GREEN AUDIT REPORT
of
BRIHAN MAHARASHTRA COLLEGE OF COMMERCE, SHIVAJINAGAR, PUNE 411 004

Year: 2019-20

Prepared by

Enrich Consultants

Yashashree, 26, Nirmal Bag Society,
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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.

19/9/18

(Smita Kudarikar)
General Manager (EC)

Enrich Consultants

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

Ref: EC/DESBMCC/19-20/02 Date: 12/7/2020

CERTIFICATE

This is to certify that we have conducted Green Audit at Deccan Education Society's Brihan Maharashtra College of Commerce, Shivajinagar, Pune 411 004, in the year 19-20.

The College has adopted following **Energy Efficient & Green** Practices:

- Usage of Energy Efficient LED Fittings
- Maximum Usage of Day Lighting
- Installation of **5500 LPD** Solar Thermal Water Heating System
- Segregation of Waste at source
- Installation of Bio gas plant at Girls Hostel block
- Maintenance of Good Internal Roads
- Tree Plantation and Maintenance of Good Internal Garden
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator

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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ACKNOWLEDGEMENT

We at Enrich Consultants, Pune, express our sincere gratitude to the management of Deccan Education Society's Brihan Maharashtra College of Commerce, Pune, for awarding us the assignment of Green Audit of their campus for the Year: 2019-20.

We are thankful to various Head of Departments & other Staff members for helping us during the field measurements.

EXECUTIVE SUMMARY

1. Deccan Education Society's Brihan Maharashtra College of Commerce, Shivajinagar, Pune 411 004, consumes Energy in the form of **Electrical Energy** used for various gadgets, Office & other facilities.

2. Present Energy Consumption& CO_2 Emission:

No	Parameter/ Value	Energy Purchased, kWh	CO_2 emissions, MT
1	Total	124765	99.81
2	Maximum	11283	9.03
3	Minimum	9634	7.71
4	Average	10397.08	8.32

3. Various Majors Adopted for Energy Conservation:

- Usage of Energy Efficient LED Fittings
- Usage of Energy efficient STAR Rated Equipment
- Installation of **5500 LPD** Solar Thermal Water Heating System

4. Usage of Renewable Energy & CO_2 Emission Reduction:

- The College has installed Solar Thermal Water Heating System of Capacity **5500 LPD**
- Electrical Energy saved by Solar Water Heating System in: 19-20 is **45205 kWh**.
- The reduction in CO_2 Emissions due to Solar PV Plant in 19-20 is **36.16 MT.**

5. Waste Management:

5.1 Segregation of Waste at Source:

The waste is segregated at the source. There are separate Waste Collection Bins at various locations, to collect Dry and Wet Waste separately.

5.2 Bio Gas Plant:

The College has installed a Bio gas plant to convert the organic waste into bio gas at the Girls hostel block.

5.3 E Waste Management:

The E-Waste generated in the campus is disposed, through authorized vendor.

6. Rain Water Harvesting:

The College is yet to install the Rain Water Harvesting Project.

At present the Rain Water falling from the terrace and also coming from the hill slope is benefitting the underground water table naturally.

7. Green &Sustainable Practices:

- The College has good internal roads for easy movement of students
- The College has well maintained Landscaped Garden.
- There are about 700 Plus Trees in the campus.
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator

8. Notes & Assumptions:

1. **1 kWh** of Electrical Energy releases **0.8 Kg of CO_2**into atmosphere
2. Energy saved by 100 LPD Solar Thermal Water Heating System in an year is **1500 kWh**
3. Annual working Days: For Solar Thermal Water Heating System in 19-20:**200 Nos**

9. References:

1. For Energy saved by Solar Thermal Water Heating System : www.mahaurja.com

ABBREVIATIONS

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

CHAPTER-I
INTRODUCTION

1.1 Objectives:

1. To study present Energy Consumption
2. To Study the present CO_2 emissions
3. To study usage of Renewable Energy
4. To study Waste Management
5. To study Rain Water Harvesting
6. To study Green & Sustainable Initiatives.

1.2 Table No 1: General Details of College:

No	Head	Particulars
1	Name	Deccan Education Society's Brihan Maharashtra College of Commerce
2	Address	545, Shivajinagar, Pune 411004
3	Year of Establishment	1943
4	Affiliation	Savitribai Phule Pune University

CHAPTER-II
STUDY OF PRESENT ENERGY CONSUMPTION

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

Table No 2: Electrical Energy Consumption Analysis- 2019-20:

No	Month	Energy Consumed, kWh
1	Apr-19	11147
2	May-19	9752
3	Jun-19	9968
4	Jul-19	11215
5	Aug-19	11283
6	Sep-19	10611
7	Oct-19	9741
8	Nov-19	9634
9	Dec-19	10828
10	Jan-20	9979
11	Feb-20	10476
12	Mar-20	10131
13	Total	124765
14	Maximum	11283
15	Minimum	9634
16	Average	10397.08

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

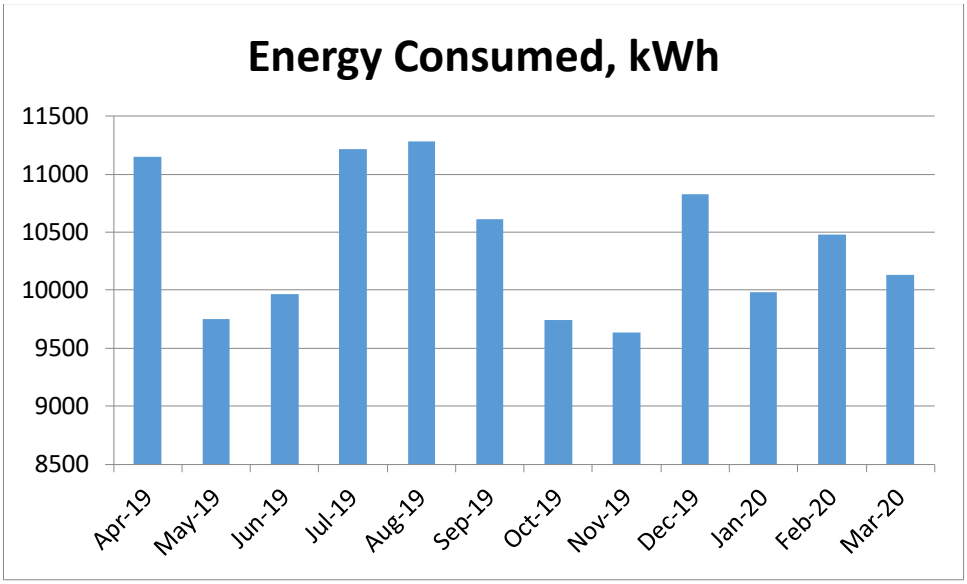


Table No 3: Key Parameters:

No	Parameter	Energy Purchased, kWh
1	Total	124765
2	Maximum	11283
3	Minimum	9634
4	Average	10397.08

CHAPTER-III
CARBON FOOTPRINTING

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

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

Basis for computation of CO_2 Emissions:

The basis of Calculation for CO_2 emissions due to Electrical Energy are:

1 Unit (kWh) of Electrical Energy releases **0.8 Kg of CO_2** into atmosphere

Based on the above Data we compute the CO_2 emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO_2 Emissions:

No	Month	Total Energy Consumed, kWh	CO_2 Emissions, MT
1	Apr-19	11147	8.92
2	May-19	9752	7.80
3	Jun-19	9968	7.97
4	Jul-19	11215	8.97
5	Aug-19	11283	9.03
6	Sep-19	10611	8.49
7	Oct-19	9741	7.79
8	Nov-19	9634	7.71
9	Dec-19	10828	8.66
10	Jan-20	9979	7.98
11	Feb-20	10476	8.38
12	Mar-20	10131	8.10
13	Total	124765	99.81
14	Maximum	11283	9.03
15	Minimum	9634	7.71
16	Average	10397.08	8.32

Chart No 2: Representation of Month wise CO_2 emissions:

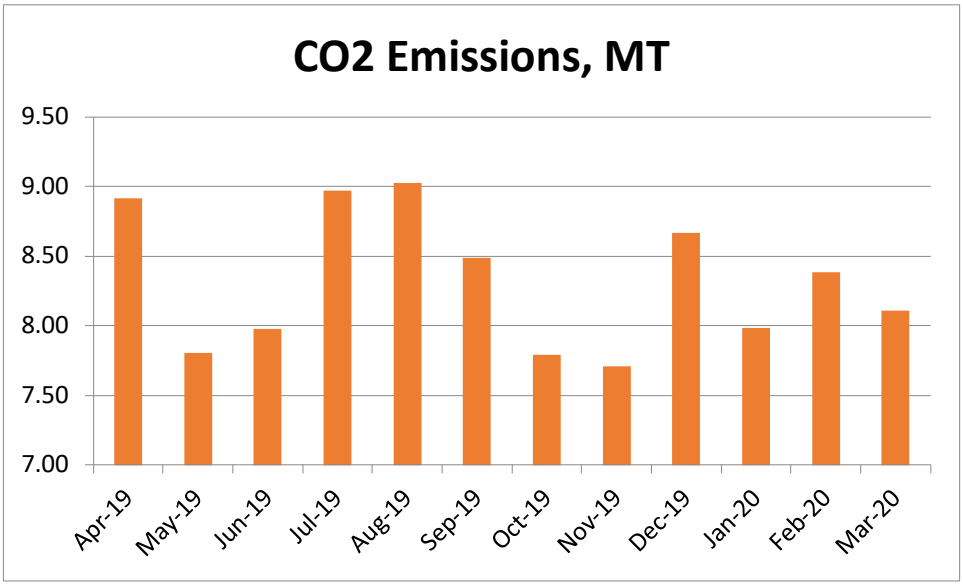


Table No 5: Key Parameters:

No	Parameter/ Value	Energy Purchased, kWh	CO_2 emissions, MT
1	Total	124765	99.81
2	Maximum	11283	9.03
3	Minimum	9634	7.71
4	Average	10397.08	8.32

CHAPTER-IV
STUDY OF USAGE OF RENEWABLE ENERGY

The College has installed **5500 LPD Solar Thermal Water heating system at Girls and Boys Hostel blocks.** (Total Installed Capacity).

In the following Table we present the Annual Reduction in CO_2 Emissions due to Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO_2 Emissions:

No	Particulars	Value	Unit
1	Installed Solar Thermal Water Heating Capacity	5500	LPD
2	Energy saved by 100 LPD System in 1 year	1500	kWh
3	Energy saved by 5500 LPD System=1*2/100	82500	kWh
4	System working days in 19-20	200	Nos
5	Energy saved by System in 19-20=82500*200/365	**45205**	kWh
6	1 kWh of Electrical Energy is equivalent to	**0.8**	Kg of CO_2
7	**Annual Reduction in CO_2 emission in 21-22= 5*6/1000**	**36.16**	**MT**

Photograph of Solar Thermal Water Heating System:

CHAPTER V
STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The waste is segregated at the source. There are separate Waste Collection Bins at various locations, to collect Dry and Wet Waste separately.

Photograph of Waste Collection Bins:

5.2 Organic Waste Management:

To convert the Bio degradable Waste, the College has installed a **Bio Gas Plant** at the Girls hostel block.

Photograph of Bio Gas Plant:

5.3 E Waste Management:

The E-Waste generated in the campus is disposed, through authorized vendor.

CHAPTER-VI
RAIN WATER HARVESTING

The College is yet to install the Rain Water Harvesting Project.

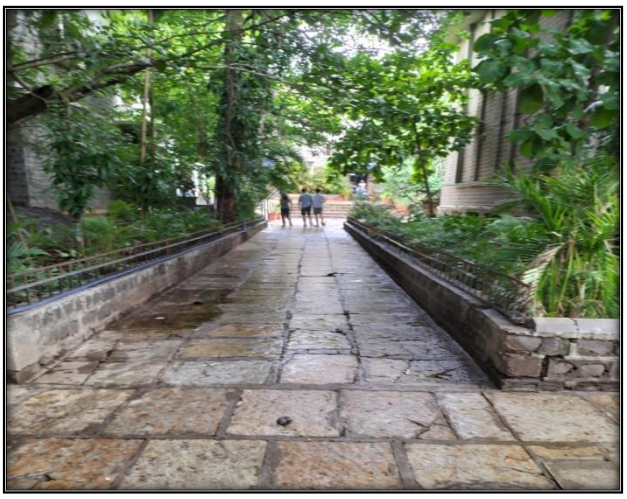
At present the Rain Water falling from the terrace and also coming from the hill slope is benefitting the underground water table naturally.

CHAPTER-VII
STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

The College has well defined pedestrian foot paths to facilitate the easy movement of the students within the campus.

Photograph of Road within campus:



7.2 Tree Plantation:

The College has beautiful Tree plantation in the campus. On all sides of the campus trees are planted. There are about 700 Plus trees in the campus.

Photograph of Tree Plantation:

7.3 Provision of Ramp for Divyangajan:

In order to facilitate the movement of Divyangajan, ramps are provides in the campus.

Photograph of Ramp:

7.4 Provision of Sanitary Waste Incinerator:

The College has installed a Sanitary Waste Incinerator.

Photograph of Sanitary Waste Incinerator: