

GREEN AUDIT REPORT
of
Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY,
Outer Ring Road, Mallathahalli,
Bengaluru 560 056



Year: 2021-22

Prepared by

ENGRESS SERVICES

Yashashree, 26, Nirmal Bag Society,
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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/2021-22/CR-43/441

8th February, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'B'**

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 Muktangam English School,
Parvati, Pune – 411 009.

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

Registration Number : *MEDA/ECN/2021-22/Class B/EA-07.*

- 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 7th **February, 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)

Engress Services

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

Ref: ES/DAIT/21-22/01

Date: 8/5/2022

CERTIFICATE

This is to certify that we have conducted Green Audit at Dr. Ambedkar Institute of Technology, Outer Ring Road, Mallathahalli, Bengaluru 560 056 in the Academic year 2021-22.

The Institute has adopted following Green practices:

- Usage of Energy Efficient LED Fittings
- Usage of Energy Efficient BEE STAR Rated equipment
- Installation of **4000 LPD** Solar Thermal Water Heating System
- Segregation of Waste at source
- Provision of Bio composting Unit for Organic Waste Management
- Good internal Roads within the campus
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator for disposal of Sanitary Waste
- Creation of awareness by Display of posters on Resource conservation
- Encouragement for Usage of E Vehicles

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

For Engress Services,

A Y Mehendale,
Certified Energy Auditor
EA-8192

INDEX

Sr. No	Particulars	Page No
I	Acknowledgement	5
II	Executive Summary	6
III	Abbreviations	8
1	Introduction	9
2	Study of Electrical Energy Consumption	10
3	Carbon Foot printing	12
4	Study of Usage of Renewable Energy	14
5	Study of Waste Management	15
6	Study of Rain Water Management	17
7	Study of Green Practices	18
	Annexure	
I	List of Plants & Trees	20

ACKNOWLEDGEMENT

We Engress Services, Pune, express our sincere gratitude to the management of Dr. Ambedkar Institute of Technology, Outer Ring Road, Mallathahalli, Bengaluru 560 056 for awarding us the assignment of Green Audit of their Bengaluru campus for the Academic Year: 2021-22.

We are thankful to all the Faculty members & Staff members for helping us during the field study.

EXECUTIVE SUMMARY

1. Dr. Ambedkar Institute of Technology, Outer Ring Road, Mallathahalli, Bengaluru consumes Energy in the form of **Electrical Energy and Diesel** used for various gadgets, Office & other facilities

2. Present Energy Consumption & CO₂ Emission:

No	Parameter	Energy consumed, kWh	Diesel Consumed, Liters	CO ₂ Emissions, MT
1	Total	610060	856	551.35
2	Maximum	89080	132	80.36
3	Minimum	47400	69	42.94
4	Average	65122.5	98.37	58.87

3. Various Majors Adopted for Energy Conservation:

- Usage of Energy Efficient LED fittings
- Usage of BEE STAR Rated equipment
- Installation of **4000 LPD** Solar Thermal Water Heating System

4. Usage of Renewable Energy:

- The Institute has installed **4000 LPD** Solar Water Heating System.
- The Equivalent Electrical Energy generated by Solar System is **344448 kWh**.
- The Annual Reduction in CO₂ Emissions due to Solar System is **310 MT**

5. Waste Management:

5.1 Segregation of Waste at Source:

The waste is segregated at source. Separate Dry and Wet waste collection bins are provided at key locations in the campus. It is then further disposed.

5.2 Organic Waste Management:

The organic waste, like Leafy Waste generated is composted in a Bio Composting Unit and the compost is used for own garden in the premises.

5.3 Liquid Waste Management:

The Institute is installing Sewage Treatment Plant, to treat the Liquid Waste. The treated water will be used for gardening purpose.

5.4 E- Waste Management:

E Waste is collected in a separate Bin and is disposed of through Authorized Vendors.

6. Rain Water Management:

The rain water falling on the terrace is run through the pipes channels and is used to increase the increase the underground water table.

7. Green & Sustainable Practices:

- Maintenance of Well Maintained Internal Roads
- Well maintained Landscaped Lawn & Garden
- Tree Plantation in the campus
- Provision of Ramp for Divyangajan
- Provision of Sanitary Waste Incinerator
- Creation of awareness by Display of posters on Resource conservation
- Encouragement of Usage of E Vehicles

8. Notes & Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. **1 Liter of Diesel** releases **2.68 Kg of CO₂** into atmosphere
3. **100 LPD** Solar Water Heating System saves **1500 kWh** Energy per annum
4. Hostel Operation Days in 21-22: **200 Nos**

9. References:

1. For CO₂ Emissions: www.tatapower.com
2. For Energy saved by Solar Thermal Water Heating system: www.mahaurja.com

ABBREVIATIONS

LED	:	Light Emitting Diode
KLD	:	Kilo Liters per Day
Kg	:	Kilo Gram
kWh	:	kilo-Watt Hour
kWp	:	Kilo Watt Peak
Qty	:	Quantity
MT	:	Metric Ton
CO ₂	:	Carbon Di Oxide

CHAPTER-I INTRODUCTION

1.1 Objectives:

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

1.2 Table No-1: General Details of Institute:

No	Head	Particulars
1	Name	Dr. Ambedkar Institute of Technology
2	Address	Outer Ring Road, Mallathahalli, Bengaluru

1.3 Google Earth Image:



CHAPTER-II STUDY OF ELECTRICAL ENERGY CONSUMPTION

In this chapter, we present the analysis of Electrical Energy & Diesel.

Table No 2: Electrical Energy & Diesel Consumption: 2021-22:

No	Month	Energy Consumed, kWh	Diesel Consumed, Liters	CO ₂ Emissions, MT
1	Jul-21	47400	105	42.94
2	Aug-21	72400	129	65.51
3	Sep-21	55780	75	50.40
4	Oct-21	63720	85	57.58
5	Nov-21	70100	82	63.31
6	Dec-21	75320	105	68.07
7	Jan-22	67080	132	60.73
8	Feb-22	69180	74	62.46
9	Mar-22	89080	69	80.36
10	Total	610060	856	551.35
11	Maximum	89080	132	80.36
12	Minimum	47400	69	42.94
13	Average	65122.5	98.37	58.87

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

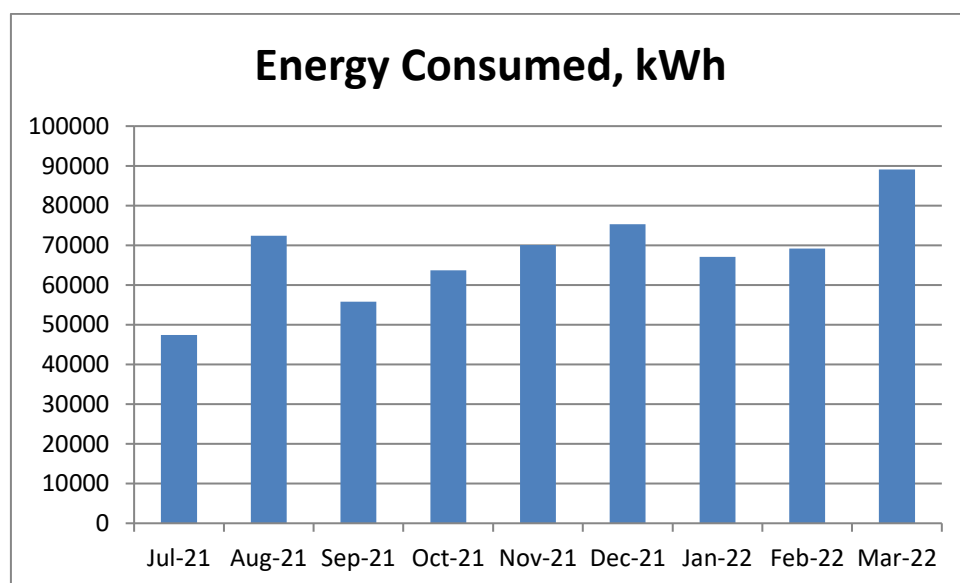


Chart No 2: To study the variation of Month wise Diesel Consumption, Liters:

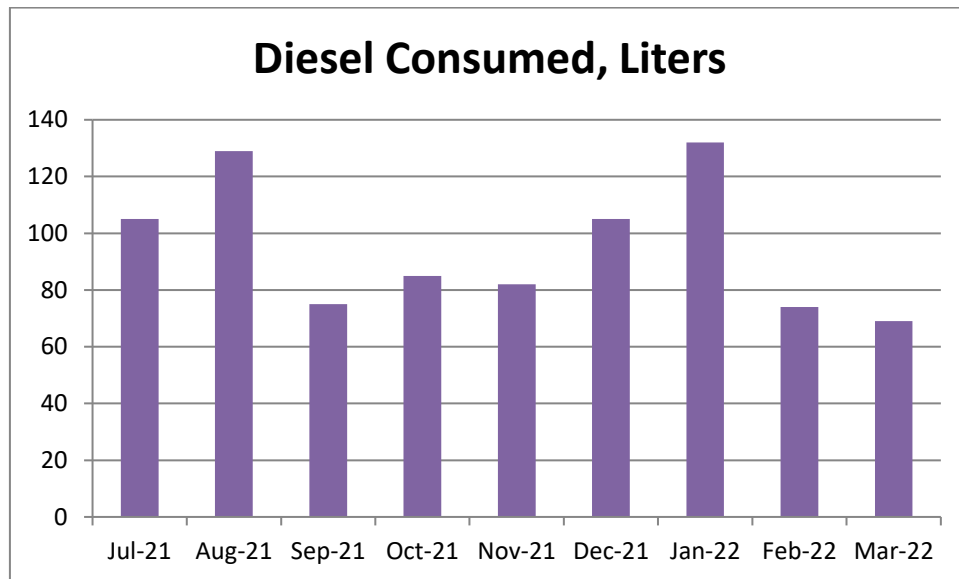


Table No 3: Key Parameters:

No	Parameter	Energy consumed, kWh	Diesel Consumed, Liters
1	Total	610060	856
2	Maximum	89080	132
3	Minimum	47400	69
4	Average	65122.5	98.37

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 Institute for performing its day to day activities

The Institute uses Electrical Energy for various Electrical gadgets.

3.2 Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is:

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
- **1 Liter** of Diesel releases **2.68 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 Institute due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Consumed, kWh	Diesel Consumed, Liters	CO ₂ Emissions, MT
1	Jul-21	47400	105	42.94
2	Aug-21	72400	129	65.51
3	Sep-21	55780	75	50.40
4	Oct-21	63720	85	57.58
5	Nov-21	70100	82	63.31
6	Dec-21	75320	105	68.07
7	Jan-22	67080	132	60.73
8	Feb-22	69180	74	62.46
9	Mar-22	89080	69	80.36
10	Total	610060	856	551.35
11	Maximum	89080	132	80.36
12	Minimum	47400	69	42.94
13	Average	65122.5	98.37	58.87

Chart No 2: Representation of Month wise CO₂ emissions:

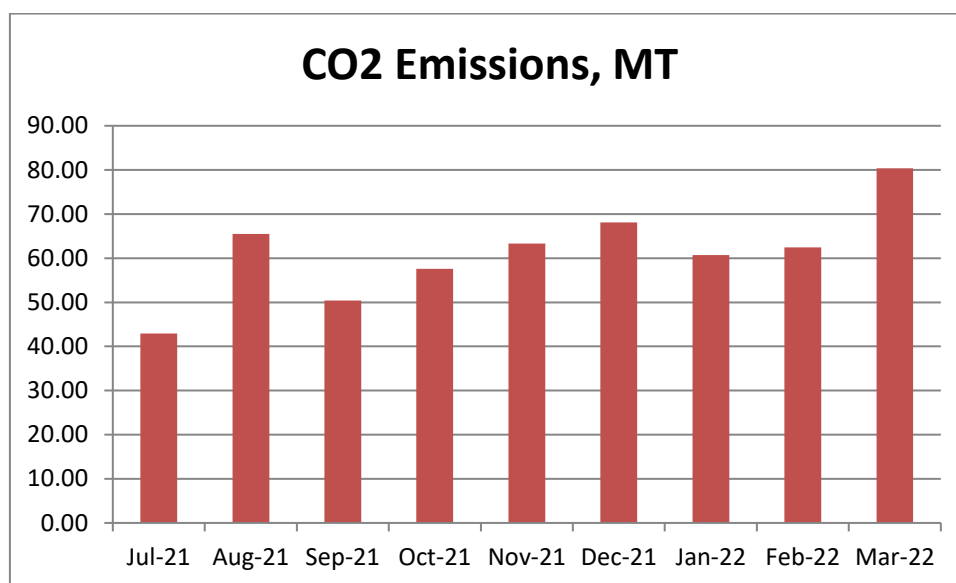


Table No 5: Key observations:

No	Value	Energy Consumed, kWh	Diesel Consumed, Liters	CO ₂ Emissions, MT
1	Total	610060	856	551.35
2	Maximum	89080	132	80.36
3	Minimum	47400	69	42.94
4	Average	65122.5	98.37	58.87

CHAPTER-IV STUDY OF USAGE OF RENEWABLE ENERGY

In this Chapter, we study the usage of Renewable Energy and compute the reduction in CO₂ Emissions. The Institute has installed Solar Water Heating System of Capacity 4000 LPD at the Hostel block.

100 LPD Solar Thermal Water Heating System saves **1500 kWh** of Electrical Energy in one Year.

In the following Table, we present the reduction in CO₂ Emissions.

Table No 6: Computation Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Solar Water Heating System at Hostel Block	4000	LPD
2	Energy Saved by 100 LPD Solar Thermal System in 365 Days	1500	kWh
3	Energy saved by 1500 LPD System in 1 Year = $4000 \times 1500 / 100$	60000	kWh
4	Actual Usage Period in 21-22	200	Nos
5	Energy saved in 200 Days of operation in 21-22 = $200 \times 60000 / 365$	32877	kWh
6	Equivalent Electrical Energy saved by 2500 LPD System	32877	kWh
7	1 kWh of Electrical Energy is equal to	0.9	Kg of CO ₂
8	Annual reduction in CO ₂ Emissions in 19-20= $6 \times 7 / 1000$	30	MT of CO₂

Photograph of Solar Thermal Water Heating System:

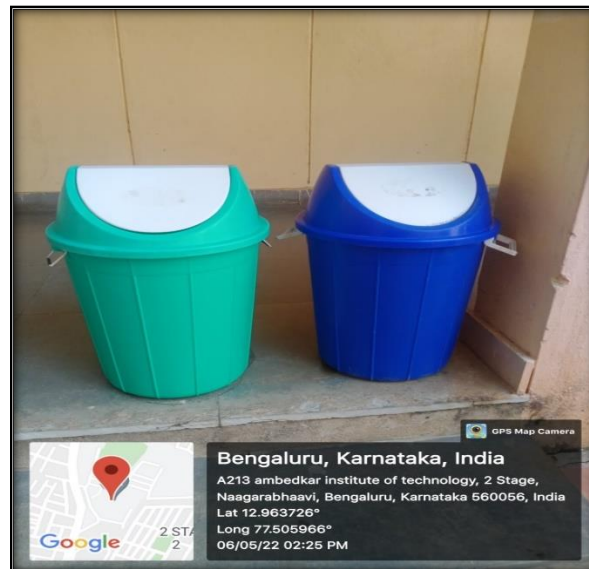


CHAPTER-V STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The waste is segregated at source. Separate Dry and Wet waste collection bins are provided at key locations in the campus. It is then further disposed.

Photograph of Waste Collection Bins:



5.2 Organic Waste Management:

The organic waste, like leafy waste generated is composted in a Bio Composting Unit and the compost produced is used for own garden.

Photograph of Bio Composting Unit:



5.3 Liquid Waste Management:

The Institute is in process of Installation of a Sewage Treatment Plant, to treat the Liquid Waste. The treated water will be used for gardening purpose.

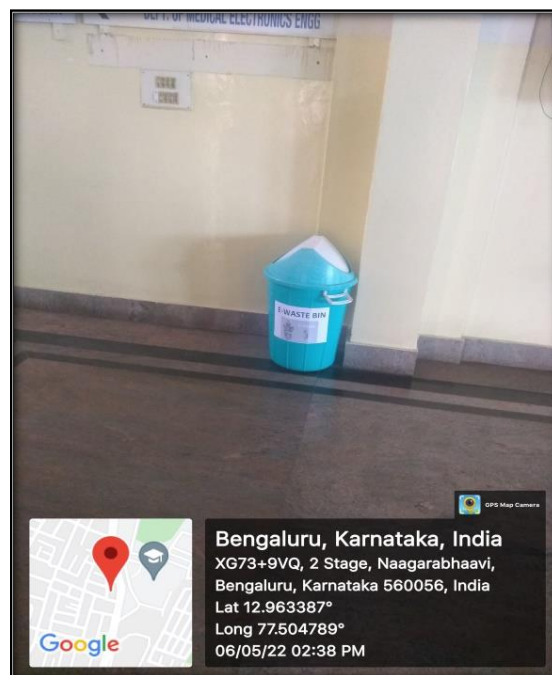
Present Photograph of Sewage Treatment Plant Site:



5.4 E Waste Management:

The E Waste is collected in a separate E Waste collection bin and is disposed of through Authorized Agency.

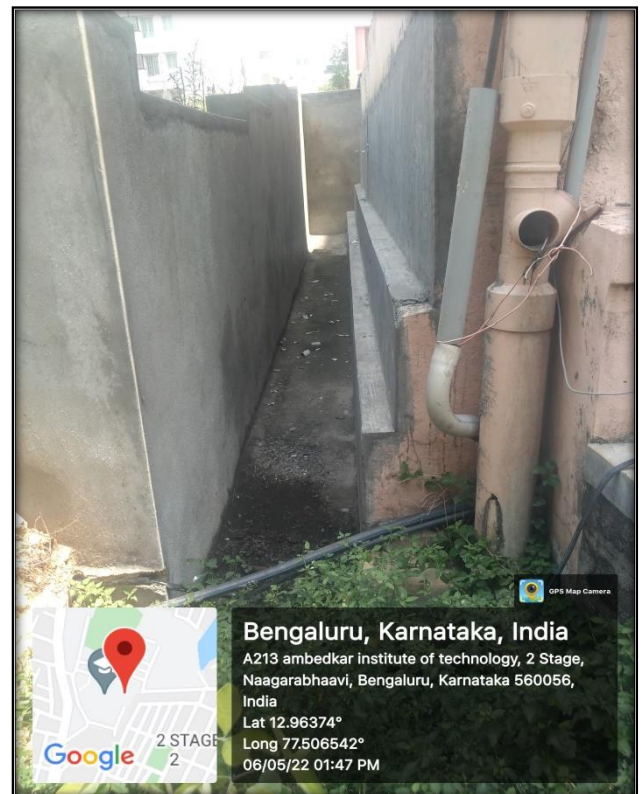
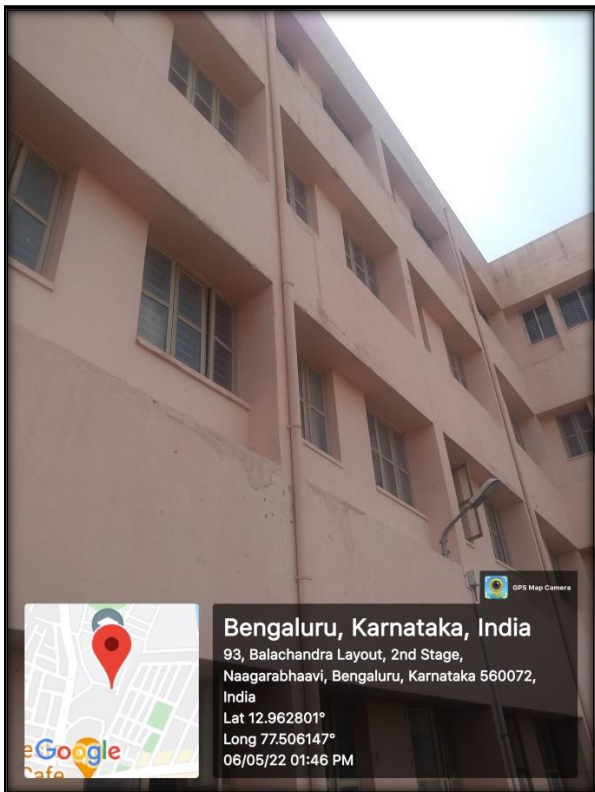
Photograph of E Waste Collection Bin:



CHAPTER-VI STUDY OF RAIN WATER MANAGEMENT

The Institute has installed Pipes from the terrace and the Rain water falling on the terrace is gathered and used to increase the underground water table.

Photograph of Rain Water Collection Pipe and Channel Section:



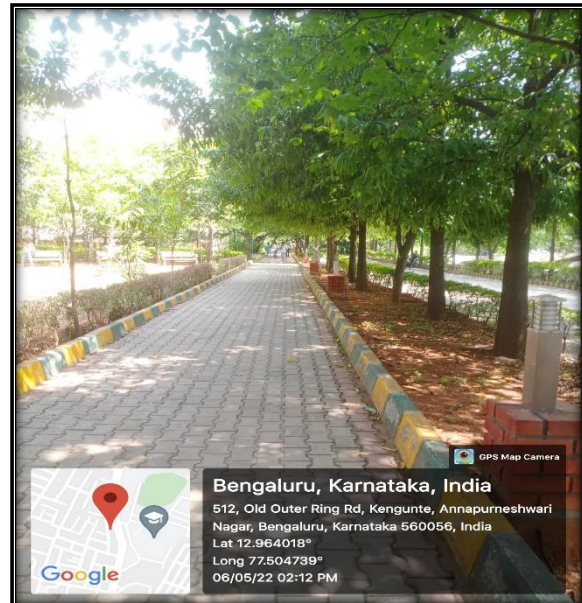
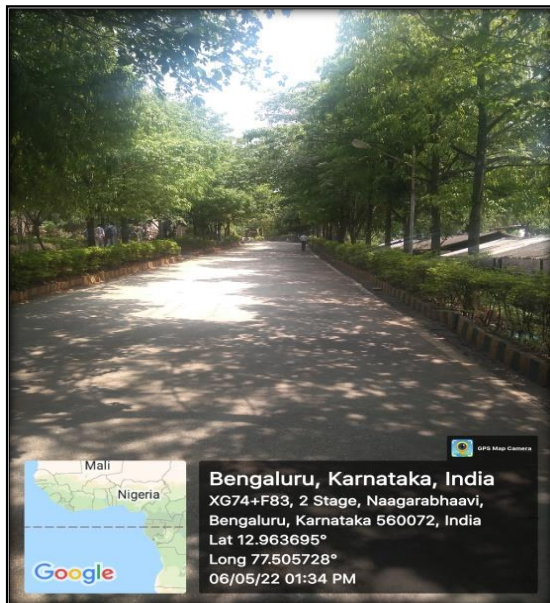
CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

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

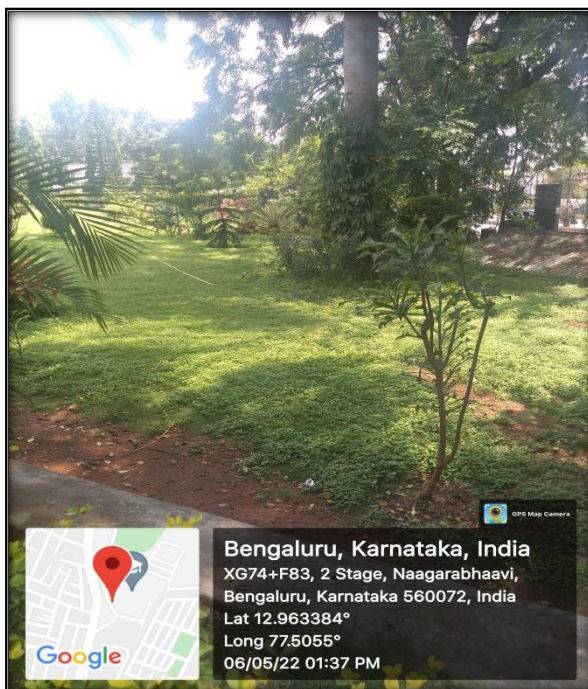
Photograph of Road within campus:



7.2 Tree Plantation in the Campus:

The Institute has well maintained Garden, inside the campus.

Photograph of Lawn and Tree Plantation:



7.3 Provision of Ramp for Divyangajan:

The Institute has made a provision of Ramp for easy movement of Divyangajan.

Photograph of Ramp:



7.4 Creation of awareness by Display of posters on resource conservation:

For creation of awareness, the Institute has displayed posters on Resource Conservation.

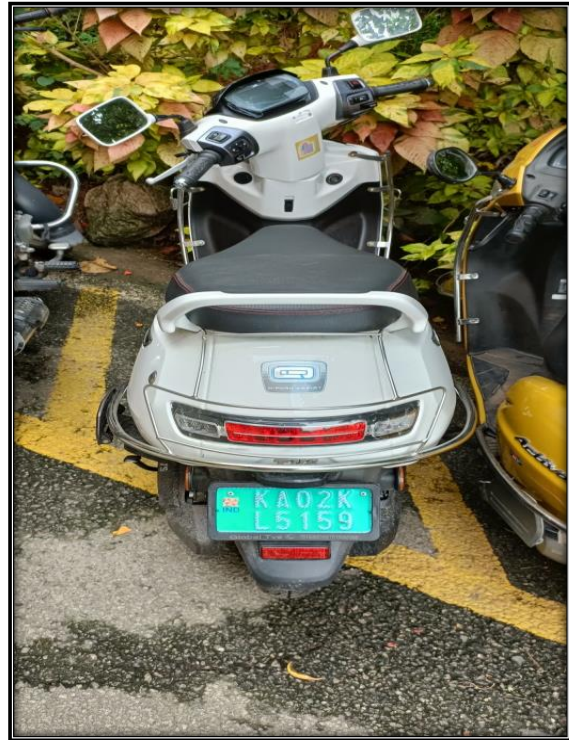
Photograph of Posters on Resource Conservation:



7.5 Promotion of E Vehicle:

The Institute is encouraging usage of E Vehicles by Stake holders. Some faculties are using the E Vehicles.

Photograph of E Vehicles:



7.6 Provision of Sanitary Waste Incinerator:

For disposal of Sanitary Waste, a Sanitary Waste Incinerator is installed in the campus.

Photograph of Sanitary Waste Incinerator:



ANNEXURE DETAILS OF TREES AND PLANTS

List of Trees and Plants:

No	Common Name of Tree	Qty
1	Mango	100
2	Teek wood	1000
3	Coconut tree	10
4	Asoka	80
5	Neem tree	10
6	Silver oak	50
7	Beech tree	25
8	Forest Almond tree	20
9	Jackfruit tree	3
10	Banyan tree	1
11	Green Gulmohar	7
12	Palm tree	2
13	Total	1308

Saplings		
No	Species	Qty
1	Rose	500
2	Majesty palm	10
3	Privet	30
4	Dump cans	10
5	Lantenna	20
6	Ixora	7
7	Elogance	10
8	Hibiscus	12
9	Total	599