

ENERGY AUDIT REPORT
of
Deccan Education Society's,
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE

Year: 2017-18

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006

Ph No: 020-26614393/266144403, Fax No: 020-26615031

Email: econ@mahaurja.com, Web: www.mahaurja.com

ECN/2017-18/CR-01/5726

30th November 2017

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor in Maharashtra under Save Energy Programme of MEDA.

Name and Address of the firm : Enrich Consultants
Yashashree, Plot No. 26, Nirmal Baug
Society, Parvati, Pune - 411009.

Registration Category : Empanelled Consultant for Save Energy Programme.

Registration Number : MEDA/ECN/CR-01/2017-18/EA-37

- The Save Energy Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid upto **3 year** from the date of registration, to carry out energy audits under the Save Energy Programme of MEDA.
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.



Plant

OFFICIATING PRINCIPAL
Deccan Education Society's
Shri Navalmal Firodia Law College
Pune-411004.

Smita
30/11
(Smita Kudarikar)
Manager (EC)



Enrich Consultants

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

Ref: EC/DESNFLC/17-18/01

Date: 11/5/2018

CERTIFICATE

This is to certify that we have conducted Energy Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, 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

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Deccan Education Society's

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5	Study of Usage of Alternate Energy	14
6	Study of LED Lighting	15



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Shri Navalmal Firodia Law College
Pune-411004.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalmal Firodia Law College, Pune for awarding us the assignment of Energy Audit of their Pune Campus for the Year: 2017-18.

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



A handwritten signature in blue ink, appearing to read "P. Lang".

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Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalma Firodia Law College Pune consumes Energy in the form of Electrical Energy; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	26858	21.49
2	Maximum	3425	2.74
3	Minimum	1808	1.45
4	Average	2238.17	1.79

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

4. Usage of Alternate Energy:

The College has yet to install Roof Top Solar PV Plant. Hence, as on Date, the percentage of Annual Energy Demand met by Alternate/Renewable Energy works out to be nil.

5. Usage of LED Lighting:

- The Total Lighting Load of the College is 9.08 kW.
- The Total LED Lighting Load of the College is 1.07 kW.
- The percentage of LED Lighting to Total Lighting Demand is 12 %.

6. Assumption:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere



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ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
DES	: Deccan Education Society
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton



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CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study Connected Load of the College
2. To study present Energy Consumption
3. To compute CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

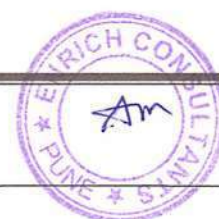
1.2 Table No 1: General Details of the College:

No	Head	Particulars
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2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



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Pune-411 004.



CHAPTER-II

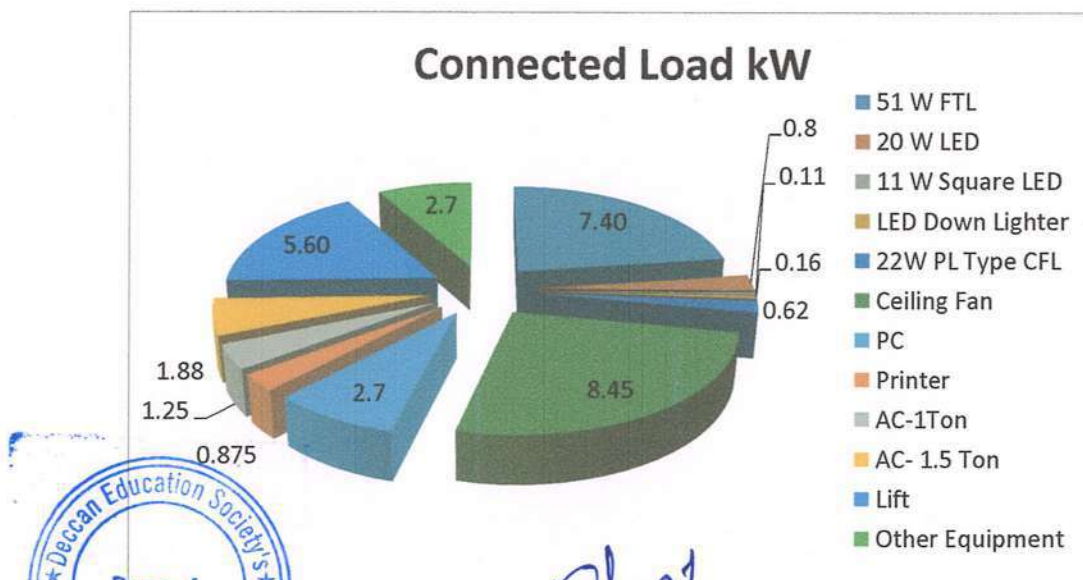
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load kW
1	51 W FTL	145	51	7.40
2	20 W LED	40	20	0.8
3	11 W Square LED	10	11	0.11
4	LED Down Lighter	10	16	0.16
5	22W PL Type CFL	22	28	0.62
6	Ceiling Fan	130	65	8.45
7	PC	18	150	2.7
8	Printer	5	175	0.875
9	AC-1Ton	1	1250	1.25
10	AC- 1.5 Ton	1	1875	1.88
11	Lift	1	5595	5.60
12	Other Equipment	18	150	2.7
13	Total			33

Chart No 1: Study of Connected Load:



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CHAPTER-III

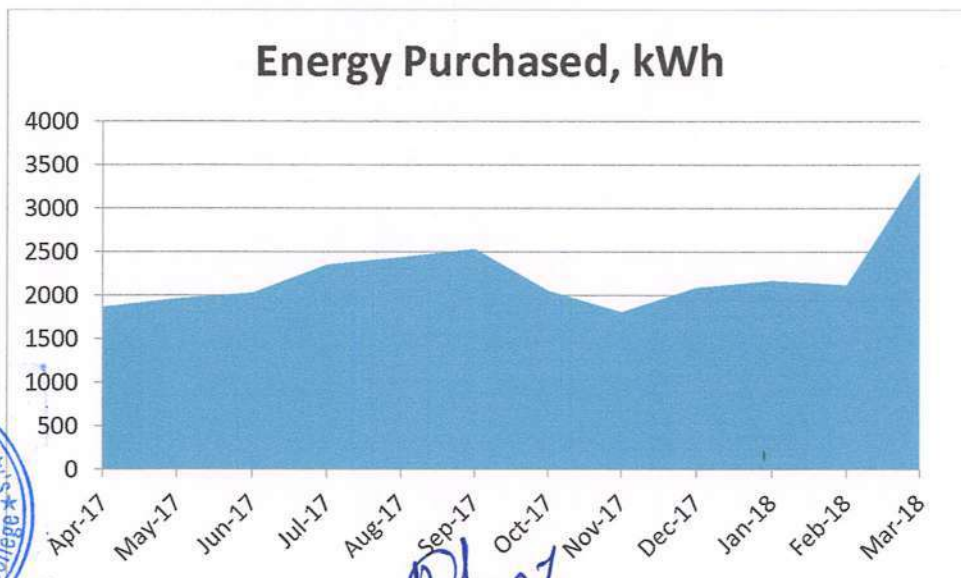
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2017-18:

No	Month	Energy Purchased, kWh
1	Apr-17	1870
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3	Jun-17	2031
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7	Oct-17	2053
8	Nov-17	1808
9	Dec-17	2090
10	Jan-18	2171
11	Feb-18	2118
12	Mar-18	3425
13	Total	26858
14	Maximum	3425
15	Minimum	1808
16	Average	2238.17

Chart No 2: Variation in Monthly Energy Consumption:



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Pune-411004.



Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	26858
2	Maximum	3425
3	Minimum	1808
4	Average	2238.17



CHAPTER-IV

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-17	1870	1.50
2	May-17	1963	1.57
3	Jun-17	2031	1.62
4	Jul-17	2356	1.88
5	Aug-17	2439	1.95
6	Sep-17	2534	2.03
7	Oct-17	2053	1.64
8	Nov-17	1808	1.45
9	Dec-17	2090	1.67
10	Jan-18	2171	1.74
11	Feb-18	2118	1.69
12	Mar-18	3425	2.74
13	Total	26858	21.49
14	Maximum	3425	2.74
15	Minimum	1808	1.45
16	Average	2238.17	1.79



Chart No 3: Month wise CO₂Emissions:

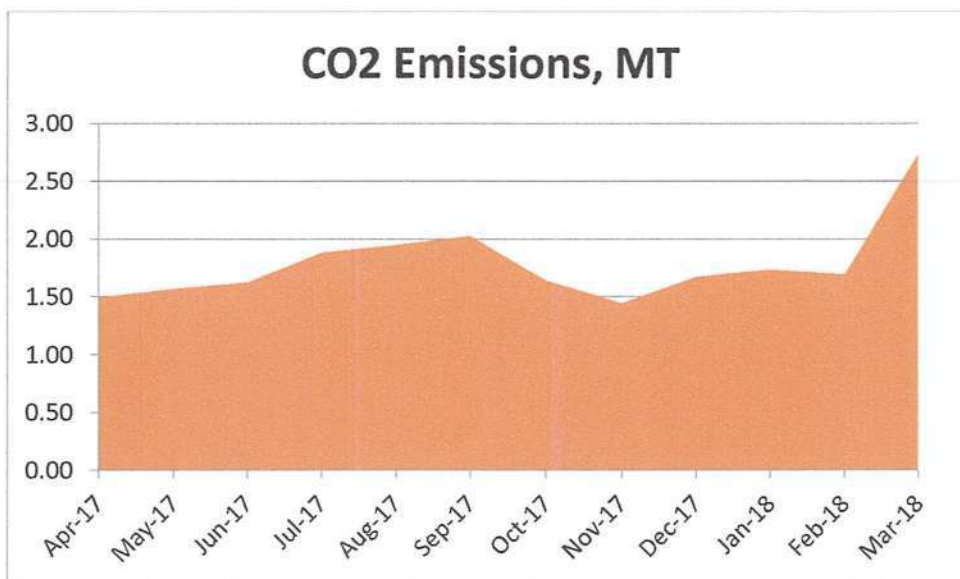


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	26858	21.49
2	Maximum	3425	2.74
3	Minimum	1808	1.45
4	Average	2238.17	1.79



Plan

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CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

The College has yet to install Roof Top Solar PV Plant. Hence, as on Date, the percentage of Annual Energy Demand met by Alternate/Renewable Energy works out to be nil.



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CHAPTER VI

STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load.

Table No 7: Percentage of Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of 51 W FTL Fittings	145	Nos
2	Demand of 20 W LED Tube Light	51	W/Unit
3	Total Electrical Load of 51 W FTL Fittings	7.40	kW
4	No of 20 W LED Tube Lights	40	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	0.8	kW
7	No of 11 W LED Fitting	10	Nos
8	Demand of 11 W LED Fitting	11	W/Unit
9	Total Electrical Load of 11 W LED Fittings	0.11	kW
10	No of 16 W LED Down Lighter	10	Nos
11	Demand of 16 W LED Down Lighter Fitting	16	W/Unit
12	Total Electrical Load of 16 W LED Down Lighter Fittings	0.16	kW
13	Qty of 22 W PL Type CFL Fittings	22	Nos
14	Demand of 22 W PL Type CFL Fittings	28	W/Unit
15	Total Electrical Load of 22 W PL Type CFL Fittings	0.62	kW
16	Total LED Lighting Load= 6+9+12	1.07	kW
17	Total Lighting Load= 3 + 6 +9 +12+15	9.08	kW
18	% of LED Lighting to Total Lighting Load = (16)*100/(17)	12	%



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GREEN AUDIT REPORT
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SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE

Year: 2017-18

Prepared by:

Enrich Consultants

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Near Mukhtangan English School, Parvati, Pune 411009
Phone: 09890444795 Email: enrichcons@gmail.com




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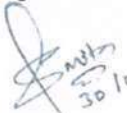
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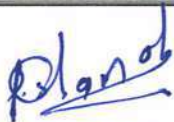
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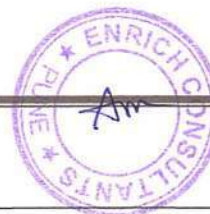

(Smita Kudarikar)
Manager (EC)





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Shri Navalma Firodia Law College
Pune-411004

Enrich Consultants, Pune



Page 2

Enrich Consultants

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

Ref: EC/ DESNFLC /17-18/02

Date: 11/5/2018

CERTIFICATE

This is to certify that we have conducted Green Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, in the Year 2017-18.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Maintenance of Good Internal Road
- Tree Plantation in the campus

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Shri Navalma Firodia Law College
Pune-411004.

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411004.



AKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of, Deccan Education Society's Shri Navalmal Firodia Law College, Pune 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.



A handwritten signature in blue ink, appearing to read "pland", written over the printed name of the Officiating Principal.

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalma Firodia Law College Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	26858	21.49
2	Maximum	3425	2.74
3	Minimum	1808	1.45
4	Average	2238.17	1.79

3. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting

4. Usage of Renewable Energy:

The College has yet to install Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste is segregated at source. It is then handed over for further action.

5.2 Organic Waste Management:

The College has a Vermi Composting Unit, to convert the leafy waste into Bio Compost.

6. Green Practices:

- Maintenance of good Internal Road
- Maintenance of Internal Garden

7. Assumption:

1. 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

ABBREVIATIONS

DES	Deccan Education Society
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity



P. Lang

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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To Study CO₂ emissions
3. To study usage of Renewable Energy
4. Study of Waste Management
5. Study of Green & Sustainable Practices

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



Polan J.

OFFICIATING PRINCIPAL
Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Bill Analysis- 2017-18:

No	Month	Energy Purchased, kWh
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2	May-17	1963
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 Shri Navalma Firodia Law College
 Pune-411 004.

Chart No 1: Variation in Monthly Energy Consumption:

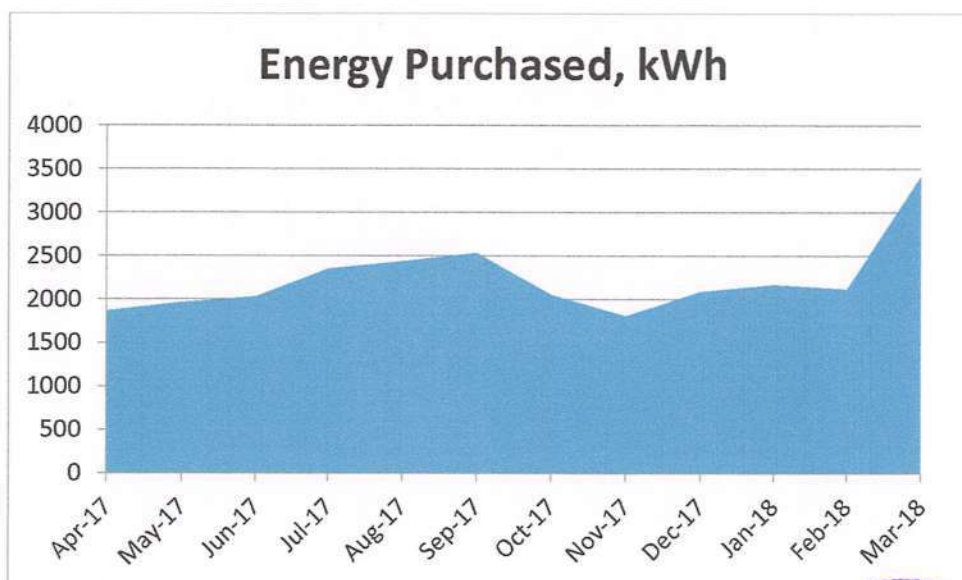


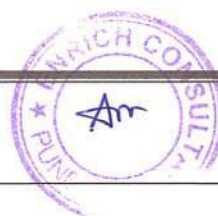
Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
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P. Shankar

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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-17	1870	1.50
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Chart No 2: Month wise CO₂Emissions:

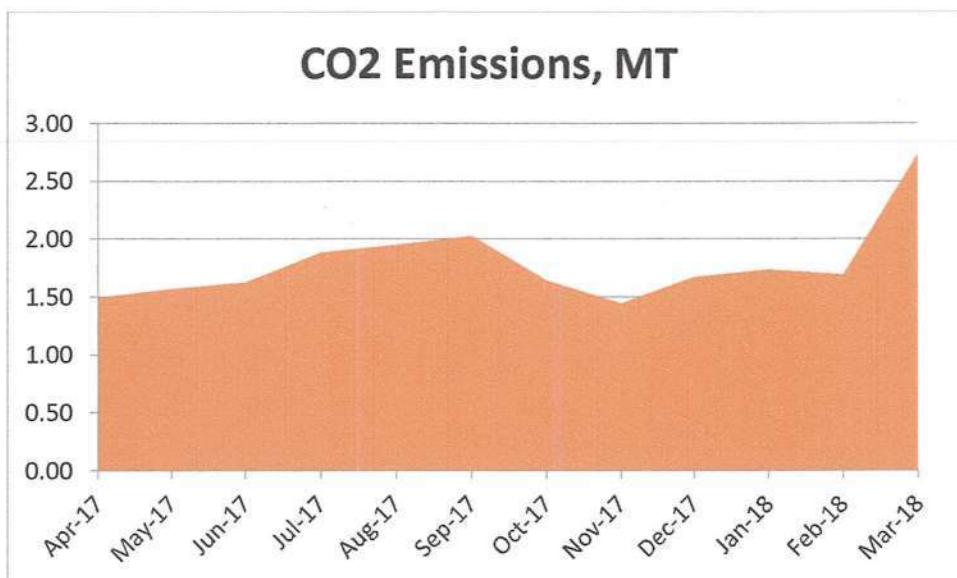


Table No 5: Variation in Important Parameters:

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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.



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Deccan Education Society's



CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-VI

STUDY OF GREEN PRACTICES

7.1 Pedestrian Friendly 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 Tree plantation:



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SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2018-19

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Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

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Ph No: 020-26614393/266144403

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19th September, 2018

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- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
General Manager (EC)





OFFICIATING PRINCIPAL
Deccan Education Society's

Shri Navalma Firodia Law College
Pune-411004.



Enrich Consultants

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

Ref: EC/DESNFLC/18-19/01

Date: 5/5/2019

CERTIFICATE

This is to certify that we have conducted Energy Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, in the Year 2018-19.

The College has adopted following Energy Efficient practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Maximum usage of Day Lighting

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Shri Navalma Firodia Law College
Pune-411 004.

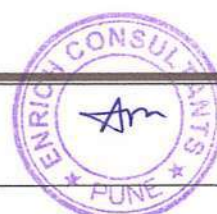
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4	Study of Carbon Foot Printing	12
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6	Study of LED Lighting	15



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Shri Navalmal Firodia Law College
Pune-411 004.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalmal Firodia Law College, Pune for awarding us the assignment of Energy Audit of their Pune Campus for the Year: 2018-19.

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



plan

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalma Firodia Law College Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	26530	23.88
2	Maximum	2698	2.43
3	Minimum	1795	1.62
4	Average	2210.83	1.99

3. Energy Conservation projects already installed:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated Equipment

4. Usage of Alternate Energy:

The College has yet to install Roof Top Solar PV Plant. Hence, as on Date, the percentage of Annual Energy Demand met by Alternate/Renewable Energy works out to be nil. It is recommended to install Roof Top Solar PV Plant.

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **8.68 kW**.
- The Total LED Lighting Load of the College is **1.63 kW**.
- The percentage of LED Lighting to Total Lighting Demand is **19 %**.

6. Assumption:

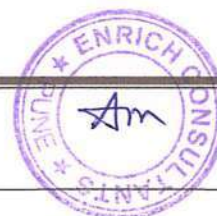
1. 1 kWh of Electrical Energy releases **0.8 Kg** of CO₂ into atmosphere



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Shri Navalma Firodia Law College
Pune-411 004.



ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
DES	: Deccan Education Society
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton



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Shri Navalma Firodia Law College
Pune-411004.



CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study Connected Load of the College
2. To study present Energy Consumption
3. To compute CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



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CHAPTER-II

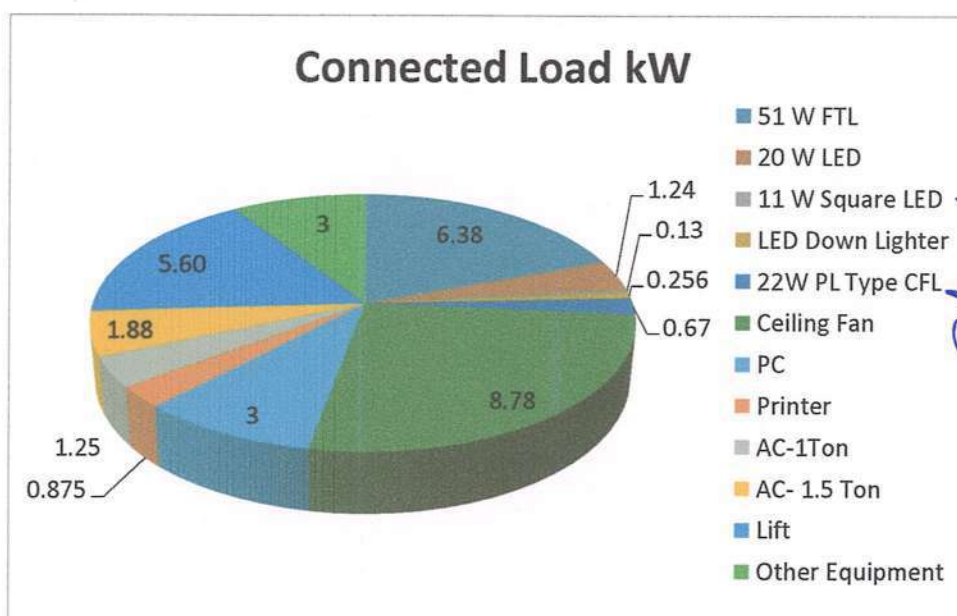
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load kW
1	51 W FTL	125	51	6.38
2	20 W LED	62	20	1.24
3	11 W Square LED	12	11	0.13
4	LED Down Lighter	16	16	0.256
5	22W PL Type CFL	24	28	0.67
6	Ceiling Fan	135	65	8.78
7	PC	20	150	3
8	Printer	5	175	0.875
9	AC-1Ton	1	1250	1.25
10	AC- 1.5 Ton	1	1875	1.88
11	Lift	1	5595	5.60
12	Other Equipment	20	150	3
13	Total			33

Chart No 1: Study of Connected Load:



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Pune-411 004.



CHAPTER-III

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2018-19:

No	Month	Energy Purchased, kWh
1	Apr-18	1975
2	May-18	1795
3	Jun-18	2134
4	Jul-18	2261
5	Aug-18	2674
6	Sep-18	2301
7	Oct-18	1987
8	Nov-18	1908
9	Dec-18	2130
10	Jan-19	2264
11	Feb-19	2403
12	Mar-19	2698
13	Total	26530
14	Maximum	2698
15	Minimum	1795
16	Average	2210.83



[Signature]
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 Shri Navalma Firodia Law College
 Pune-411004.

Chart No 2: Variation in Monthly Energy Consumption:

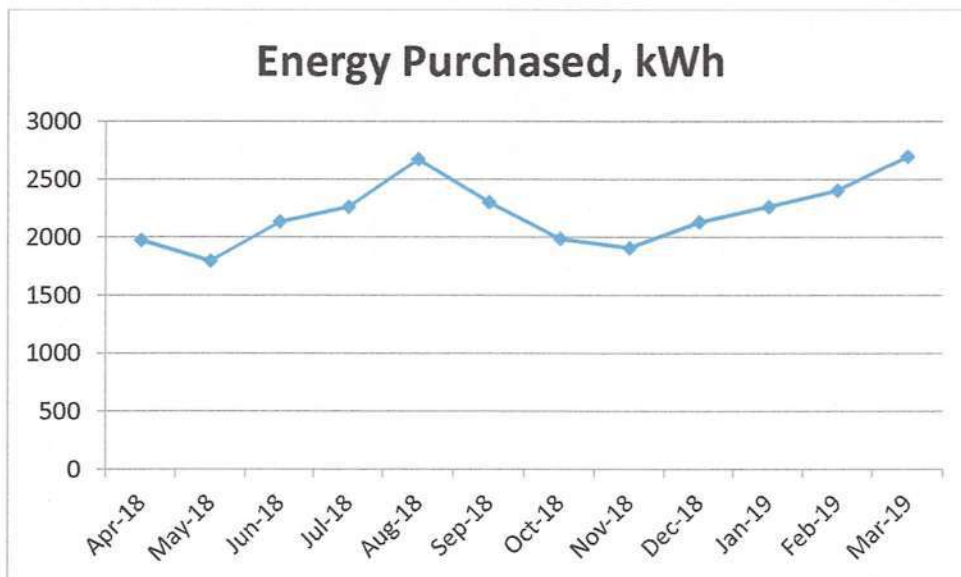


Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	26530
2	Maximum	2698
3	Minimum	1795
4	Average	2210.83



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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-IV

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-18	1975	1.78
2	May-18	1795	1.62
3	Jun-18	2134	1.92
4	Jul-18	2261	2.03
5	Aug-18	2674	2.41
6	Sep-18	2301	2.07
7	Oct-18	1987	1.79
8	Nov-18	1908	1.72
9	Dec-18	2130	1.92
10	Jan-19	2264	2.04
11	Feb-19	2403	2.16
12	Mar-19	2698	2.43
13	Total	26530	23.88
14	Maximum	2698	2.43
15	Minimum	1795	1.62
16	Average	2210.83	1.99



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Shri Navalmal Firodia Law College
Pune-411 004.

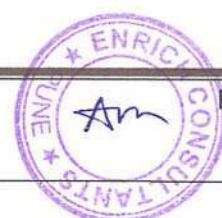


Chart No 3: Month wise CO₂Emissions:

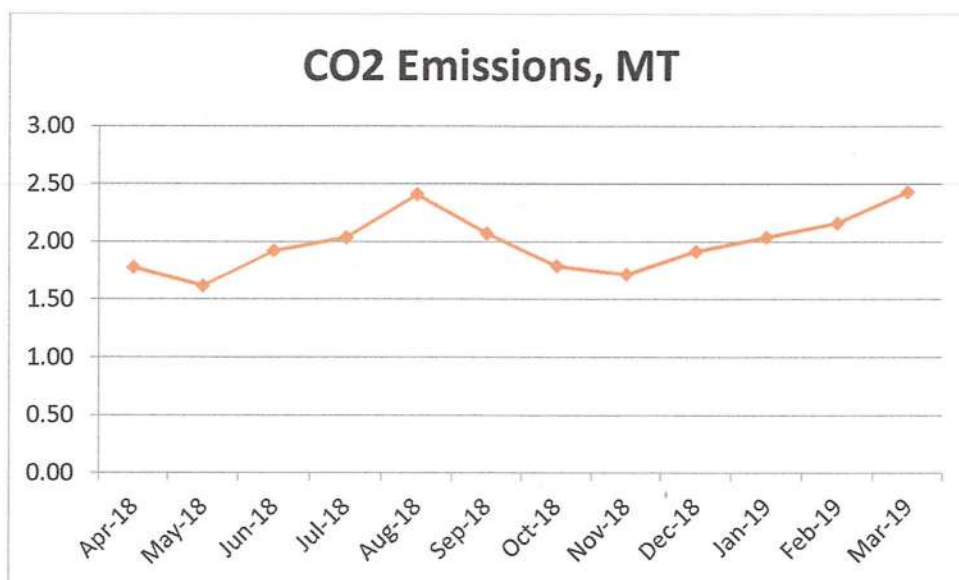


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	26530	23.88
2	Maximum	2698	2.43
3	Minimum	1795	1.62
4	Average	2210.83	1.99



[Signature]

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Pune-411 004.



CHAPTER-V

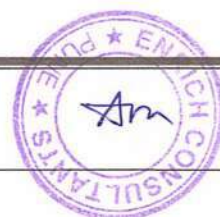
STUDY OF USAGE OF ALTERNATE ENERGY

The College has yet to install Roof Top Solar PV Plant. Hence, as on Date, the percentage of Annual Energy Demand met by Alternate/Renewable Energy works out to be nil. It is recommended to install Roof Top Solar PV Plant.



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Deccan Education Society's



CHAPTER VI

STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load.

Table No 7: Percentage of Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of 51 W FTL Fittings	125	Nos
2	Demand of 20 W LED Tube Light	51	W/Unit
3	Total Electrical Load of 51 W FTL Fittings	6.38	kW
4	No of 20 W LED Tube Lights	62	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	1.24	kW
7	No of 11 W LED Fitting	12	Nos
8	Demand of 11 W LED Fitting	11	W/Unit
9	Total Electrical Load of 11 W LED Fittings	0.13	kW
10	No of 16 W LED Down Lighter	16	Nos
11	Demand of 16 W LED Down Lighter Fitting	16	W/Unit
12	Total Electrical Load of 16 W LED Down Lighter Fittings	0.256	kW
13	Qty of 22 W PL Type CFL Fittings	24	Nos
14	Demand of 22 W PL Type CFL Fittings	28	W/Unit
15	Total Electrical Load of 22 W PL Type CFL Fittings	0.67	kW
16	Total LED Lighting Load= 6+9+12	1.63	kW
17	Total Lighting Load= 3 + 6 +9 +12+15	8.68	kW
18	% of LED Lighting to Total Lighting Load = (16)*100/(17)	19	%



Plan



GREEN AUDIT REPORT
of
Deccan Education Society's
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2018-19

Prepared by:

Enrich Consultants

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



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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411004.

MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,

Ph No: 020-26614393/266144403

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19th September, 2018

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

Registration Category : *Empanelled Consultant for Energy Conservation Programme*

Registration Number : **MEDA/ECN/CR-05/2018-19/EA-03**

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
General Manager (EC)



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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411004.

Enrich Consultants, Pune



Enrich Consultants

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

Ref: EC/ DESNFLC /18-19/02

Date: 5/5/2019

CERTIFICATE

This is to certify that we have conducted Green Audit at Deccan Education Society's Shri Navalma Firodia Law College, Pune, in the Year 2018-19.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Implementation of Rain Water Management Project
- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangjan

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.

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3	Study of Carbon Foot Printing	11
4	Study of Usage of Renewable Energy	13
5	Study of Waste Management	14
6	Study of Rain water Management	15
7	Study of Green Practices	16



P. S. Land

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of, Deccan Education Society's Shri Navalma Firodia Law College, Pune 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.



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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.

Enrich Consultants, Pune



Page 5

EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalmal Firodia Law College Pune consumes Energy in the form of Electrical Energy used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	26530	23.88
2	Maximum	2698	2.43
3	Minimum	1795	1.62
4	Average	2210.83	1.99

3. Various initiatives taken for Energy Conservation:

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

4. Usage of Renewable Energy:

The College has yet to install Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. It is then handed over for further action.

5.2 Organic Waste Management:

The College has a Vermi Composting Plant, to convert the leafy waste into Bio Compost.

6. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.

7. Green Practices:

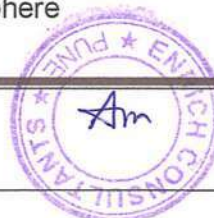
- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan

8. Assumption:

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere



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Pune-411 004.



ABBREVIATIONS

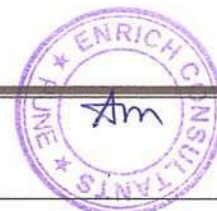
DES	Deccan Education Society
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity



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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-I INTRODUCTION

1.1 Objectives:

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

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



Polant.

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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

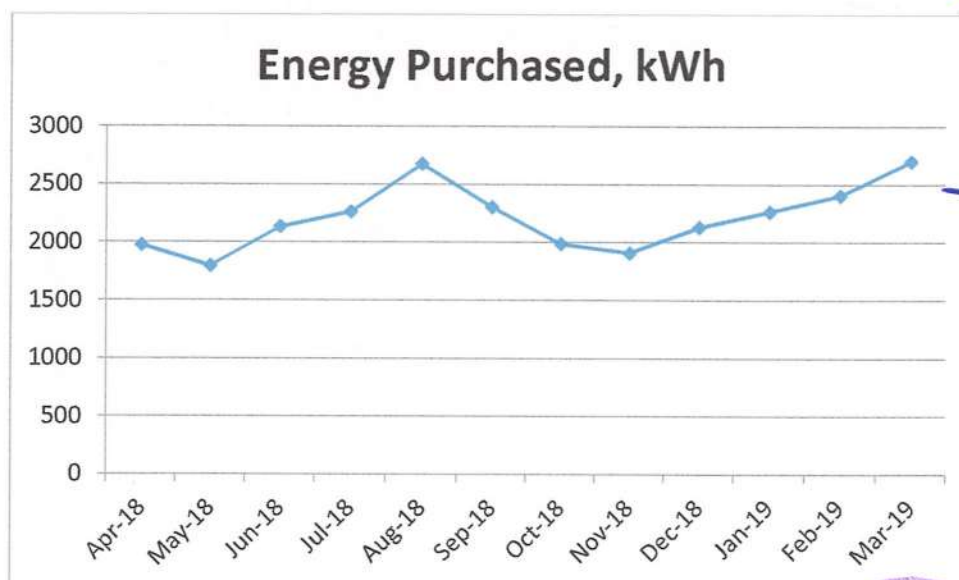
In this chapter, we present the analysis of last year Electricity Bills.

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

No	Month	Energy Purchased, kWh
1	Apr-18	1975
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3	Jun-18	2134
4	Jul-18	2261
5	Aug-18	2674
6	Sep-18	2301
7	Oct-18	1987
8	Nov-18	1908
9	Dec-18	2130
10	Jan-19	2264
11	Feb-19	2403
12	Mar-19	2698
13	Total	26530
14	Maximum	2698
15	Minimum	1795
16	Average	2210.83



Chart No 1: Variation in Monthly Energy Consumption:



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Pune-411004.



Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	26530
2	Maximum	2698
3	Minimum	1795
4	Average	2210.83



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Shri Navalma Firodia Law College
Pune-411004.



CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-18	1975	1.78
2	May-18	1795	1.62
3	Jun-18	2134	1.92
4	Jul-18	2261	2.03
5	Aug-18	2674	2.41
6	Sep-18	2301	2.07
7	Oct-18	1987	1.79
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16	Average	2210.83	1.99

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Shri Navalma Firodia Law College
Pune-411004.

Chart No 2: Month wise CO₂Emissions:

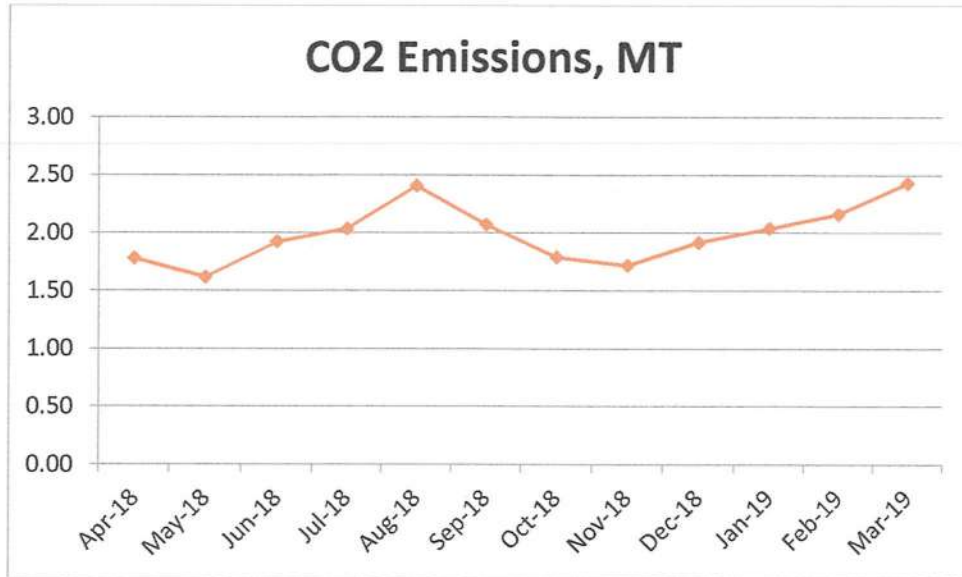


Table No 5: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	26530	23.88
2	Maximum	2698	2.43
3	Minimum	1795	1.62
4	Average	2210.83	1.99



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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof Top Solar PV Plant. It is recommended to install Roof Top Solar PV Plant.



A handwritten signature in blue ink, appearing to read "P. Land", written over the printed name of the Officiating Principal.

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



plant.



CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.

Photograph of Rain water Management Pipe:



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Shri Navalma Firodia Law College
Pune-411 004.



CHAPTER-VII

STUDY OF GREEN PRACTICES

7.1 Pedestrian Friendly Roads:

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 Tree plantation:



Enrich Consultants, Pune

P. Lang
OFFICIATING PRINCIPAL
Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



Page 16

7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp at the main entrance.

Photograph of Ramp:



P. Lang

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



ENERGY AUDIT REPORT
of
Deccan Education Society's,
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2019-20

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,

Ph No: 020-26614393/266144403

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19th September, 2018

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

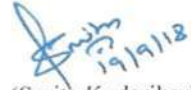
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- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
General Manager (EC)





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Deccan Education Society's

Shri Navalma Firodia Law College
Pune-411 004.

Enrich Consultants, Pune



Page 2

Enrich Consultants

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

Ref: EC/DESNFLC/19-20/01

Date: 16/8/2020

CERTIFICATE

This is to certify that we have conducted Energy Audit at Deccan Education Society's Shri Navalma Firodia Law College, Pune, 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 making the Campus Energy Efficient.

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Shri Navalma Firodia Law College
Pune-411004.

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Pune-411 004.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalmal Firodia Law College, Pune for awarding us the assignment of Energy Audit of their Pune Campus for the Year: 2019-20.

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



P. Lang

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Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalma Firodia Law College Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	22919	20.63
2	Maximum	2564	2.31
3	Minimum	1269	1.14
4	Average	1909.92	1.72

3. Energy Conservation projects already installed:

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

4. Usage of Alternate Energy:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- Energy purchased from MSEDCL is **22919 kWh**.
- Energy generated by Roof Top Solar PV Plant is **8000 kWh**.
- Total Annual Energy Requirement of College is **30919 kWh**.
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **25.87 %**.

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **8.18 kW**.
- The Total LED Lighting Load of the College is **1.90 kW**.
- The percentage of LED Lighting to Total Lighting Demand is **23.24 %**.

6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Solar Energy Generation Days in 19-20 (System installed in June-19): **200 Nos**

7. Reference:

- For Solar PV Energy Generation: www.solarrooftop.gov.in

ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
DES	: Deccan Education Society
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton



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CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study Connected Load of the College
2. To study present Energy Consumption
3. To compute CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



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CHAPTER-II

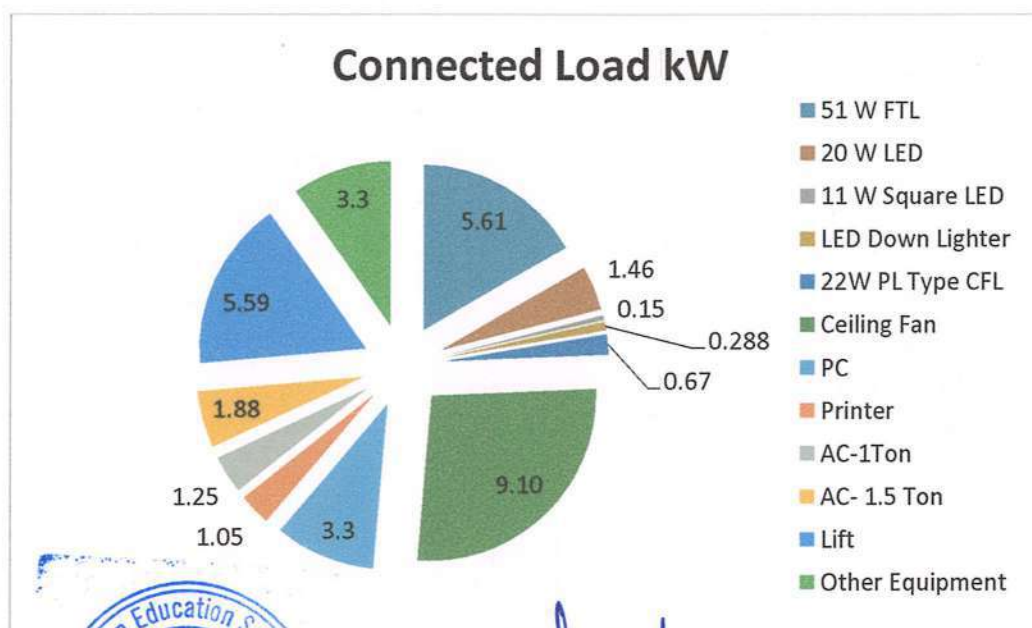
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load kW
1	51 W FTL	110	51	5.61
2	20 W LED	73	20	1.46
3	11 W Square LED	14	11	0.15
4	LED Down Lighter	18	16	0.288
5	22W PL Type CFL	24	28	0.67
6	Ceiling Fan	140	65	9.10
7	PC	22	150	3.3
8	Printer	6	175	1.05
9	AC-1Ton	1	1250	1.25
10	AC- 1.5 Ton	1	1875	1.88
11	Lift	1	5595	5.60
12	Other Equipment	22	150	3.3
13	Total			34

Chart No 1: Study of Connected Load:



CHAPTER-III

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2019-20:

No	Month	Energy Purchased, kWh
1	Apr-19	2365
2	May-19	2146
3	Jun-19	2412
4	Jul-19	1698
5	Aug-19	1789
6	Sep-19	1269
7	Oct-19	2126
8	Nov-19	1785
9	Dec-19	2164
10	Jan-20	2564
11	Feb-20	1298
12	Mar-20	1303
13	Total	22919
14	Maximum	2564
15	Minimum	1269
16	Average	1909.92

Chart No 2: Variation in Monthly Energy Consumption:

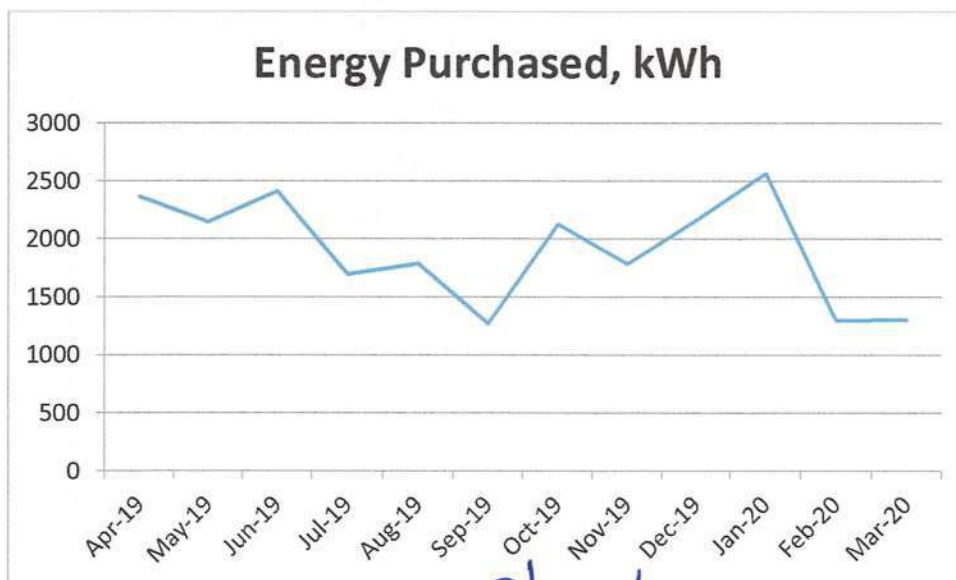


Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	22919
2	Maximum	2564
3	Minimum	1269
4	Average	1909.92



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CHAPTER-IV

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-19	2365	1.89
2	May-19	2146	1.72
3	Jun-19	2412	1.93
4	Jul-19	1698	1.36
5	Aug-19	1789	1.43
6	Sep-19	1269	1.02
7	Oct-19	2126	1.70
8	Nov-19	1785	1.43
9	Dec-19	2164	1.73
10	Jan-20	2564	2.05
11	Feb-20	1298	1.04
12	Mar-20	1303	1.04
13	Total	22919	18.34
14	Maximum	2564	2.05
15	Minimum	1269	1.02
16	Average	1909.92	1.53

Chart No 3: Month wise CO₂Emissions:

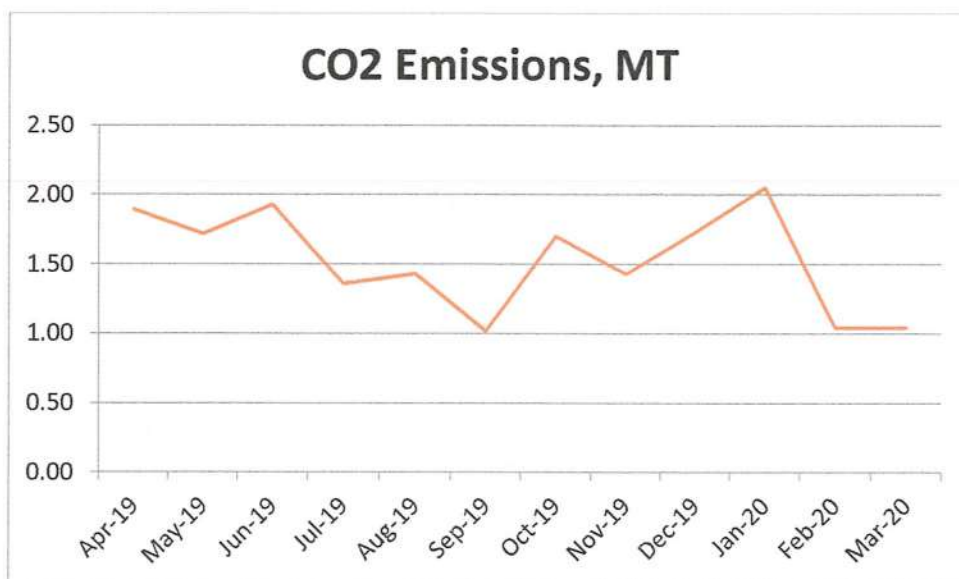


Table No 6: Important Parameters:

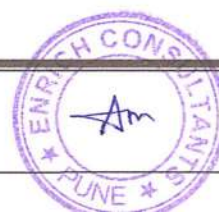
No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	22919	18.34
2	Maximum	2564	2.05
3	Minimum	1269	1.02
4	Average	1909.92	1.53



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CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

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

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

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

No	Particulars	Value	Unit
1	Energy purchased from MSEDCL	22919	kWh/Annum
2	Capacity of Roof Top Solar PV Capacity	10	kWp
3	Average Energy Generated per kWp per Day	4	kWh/kWp
4	Annual Generation Days	200	Nos
5	Annual Solar Energy Generated = $2 \times 3 \times 4$	8000	kWh/Annum
6	Total Energy Requirement = (1) + (5)	30919	kWh/Annum
7	Percent of Alternate Energy to Annual Energy Requirement = $(5) \times 100 / (6)$	25.87	%

Photograph of Roof Top Solar PV Plant:



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CHAPTER VI

STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load.

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

No	Particulars	Value	Unit
1	No of 51 W FTL Fittings	110	Nos
2	Demand of 20 W LED Tube Light	51	W/Unit
3	Total Electrical Load of 51 W FTL Fittings	5.61	kW
4	No of 20 W LED Tube Lights	73	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	1.46	kW
7	No of 11 W LED Fitting	14	Nos
8	Demand of 11 W LED Fitting	11	W/Unit
9	Total Electrical Load of 11 W LED Fittings	0.15	kW
10	No of 16 W LED Down Lighter	18	Nos
11	Demand of 16 W LED Down Lighter Fitting	16	W/Unit
12	Total Electrical Load of 16 W LED Down Lighter Fittings	0.288	kW
13	Qty of 22 W PL Type CFL Fittings	24	Nos
14	Demand of 22 W PL Type CFL Fittings	28	W/Unit
15	Total Electrical Load of 22 W PL Type CFL Fittings	0.67	kW
16	Total LED Lighting Load= 6+9+12	1.90	kW
17	Total Lighting Load= 3 + 6 +9 +12+15	8.18	kW
18	% of LED Lighting to Total Lighting Load = (16)*100/(17)	23.24	%



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GREEN AUDIT REPORT
of
Deccan Education Society's
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2019-20

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,

Ph No: 020-26614393/266144403

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19th September, 2018

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

Registration Category : *Empanelled Consultant for Energy Conservation Programme*

Registration Number : *MEDA/ECN/CR-05/2018-19/EA-03*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director-General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
General Manager (EC)



Enrich Consultants

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

Ref: EC/ DESNFLC /19-20/02

Date: 16/8/2020

CERTIFICATE

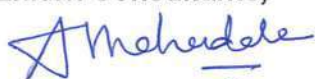
This is to certify that we have conducted Green Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, in the Year 2019-20.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Implementation of Rain Water Management Project
- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness by Display of Posters on Resource Conservation

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Shri Navalma Firodia Law College
Pune-411 004.

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Plan

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Pune-411 004.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of, Deccan Education Society's Shri Navalmal Firodia Law College, Pune for awarding us the assignment of Green Audit of their Campus for the Year: 2019-20.

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



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EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalmal Firodia Law College Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	22919	20.63
2	Maximum	2564	2.31
3	Minimum	1269	1.14
4	Average	1909.92	1.72

3. Various initiatives taken for Energy Conservation:

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

4. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 2019-20 is **8000 kWh**.
- Reduction in CO₂ Emissions in 2019-20 works out to be **6.4 MT**.

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. It is then handed over for further action.

5.2 Organic Waste Management:

The College has a Vermi Composting Plant, to convert the leafy waste into Bio Compost.

5.3 Sanitary Waste Management:

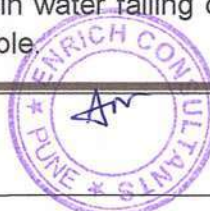
The College has made provision of Sanitary Waste Incinerator to dispose of the Sanitary Waste.

6. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.



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7. Green & Sustainable Initiatives:

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Display of Posters on Resource Conservation

8. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Solar Energy Generation Days in 19-20 (System installed in June-19): **200 Nos**

9. Reference:

- For Roof Top Solar PV Energy generation: www.solarrooftop.gov.in



P. Lang



ABBREVIATIONS

DES	Deccan Education Society
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity



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Pune-411 004.



CHAPTER-I INTRODUCTION

1.1 Objectives:

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

1.2 General Details of College: Table No 1:

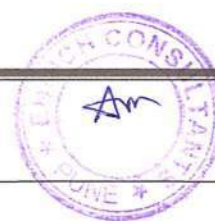
No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



Plant

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Pune-411 004.



CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

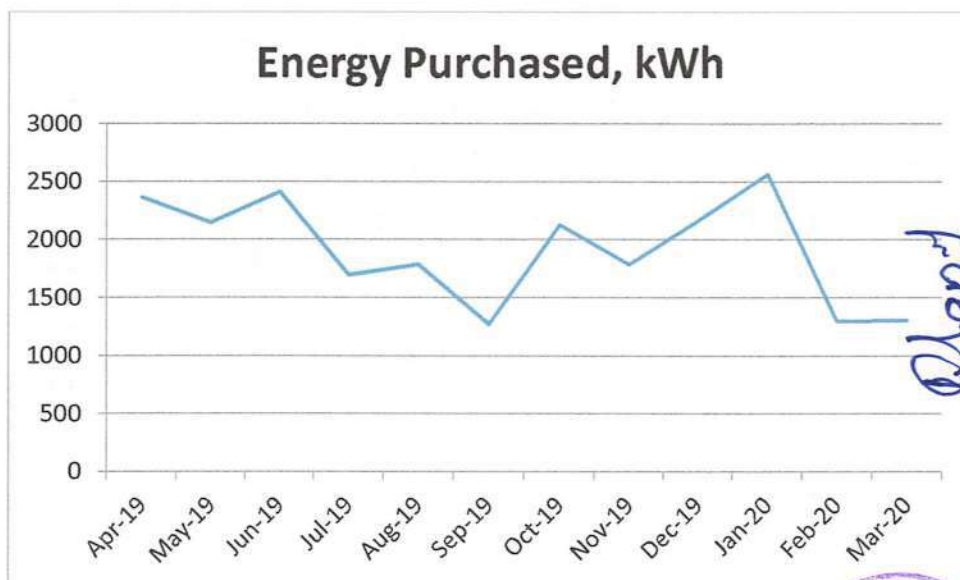
In this chapter, we present the analysis of last year Electricity Bills.

Table No 2: Electrical Bill Analysis- 2019-20:

No	Month	Energy Purchased, kWh
1	Apr-19	2365
2	May-19	2146
3	Jun-19	2412
4	Jul-19	1698
5	Aug-19	1789
6	Sep-19	1269
7	Oct-19	2126
8	Nov-19	1785
9	Dec-19	2164
10	Jan-20	2564
11	Feb-20	1298
12	Mar-20	1303
13	Total	22919
14	Maximum	2564
15	Minimum	1269
16	Average	1909.92



Chart No 1: Variation in Monthly Energy Consumption:



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Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	22919
2	Maximum	2564
3	Minimum	1269
4	Average	1909.92



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CHAPTER III

STUDY OF CARBON FOOTPRINTING

A **Carbon Foot print** is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-19	2365	1.89
2	May-19	2146	1.72
3	Jun-19	2412	1.93
4	Jul-19	1698	1.36
5	Aug-19	1789	1.43
6	Sep-19	1269	1.02
7	Oct-19	2126	1.70
8	Nov-19	1785	1.43
9	Dec-19	2164	1.73
10	Jan-20	2564	2.05
11	Feb-20	1298	1.04
12	Mar-20	1303	1.04
13	Total	22919	18.34
14	Maximum	2564	2.05
15	Minimum	1269	1.02
16	Average	1909.92	1.53



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Chart No 2: Month wise CO₂Emissions:

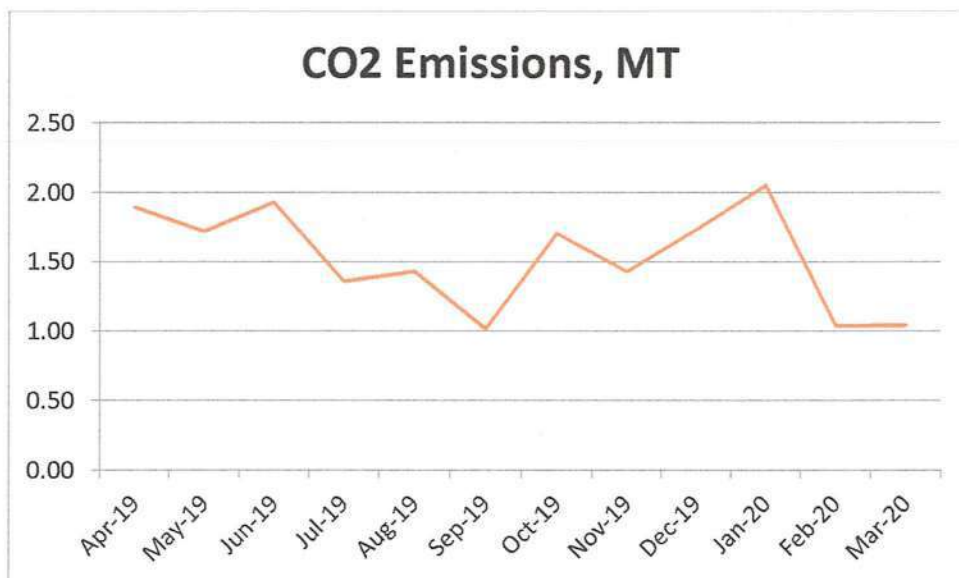


Table No 5: Variation in Important Parameters:

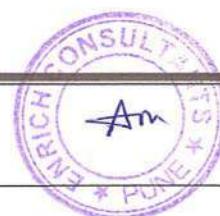
No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	22919	18.34
2	Maximum	2564	2.05
3	Minimum	1269	1.02
4	Average	1909.92	1.53



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Pune-411 004.



CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

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

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO₂ Emissions:

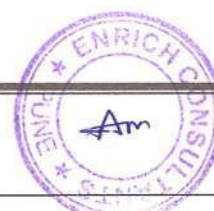
No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	8000	kWh
5	1 kWh of Electrical Energy saves	0.8	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	6.4	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



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CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



5.3 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.

Photograph of Rain water Management Pipe:



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CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

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 Tree plantation:



7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp at the main entrance.

Photograph of Ramp:



7.4 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:

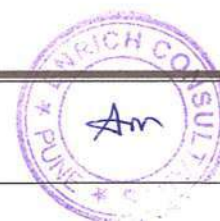


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Shri Navalma Firodia Law College
Pune-411004.



ENVIRONMENTAL AUDIT REPORT
of
Deccan Education Society's
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2019-20

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(A Government of Maharashtra undertaking)

2nd Floor, MHADA Commercial Complex, Opp. Tridal Nagar, Yerwada, Pune 411 006,

Ph No: 020-26614393/266144403

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2018-19/CR-05/4174

19th September, 2018

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

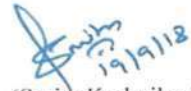
We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

Registration Category : *Empanelled Consultant for Energy Conservation Programme*

Registration Number : **MEDA/ECN/CR-05/2018-19/EA-03**

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit the firm at any time without giving any prior information and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **31st March 2021** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


(Smita Kudarikar)
General Manager (EC)




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Enrich Consultants, Pune



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Enrich Consultants

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

Ref: EC/ DESNFLC/19-20/03

Date: 16/8/2020

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Deccan Education Society's Shri Navalmal Firodia Law College Pune, in the Year 2019-20.

The College has adopted following Environment Friendly Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Implementation of Rain Water Management Project
- Tree Plantation in the campus

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Pune-411 004.

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalmal Firodia Law College, Pune, 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.



A handwritten signature in blue ink, appearing to read "P. Lang".

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Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. **Deccan Education Society's Shri Navalmal Firodia Law College Pune** consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Pollution due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	22919	20.63
2	Maximum	2564	2.31
3	Minimum	1269	1.14
4	Average	1909.92	1.72

4. Various initiatives taken for Energy Conservation:

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

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

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 2019-20 is **8000 kWh**.
- Reduction in CO₂ Emissions in 2019-20 works out to be **6.4 MT**.

6. Waste Management:

6.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. It is then handed over for further action.

6.2 Organic Waste Management:

The College has a Vermi Composting Plant, to convert the leafy waste into Bio Compost.

6.3 Sanitary Waste Management:

The College has made provision of Sanitary Waste Incinerator to dispose of the Sanitary Waste.



7. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.

8. Environment Friendly Initiatives:

- Maintenance of Internal Garden

9. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.8 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Solar Energy Generation Days in 19-20 (System installed in June-19): **200 Nos**

10. Reference:

- For Solar PV Energy Generation: www.solarrooftop.gov.in



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ABBREVIATIONS

Kg	: Kilo Gram
DES	: Deccan Education Society
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode



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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 compiled with and adequate care has been taken towards environmental protection and preservation

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

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

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

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



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

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

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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 Objectives:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To Study of Waste Management
4. To Study of Rain Water Management
5. To Study of Environment Friendly Initiatives

1.3 General Details of College: Table No 4:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



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CHAPTER-II

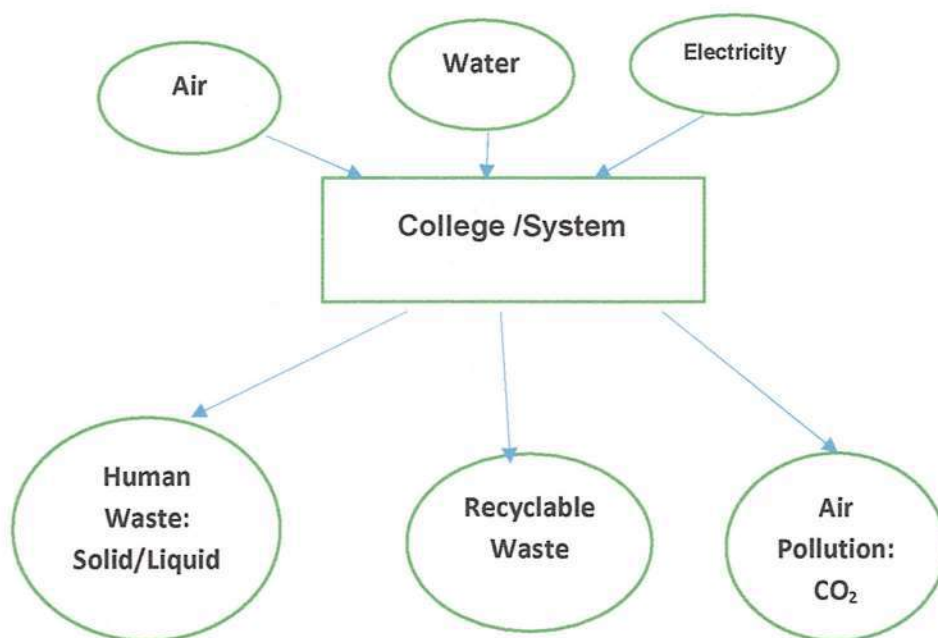
STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The College consumes following basic/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 & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

- 1 kWh of Electrical Energy releases 0.8 Kg of CO₂ into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 19-20:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-19	2365	1.89
2	May-19	2146	1.72
3	Jun-19	2412	1.93
4	Jul-19	1698	1.36
5	Aug-19	1789	1.43
6	Sep-19	1269	1.02



7	Oct-19	2126	1.70
8	Nov-19	1785	1.43
9	Dec-19	2164	1.73
10	Jan-20	2564	2.05
11	Feb-20	1298	1.04
12	Mar-20	1303	1.04
13	Total	22919	18.34
14	Maximum	2564	2.05
15	Minimum	1269	1.02
16	Average	1909.92	1.53

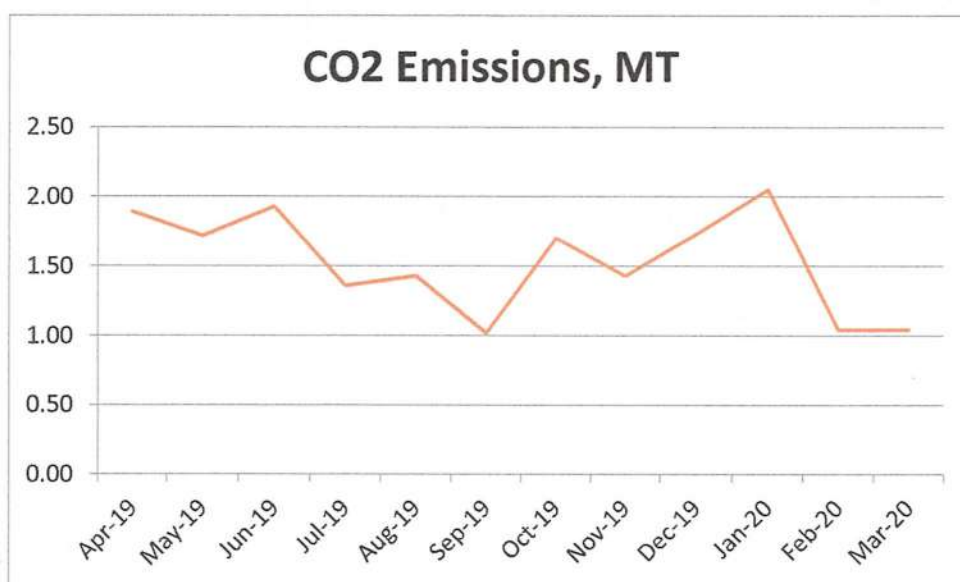
Chart No 2: Month wise CO₂ Emissions:

Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	22919	18.34
2	Maximum	2564	2.05
3	Minimum	1269	1.02
4	Average	1909.92	1.53



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CHAPTER III

STUDY OF CO₂ EMISSION REDUCTION

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

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	200	Nos
4	Energy Generated in the Year: 19-20	8000	kWh
5	1 kWh of Electrical Energy saves	0.8	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	6.4	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



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CHAPTER IV STUDY OF WASTE MANAGEMENT

4.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



4.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



4.3 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



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CHAPTER-V

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.



[Signature]

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The College has well maintained landscaped garden in the campus.
Photograph of Tree plantation:



The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:




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ENERGY AUDIT REPORT
of
Deccan Education Society's,
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2020-21

Prepared by:

Enrich Consultants

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Near Mukhtangan English School, Parvati, Pune 411009
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MAHARASHTRA ENERGY DEVELOPMENT AGENCY

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



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,

Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577

22nd April, 2021

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

Registration Category : Empanelled Consultant for Energy Conservation
Programme for Class 'A'

Registration Number : MEDA/ECN/2021-22/Class A/EA-03

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)



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Deccan Education Society's

Shri Navalma Firodia Law College
Pune-411004.



Enrich Consultants

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

Ref: EC/DESNFLC/20-21/01

Date: 10/5/2021

CERTIFICATE

This is to certify that we have conducted Energy Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, 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 making the Campus Energy Efficient.

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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4	Study of Carbon Foot Printing	12
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Pune-411 004.



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalmal Firodia Law College, Pune for awarding us the assignment of Energy Audit of their Pune Campus for the Year: 2020-21.

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



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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalma Firodia Law College Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	17925	16.13
2	Maximum	9296	8.37
3	Minimum	0	0.00
4	Average	1493.75	1.34

3. Energy Conservation projects already installed:

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

4. Usage of Alternate Energy:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- Energy purchased from MSEDCL is **17925 kWh**.
- Energy generated by Roof Top Solar PV Plant is **12000 kWh**.
- Total Annual Energy Requirement of College is **29925 kWh**.
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **40.10 %**.

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **7.82 kW**.
- The Total LED Lighting Load of the College is **2.2 kW**.
- The percentage of LED Lighting to Total Lighting Demand is **28.10 %**.

6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh per kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

7. References

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar PV Plant Energy generation: www.solarroftop.gov.in

ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
DES	: Deccan Education Society
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton



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CHAPTER-I INTRODUCTION

1.1 Objectives:

1. To study Connected Load of the College
2. To study present Energy Consumption
3. To compute CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



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CHAPTER-II

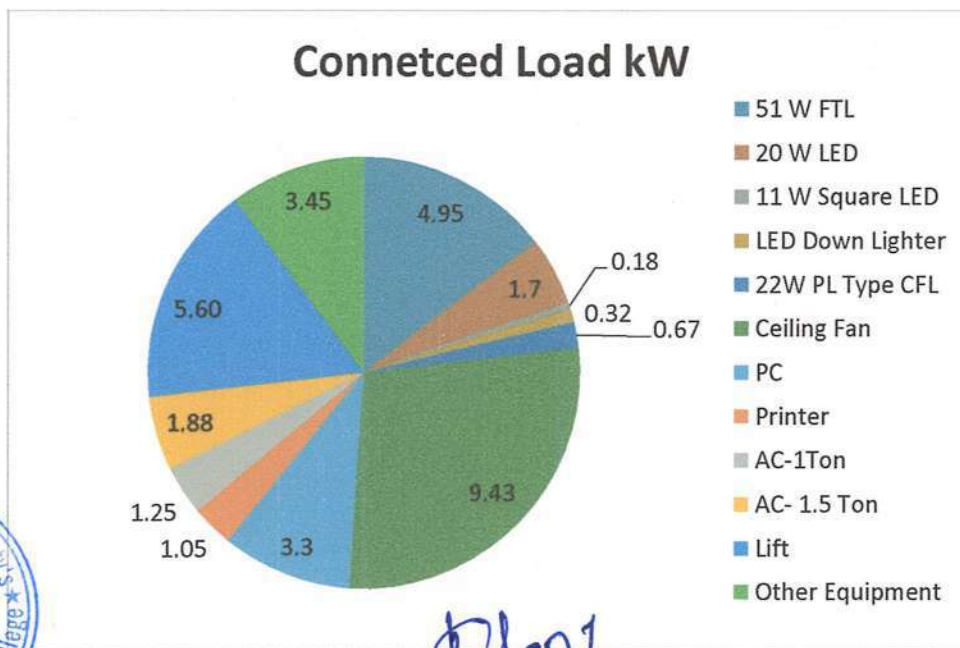
STUDY OF CONNECTED LOAD

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

Table No 2: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load kW
1	51 W FTL	97	51	4.95
2	20 W LED	85	20	1.7
3	11 W Square LED	16	11	0.18
4	LED Down Lighter	20	16	0.32
5	22W PL Type CFL	24	28	0.67
6	Ceiling Fan	145	65	9.43
7	PC	22	150	3.3
8	Printer	6	175	1.05
9	AC-1Ton	1	1250	1.25
10	AC- 1.5 Ton	1	1875	1.88
11	Lift	1	5595	5.60
12	Other Equipment	23	150	3.45
13	Total			34

Chart No 1: Study of Connected Load:



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CHAPTER-III

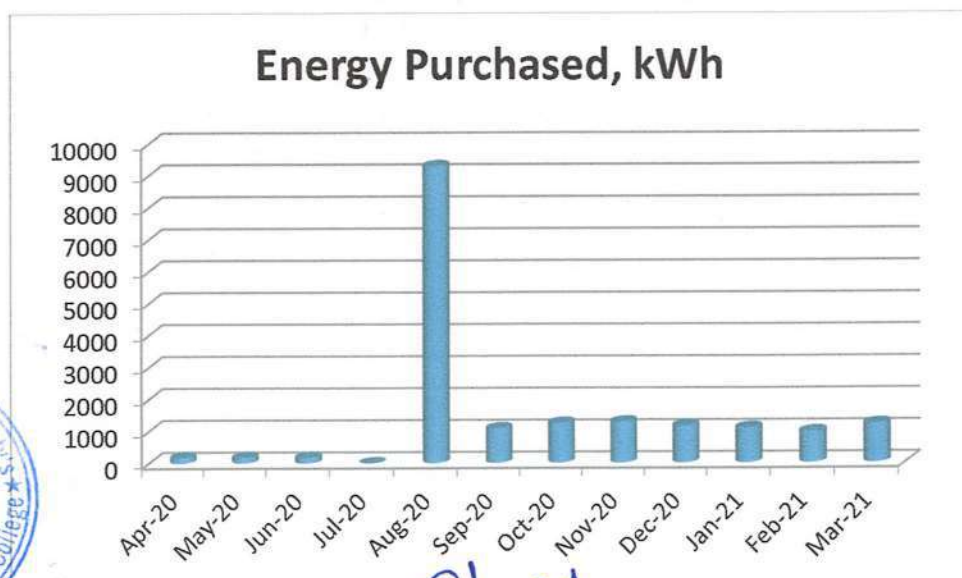
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 3: Electrical Bill Analysis- 2020-21:

No	Month	Energy Purchased, kWh
1	Apr-20	176
2	May-20	176
3	Jun-20	176
4	Jul-20	0
5	Aug-20	9296
6	Sep-20	1085
7	Oct-20	1250
8	Nov-20	1288
9	Dec-20	1167
10	Jan-21	1099
11	Feb-21	982
12	Mar-21	1230
13	Total	17925
14	Maximum	9296
15	Minimum	0
16	Average	1493.75

Chart No 2: Variation in Monthly Energy Consumption:



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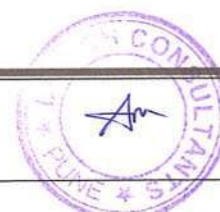


Table No 4: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	17925
2	Maximum	9296
3	Minimum	0
4	Average	1493.75



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Pune-411004.



CHAPTER-IV

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

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

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 5: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-20	176	0.16
2	May-20	176	0.16
3	Jun-20	176	0.16
4	Jul-20	0	0.00
5	Aug-20	9296	8.37
6	Sep-20	1085	0.98
7	Oct-20	1250	1.13
8	Nov-20	1288	1.16
9	Dec-20	1167	1.05
10	Jan-21	1099	0.99
11	Feb-21	982	0.88
12	Mar-21	1230	1.11
13	Total	17925	16.13
14	Maximum	9296	8.37
15	Minimum	0	0.00
16	Average	1493.75	1.34



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Chart No 3: Month wise CO₂Emissions:

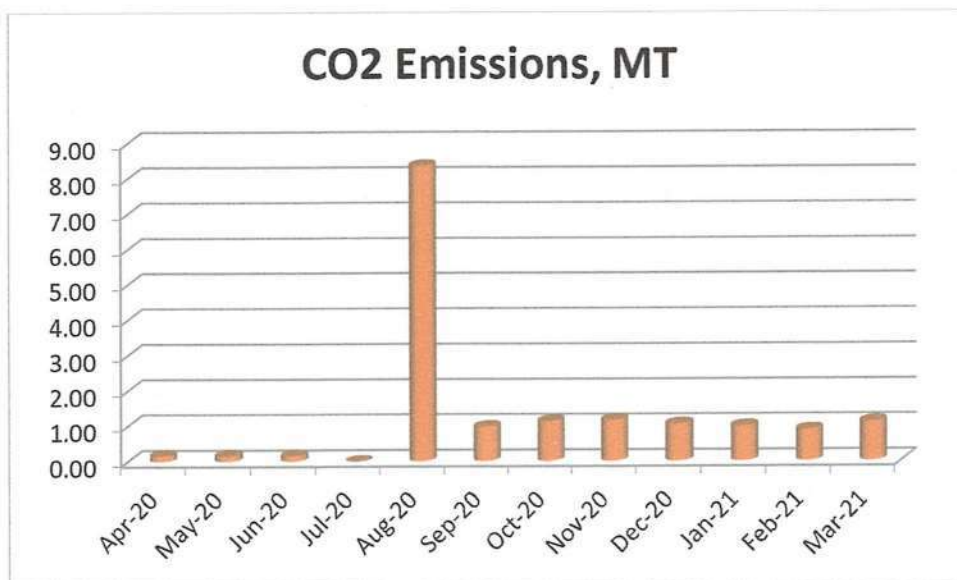


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	17925	16.13
2	Maximum	9296	8.37
3	Minimum	0	0.00
4	Average	1493.75	1.34



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CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

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

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

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

No	Particulars	Value	Unit
1	Energy purchased from MSEDCL	17925	kWh/Annum
2	Capacity of Roof Top Solar PV Capacity	10	kWp
3	Average Energy Generated per kWp per Day	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated = $2*3*4$	12000	kWh/Annum
6	Total Energy Requirement = (1) + (5)	29925	kWh/Annum
7	Percent of Alternate Energy to Annual Energy Requirement = $(5)*100/(6)$	40.10	%

Photograph of Roof Top Solar PV Plant:



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CHAPTER VI

STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load.

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

No	Particulars	Value	Unit
1	No of 51 W FTL Fittings	97	Nos
2	Demand of 20 W LED Tube Light	51	W/Unit
3	Total Electrical Load of 51 W FTL Fittings	4.95	kW
4	No of 20 W LED Tube Lights	85	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	1.7	kW
7	No of 11 W LED Fitting	16	Nos
8	Demand of 11 W LED Fitting	11	W/Unit
9	Total Electrical Load of 11 W LED Fittings	0.18	kW
10	No of 16 W LED Down Lighter	20	Nos
11	Demand of 16 W LED Down Lighter Fitting	16	W/Unit
12	Total Electrical Load of 16 W LED Down Lighter Fittings	0.32	kW
13	Qty of 22 W PL Type CFL Fittings	24	Nos
14	Demand of 22 W PL Type CFL Fittings	28	W/Unit
15	Total Electrical Load of 22 W PL Type CFL Fittings	0.67	kW
16	Total LED Lighting Load= 6+9+12	2.20	kW
17	Total Lighting Load= 3 + 6 +9 +12+15	7.82	kW
18	% of LED Lighting to Total Lighting Load = (16)*100/(17)	28.10	%



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GREEN AUDIT REPORT
of
Deccan Education Society's
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2020-21

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2462



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577

22nd April, 2021

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2021-22/Class A/EA-03*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)



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Shri Navalma Firodia Law College
Pune-411 004.



Enrich Consultants

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

Ref: EC/ DESNFLC/20-21/02

Date: 10/5/2021

CERTIFICATE

This is to certify that we have conducted Green Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, in the Year 2020-21.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Implementation of Rain Water Management Project
- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness by Display of Posters on Resource Conservation

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor, EA-8192



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Shri Navalma Firodia Law College
Pune-411 004.

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Plan 1

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ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of, Deccan Education Society's Shri Navalmal Firodia Law College, Pune 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.



A handwritten signature in blue ink, appearing to read "Plant", written over the official stamp of the Officiating Principal.

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Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalmal Firodia Law College Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	17925	16.13
2	Maximum	9296	8.37
3	Minimum	0	0.00
4	Average	1493.75	1.34

3. Various initiatives taken for Energy Conservation:

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

4. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 2020-21 is **12000 kWh**.
- Reduction in CO₂ Emissions in 2020-21 works out to be **10.8 MT**.

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. It is then handed over for further action.

5.2 Organic Waste Management:

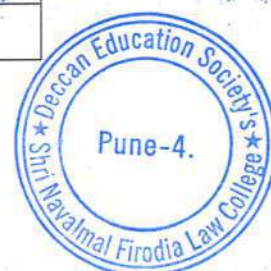
The College has Vermi Composting Plant, to convert the leafy waste into Bio Compost

5.3 Sanitary Waste Management:

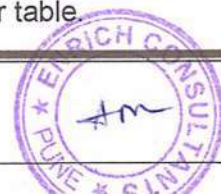
The College has made provision of Sanitary Waste Incinerator to dispose of the Sanitary Waste.

6. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.



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7. Green & Sustainable Initiatives:

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Display of Posters on Resource Conservation

8. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

9. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar PV Energy generation: www.solarrooftop.gov.in



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ABBREVIATIONS

DES	Deccan Education Society
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity



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CHAPTER-I INTRODUCTION

1.1 Objectives:

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

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



P. Lang

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Deccan Education Society's



CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Bill Analysis- 2020-21:

No	Month	Energy Purchased, kWh
1	Apr-20	176
2	May-20	176
3	Jun-20	176
4	Jul-20	0
5	Aug-20	9296
6	Sep-20	1085
7	Oct-20	1250
8	Nov-20	1288
9	Dec-20	1167
10	Jan-21	1099
11	Feb-21	982
12	Mar-21	1230
13	Total	17925
14	Maximum	9296
15	Minimum	0
16	Average	1493.75

Chart No 1: Variation in Monthly Energy Consumption:

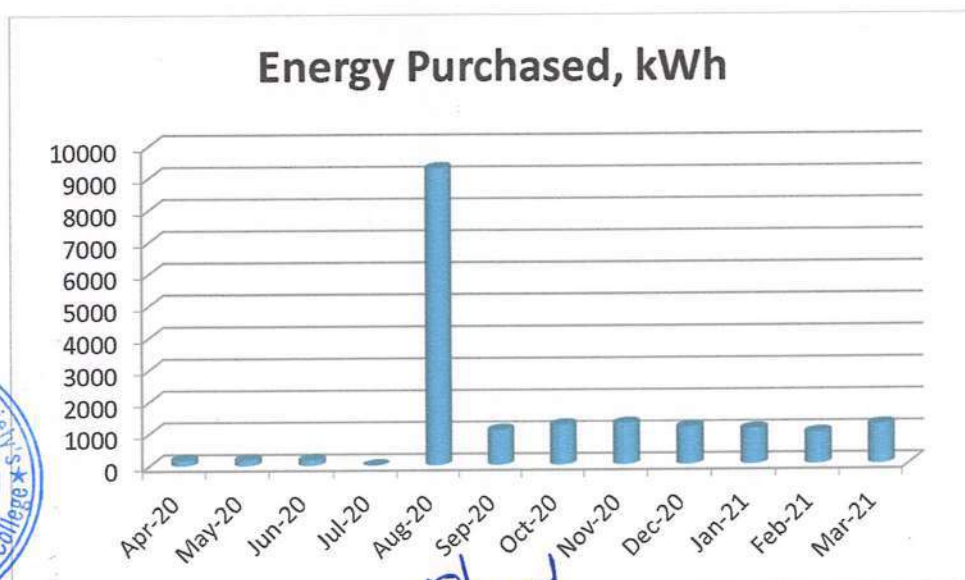


Table No 3: Variation in Important Parameters:

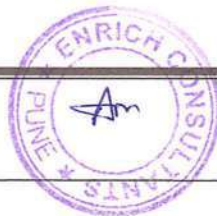
No	Parameter/ Variation	Energy Purchased, kWh
1	Total	17925
2	Maximum	9296
3	Minimum	0
4	Average	1493.75



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CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

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

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-20	176	0.16
2	May-20	176	0.16
3	Jun-20	176	0.16
4	Jul-20	0	0.00
5	Aug-20	9296	8.37
6	Sep-20	1085	0.98
7	Oct-20	1250	1.13
8	Nov-20	1288	1.16
9	Dec-20	1167	1.05
10	Jan-21	1099	0.99
11	Feb-21	982	0.88
12	Mar-21	1230	1.11
13	Total	17925	16.13
14	Maximum	9296	8.37
15	Minimum	0	0.00
16	Average	1493.75	1.34



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Chart No 2: Month wise CO₂Emissions:

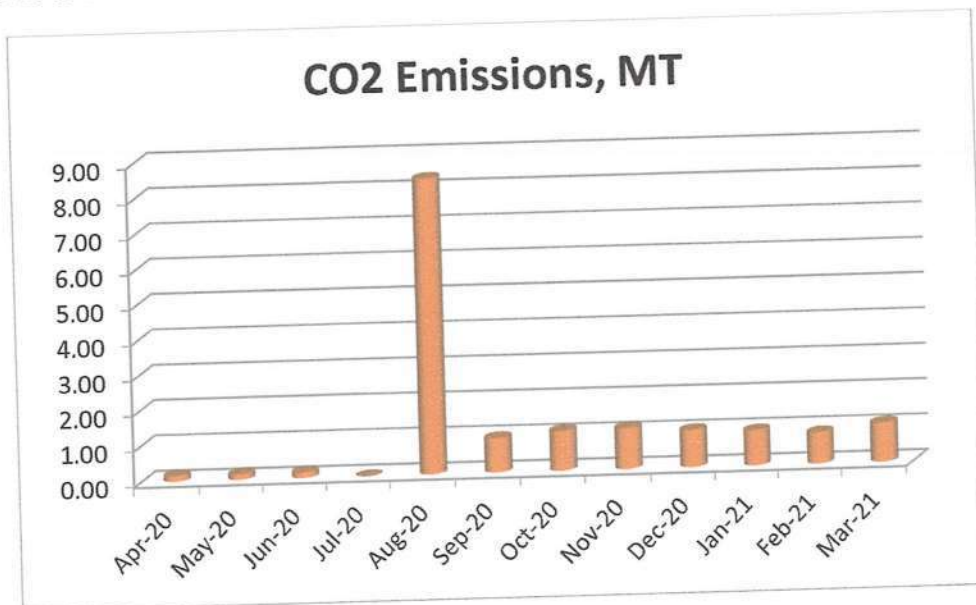


Table No 5: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	17925	16.13
2	Maximum	9296	8.37
3	Minimum	0	0.00
4	Average	1493.75	1.34



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CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY

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

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO₂ Emissions:

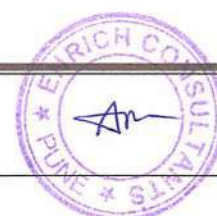
No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 20-21	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	10.8	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



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CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



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5.3 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



Pranav

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Shri Navalma Firodia Law College
Pune-411 004.

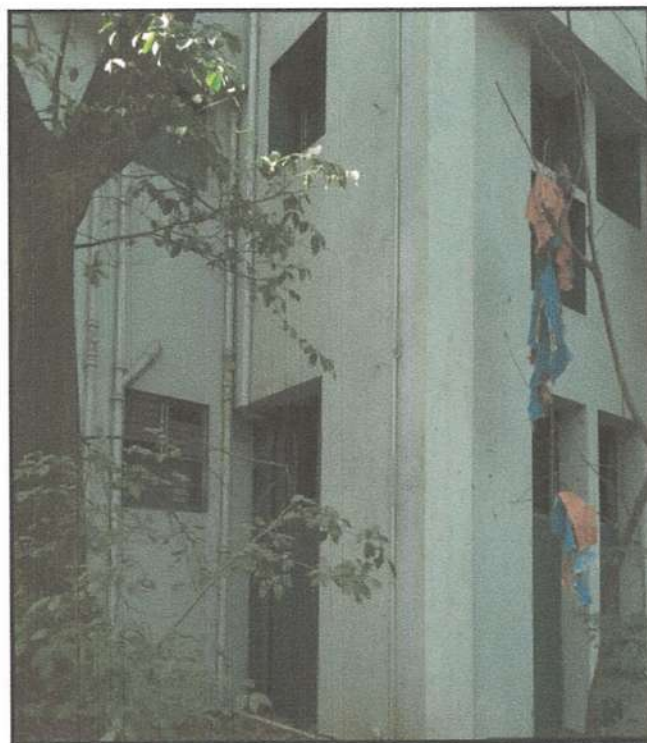


CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.

Photograph of Rain water Management Pipe:



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Pune-411 004.



CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

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 Tree plantation:



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Shri Navalma Firodia Law College
Pune-411 004.



7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp at the main entrance.

Photograph of Ramp:



7.4 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



Pland

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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411 004.



ENVIRONMENTAL AUDIT REPORT

of

Deccan Education Society's SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



Year: 2020-21

Prepared by:

Enrich Consultants

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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY

An ISO 9001 : 2000 Reg. no. : RQ 91 / 2452



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2021-22/CR-14/1577

22nd April, 2021

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

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

Registration Category : Empanelled Consultant for Energy Conservation
Programme for Class 'A'

Registration Number : MEDA/ECN/2021-22/Class A/EA-03

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **21st April, 2023** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.




General Manager (EC)


OFFICIATING PRINCIPAL
Deccan Education Society's

Enrich Consultants, Pune

Shri Navalma Firodia Law College
Pune-411004.



Enrich Consultants

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

Ref: EC/ DESNFLC/20-21/03

Date: 10/5/2021

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Deccan Education Society's Shri Navalma Firodia Law College Pune, in the Year 2020-21.

The College has adopted following Environment Friendly Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Implementation of Rain Water Management Project
- Tree Plantation in the campus
- Creation of Awareness by Display of Posters on Resource Conservation

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

For Enrich Consultants,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Shri Navalma Firodia Law College

Pune-4-2021



ACKNOWLEDGEMENT

We Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalma Firodia Law College, Pune, 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.



A handwritten signature in blue ink, appearing to read "P. Lang".

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Pune-411 004.



7.2 Organic Waste Management:

The College has a Vermi Composting Plant, to convert the leafy waste into Bio Compost.

7.3 Sanitary Waste Management:

The College has made provision of Sanitary Waste Incinerator to dispose of the Sanitary Waste.

8. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.

9. Environment Friendly Initiatives:

- Maintenance of Internal Garden
- Display of Posters on Resource Conservation

10. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

11. References:

- For CO₂ Emissions: www.tatapower.com
- For Solar PV Energy Generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com



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Shri Navalmal Firodia Law College
Pune-411 004.



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- For AQI & Water Quality Standards: www.cpcb.com



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Pune-411 004.



ABBREVIATIONS

Kg	: Kilo Gram
DES	: Deccan Education Society
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board
ISHRAE	: The Indian Society of Heating & Refrigerating & Air Conditioning Engineers



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Shri Navalma Firodia Law College
Pune-411 004.



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 compiled with and adequate care has been taken towards environmental protection and preservation

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

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

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

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



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

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

Official stamp and signature of the Principal, Deccan Education Society's Shri Navalma Firodia Law College, Pune-411004.



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 Objectives:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To study Indoor Comfort Condition Parameters
5. To Study of Waste Management
6. To Study of Rain Water Management
7. To Study of Environment Friendly Initiatives

1.3 General Details of College: Table No 4:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



[Handwritten Signature]

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Deccan Education Society's
Shri Navalmal Firodia Law College
Pune-411004.



CHAPTER-II

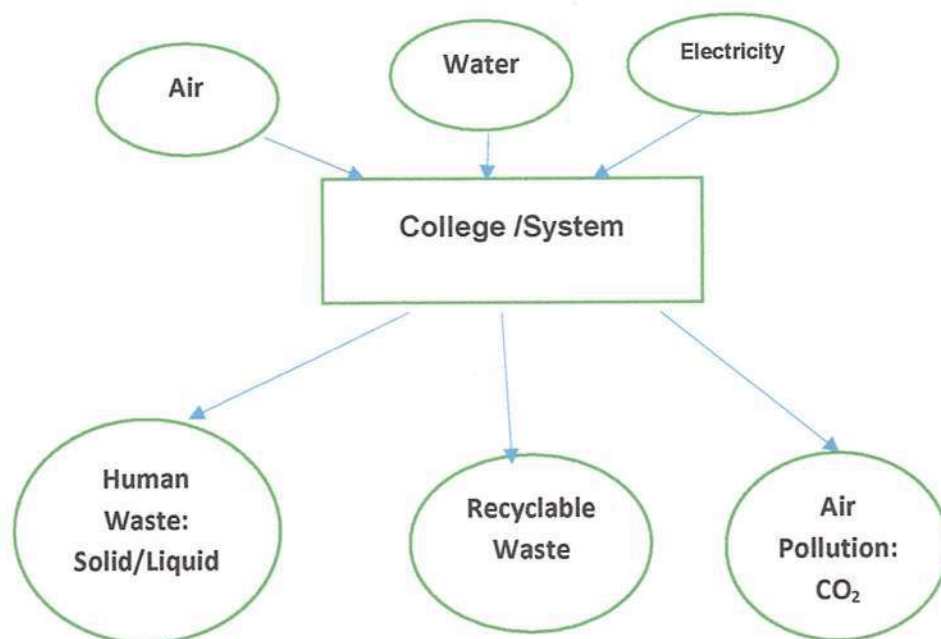
STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The College consumes following basic/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 & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

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

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 20-21:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-20	176	0.16
2	May-20	176	0.16
3	Jun-20	176	0.16
4	Jul-20	0	0.00
5	Aug-20	9296	8.37



6	Sep-20	1085	0.98
7	Oct-20	1250	1.13
8	Nov-20	1288	1.16
9	Dec-20	1167	1.05
10	Jan-21	1099	0.99
11	Feb-21	982	0.88
12	Mar-21	1230	1.11
13	Total	17925	16.13
14	Maximum	9296	8.37
15	Minimum	0	0.00
16	Average	1493.75	1.34

Chart No 2: Month wise CO₂ Emissions:

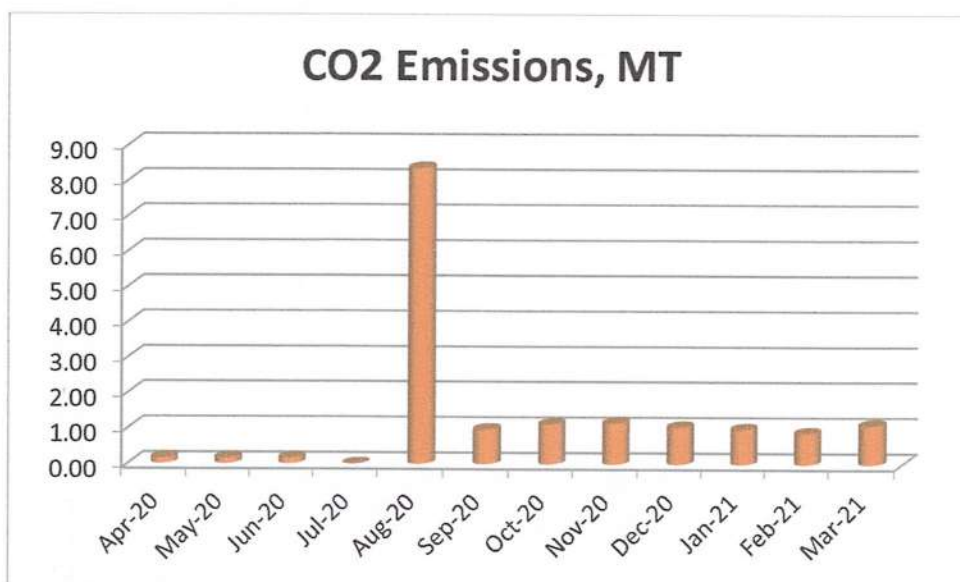


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	17925	16.13
2	Maximum	9296	8.37
3	Minimum	0	0.00
4	Average	1493.75	1.34



Plant



CHAPTER III

STUDY OF CO₂ EMISSION REDUCTION

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

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

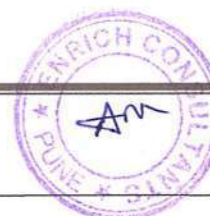
Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 20-21	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	10.8	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



Plan 2
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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 livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

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. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

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

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
	Ground Floor			



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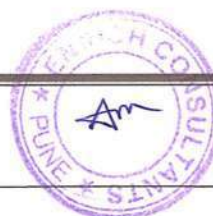
1	Admin Office	103	60	78
2	Conference Room	106	62	80
	First Floor			
3	LC-IV	113	64	86
4	Sick Room	120	67	87
	Second Floor			
5	LC-XI	110	68	82
6	Library	113	65	80
	Maximum	120	68	87
	Minimum	103	60	78



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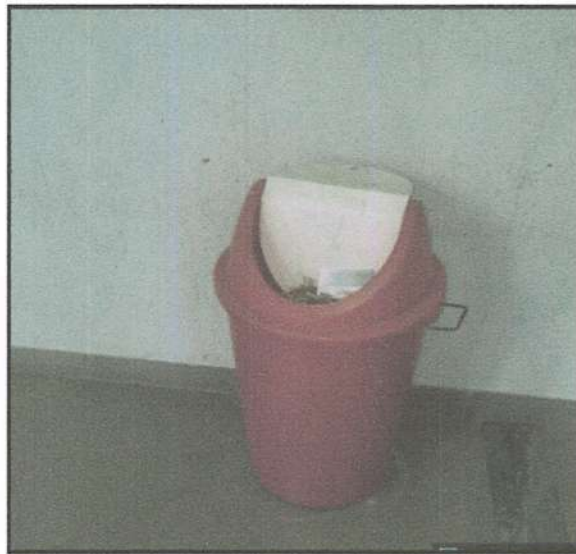


CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



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5.3 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



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Pune-411 004.



CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.

Photograph of Rain water Management Pipe:



[Handwritten Signature]

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Pune-411 004.



CHAPTER-VII

STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

7.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



7.2 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



Plant.



ANNEXURE-I: VARIOUS 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 +



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Shri Navalma Firodia Law College
Pune-411 004.



ENERGY AUDIT REPORT
of
Deccan Education Society's,
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY



Maharashtra Energy Development Agency

(Government of Maharashtra Institution)

Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067

Ph No: 020-35000450

Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709

10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune – 411 009.

Registration Category : Empanelled Consultant for Energy Conservation
Programme for Class 'A'

Registration Number : MEDA/ECN/2022-23/Class A/EA-32.

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

General Manager (EC)



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Engress Services, Pune



Page 2

ENGRESS SERVICES

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

Ref: ES/DESNFLC/21-22/01

Date: 11/6/2022

CERTIFICATE

This is to certify that we have conducted Energy Audit at Deccan Education Society's Shri Navalma Firodia Law College, Pune, 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 making the Campus Energy Efficient.

For Engress Services,



A Y Mehendale,
Certified Energy Auditor
EA-8192



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Engress Services, Pune

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Pune-411 004.



Page 3

INDEX

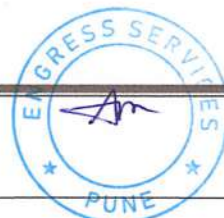
Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	7
1	Introduction	8
2	Study of Connected Load	9
3	Study of Present Energy Consumption	11
4	Study of Carbon Foot Printing	13
5	Study of Usage of Alternate Energy	15
6	Study of LED Lighting	16



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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalmal Firodia Law College, Pune for awarding us the assignment of Energy Audit of their Pune Campus for the Year: 2021-22.

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



A handwritten signature in blue ink, appearing to read "P. Pant", written over the printed name of the Officiating Principal.

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Shri Navalmal Firodia Law College
Pune-411 004.

Engress Services, Pune



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalmal Firodia Law College Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	14436	12.99
2	Maximum	1603	1.44
3	Minimum	923	0.83
4	Average	1203	1.08

3. Energy Conservation projects already installed:

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

4. Usage of Alternate Energy:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- Energy purchased from MSEDCL is **14436 kWh**.
- Energy generated by Roof Top Solar PV Plant is **12000 kWh**.
- Total Annual Energy Requirement of College is **26436 kWh**.
- The percentage of Usage of Alternate Energy to Annual Energy Demand is **45.39 %**.

5. Usage of LED Lighting:

- The Total Lighting Load of the College is **7.32 kW**.
- The Total LED Lighting Load of the College is **2.47 kW**.
- The percentage of LED Lighting to Total Lighting Demand is **34 %**.

6. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh per kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

7. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar PV Plant Energy generation: www.solarroftop.gov.in

ABBREVIATIONS

LED	: Light Emitting Diode
MSEDCL	: Maharashtra State Electricity Distribution Company Limited
IQAC	: Internal Quality Assurance Cell
DES	: Deccan Education Society
FTL	: Fluorescent Tube Light
CFL	: Compact Fluorescent Light
PV	: Photo Voltaic
Kg	: Kilo Gram
kWh	: kilo-Watt Hour
CO ₂	: Carbon Di Oxide
MT	: Metric Ton



A handwritten signature in blue ink, appearing to read "Plan", written over the printed name of the Officiating Principal.

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Page 7

CHAPTER-I INTRODUCTION

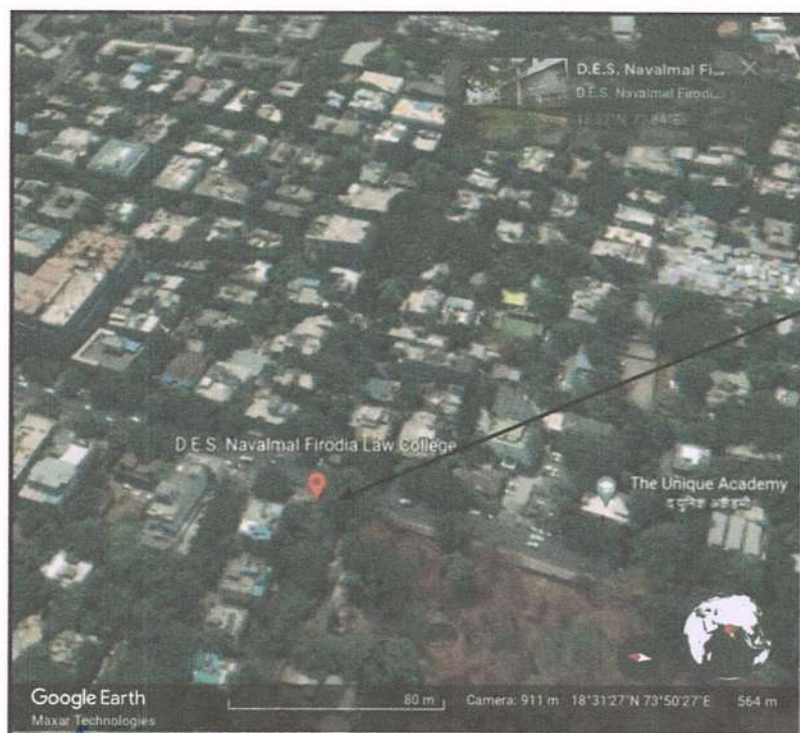
1.1 Objectives:

1. To study Connected Load of the College
2. To study present Energy Consumption
3. To compute CO₂ emissions
4. To study usage of Alternate Energy
5. To study usage of LED Lighting

1.2 Table No 1: General Details of the College:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



pland

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CHAPTER-II

STUDY OF CONNECTED LOAD

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

Table No 2: Location wise Connected Load:

No	Location	51 W FTL	20 W LED	11W Sq. LED	22 W PL Type CFL	LED D/L	Ceiling Fan	PC
	Ground Floor							
1	Staff Room		9				6	2
2	Admin Office		6				6	9
3	Principal Cabin		4				2	1
4	Conference Room		4					
5	Corridor			11				
6	Legal Aid	5	4				6	
7	LC-I	6	3				6	
8	LC-II	5	4				6	
9	LC-III	5	4				6	
	First Floor							
10	LC-IV	5	7				9	
11	LC-V	8	4				9	
12	Corridor			8				
13	LC-VI	3	6				6	
14	LC-VII	4	5				6	
15	LC-VIII	5	4				6	
16	LC-IX	2	7				6	
17	Sick Room	6					2	
	Second Floor							
18	LC-X	8	7				6	
19	LC-XI	1					6	
20	LC-XII	9	3				9	
21	LC-XIII	10	7				9	
22	Library		5		24		20	10
23	Reading Room	0				25	13	
	Total	82	93	19	24	25	145	22



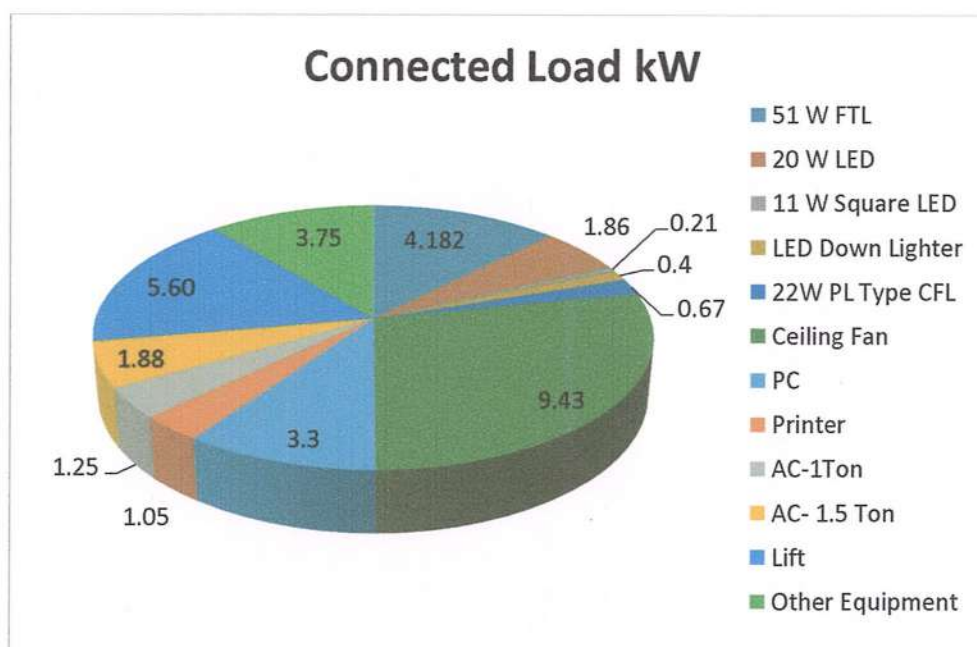
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 Pune-411004.



Table No 3: Study of Equipment wise Connected Load:

No	Equipment	Qty	Load/Unit	Load kW
1	51 W FTL	82	51	4.182
2	20 W LED	93	20	1.86
3	11 W Square LED	19	11	0.21
4	LED Down Lighter	25	16	0.4
5	22W PL Type CFL	24	28	0.67
6	Ceiling Fan	145	65	9.43
7	PC	22	150	3.3
8	Printer	6	175	1.05
9	AC-1Ton	1	1250	1.25
10	AC- 1.5 Ton	1	1875	1.88
11	Lift	1	5595	5.60
12	Other Equipment	25	150	3.75
13	Total			34

Chart No 1: Study of Connected Load:



[Signature]



CHAPTER-III

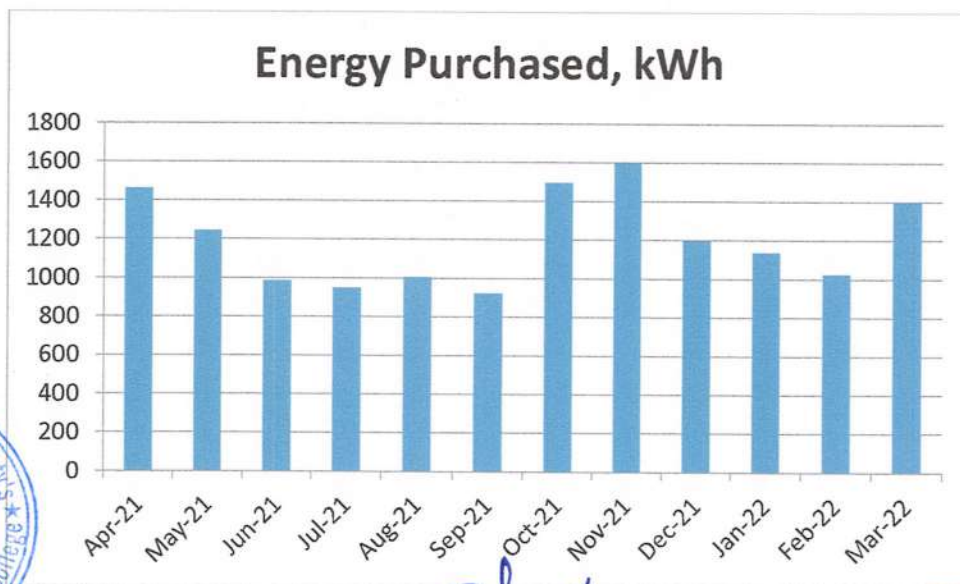
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 4: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	1461
2	May-21	1245
3	Jun-21	987
4	Jul-21	950
5	Aug-21	1007
6	Sep-21	923
7	Oct-21	1496
8	Nov-21	1603
9	Dec-21	1198
10	Jan-22	1139
11	Feb-22	1027
12	Mar-22	1400
13	Total	14436
14	Maximum	1603
15	Minimum	923
16	Average	1203

Chart No 2: Variation in Monthly Energy Consumption:



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Pune-411004.



Table No 5: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	14436
2	Maximum	1603
3	Minimum	923
4	Average	1203



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CHAPTER-IV

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities.

In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

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

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 6: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	1461	1.31
2	May-21	1245	1.12
3	Jun-21	987	0.89
4	Jul-21	950	0.86
5	Aug-21	1007	0.91
6	Sep-21	923	0.83
7	Oct-21	1496	1.35
8	Nov-21	1603	1.44
9	Dec-21	1198	1.08
10	Jan-22	1139	1.03
11	Feb-22	1027	0.92
12	Mar-22	1400	1.26
13	Total	14436	12.99
14	Maximum	1603	1.44
15	Minimum	923	0.83
16	Average	1203	1.08



P. J. D. S.
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Chart No 3: Month wise CO₂Emissions:

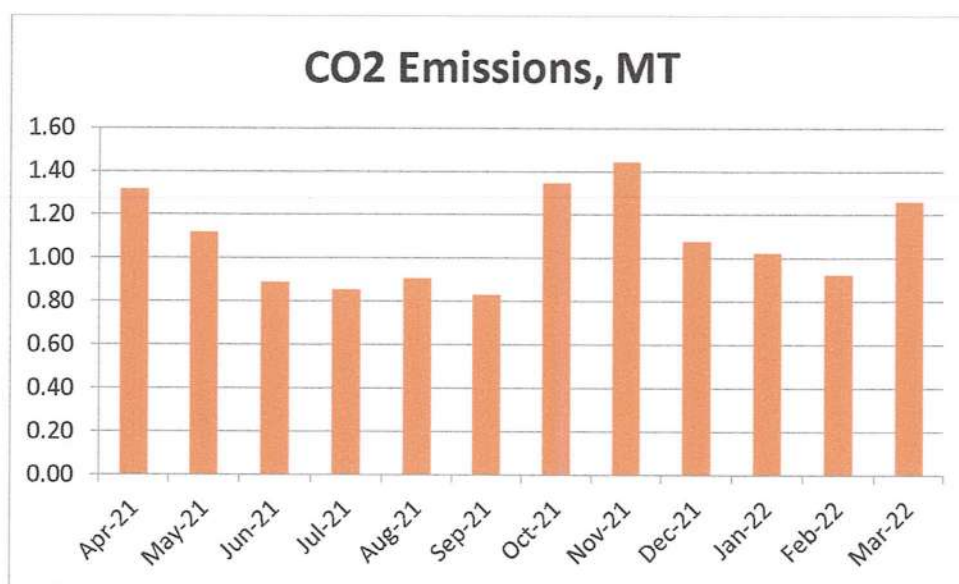


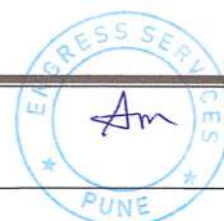
Table No 7: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	14436	12.99
2	Maximum	1603	1.44
3	Minimum	923	0.83
4	Average	1203	1.08



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CHAPTER-V

STUDY OF USAGE OF ALTERNATE ENERGY

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

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

Table No 8: Computation of % Annual Energy Demand met by Alternate Energy:

No	Particulars	Value	Unit
1	Energy purchased from MSEDCL	14436	kWh/Annum
2	Capacity of Roof Top Solar PV Capacity	10	kWp
3	Average Energy Generated per kWp per Day	4	kWh/kWp
4	Annual Generation Days	300	Nos
5	Annual Solar Energy Generated = $2*3*4$	12000	kWh/Annum
6	Total Energy Requirement = (1) + (5)	26436	kWh/Annum
7	Percent of Alternate Energy to Annual Energy Requirement = $(5)*100/(6)$	45.39	%

Photograph of Roof Top Solar PV Plant:



Plant

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CHAPTER VI

STUDY OF USAGE OF LED LIGHTING

In this chapter, we compute the percentage of usage of LED Lighting to Total Lighting Load.

Table No 9: Percentage of Usage of LED Lighting to Annual Lighting Load:

No	Particulars	Value	Unit
1	No of 51 W FTL Fittings	82	Nos
2	Demand of 20 W LED Tube Light	51	W/Unit
3	Total Electrical Load of 51 W FTL Fittings	4.18	kW
4	No of 20 W LED Tube Lights	93	Nos
5	Demand of 20 W LED Tube Light	20	W/Unit
6	Total Electrical Load of 20 W LED Fittings	1.86	kW
7	No of 11 W LED Fitting	19	Nos
8	Demand of 11 W LED Fitting	11	W/Unit
9	Total Electrical Load of 11 W LED Fittings	0.21	kW
10	No of 16 W LED Down Lighter	25	Nos
11	Demand of 16 W LED Down Lighter Fitting	16	W/Unit
12	Total Electrical Load of 16 W LED Down Lighter Fittings	0.4	kW
13	Qty of 22 W PL Type CFL Fittings	24	Nos
14	Demand of 22 W PL Type CFL Fittings	28	W/Unit
15	Total Electrical Load of 22 W PL Type CFL Fittings	0.67	kW
16	Total LED Lighting Load= 6+9+12	2.47	kW
17	Total Lighting Load = 3 + 6 +9 +12+15	7.32	kW
18	% of LED Lighting to Total Lighting Load = (16)*100/(17)	34	%



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Shri Navalma Firodia Law College
Pune-411 004.



GREEN AUDIT REPORT

of

Deccan Education Society's SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709 10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

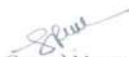
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- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.

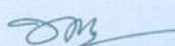

General Manager (EC)

 **GEM Certificate** 

ASSOCHAM hereby certifies that
Mr. A Y Mehendale
has successfully passed the
Green and Eco-friendly Movement Certified Professional Test (GEM CP)
with
"Excellent Performance"
on
06 June, 2022
He/she is now eligible to execute the GEM Sustainability Certification Projects.
ASSOCHAM feels proud to award the GEM Certified Professional title to him/her.

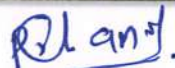
Pankaj R. Dharkar 
Chairman, GEM

GEM CP 22/788

Deepak Sood 
Secretary General, ASSOCHAM



Engress Services, Pune


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Deccan Education Society's
Shri Navalma Firodia Law College
Pune-411004.



ENGRESS SERVICES

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

Ref: ES/ DESNFLC /21-22/02

Date: 11/6/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Deccan Education Society's Shri Navalmal Firodia Law College, Pune, in the Year 2021-22.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Implementation of Rain Water Management Project
- Maintenance of Good Internal Road
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Creation of Awareness by Display of Posters on Resource Conservation

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

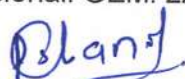
For Engress Services,



A Y Mehendale,

Certified Energy Auditor, EA-8192

ASSOCHAM GEM Certified Professional: GEM: 22/788



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(Signature)

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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of, Deccan Education Society's Shri Navalma Firodia Law College, Pune for awarding us the assignment of Green Audit of their Campus for the Year: 2021-22.

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



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Engress Services, Pune

Shri Navalma Firodia Law College
Pune-411 004.



EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalmal Firodia Law College Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Present Energy Consumption & CO₂ Emissions:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	14436	12.99
2	Maximum	1603	1.44
3	Minimum	923	0.83
4	Average	1203	1.08

3. Various initiatives taken for Energy Conservation:

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

4. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 2021-22 is **12000 kWh**.
- Reduction in CO₂ Emissions in 2021-22 works out to be **10.8 MT**.

5. Waste Management:

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. It is then handed over for further action.

5.2 Organic Waste Management:

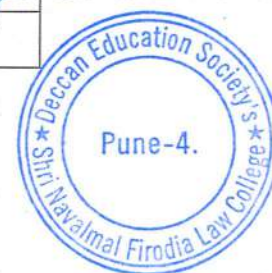
The College has Vermi Composting Plant, to convert the leafy waste into Bio Compost

5.3 Sanitary Waste Management:

The College has made provision of Sanitary Waste Incinerator to dispose of the Sanitary Waste.

5.4 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.



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6. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.

7. Green & Sustainable Initiatives:

- Maintenance of good Internal Road
- Maintenance of Internal Garden
- Provision of Ramp for Divyangajan
- Display of Posters on Resource Conservation

8. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

9. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar PV Energy generation: www.solarrooftop.gov.in



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ABBREVIATIONS

DES	Deccan Education Society
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity




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CHAPTER-I INTRODUCTION

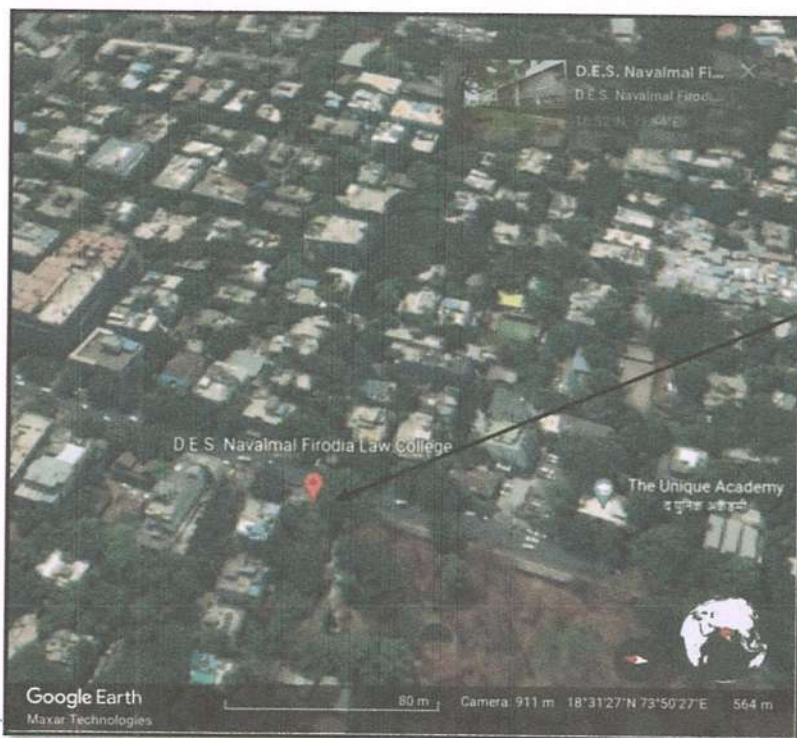
1.1 Objectives:

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

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



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CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	1461
2	May-21	1245
3	Jun-21	987
4	Jul-21	950
5	Aug-21	1007
6	Sep-21	923
7	Oct-21	1496
8	Nov-21	1603
9	Dec-21	1198
10	Jan-22	1139
11	Feb-22	1027
12	Mar-22	1400
13	Total	14436
14	Maximum	1603
15	Minimum	923
16	Average	1203

Chart No 1: Variation in Monthly Energy Consumption:

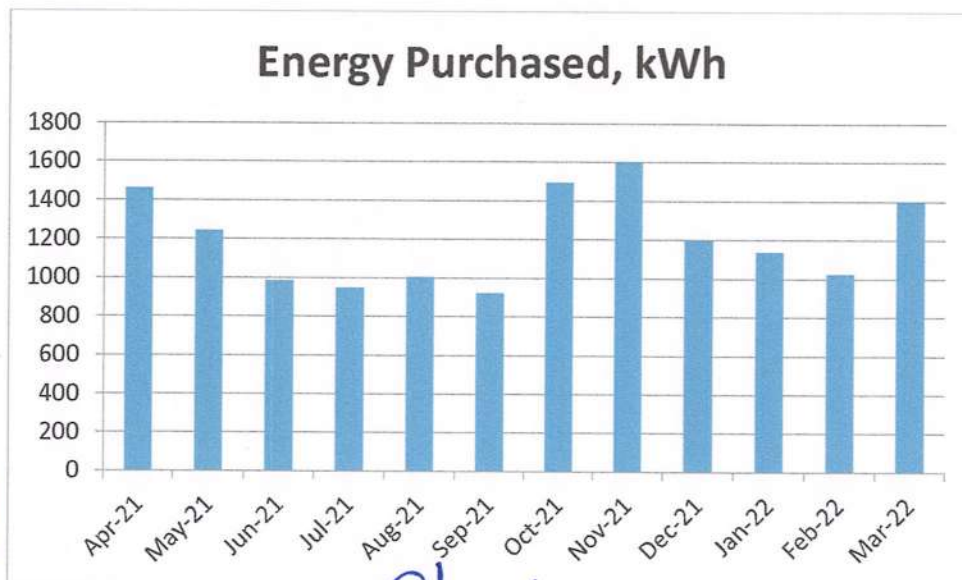


Table No 3: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh
1	Total	14436
2	Maximum	1603
3	Minimum	923
4	Average	1203



polan



CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

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

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	1461	1.31
2	May-21	1245	1.12
3	Jun-21	987	0.89
4	Jul-21	950	0.86
5	Aug-21	1007	0.91
6	Sep-21	923	0.83
7	Oct-21	1496	1.35
8	Nov-21	1603	1.44
9	Dec-21	1198	1.08
10	Jan-22	1139	1.03
11	Feb-22	1027	0.92
12	Mar-22	1400	1.26
13	Total	14436	12.99
14	Maximum	1603	1.44
15	Minimum	923	0.83
16	Average	1203	1.08



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Chart No 2: Month wise CO₂Emissions:

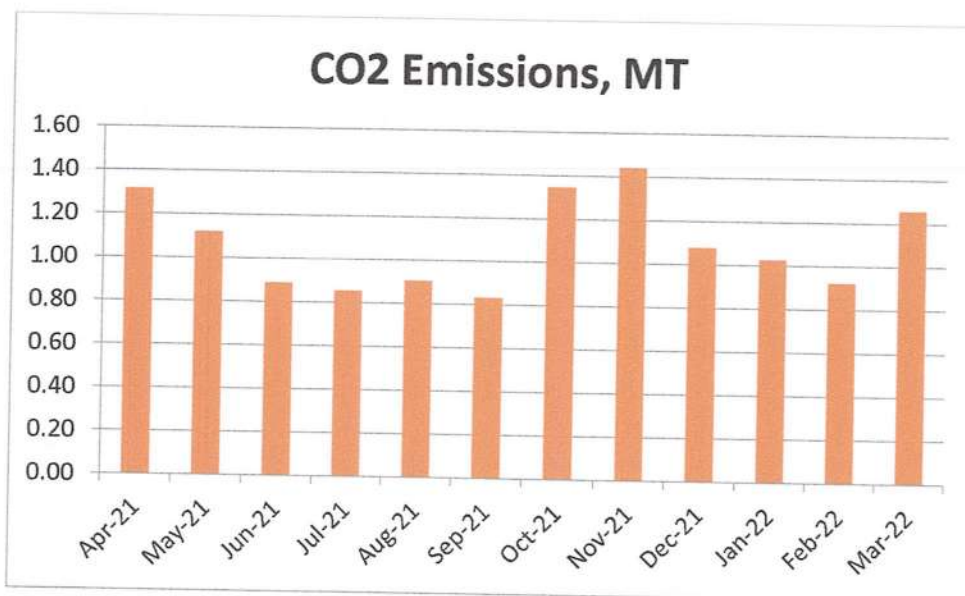


Table No 5: Variation in Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO2 Emissions, MT
1	Total	14436	12.99
2	Maximum	1603	1.44
3	Minimum	923	0.83
4	Average	1203	1.08



Plant

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CHAPTER IV STUDY OF USAGE OF RENEWABLE ENERGY

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

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	10.8	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



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CHAPTER V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



Plan
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5.3 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



5.4 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.



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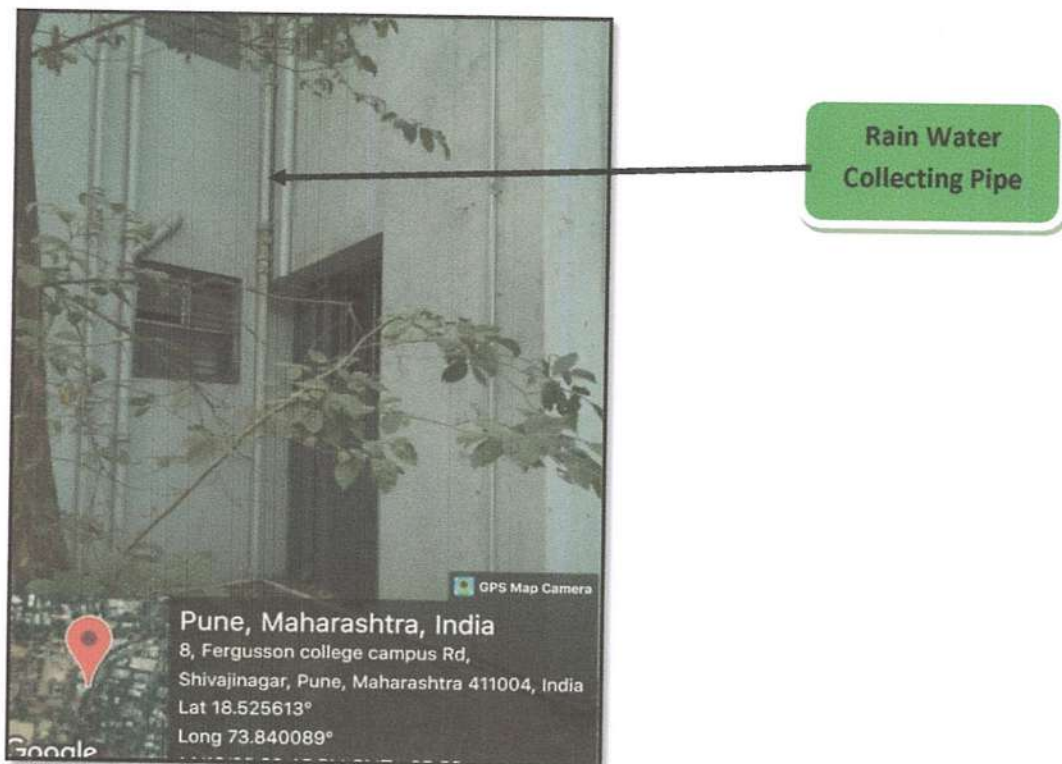


CHAPTER-VI

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.

Photograph of Rain water Management Pipe:



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CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

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 Tree plantation:



[Signature]

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7.3 Provision of Ramp:

For easy movement of Divyangajan, the College has made provision of Ramp at the main entrance.

Photograph of Ramp:



7.4 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



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Shri Navalmal Firodia Law College
Pune-411004.



ANEXURE-I

DETAILS OF TREES AND PLANTS IN THE CAMPUS

A. List of Trees in the Campus:

No	Name of Tree
1	Guava
2	Sitafal
3	Tamarind
4	Mango
5	Badam
6	Vad
7	Phycus
8	Saptaparni
9	Lemon
10	Palm
11	Bamboo
12	Gulmohor
13	Silver Oak
14	Papaya

B. List of Plants in the Campus:

No	Name of Plant
1	Plumbago
2	Duranta
3	Copper Leaf
4	Tulsi
5	Rose
6	Mogra
7	Ticoma
8	Fern
9	Ghaneri
10	Bougainvillea



Plant.

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Shri Navalma Firodia Law College
Pune-411 004.



ENVIRONMENTAL AUDIT REPORT
of
Deccan Education Society's
SHRI NAVALMAL FIRODIA LAW COLLEGE, PUNE



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



MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
(Government of Maharashtra Institution)
Aundh Road, Opposite Spicer College Road, Near Commissionerate of Animal Husbandary,
Aundh, Pune, Maharashtra 411067
Ph No: 020-35000450
Email: eee@mahaurja.com, Web: www.mahaurja.com

ECN/2022-23/CR-43/1709 10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**

We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Muktangan English School,
Parvati, Pune - 411 009.

Registration Category : Empanelled Consultant for Energy Conservation Programme for Class 'A'

Registration Number : MEDA/ECN/2022-23/Class A/EA-32.

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


General Manager (EC)

 **GEM Certificate** 

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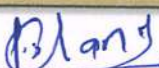
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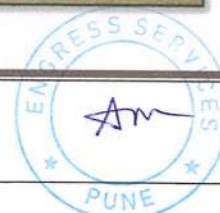
GEM CP 22/788

Deepak Sood 
Secretary General, ASSOCHAM



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ENGRESS SERVICES

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

Ref: ES/ DESNFLC /21-22/03

Date: 11/6/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Deccan Education Society's Shri Navalma Firodia Law College Pune, in the Year 2021-22.

The College has adopted following Environment Friendly Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at Source
- Installation of Vermi Composting Unit
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Implementation of Rain Water Management Project
- Tree Plantation in the campus
- Creation of Awareness by Display of Posters on Resource Conservation

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

For Engress Services,



A Y Mehendale,

Certified Energy Auditor, EA-8192

ASSOCHAM GEM Certified Professional: GEM: 22/788



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Shri Navalma Firodia Law College
Pune-411 004.

Engress Services, Pune



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ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Deccan Education Society's Shri Navalma Firodia Law College, Pune, 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.



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Page 5

EXECUTIVE SUMMARY

1. Deccan Education Society's Shri Navalmal Firodia Law College Pune consumes Energy in the form of **Electrical Energy** used for various Electrical Equipment, office & other facilities.

2. Pollution due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	14436	12.99
2	Maximum	1603	1.44
3	Minimum	923	0.83
4	Average	1203	1.08

4. Various initiatives taken for Energy Conservation:

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

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

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 2021-22 is **12000 kWh**.
- Reduction in CO₂ Emissions in 2021-22 works out to be **10.8 MT**.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	98	58	74
2	Minimum	85	49	63

7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	30	41	231	45
2	Minimum	29.9	40	123	36.9

8. Waste Management:

8.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. It is then handed over for further action.

8.2 Organic Waste Management:

The College has a Vermi Composting Plant, to convert the leafy waste into Bio Compost.

8.3 Sanitary Waste Management:

The College has made provision of Sanitary Waste Incinerator to dispose of the Sanitary Waste.

8.4 E Waste Management:

It is recommended to dispose of the E Waste through Authorized Agency.

9. Rain Water Management:

The College has installed the Rainwater Management project; the rain water falling on the terrace is collected and is used for enriching the underground water table.

10. Environment Friendly Initiatives:

- Maintenance of Internal Garden
- Display of Posters on Resource Conservation

11. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy Generated by Roof Solar PV Plant Per Day: **4 kWh/ kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

12. References:

- For CO₂ Emissions: www.tatapower.com
- For Solar PV Energy Generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com



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Pune-411 004.



ABBREVIATIONS

Kg	: Kilo Gram
DES	: Deccan Education Society
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board
ISHRAE	: The Indian Society of Heating & Refrigerating & Air Conditioning Engineers



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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 compiled with and adequate care has been taken towards environmental protection and preservation

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

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

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

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

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

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

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 Objectives:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To study Indoor Comfort Condition Parameters
5. To Study of Waste Management
6. To Study of Rain Water Management
7. To Study of Environment Friendly Initiatives

1.3 General Details of College: Table No 4:

No	Head	Particulars
1	Name of Institution	Shri Navalmal Firodia Law College
2	Address	Fergusson Road, Pune
3	Affiliation	Savitribai Phule Pune University



P. Mani

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1.4 Google Earth Image:



College
Campus



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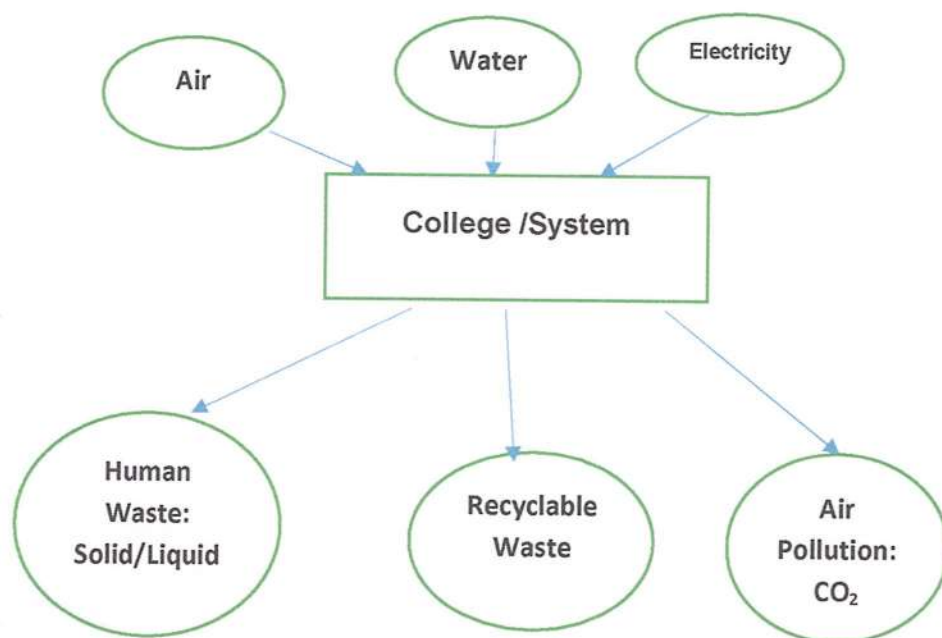
CHAPTER-II

STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

The College consumes following basic/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 & Study of Resources & Waste

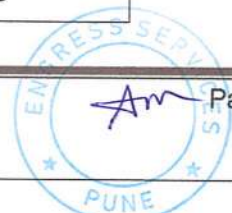


Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy is as under.

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

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 21-22:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	1461	1.31
2	May-21	1245	1.12
3	Jun-21	987	0.89
4	Jul-21	950	0.86
5	Aug-21	1007	0.91
6	Sep-21	923	0.83



7	Oct-21	1496	1.35
8	Nov-21	1603	1.44
9	Dec-21	1198	1.08
10	Jan-22	1139	1.03
11	Feb-22	1027	0.92
12	Mar-22	1400	1.26
13	Total	14436	12.99
14	Maximum	1603	1.44
15	Minimum	923	0.83
16	Average	1203	1.08

Chart No 2: Month wise CO₂ Emissions:

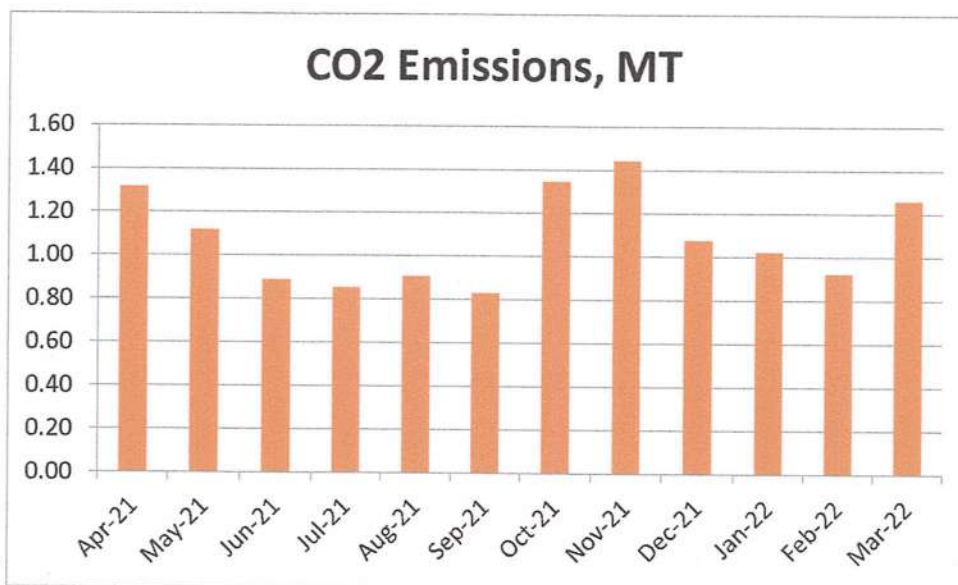


Table No 6: Important Parameters:

No	Parameter/ Variation	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Total	14436	12.99
2	Maximum	1603	1.44
3	Minimum	923	0.83
4	Average	1203	1.08



P. Lang

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CHAPTER III

STUDY OF CO₂ EMISSION REDUCTION

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

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	38	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	45600	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO ₂ Saved by Solar PV Plant $= (4) * (5) / 1000$	41	MT of CO ₂

Photograph of Roof Top Solar PV Plant:



Plans

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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 livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

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. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the AQI requires an air monitor and an air pollutant concentration over a specified averaging period.

We present herewith following important Parameters.

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

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM2.5	PM10
	Ground Floor			
1	Staff Room	93	55	72
2	Admin Office	96	56	69



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3	Principal Cabin	96	58	74
4	Conference Room	85	49	63
	First Floor			
5	LC-IV	86	52	67
6	LC-V	94	55	71
7	LC-IX	93	56	72
8	Sick Room	98	58	70
	Second Floor			
9	LC-XI	96	55	70
10	LC-XII	97	56	72
11	Library	89	52	74
12	Reading Room	90	52	69
13	Maximum	98	58	74
14	Minimum	85	49	63



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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 9: Study of Indoor Comfort Condition Parameters:

No	Location	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
	Ground Floor				
1	Staff Room	29.9	40	169	36.9
2	Admin Office	29.9	41	157	37
3	Principal Cabin	30	41	201	39
4	Conference Room	30	40	231	42.3
	First Floor				
5	LC-IV	30	41	197	44.5
6	LC-V	29.9	41	178	45
7	LC-IX	29.9	41	145	43.6
8	Sick Room	29.9	40	163	44
	Second Floor				
9	LC-XI	30	40	123	39.6
10	LC-XII	30	40	134	40
11	Library	30	41	141	42.9
12	Reading Room	29.9	40	128	44.3
13	Maximum	30	41	231	45
14	Minimum	29.9	40	123	36.9



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CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The recyclable waste, like paper waste is segregated at source by usage of Waste Bins at various locations.

Photograph of Waste Collection Bin:



6.2 Organic Waste Management:

For conversion of Organic Waste like, Leafy Waste, Vermi Composting facility is constructed and the compost is used in the campus garden.

Photograph of Vermi Composting Unit:



Plans

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6.3 Sanitary Waste Management:

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

Photograph of Sanitary Waste Incinerator:



6.4 E Waste Management:

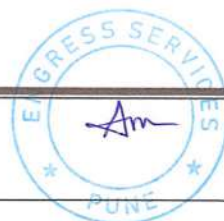
It is recommended to dispose of the E Waste through Authorized Agency.



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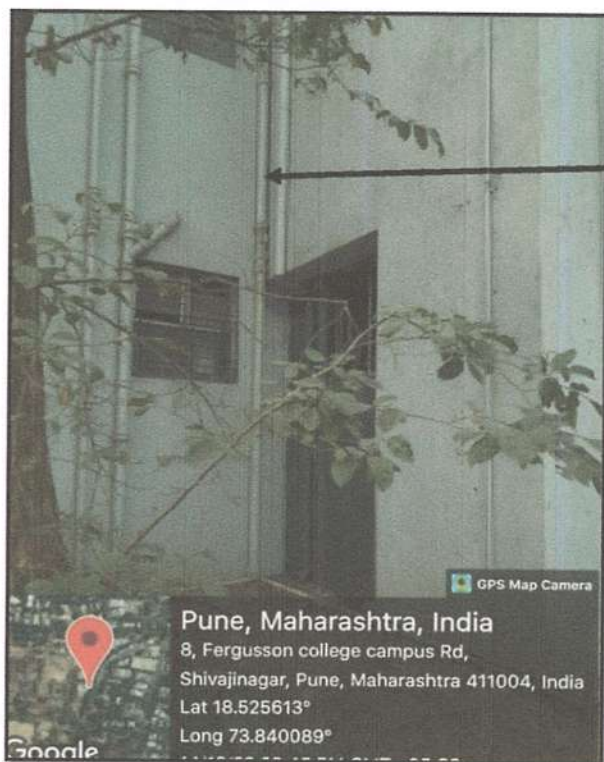


CHAPTER-VII

STUDY OF RAIN WATER MANAGEMENT

The College has implemented the Rain Water Management Project. The College has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and is used to enrich the underground Water Table.

Photograph of Rain water Management Pipe:



Rain Water
Collecting Pipe



P. D. Land

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CHAPTER-VIII

STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



8.2 Creation of Awareness about Energy Conservation:

The College has displayed posters emphasizing on importance of Energy Conservation.

Photograph of Poster on Energy Conservation:



ANNEXURE-I:

VARIOUS AIR QUALITY, WATER 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 Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5



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3. 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

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

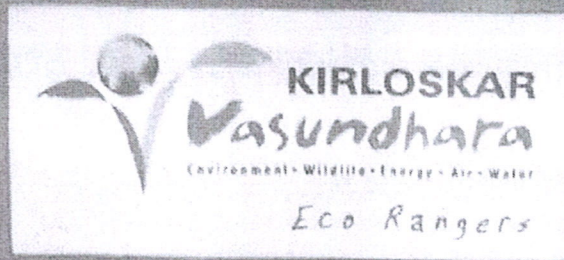
No	Parameter	Value
1	Temperature	Less Than 33 ⁰ C
2	Humidity	Less Than 70%



Plan

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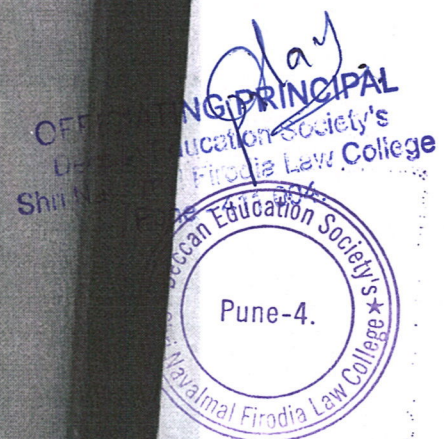
Certificate

Of Merit

This is to certify that
DES Shri. Navalmal Firodia Law College, Pune
 has been awarded the **Consolation Prize** in
'GCCC Trophy Competition 2017'.
 'Green College Clean College' is not
 just an environmental initiative, it's
 fast becoming a movement that's
 changing mindsets.
 Its objective is to sensitize students
 on the importance of an
 environment friendly college
 campus.

Yours,

Atul Kirloskar	Arti Kirloskar	Madhav Chandrachud	Virandra Chitrev





MAJHI VASUNDHARA {MY EARTH}
Environment & Climate Change Department
Government of Maharashtra



MAJHI VASUNDHARA
MITRA

CERTIFIED
MAJHI VASUNDHARA MITRA

NAME

ARCHANA LAHOTI

DATE: 11/01/2021

Shri. Aaditya Thackeray
Minister

Tourism, Protocol & Environment and Climate Change Department
Government of Maharashtra.

REPORT ON TREE PLANTATION OUTSIDE THE CAMPUS

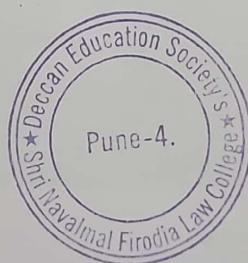
Plantation Drives:

College encourages plantation drives on campus and also outside the campus. Many indigenous and medicinal plants are planted and nurtured in the campus and also around the campus premises. Luscious green campus is the result of earnest efforts taken by staff, teachers and students for maintaining it; campus has all round green cover with different kinds of plants and trees consciously conserve.

Following activities done by college through NSS department to ensure green campus maintained in the college premise and outside college premise

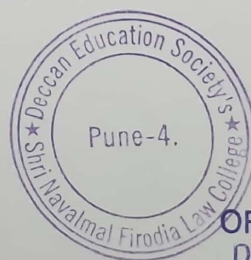
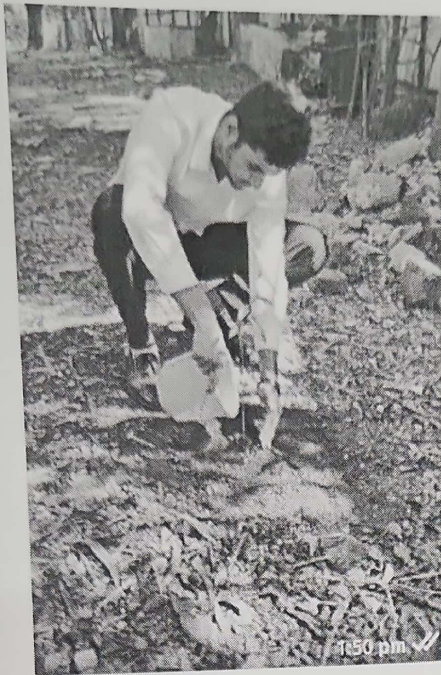
1. Raising awareness and sensitization about environmental issues : Students , staff and teachers enthusiastically participate in tree plantation drive
2. Cleanliness drive on campus and awareness generation : We encourage plastic free environment and encourage students to participate in various environmental drives and use recyclable material
3. Organization of Seminars, Conferences : Awareness about various environmental seminars , conferences were made to students and students are encouraged to participate in various conferences and seminars .

Photographs of the Activity:



A handwritten signature in blue ink, appearing to read "P. Lang".

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Plan 7

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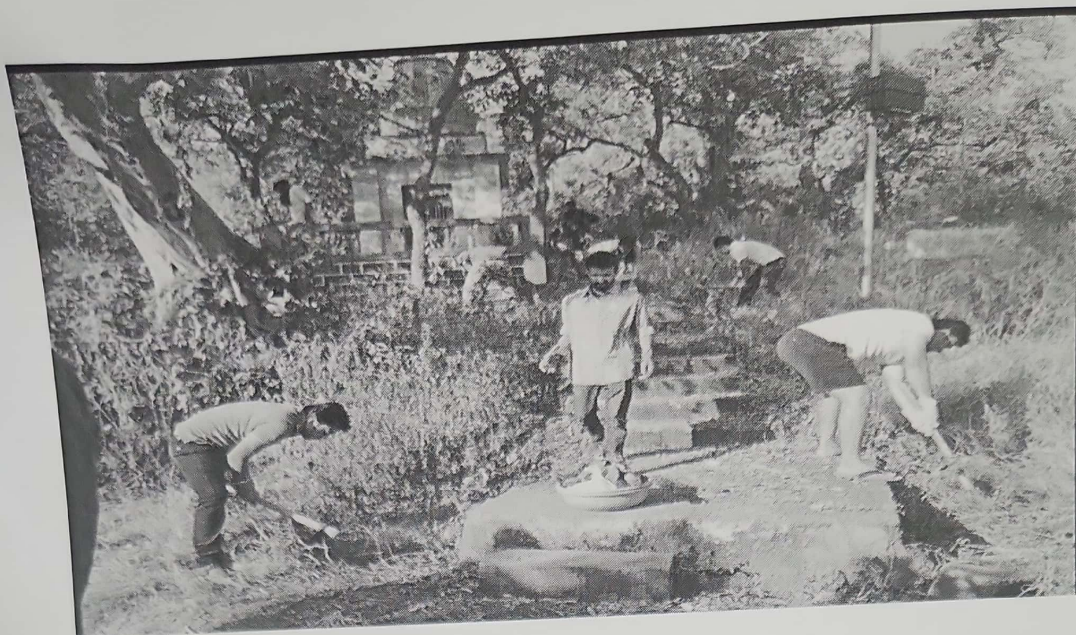


Tree Plantation Drive



P. Lany

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Cleanliness & Tree Plantation Drive



Plang

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