODUCT/ITEM Buyer's Order No.	
Customer: Vilas Tambe Women's College Of Education Plot No. 20, Sector 10, Gurgaon, Haryana Gurgaon - 122002, India Phone: +91 122 412 2222 Email: info@jscenergymarketers.com		Supplier Ref: Order Reference No. Invoice Ref: Invoice Reference No. Invoice Date: Invoice Date Invoice Type: Invoice Type Invoice No: Invoice No.	
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Sl. No.	Description of Goods	Quantity	Rate	Unit	Tax %	Amount
1	SOLAR POWER PACK 10KW JSC ENERGY MARKETERS PVT LTD	1	17,140.00	NO.	18%	20,125.20
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						17,140.00
						15,475.20
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						17,140.00
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						1,224.80
						17,140.00
						15,475.20



- 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.



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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.



[Signature]
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- Master Switches-

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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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- 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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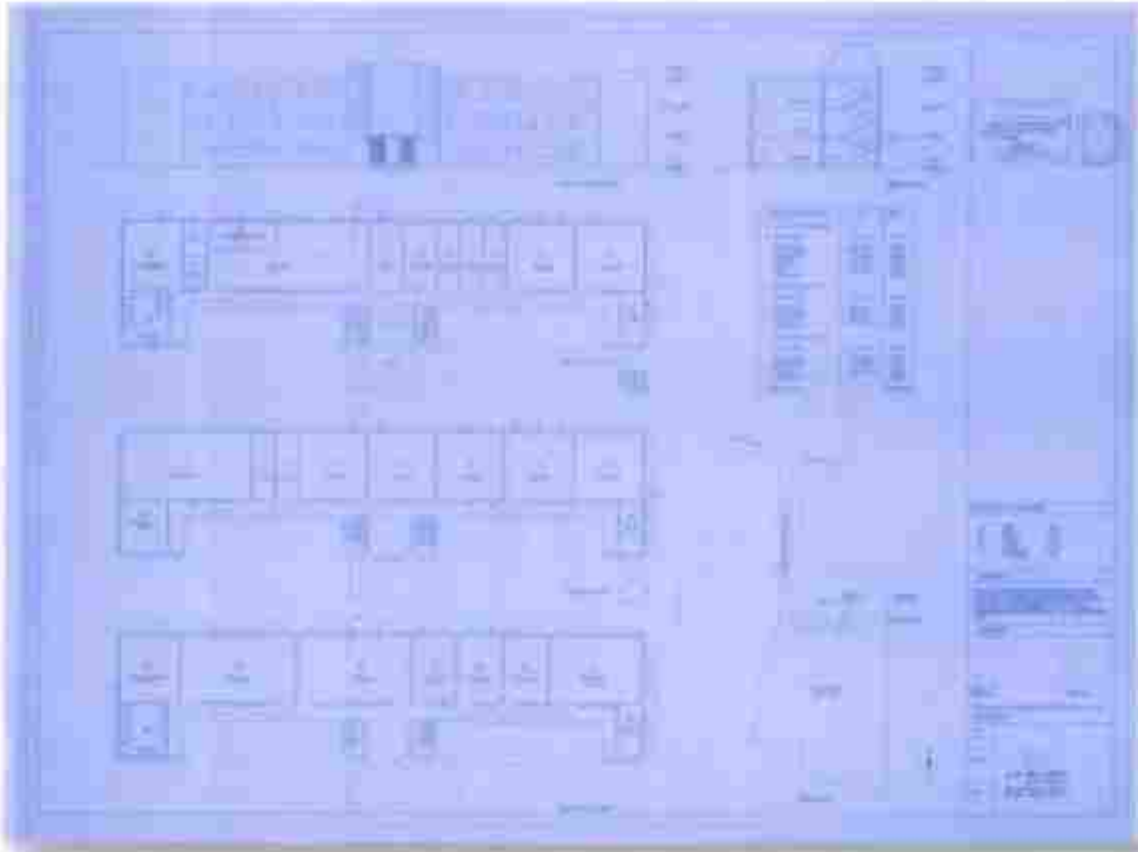


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- Map-



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 compuse, ensuring a reliable and sustainable water source for various needs, promoting environmental responsibility, and contributing to cost savings in water management.



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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.



9 | P a g e

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▪ Vermicompost –



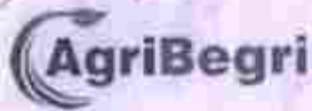
What is Vermicomposting?

- ▶ 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.



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Tax Invoice/Bill of Supply/Cash Memo
(Duplicate for Transporter)

Vilas Tambe Women's College Of Education (B.Ed.)

Sold By
Mipatex
1, S No. 36/32, Dagada Farm, Pipoli Rd, near Furtach
Furniture, Kothrud
Pune - 411050
Maharashtra, India
GST NO: 27APUPR4132F1ZG

Billing Address:
Vilas Tambe Women's College Of Education (B.Ed.)
dumbarwadi, post- khamundi
Junner
Pune - 410504
Maharashtra

Shipping Address
Vilas Tambe Women's College Of Education (B.Ed.)
dumbarwadi, post- khamundi
Junner
Pune - 410504
Maharashtra

Order Number: 20290640
Order Date: 07/01/2022 01:07:53

Invoice Number: AB2000192022200290640
Invoice Date: 07/01/2022 03:08:59

Sl. No	Product Name	Unit Price	Qty	Tax Rate	Tax Type	Tax Amount	Total Amount
1	Mipatex HDPE Organic Varnis Compost Bed. 80 x 40 x 20. (Green). High Quality Material - 1. No (250 GSM)	Rs. 1,230.00	2.00	9% 9%	SGST CGST	221.55 221.50	Rs. 2954.00
TOTAL							Rs. 2954.00 ✓

This is a computer generated invoice and does not require a signature.

SUBJECT TO PUNE JURISDICTION

Order online: www.agribegri.com

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▪ Ban on Use of Plastic-



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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