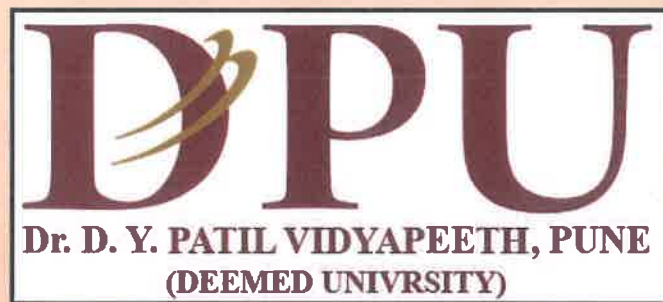


**REPORT**  
**on**  
**CO2 EMISSION & MITIGATION**

**DR. D. Y. PATIL VIDYAPEETH PUNE**

Sant Tukaram Nagar, Pimpri, Pune 411 018



**Year: 2023-24**

Prepared by:

**ENGRESS SERVICES**

Yashashree, 26, Nirmal Bag Society  
Near Mukhtangan English School, Parvati, Pune 411009  
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## Registration Certificates: UDYAM, MEDA, ASSOCHAM GEM-CP, ISO: 9001 &amp; 14001:

**UDYAM REGISTRATION CERTIFICATE**

UDYAM REGISTRATION NUMBER: UDYAM-MH-26-0135636

NAME OF ENTERPRISE: ENGRESS SERVICES

TYPE OF ENTERPRISE:

S.No.	Classification Year	Enterprise Type	Classification Date
1	2023-24	Micro	03/02/2024
2	2022-23	Micro	26/06/2022
3	2021-22	Micro	27/07/2021

MAJOR ACTIVITY: SERVICES

SOCIAL CATEGORY OF ENTREPRENEUR: GENERAL

NAME OF UNIT(S): Engress Services

OFFICIAL ADDRESS OF ENTERPRISE:

S.No.	Name of Unit(s)
1	Engress Services

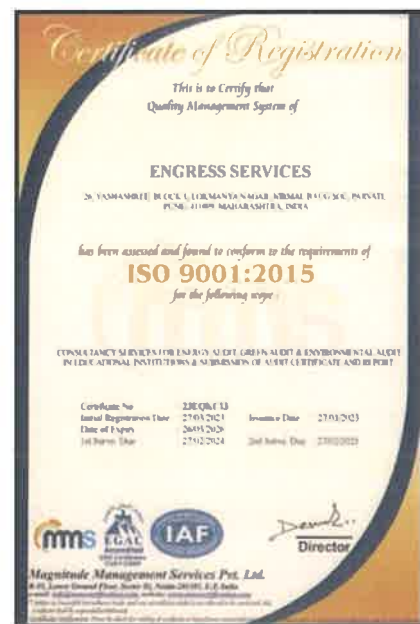
DATE OF INCORPORATION / REGISTRATION OF ENTERPRISE: 13/04/2021

DATE OF COMMENCEMENT OF PRODUCTION/BUSINESS: 13/04/2021

NATIONAL INDUSTRY CLASSIFICATION CODE(S):

S.No.	NIC 2 Digit	NIC 4 Digit	NIC 5 Digit	Activity
1	79	7910	79109	Activities of real estate management consultancy activities

DATE OF UDYAM REGISTRATION: 27/07/2021



**Maharashtra Energy Development Agency**  
(Government of Maharashtra Institution)  
Aashvi Road, Opposite Spicer College Road, Near Commemorative of Animal Husbandary,  
Aundh, Pune, Maharashtra 411007  
Ph No: 020-35000450  
Email: ceo@mahmeda.gov.in, Web: www.mahmeda.gov.in

**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, Yashdare, 26, Nirmal Bag Society, Near Mukundan English School, Parvati, Pune - 411 009

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

Registration Number: MEDA/ECN/2022-23/Class A/91-12

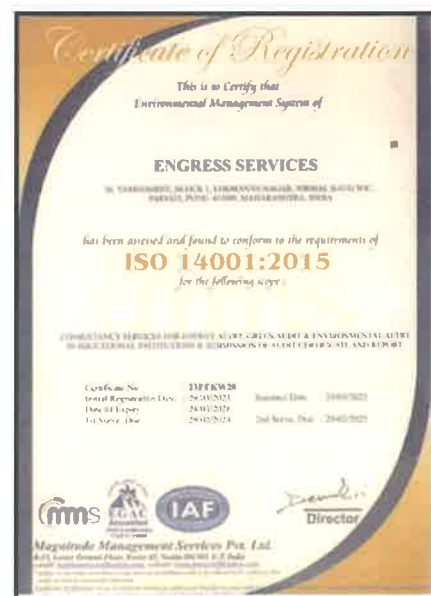
• Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.

• 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 empowerment is valid till **09<sup>th</sup> 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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## **ACKNOWLEDGEMENT**

We Engress Services, Pune, express our sincere gratitude to the management of Dr. D. Y. Patil Vidyapeeth, Pune, Sant Tukaram Nagar, Pimpri. Pune 411 018, for awarding us the assignment of CO<sub>2</sub> Emission Audit of their University Campus for the Academic Year: 2023-24.

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



## EXECUTIVE SUMMARY

1. Dr. D. Y. Patil Vidyapeeth, Pune, Sant Tukaram Nagar, Pimpri, Pune 411 018 consumes Energy in the form of **Electrical Energy, LPG & Diesel** used for various gadgets.

2. This Report is prepared taking into account the CO<sub>2</sub> Emissions under Scope-1, Scope-2 and Scope-3

3. **Reporting Period:** 1/4/2023 to 31/3/2024

4. **Present Annual CO<sub>2</sub> Emissions: Under- Scope-1:**

No	Fuel Consumed	Qty	Emission Factor	Emissions, tCO <sub>2</sub> e
1	Diesel, Liters	26412	2.66	70.256
2	LPG, Kg	13775	2.94	40.50
3	<b>Sub Total - Scope-1</b>			<b>110.75</b>

5. **Present Annual CO<sub>2</sub> Emissions: Under- Scope-2:**

No	Energy Purchased, kWh	Qty	Emission Factor	Emissions, tCO <sub>2</sub> e
1	Electricity	11472645	0.93	10669.56
2	<b>Sub Total - Scope-2</b>			<b>10669.56</b>

6. **Present Annual CO<sub>2</sub> Emissions: Under- Scope-3:**

No	Type of Vehicle	Emissions, tCO <sub>2</sub> e
1	On A/C of Four-Wheeler	1734.3
2	On A/C of Two-Wheeler	4219.03
3	On A/C of Bus	49.65
4	<b>Sub Total- Scope-3</b>	<b>6002.98</b>

7. **CO<sub>2</sub> Emission Benchmark: (For Scope-1&2):**

No	Particulars	Value	Unit
1	Annual CO <sub>2</sub> Emissions: <b>Scope1+2</b>	10780.32	tco <sub>2</sub> e
2	Total Built Up Area of University:23-24	250000	m <sup>2</sup>
3	<b>CO<sub>2</sub> Emission Benchmark: (1) / (2)</b>	<b>0.043</b>	tco <sub>2</sub> e/m <sup>2</sup>

8. **CO<sub>2</sub> Emission Offset through Renewable Energy Usage:**

No	Particulars	Value	Unit
1	Installed Roof Top Solar PV Capacity	1395.6	kWp
2	Energy Generated by Solar PV Plant in 23-24	1674720	kWh.
3	Reduction in Annual CO <sub>2</sub> Emissions= (2) *0.93/1000	<b>1557.49</b>	tco <sub>2</sub> e



**9. % of CO<sub>2</sub> Emission Offset to CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Present Annual CO <sub>2</sub> Emissions offset	1557.49	tco <sub>2</sub> e
2	Present Annual CO <sub>2</sub> Emissions offset	10780.32	tco <sub>2</sub> e
3	% of CO <sub>2</sub> Offset to CO <sub>2</sub> Emissions= (1) * 100/ (2)	14.45	%

**10. Other Measures taken for CO<sub>2</sub> Emission Reduction:**

No	Actions Taken
1	100 % Usage of Energy Efficient LED Lighting
2	Replacement of Ceiling Fans by Super Energy Efficient BLDC Fans
3	Conversion of Organic Waste into Bio Compost within the Campus
4	Installation of Bio Gas Plant for Conversion of Food Waste
5	Installation of STP & Usage of Treated Water for Gardening
6	Implementation of Rain Water Management Project
7	Usage of E Vehicles in the Campus
8	Internal Tree Plantation in the University Campus

**11. Assumptions:**

- 1 kWh of Electrical Energy releases **0.93 Kg of CO<sub>2</sub>** into atmosphere
- 1 Kg of LPG releases **2.94 Kg of CO<sub>2</sub>** into atmosphere
- 1 Liter of Diesel releases **2.66 Kg of CO<sub>2</sub>** into atmosphere
- 1 Liter of Petrol releases **2.33 Kg of CO<sub>2</sub>** into atmosphere
- 1 Kg of CNG releases **2.73 Kg of CO<sub>2</sub>** into atmosphere
- 1 kWp Solar PV system generates **4 kWh** of Electrical Energy per Day
- Annual Solar Energy Generation Days: **300 Nos**

**12. References:**

- For CO<sub>2</sub> Emissions: [www.ccd.gujarat.gov.in](http://www.ccd.gujarat.gov.in)
- For Solar PV Energy generation: [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in)

## **ABBREVIATIONS**

Kg	: Kilo Gram
MSEDCL	: Maharashtra State Distribution Company Limited
tCO <sub>2</sub> e	: Ton of Carbon-Di-Oxide Equivalent
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode



## CHAPTER-I INTRODUCTION

### 1.1 Introduction:

An Audit is conducted at Dr. D. Y. Patil Vidyapeeth, Pune, Sant Tukaram Nagar, Pimpri, Pune, to study the CO<sub>2</sub> Emissions of the University & various measures adopted to mitigate the same.

### 1.2 Key Study Points:

No	Particulars
1	Computation of CO <sub>2</sub> emissions under Socpe-1 & 2
2	Computation of CO <sub>2</sub> emissions under Socpe-3
3	Study of Usage of Renewable Energy & CO <sub>2</sub> Offset
4	Study of Measures for CO <sub>2</sub> Emission Reduction

### 1.3 University Location Image:



University  
Campus



## CHAPTER-II

### STUDY OF CO<sub>2</sub> EMISSION: SCOPE-1 & 2.

The Vidyapeeth consumes following basic/derived Fuel Resources:

1. Diesel used for D G Sets
2. LPG used for cooking purpose
3. Electrical Energy used for various Equipment

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

#### 2.2 Basis for computation of CO<sub>2</sub> Emissions: (Emission Factors)

1. **1 kWh** of Electrical Energy releases **0.93 Kg of CO<sub>2</sub>** into atmosphere
2. **1 Kg** of LPG releases **2.94 Kg of CO<sub>2</sub>** into atmosphere
3. **1 Liter** of Diesel releases **2.66 Kg of CO<sub>2</sub>** into atmosphere
4. **1 Liter** of Petrol releases **2.33 Kg of CO<sub>2</sub>** into atmosphere
5. **1 Kg** of CNG releases **2.73 Kg of CO<sub>2</sub>** into atmosphere

In this Chapter we compute the Emissions for Scope-1 & 2:

#### 2.3 Computation of Scope-1 CO<sub>2</sub> Emissions:

In computing the **Scope-1**, emissions, we take into account the Emissions due to **Diesel Consumption & LPG Consumption**.

**2.3.1** Now we compute the CO<sub>2</sub> emissions on account of **Diesel Consumption**.

**Table No 1: Computation of Month wise CO<sub>2</sub> Emissions by Diesel Consumption:**

No	Month	Diesel Consumed, Liters	Emission Factor	CO <sub>2</sub> Emissions, tCO <sub>2</sub> e
1	Apr-23	558	2.66	1.48
2	May-23	4509	2.66	11.99
3	Jun-23	4500	2.66	11.97
4	Jul-23	1633	2.66	4.34
5	Aug-23	992	2.66	2.64
6	Sep-23	4360	2.66	11.60
7	Oct-23	658	2.66	1.75
8	Nov-23	1216	2.66	3.23
9	Dec-23	2306	2.66	6.13
10	Jan-24	1420	2.66	3.78
11	Feb-24	670	2.66	1.78
12	Mar-24	3590	2.66	9.55
13	Total	26412	2.66	70.26

**2.3.2** Now we compute the CO<sub>2</sub> emissions on account of **LPG Consumption**.

**Table No 2: Computation of Month wise CO<sub>2</sub> Emissions by LPG Consumption:**

No	Month	LPG Cylinders Consumed, Nos	LPG Consumed, Kg	Emission Factor	CO <sub>2</sub> Emissions, tCO <sub>2</sub> e
1	Apr-23	60	1140	2.94	3.35
2	May-23	55	1045	2.94	3.07
3	Jun-23	65	1235	2.94	3.63
4	Jul-23	68	1292	2.94	3.80
5	Aug-23	66	1254	2.94	3.69
6	Sep-23	60	1140	2.94	3.35
7	Oct-23	54	1026	2.94	3.02
8	Nov-23	57	1083	2.94	3.18
9	Dec-23	60	1140	2.94	3.35
10	Jan-24	58	1102	2.94	3.24
11	Feb-24	62	1178	2.94	3.46
12	Mar-24	60	1140	2.94	3.35
13	<b>Total</b>	<b>725</b>	<b>13775</b>	<b>2.94</b>	<b>40.50</b>

**2.3.3 Table No 3: Computation of Total Scope-1 CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	CO <sub>2</sub> Emissions on account of Diesel Consumption	70.26	TCO <sub>2</sub> E
2	CO <sub>2</sub> Emissions on account of LPG Consumption	40.50	TCO <sub>2</sub> E
3	<b>Total Scope-1 CO<sub>2</sub> Emissions</b>	<b>110.76</b>	<b>TCO<sub>2</sub>E</b>

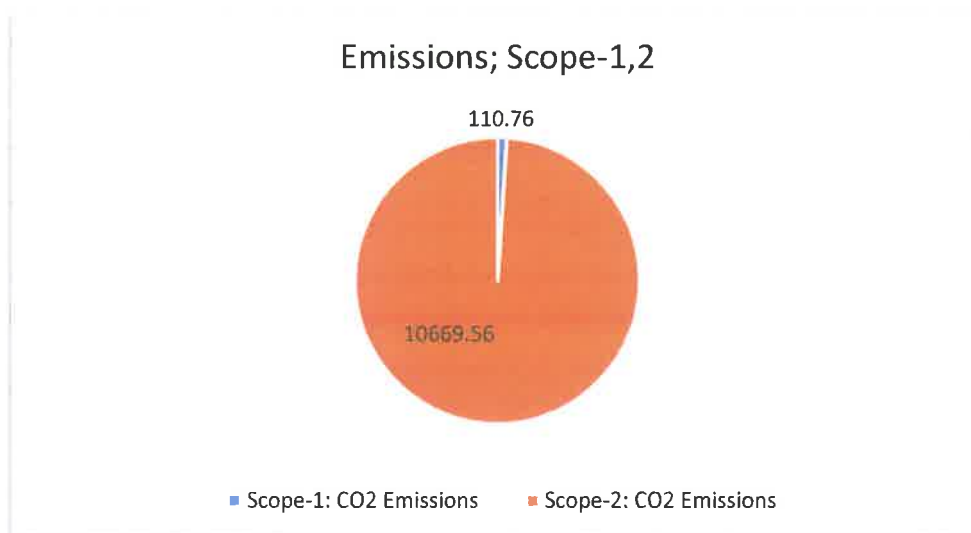
**2.4 Computation of Scope-2 CO<sub>2</sub> Emissions:** In computing the **Scope-2**, emissions, we take into account the Emissions due to **Electrical Energy** Consumption.

**Table No 4: Computation of CO<sub>2</sub> Emissions by Electrical Energy Consumption:**

No	Month	Energy Purchased, kWh	Emission Factor	CO <sub>2</sub> Emissions, tCO <sub>2</sub> e
1	Apr-23	993386	0.93	923.85
2	May-23	1159527	0.93	1078.36
3	Jun-23	1104347	0.93	1027.04
4	Jul-23	965306	0.93	897.73
5	Aug-23	933312	0.93	867.98
6	Sep-23	961790	0.93	894.46
7	Oct-23	1012291	0.93	941.43
8	Nov-23	876425	0.93	815.08
9	Dec-23	842175	0.93	783.22
10	Jan-24	838610	0.93	779.91
11	Feb-24	809587	0.93	752.92
12	Mar-24	975889	0.93	907.58
13	<b>Total</b>	<b>11472645</b>	<b>0.93</b>	<b>10669.56</b>

**2.5 Table no 5: Computation of Total CO<sub>2</sub> Emissions: Scope-1 Plus Scop-2:**

No	Particulars	Value	Unit
1	Scope-1: CO <sub>2</sub> Emissions	110.76	tCO <sub>2</sub> e
2	Scope-2: CO <sub>2</sub> Emissions	10669.56	tCO <sub>2</sub> e
3	<b>Total CO<sub>2</sub> Emissions: Scope-1 Plus Scope-2</b>	<b>10780.32</b>	tCO <sub>2</sub> e

**Chart No 1: Representation of CO<sub>2</sub> Emissions: Scope-1 Plus Scop-2:****2.6 CO<sub>2</sub> Emission Benchmark: (For Scope-1&2):**

Now we try to define a Ratio of Annual CO<sub>2</sub> Emissions to Total Built-Up area of the University.

**Table No 6: CO<sub>2</sub> Emission Benchmark: (For Scope-1&2):**

No	Particulars	Value	Unit
1	Annual CO <sub>2</sub> Emissions: <b>Scope1+2</b>	10780.32	tco <sub>2</sub> e
2	Total Built Up Area of University:23-24	250000	m <sup>2</sup>
3	<b>CO<sub>2</sub> Emission Benchmark: (1) / (2)</b>	<b>0.043</b>	tco <sub>2</sub> e/m <sup>2</sup>

### CHAPTER-III

#### STUDY OF CO<sub>2</sub> EMISSION- SCOPE-3

In this Chapter, we compute the CO<sub>2</sub> emissions for Scope-3.

For computation of Scope-3, we consider the emissions on account of Vehicle transportation of Stake holders.

**Table No 7: Computation of CO<sub>2</sub> Emissions- Scope-3:**

No	No of Cars	Daily Distance	Daily Petrol Consumed, Liters	Annual Working Days	Annul Petrol Consumed, Liters	Emission Factor	CO <sub>2</sub> Emissions, tCO <sub>2</sub> e
1	570	40	3.33	350	665000	2.33	1549.45
2	12	40	3.33	350	14000	2.66	37.24
3	21	40	3.33	350	24500	2.73	66.89
4	62	40	4	350	86800	0.93	80.72
					<b>Sub Total</b>		<b>1734.30</b>
No	No of 2 Whelers	Daily Distance	Daily Petrol Consumed, Liters	Annual Working Days	Annul Petrol Consumed, Liters	Emission Factor	CO <sub>2</sub> Emissions, tCO <sub>2</sub> e
1	2575	50	2	350	1802500	2.33	4199.83
2	118	50	5	35	20650	0.93	19.20
					<b>Sub Total</b>		<b>4219.03</b>
No	No of Buses	Daily Distance	Daily Petrol Consumed, Liters	Annual Working Days	Annual Petrol Consumed, Liters	Emission Factor	CO <sub>2</sub> Emissions, tCO <sub>2</sub> e
1	8	40	6.66	350	18667	2.66	49.65
					<b>Sub Total</b>		<b>49.65</b>
<b>Grand Total:</b>							<b>6002.98</b>

**Table No 8: Total CO<sub>2</sub> Emissions- Scope-1, Scope-2 Plus Scope-3:**

No	Particulars	Value	Unit
1	Emissions- Scope-1	110.76	tCO <sub>2</sub> e
2	Emissions- Scope-2	10669.78	tCO <sub>2</sub> e
3	Emissions- Scope-3	6002.98	tCO <sub>2</sub> e
4	Total: Emissions	<b>16783.52</b>	tCO <sub>2</sub> e



## CHAPTER IV

### STUDY OF USAGE OF RENEWABLE ENERGY & CO<sub>2</sub> EMISSION OFFSET

The Vidyapeeth has installed Roof Top Solar PV Plant of Capacity **1395.6 kWp**  
In the following Table, we present the reduction in CO<sub>2</sub> emissions due to Solar Energy:

**Table No 9: Computation of Reduction in CO<sub>2</sub> Emissions:**

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	<b>1395.6</b>	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: 23-24	<b>1674720</b>	kWh
5	1 kWh of Electrical Energy saves	<b>0.93</b>	Kg/kWh
6	<b>Qty of CO<sub>2</sub> Saved by Solar PV Plant = (4) *(5) /1000</b>	<b>1557.49</b>	tCO <sub>2</sub> e

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



**Table No 10: Computation of % of CO<sub>2</sub> Emission Offset to CO<sub>2</sub> Emissions:**



No	Particulars	Value	Unit
1	Present Annual CO <sub>2</sub> Emissions offset	<b>1557.49</b>	tco <sub>2</sub> e
2	Present Annual CO <sub>2</sub> Emissions offset	<b>10780.32</b>	tco <sub>2</sub> e
3	<b>% of CO<sub>2</sub> Offset to CO<sub>2</sub> Emissions= (1) * 100/ (2)</b>	<b>14.45</b>	%

## CHAPTER V



### STUDY OF CO<sub>2</sub> EMISSION REDUCTION MEASURES




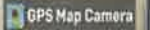
In this Chapter we present various measures taken by the University towards CO<sub>2</sub> Emission reduction & Sustainability.


#### Measures for CO<sub>2</sub> Emission Reduction & Sustainability:

No	Head	Action Taken	Photograph
1	Energy Efficiency	Usage of Energy Efficient LED Fittings	<p><b>LED Light Fittings:</b></p>  <p>The photograph shows a ceiling with several bright, circular LED light fittings. A GPS Map Camera overlay is visible in the bottom right corner of the image, showing the location as Pimpri-Chinchwad, Maharashtra, India.</p>
2	Energy Efficiency	Usage of Super Energy Efficient BLDC Fans	<p><b>BLDC Ceiling Fan:</b></p>  <p>The photograph shows a white BLDC ceiling fan with three blades, mounted on a ceiling. A GPS Map Camera overlay is visible in the bottom right corner of the image, showing the location as Pimpri-Chinchwad, Maharashtra, India.</p>



3	Waste Management	Provision of Bio Composting Unit for conversion of Leafy Waste	<p><b>Bio Composting unit:</b></p> 
4	Waste Management	Provision of Bio Gas Unit for conversion of Food Waste	<p><b>Bio Gas Unit:</b></p> 

5	Waste Management	Provision of STP Unit for treatment of Liquid Waste	<p><b>ST P Unit:</b></p>  <p>Pimpri-Chinchwad, Maharashtra, India</p> <p>JRCC-WWG DR. D.Y. PATIL MEDICAL COLLEGE, Dy. Patil School Rd, Sant Tukaram Nagar, Pimpri Colony, Pimpri-Chinchwad, Maharashtra 411018, India</p> <p>Lat: 18.6220948 / Long 73.8226078</p> 
6	Rain Water Management	Implementation of Rain Water Collection & Recharge Project	<p><b>Rain Water Collecting pipe:</b></p>  <p>Pune, Maharashtra, India</p> <p>2738, opp. Dr. D.Y. Patil Medical College, Sant Tukaram Nagar, Pimpri Colony, Pune, Pimpri-Chinchwad, Maharashtra 411018, India</p> <p>Lat 18.623910° Long 73.821226°</p> 

7	<b>Sustainable Transportation</b>	<b>Provision of E Vehicles in the Campus</b>	<p><b>E Vehicle:</b></p> 
8	<b>Green Cover</b>	<b>Internal Tree Plantation</b>	<p><b>Internal Tree Plantation:</b></p> 