Estd. 1990

IMS GHAZIABAD

(UNIVERSITY COURSES CAMPUS)

Status of **12(B)** by **UGC**

Quality audits on environment and energy are regularly undertaken by the institution

ENERGY AUDIT REPORT

Jun'20

Institute Of Management Studies

NH-24, Adhyatmik Nagar
Ghaziabad (U.P)

ZERO SQUARE ENERGY SOLUTIONS PVT. LTD.
Level 5 Tower C Green boulevard, block-B 9/A,
Sector-62, Noida, INDIA
Mob :9810387133

ACKNOWLEDGEMENT

We take the opportunity to express our deep sense of gratitude towards Dr. Sapna Rakesh, Director, Dr. Gagan Varshney, Professor, Prof. Sunil Kumar Sharma, Assistant Professor, and Teaching & Supporting Staff of Collage for awarding the work of executing Energy Audit in Institute of Management Studies. In particular we wish to thank him for his timely initiative, advice and valuable support extended to the project.

We are also grateful for extending all sorts of help while carrying out energy audit and also for their valuable help regarding the data collection and details at various stages of the project. We are also thankful to them for providing support while conducting survey in Institute of Management Studies.

We would be failing in our duty if we do not thank our respondents who gave their valuable time and answered the survey questions with tremendous patience and understanding.

DISCLAIMER

This Energy audit report of Institute Of Management Studies is prepared by Zero square Energy solutions Pvt. Ltd., Noida on interest of the organization.

This report need not necessarily represent the views of building management and its employees. The building management, any employee of Institute Of Management Studies or any person acting on behalf of any of them makes no warranty or representation whatsoever express or implied with respect to use of any information, process, method or similar item disclosed in this report and assumes no legal liability for the information in this report, nor does any party represent that the use of this information will not infringe upon privately owned rights.

All calculations in this report are done based on the data provided by plant administration, the necessary measurements taken during the study, and the operating conditions prevailing during the study period. The accuracy of the report is subject to these limitations.

The circulation of report copy is limited to Institute of Management Studies. No part of this report or there of shall be reproduced, stored in a retrieval system or transmitted in any form or by any means (Electronic, Mechanical, Photocopying and Recording) without the prior written permission from Institute of Management Studies.

Using/Reproducing Information:

All requests to use or reproduce any part of this report should be directed to:

The Dean Academics

Institute of Management Studies. Ghaziabad.

TEAM MEMBERS

Project Team	Name
IMS, Ghaziabad	Prof. Sunil Kumar Sharma
	Mr. Naresh Choudhary
	Teaching & Supporting Staff of Collage
Zero square Energy solutions pvt. Ltd. , Noida	Mr. Deepak Bajpai (BEE Certified -Energy Auditor)
	Mr. Om Pal (Executive- Energy Audit)
	Mr. Shubham Aggarwal (Engineer-Energy Audit)
	Mr. Rajat (Engineer-Energy Audit)

TABLE OF CONTENTS

1. ABOUT ZERO SQUARE ENERGY SOLUTIONS PVT. LTD.

1 ABOUT Zero square Energy solutions Pvt. Ltd.

1.1 PROFILE OF THE COMPANY

"Zero square Energy solutions Pvt. Ltd." is an energy centric organization involved in Generation (Renewable), Measurement & Efficiency enhancement of energy. Our focus is towards greener & cleaner economy with three dimensional approach viz Generation of power from renewable sources, manufacturing of world class energy monitoring devices and Energy Audit Services. Our Manufacturing facilities are located in North India.

1.2 VISION & MISSION

We shall "**GENERATE", "MEASURE" & "MANAGE"** the "**ENERGY."**

It is evident that organization has been launched with a very thoughtfully nurture division of being the leader in a basket of High Technology Business fields with far-reaching & all-encompassing implication on the Industry, Society & Ecology. We

- ✓ Shall "Generate" only "Renewable" or "Green" Energy;
- ✓ Shall Design & Manufacture the most advanced, accurate & reliable "Measurement" Products & Systems for Energy & Power Sector;
- ✓ Shall "Manage" the "Energy Consumption" by helping Monitor the "wastage" and/or "consumption" ternsofcommercial,industrial,municipalorganizations;hencehelpimprovetheir "Energy Efficiency".

Our Vision to dedicate all our Resources in 'Generation', 'Measurement' and 'Management' of 'Power& 'Energy' is very unique in a way that shows our deep compassion for the Society & Ecology.

The promoters have committed their organization to the business, which shall practice & advocate the tenet of "Sustainable Development" which makes us responsible & account to "Meeting the needs of the present generation without compromising the ability of future generations to meet their needs".

1.3 APPROVALS/CREDENTIALS

BEE Accredited Energy Auditors & Certified Energy Auditors/Managers (Under Ministry of Power, Govt. of India).

1.4 PRODUCTS & SERVICES

In Brief, our company operates in several business Segments:-

Power Generation- Green Energy
Consultancies & Services
Energy Audit
PAT Assistance
Support for energy efficiency enhancement projects
Green Buildings
Renewable energy project implementation
Trainings to improve Energy Efficiency

1.5 ENERGY AUDIT & MANAGEMENT

The Objective of this division is to provide solutions for the efficient management of every form of energy. The management service begins with the energy audit process comprising of an inspection and survey of the total energy consumption in a building, process system with the end objective to reduce the amount of energy used without any negative effect. The available consumer base of this division covers a single residential consumer to the largest industrial establishment or commercial complex however the focus for now is 4 main areas.

Commercial - Malls, Commercial Buildings etc.

Power Plant – Energy audit of thermal power plant and captive power plant.

Industrial – Energy intensive industrial establishments.

Hospitality – Building and Resort complex

2. INTRODUCTION TO ENERGY AUDIT & METHODOLOGY

2 INTRODUCTION TO ENERGY AUDIT & METHODOLOGY

2.1 OBJECTIVE OF ENERGY AUDIT IN IMS

The objective of this study is to carry out investment grade audit of building followed by submission of Detailed Energy Audit Report to the building management & maintenance department. The implementation support provided is for the benefit of the building management so as to make sure that the recommended savings potential are met and monetary savings achieved to the fullest.

2.2 SCOPE OF WORK

Broadly, the following scopes are limited to the building:-

Review of present electricity, fuel oil, fuel gas, lighting, and HVAC and Water consumption.

Review and Study of existing Electrical Distribution System, Lighting System, HVAC System, and Diesel Generator sets etc. along with respective energy conservation options.

Review and Study of Energy Monitoring & Accounting System.

Review of present maintenance practices.

Cost benefits analysis of each energy conservation options.

Preparation and submission of Detailed Energy Audit Report.

2.3 METHODOLOGY

The study has been conducted by the Energy consultants, Auditors of Zero square Energy solutions Pvt. Ltd. and consists of the following components.

Preliminary visits to each of the sub-systems to obtain an overview. Brief discussions with concerned executives, preparation of data collection forms/checklists instrumentation requirements, etc.

We have used diagnostic portable instruments for power measurement, Water Flow measurement, Thermograph study, Lux meter, Infra-red and conventional temperature measurement instruments, and would also draw upon the inferences from onsite instrumentation data, etc.

Carried at field studies in each of the sub-systems, involving performance assessment trials of Refrigeration & Air Conditioning System, vis-à-vis existing conditions. To the extent possible, trials have been conducted without disturbing normal operation of working equipment.

Detailed analysis of field data outputs and evaluation of energy performance of equipment studied, with respect to operation efficiencies, comparison of these values with Performance Guarantee figures, or typical industry norms and establishing margins for improvements.

Identification of Energy Conservation opportunities (ENCON).

2.4 APPROACH

The Energy Audit & Investment Grade Audit is planned in five parts:

Part-I: Energy Audit

This part involves performance assessment of the key energy consuming equipment such as A/C machines, Fans, Deep freezers, Lighting, and all major electrical motors to establish margins for improvement.

Part-II: Energy Conservation

This part as a fall out of the Energy Audit Study would involve identification of Energy Saving measures, detailing of measure to achieve improvements in efficiency and reduction in energy consumption, backed by operational trial data wherever possible, in-depth analysis and techno-economic feasibility reports along with relevant vendor information.

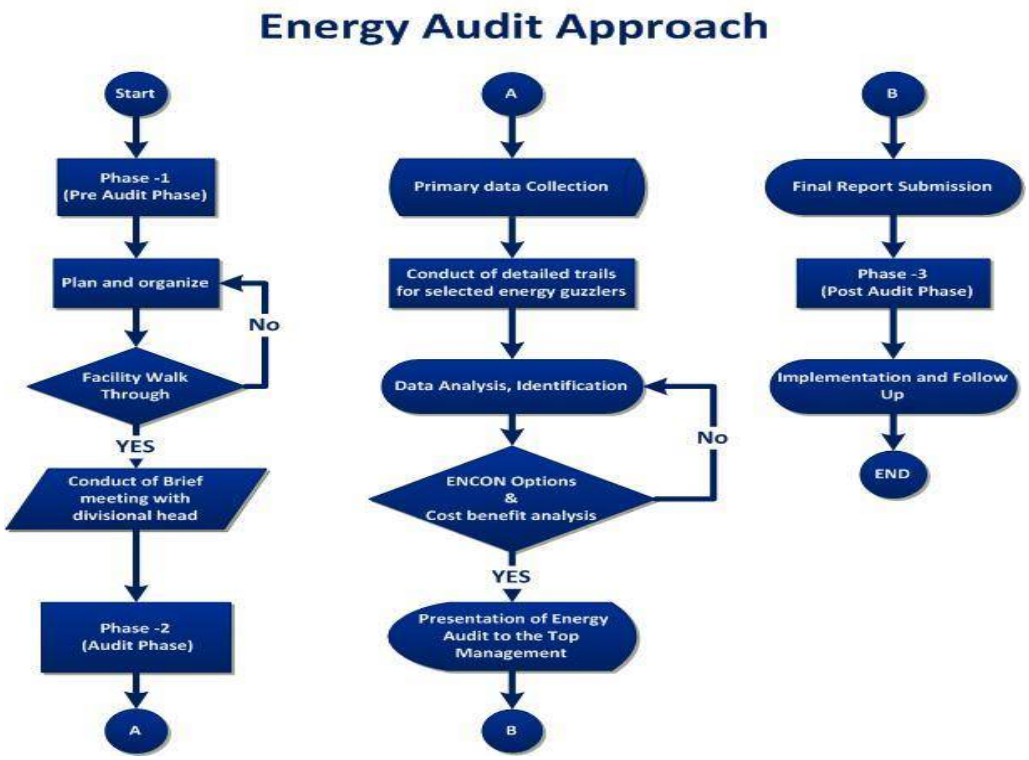
Part-III: Preparation of Investment Grade Proposals

This part involves preparation of Investment Grade proposal, based on the identified Energy Conservation Options with cost benefits and vendor details

Part – IV: Preparation of Draft Report

In this phase, the draft report would be prepared and submitted to Building Management.

Part – V: Final Report Submission



After presentation of the report and getting comments from Building Management the final report would be submitted after incorporating all the comments and suggestions.

Figure 1: Energy Audit Approach

2.5 INSTRUMENTS USED IN ENERGY AUDIT

Master List Of EA Instruments

Sr. no.	Instruments	Model	Instrument Number	OEM	Image of Instruments
1	Power Analyzer	ALM 30 ALM 35	00302929	KRYKARD INDIA	
2	Flow Meter	PT878	PT 7 6186 E	GE USA	
3	Thermal Imager	881 – 2	02214667	TESTO GERMANY	
4	Infrared Thermometer	62 Mini	14841880	FLUKE USA	
5	Digital Thermo Hygrometer	288 ATH	2027386	HTC CHINA	
6	Digital Anemometer	AM 4201	AE.09961	LUTRON CHINA	
7	Digital Lux Meter	LX 101	AE.09143	LUTRON CHINA	
8	Digital Multimeter	801 AUTO	201061078	MECO INDIA	
9	Digital Clampmeter	DT 3150	YC-209634	MECO INDIA	
10	Digital TDS Meter	CD 610	S358236	HANNA ITALY	

Figure 2: Energy Audit Instruments

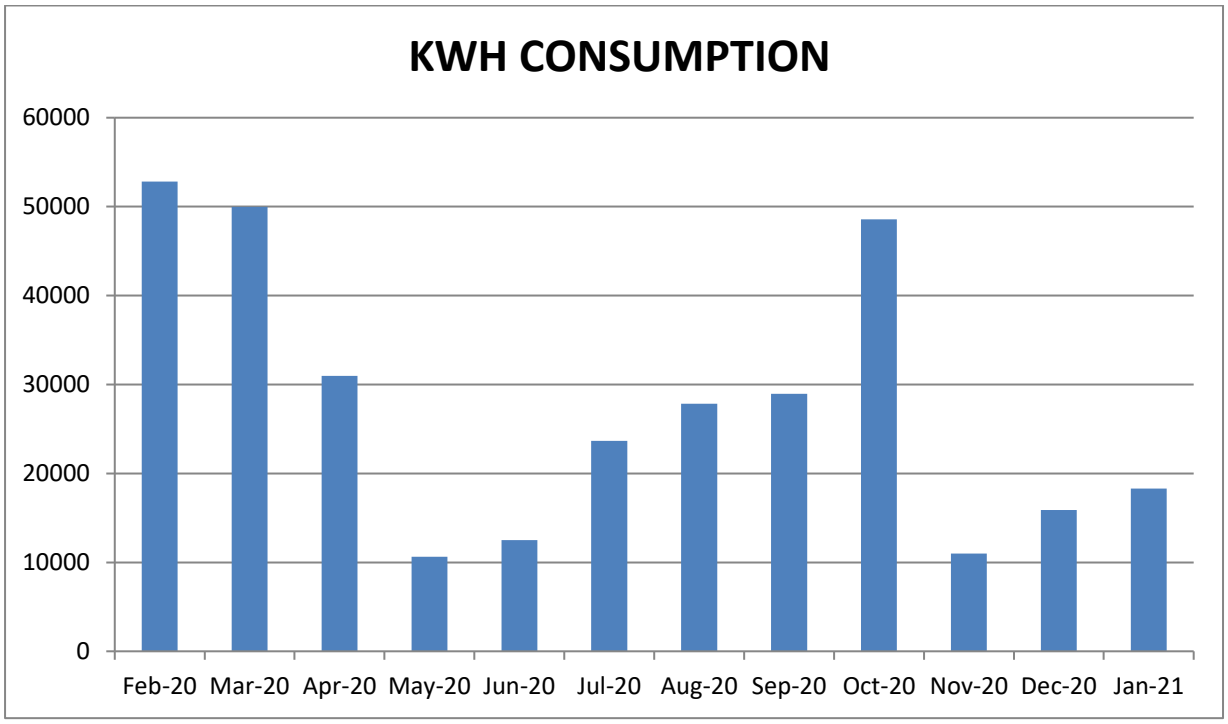
3. BASELINE ENERGY CONSUMPTION

3 BASELINE ENERGY DESCRIPTION

Building is consuming different sources of energy - Grid Electricity, Solar Energy & Electricity from Diesel Generating Sets. Electricity is generally used for all electrical devices while diesel is used to operate the DG sets.

The Building is obtaining the power supply from Pashchimanchal Vidyut Vitran Nigam Limited through 11kV line which directly feeds into transformer (250KVA) which steps down voltage from 11kV to 433V.

Graph shows the total billed amount in KWH



Lighting, pump/ motor load and HVAC are the major energy consuming components in the building, followed by diesel (very less consumption) used in DG sets.

The building utilizes various energy resources to provide best of the amenities in the management, break up of different resources is given below and this consumption of resources forms the baseline/ benchmarking of the energy use.

Sr. no	Fuel used	Units	consumption	% share
1	Electricity	KWH	331141	94.58 %
2	Solar	KWH	18967	5.42 %

Billing details of Institute is given below:

BILLING MONTH	KWH CONSUMPTION	KVAH CONSUMPTION	DEMAND CHARGES	ENERGY CHARGES (INR)	PF	CONTRACT DEMAND (KW)	BILL DEMAND (KVA)	BILL AMOUNT (INR)
Feb-20	52830	53820	387000	466257	0.982	1080	155	1062744
Mar-20	49980	51150	387000	443082	0.977	1080	155	892434
Apr-20	30960	33000	387000	285540	0.938	1080	135	0
May-20	10650	13410	387000	115499	0.794	1080	37	38866
Jun-20	12495	13920	387000	119925	0.898	1080	50	667220
Jul-20	23655	24810	387000	214451	0.953	1080	398	653661
Aug-20	27840	28800	387000	249084	0.967	1080	417	683815
Sep-20	28965	30120	387000	260542	0.962	1080	341	689747
Oct-20	48585	50085	387000	441561	0.970	1080	518	897172
Nov-20	10996	11424	387000	98260	0.963	1080	142	525132
Dec-20	15878	17102	387000	147559	0.928	1080	73	569788
Jan-21	18307	19034	387000	164313	0.962	1080	59	587316
Total	**331141**	**346675**	**4644000**	**3006073**				**7267895**
Average	**27595**	**28890**	**387000**	**250506**	**0.941**	**1080**	**207**	**605658**

It is observed that average bill demand is 398 KVA but Pashchimanchal Vidyut Vitran Nigam Limited charge minimum 80% of sanction demand. If we reduce the contract demand from 1080 KVA to 800 KVA by installing MDI controller than the saving calculation is given below:

Parameters	Units	Value
Existing contract demand	KVA	1080
Proposed contract demand	KVA	800
Demand Saved	KVA	280
Demand Charges	Rs./KVA	430
Savings as per reduced	Rs./Month	120400
Savings per year after reducing demand	Rs./Year	1444800

Building is getting the power supply from Pashchimanchal Vidyut Vitran Nigam Limited through 11kV line which directly feeds into the transformer that is of 1600 KVA, which steps down voltage from 11kV to 433V. Details of transformers are given below.

Transformer name plate		
Make & Model No.	**Capacity (kVA)**	**No Load Voltage (kV)**
TR (on loading)	1600	HV-11/LV-0.433

Pashchimanchal Vidyut Vitran Nigam charge as per tariff HV1 is as under

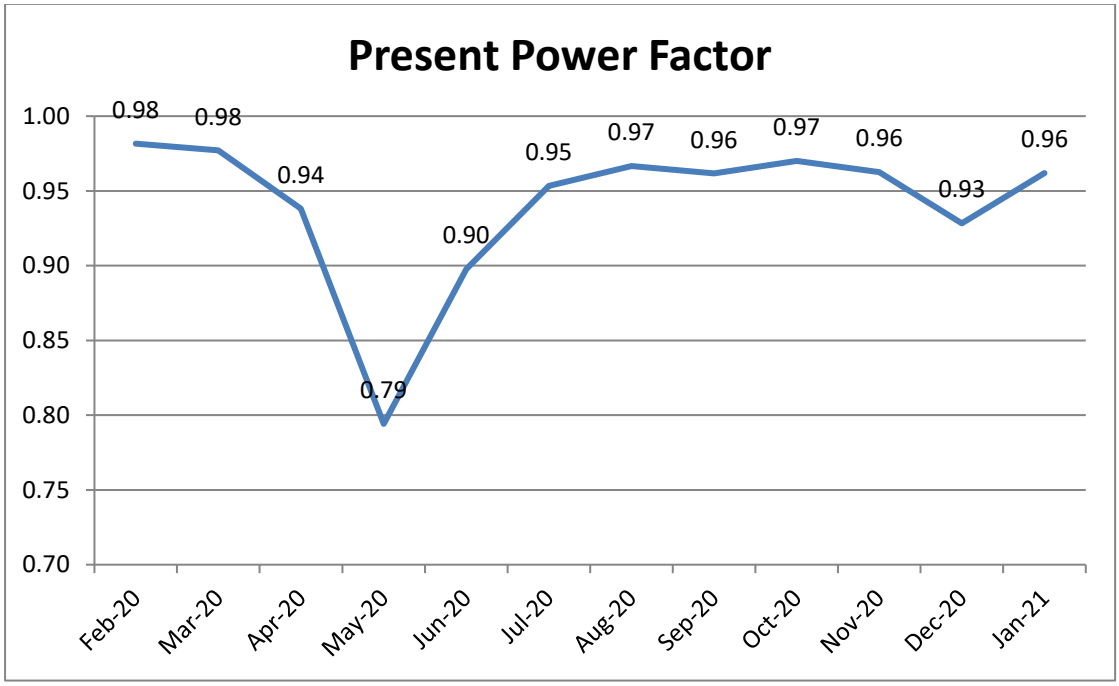
Description	Avg. Unit Price (Rs./KVAh)
Unit charge	Rs 8.68 per KVAH
Fix Charge	Rs 430 per KVA per month

Per unit charge for the building is Rs 21.95/KWh

Months	Avg. Unit Price (Rs./KWh)
Feb 2020 – Jan 2021	21.95

Billing is done on KVAH basis so recommended to maintain the power factor unity.

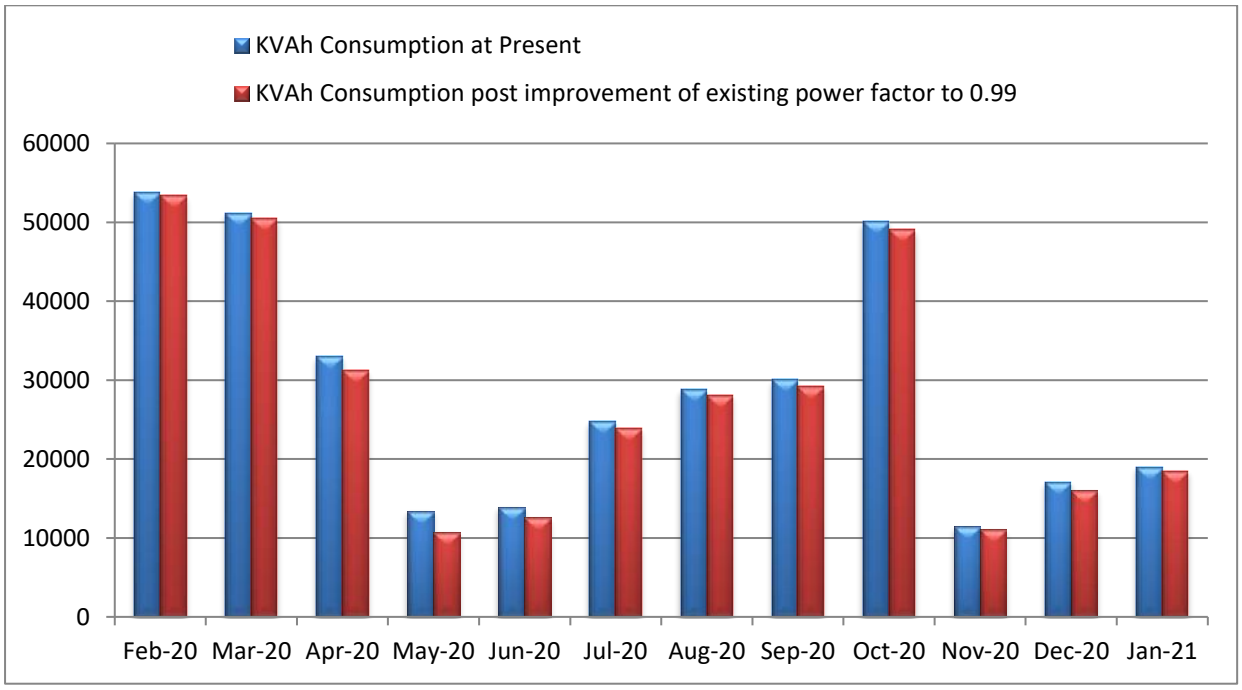
Present Power Factor graphical representation is shown below:



Saving calculation shown below by maintain power from current level to 0.99 (By considering power cost Rs 8.68 per KVA)

Bill Period	KVAh Consumption at Present	Present Power Factor	KVAh Consumption post improvement of existing power factor to 0.99	Net Reduction in KVAh Consumption	Corresponding reduction in Energy Charges (Rs)	Total Monitory Benefit (Rs)
Feb-20	53820	0.98	53364	456	3961	3961
Mar-20	51150	0.98	50485	665	5774	5774
Apr-20	33000	0.94	31273	1727	14993	14993
May-20	13410	0.79	10758	2652	23023	23023
Jun-20	13920	0.90	12621	1299	11273	11273
Jul-20	24810	0.95	23894	916	7951	7951
Aug-20	28800	0.97	28121	679	5892	5892
Sep-20	30120	0.96	29258	862	7486	7486
Oct-20	50085	0.97	49076	1009	8760	8760
Nov-20	11424	0.96	11107	317	2749	2749
Dec-20	17102	0.93	16038	1064	9237	9237
Jan-21	19034	0.96	18492	542	4702	4702
Total	**346675.2**		**334486**			**105802**

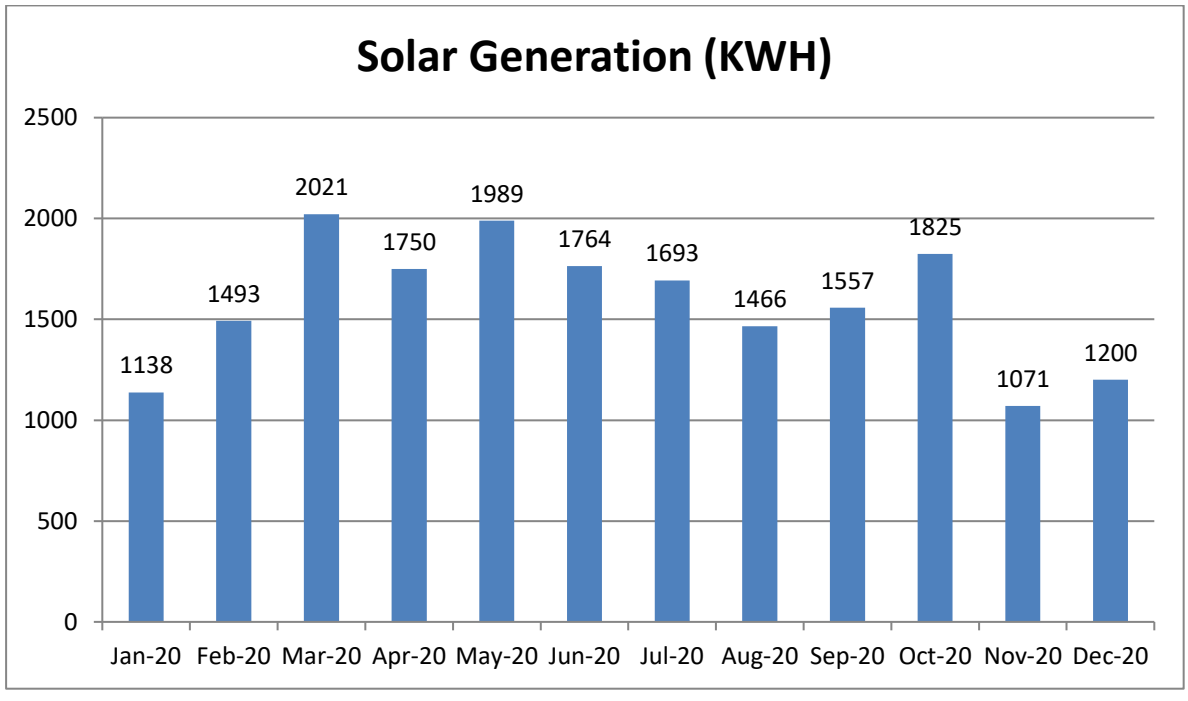
Graphical representation of reduction in KVAh after maintaining the power factor 0.99



Solar Plant (12.5KWH) Power generation detailed below:

MONTH	Solar Generation (KWH)
Jan-20	1138
Feb-20	1493
Mar-20	2021
Apr-20	1750
May-20	1989
Jun-20	1764
Jul-20	1693
Aug-20	1466
Sep-20	1557
Oct-20	1825
Nov-20	1071
Dec-20	1200
Total	**18967**

Solar Plant 12.5 KWH, power generation in KWH:



4. ELECTRICAL LOAD MEASUREMENT

ELECTRICAL LOAD CALCULATION (ACEDEMIC BLOCK)

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
1	Director Office	6	4	3			2	1			2									2											1								
2	Mgt. office			30					28	4	11	1																			1	1							
3	Faculty-I					1		8					13	1										1															
4	Accts. Office							6					9											2														
5	Reception/Adm.	4		16			4		4	20		1																			4							
6	Store													4	1																							
7	Auditorium						53						24				10	2	20														2					
8	Green Room							6					6											2														
9	MDP Room												8											2	0													
10	Room No. 001							6					6											2														
11	Library					1		12					32											6														

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
12	Gallery												41	50									9																	2
13	Student Entry Gate			15					23																														
14	Wash Rooms												50							37																				
15	B.Sc. Lab																				1																			
16	stores							1						18																										
17	IT Load																								1		260	18	12	32									
18	Room No. 101							6					6											2																
19	Room No. 102							6					6											2																
20	Faculty-II							8					13	1										1																
21	Room No. 103							6					6											2																

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
22	Computer Lab-I							8					8											2															
23	Server Room							3					6									1			1														
24	Room No. 104							6					6											2															
25	Computer Lab-II							8					8											2															
26	Room No. 105							6					6											2															
27	Room No. 106							6					6											2															
28	Room No. 107							6					6											2															
29	Room No. 108							6					6											2															
30	Room No. 201							6					6											2															
31	Room No. 202							6					6											2															
32	Faculty-III							8					13	1										1															

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
33	Room No. 203							6					6											2																
34	Computer Lab-III							8					8											2																
35	Room No. 204							6					6											2																
36	Biotech Lab-I							8					10											2																
37	Biotech Lab-II							8					10											2																
38	Room No. 205							6					6											2																
39	Computer Lab-IV							8					8											2																
40	Room No. 206							6					6											2																
41	Room No. 207							6					6											2																
42	Room No. 208							6					6											2																
43	Room No. 209							6					6											2																

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
44	BJMC Lab				4			2				1	21	1		5						1		2															
45	Room No. 301							6					6											2															
46	Room No. 302							6					6											2															
47	CRC	8		8				1		2			1	1										1	1														
48	Room No. 303							6					6											2															
49	Room No. 304							6					6											2															
50	Room No. 305							6					6											2															
51	Room No. 306							8					10											2															
52	Room No. 307							8					10											2															
53	Room No. 308							6					6											2															
54	Room No. 309							6					6											2															

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
55	Room No. 310							6					6											2																
56	Room No. 311							6					6											2																
57	Room No. 312							6					6											2																
58	Room No. 313							6					6											2																
59	MINI AUDI					50	65				10		4											2	1															
60	Room No. 401							6					8											2																
61	Room No. 402							6					8											2																
62	Faculty-IV							7					11	1																					1					
63	Room No. 403							6					8											2																
64	Room No. 404							6					8											2																
65	Room No. 405							6					8											2																

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
66	Room No. 406							6	14				21											2																
67	Room No. 407							6	14				21											2																
68	Room No. 408							6					8											2																
69	Room No. 409							6					8											2																
70	Room No. 410							6					8											2																
71	Room No. 411							6					8											2																
72	Room No. 412							6					8											2																
73	Room No. 413							6					8											2																
74	Boys C Room							10																2																
75	Terrace																	2								1										4	5	3	1	
	Total	18	4	72	4	52	124	389	83	26	23	3	628	78	1	5	10	2	20	39	1	2	9	122	3	1	11	260	18	12	32	6	1	2	1	4	5	3	1	2

Sl.	ACADEMIC BLOCK	Led Panel Lights 1x1 17W	Led Panel Lights 2x1 24W	Led 8W	Led 12W	Led 15W	Led 2W	Fan 60W	COB Led 24W	Linear light 36 W	Strip Led Light 36W	Led TV 65W	Panel Light 2x2 36W	Tube Light 36W	Wall Fan 60W	Focus Light 72W	Focus Light 80W	Focus Light 35W	Par Light 120w	Exhaust Fans 60W	Fridges 11000w	Split AC 2200W	Water Cooler 1500 W	AHU 2500 CFM(1 HP)	FCU 800 CFM(100W)	Sound System1000W	RO System 2500w	Computer Sys. 300W	Printer 200W	UPS 10KVA	Projector 300 W	Ductable AC 5.5 TN (7 KVA) 3PH	Ductable AC 3 TN (5 KVA) 3PH.	AHU 6500 CFM (3 HP 3 PH.)	AHU 3500 CFM (3 HP 3 PH.)	Chiller Plant 90 TR (150 KVA)3 PH.	Primary Pump 3HP 3 PH.	Secondary Pump 15HP 3 PH.	Fire Pump 7.5HP 3 PH.	Lift 12.5 HP 3 PH.
	Total Watt	3006	96	576	48	780	248	23340	19192	936	828	195	22608	2808	60	360	800	70	2400	2220	11000	4400	13500	91500	300	1000	2500	78000	3600	89520	9600	748.5 KVA							

ELECTRICAL LOAD CALCULATION (OUTHER AREA)

Sl.	Outer Area	LED LIGHTS 120W	LED LIGHTS 150W	LED LIGHTS 100W	Street Light Led 30W	Street Light Led 90W	Tube Light 36W	Fan 60W	Bulb 100w	Submersible Pump 7.5 HP 3 PH.	Pump 3HP 3 ph.	Pump 2HP 3 ph.	Pump 15HP 3 ph.	Coffee Machine 2000w	cold coffee machine 800w	Oven 1200w	Fridge 100w	Induction1200w	Induction 3000w	Deep Freezer 1500w
1	Roof	9	8	13																
2	Boundary Wall				103	2														
2	Guard Rooms						2	2												
3	Meter Room		4						4											

4	electrical room						4	3											
5	STP										4	2	1						
6	Boys Hostel									2									
7	Coffee Shop													1	1	1	1	1	1	1
	Total	9	12	13	103	2	6	5	4	2	4	2	1	1	1	1	1	1	1	1
	Total Watt	1080 w	1800 w	1300 w	3090 w	180 w	216 w	300 w	400 w	15HP	12HP	4HP	15HP	2000 w	800 w	1200 w	100 w	1200 w	3000 w	1500 w

ELECTRICAL LOAD CALCULATION (BOYS HOSTEL)

Sl.	Boys Hostel	Refrigerator 2000w	Deep Freezer 750w	Exhaust Fan 60W	Exhaust Fan 500W	Air Curtain 500W	Ben Merry 2KW	Tube Light 36W	Tube Light 18W	Fan 60W	LED 15W	Induction 2KW	Iron 1000w	Washing Machine 500w	Boiler 4 kw	Room Cooler 250w	Water cooler 1500 w	FCU 100W+ 60W	TREADMILL 1300W	Air Duct Cooler 2hp 1 ph.	Led TV 60W	Lift 12.5 HP 3PH.
1	Mess	1	2		1	1	3											6		1		
2	rooms & mess			20				183	260	181	142	6	6	6	6	15	7	130	2		3	
3	Lobby																					2
4	Gym																	2				
	Total	1	2	20	1	1	3	183	260	181	142	6	6	6	6	15	7	138	2	1	3	2
	Total Watt	2000	1500	1200	500	500	6000	6588	4680	10860	2130	12000	6000	3000	24000	3750	10500	8600	2600	1500	180	25HP

ELECTRICAL LOAD CALCULATION (GIRLS HOSTEL)

Sl.	Girls Hostel	Refrigerator 500w	Deep Freezer 750 w	Exhaust Fan 60W	Coffee Machine 3000w	Coffee Machine 2000w	Cod Coffee machine	Oven 3000w	Tube Light 36W	Tube Light 18W	Fan 60W	LED 15W	Induction 2KW	Iron 1000w	Washing Machine 500w	Boiler 4 kw	Room Cooler 250w	Water cooler 1500 w	FCU 100W + 60W + WINDOW AC	TREADMILL 1300W	Led TV 60W	Wall fan 60w	Lift 12.5 HP 3PH.
1	Canteen	2	3		1	1	1	1											7				
2	rooms & office			22					172	200	133	55	6	6	6	6	20	6	100	2	3	3	
3	Lobby																						2
4	GYM																		2				
5	GUEST ROOMS																		2				

6	WARDEN OFFICE																	1				
	Total	2	3	22	1	1	1	1	172	200	133	55	6	6	6	6	20	6	14	2	3	3	2
	Total Watt	1000	2250	1320	3000	2000	800	3000	6192	3600	7980	825	12000	6000	3000	24000	5000	9000	28200	2600	180	180	25 HP

5. LIGHTING/ILLUMINATION SYSTEM

4 LIGHTING SYSTEM

4.1 LUMINARY DETAILS

The building management had already changed all the old high energy consuming light with the energy efficient LED lights.

We have measured lux area wise for the sample basis.

AREA WISE LUX LEVEL

Academic building:

Sr No	Location	Lux Level	
		Max.	Min.
1	College visitor entry gate	150	110
2	Reception area	140	120
3	Admission counselors office	140	125
4	Accounts & administration office	160	150
5	Faculty-I office	120	110
6	Chairmen office	210	180
7	Chairmen office conference room	220	210
8	Vice Chairmen office	210	180
9	Director office	260	210
10	Library	250	210
11	Digital library	160	120
12	Admission cell office	150	110
13	Fee counter	150	140
14	MDP office	120	110
15	EWL room	140	120
16	Green room	110	90
17	Auditorium	250	210
18	Main store room	85	70
19	First floor faculty office-II	140	120
20	First floor class room - 101	110	90
21	First floor class room - 102	107	91
22	First floor class room - 103	105	98
23	First floor class room - 104	113	106
24	First floor class room - 105	110	104
25	First floor class room - 106	109	98
26	First floor class room - 107	103	89
27	First floor class room - 108	107	95
28	First floor computer lab-02	180	120
29	First floor server room	150	130
30	First floor computer lab-01	130	110
31	Second floor faculty office- III	220	210
32	Second floor class room - 201	140	120
33	Second floor class room - 202	135	123

Sr No	Location	Lux Level	
		Max.	Min.
1	College visitor entry gate	150	110
34	Second floor class room - 203	145	122
35	Second floor class room - 204	138	129
36	Second floor class room - 205	123	118
37	Second floor class room - 206	134	124
38	Second floor class room - 207	145	132
39	Second floor class room – 208	136	126
40	Second floor class room – 209	142	127
41	Second floor expressions (studio)	280	270
42	Second floor expressions (studio) photography room	220	190
43	Second floor expressions (studio) TV studio	228	210
44	Second floor computer lab-04	180	150
45	Second floor microbiology lab	210	170
46	Second floor bio technology lab	204	160
47	Second floor computer lab-03	180	150
48	Third floor CRC & CDC office	180	140
49	Third floor class room- 301	138	125
50	Third floor class room- 302	132	121
51	Third floor class room- 303	134	123
52	Third floor class room- 304	137	119
53	Third floor class room- 305	134	124
54	Third floor class room- 306	139	128
55	Third floor class room- 307	143	124
56	Third floor class room- 308	143	127
57	Third floor class room- 309	134	119
58	Third floor class room- 310	129	119
59	Third floor class room- 311	142	122
60	Third floor class room- 312	136	124
61	Third floor class room- 313	132	127
62	Third floor mini auditorium	240	220
63	Fourth floor faculty office-IV	210	180
64	Fourth floor class room - 401	150	150
65	Fourth floor class room - 402	145	128
66	Fourth floor class room - 403	148	129
67	Fourth floor class room - 404	134	125
68	Fourth floor class room - 405	136	133
69	Fourth floor class room - 406	133	123
70	Fourth floor class room - 407	134	145
71	Fourth floor class room - 408	148	143
72	Fourth floor class room - 409	139	127
73	Fourth floor class room - 410	135	125
74	Fourth floor class room - 411	145	132

Sr No	Location	Lux Level	
		Max.	Min.
1	College visitor entry gate	150	110
75	Fourth floor class room - 412	149	134
76	Fourth floor class room - 413	143	124
77	Circulating area & two wheeler parking area	65	45
78	Circulating area & four wheeler parking area	68	48
79	Mess kitchen room	110	98
80	S.T.P. plant area	55	54
81	Mess staff residence room	74	62
82	Generator room	78	68
83	Electrical panel room	98	88
84	Basketball court	59	43
85	Play ground	53	35

Boys Hostel building:

Sr No	Location	Lux Level	
		Max.	Min.
1	Ground floor akashay patra(mess)	110	90
2	Ground floor digital library	210	179
3	First floor facility room	90	65
4	First floor wash room	120	90
5	First floor gymnasium hall	160	140
6	First floor room- 101	105	95
7	First floor room- 102	104	89
8	First floor room- 103	107	98
9	First floor room- 104	114	99
10	First floor room- 105	113	103
11	First floor room- 106	98	89
12	First floor room- 107	112	109
13	First floor room- 108	124	110
14	First floor room- 109	110	98
15	First floor room- 110	112	88
16	First floor room- 111	96	85
17	First floor room- 112	109	98
18	First floor room- 113	116	99
19	First floor room- 114	112	97
20	First floor room- 115	121	95
21	Second floor facility room	112	87
22	Second floor wash room	109	85
23	Second floor room- 201	90	65
24	Second floor room- 202	120	90
25	Second floor room- 203	160	140

Sr No	Location	Lux Level	
		Max.	Min.
26	Second floor room- 204	105	95
27	Second floor room- 205	104	89
28	Second floor room- 206	107	98
29	Second floor room- 207	114	99
30	Second floor room- 208	113	103
31	Second floor room- 209	98	89
32	Second floor room- 210	112	109
33	Second floor room- 211	124	110
34	Second floor room- 212	110	98
35	Second floor room- 213	112	88
36	Second floor room- 214	96	85
37	Second floor room- 215	109	98
38	Second floor room- 216	116	99
39	Second floor room- 217	112	97
40	Second floor room- 218	121	95
41	Second floor room- 219	112	87
42	Second floor room- 220	109	85
43	Second floor room- 221	104	89
44	Second floor room- 222	107	98
45	Second floor room- 223	114	99
46	Third floor facility room	113	103
47	Third floor wash room	98	89
48	Third floor room- 301	120	110
49	Third floor room- 302	105	95
50	Third floor room- 303	104	89
51	Third floor room- 304	107	98
52	Third floor room- 305	114	99
53	Third floor room- 306	113	103
54	Third floor room- 307	98	89
55	Third floor room- 308	112	109
56	Third floor room- 309	124	110
57	Third floor room- 310	110	98
58	Third floor room- 311	112	88
59	Third floor room- 312	96	85
60	Third floor room- 313	109	98
61	Third floor room- 314	116	99
62	Third floor room- 315	112	97
63	Third floor room- 316	121	95
64	Third floor room- 317	112	87
65	Third floor room- 318	109	85
66	Third floor room- 319	105	95
67	Third floor room- 320	104	89
68	Third floor room- 321	107	98

Sr No	Location	Lux Level	
		Max.	Min.
69	Third floor room- 322	114	99
70	Third floor room- 323	113	103
71	Fourth floor facility room	98	89
72	Fourth floor wash room	112	109
73	Fourth floor room- 401	124	110
74	Fourth floor room- 402	110	98
75	Fourth floor room- 403	112	88
76	Fourth floor room- 404	96	85
77	Fourth floor room- 405	109	98
78	Fourth floor room- 406	116	99
79	Fourth floor room- 407	112	97
80	Fourth floor room- 408	121	95
81	Fourth floor room- 409	112	87
82	Fourth floor room- 410	109	85
83	Fourth floor room- 411	90	65
84	Fourth floor room- 412	120	90
85	Fourth floor room- 413	160	140
86	Fourth floor room- 414	105	95
87	Fourth floor room- 415	104	89
88	Fourth floor room- 416	107	98
89	Fourth floor room- 417	114	99
90	Fourth floor room- 418	113	103
91	Fourth floor room- 419	98	89
92	Fourth floor room- 420	112	109
93	Fourth floor room- 421	124	110
94	Fourth floor room- 422	110	98
95	Fourth floor room- 423	112	88
96	Fifth floor facility room	96	85
97	Fifth floor wash room	109	98
98	Fifth floor room- 501	116	99
99	Fifth floor room- 502	112	97
100	Fifth floor room- 503	121	95
101	Fifth floor room- 504	112	87
102	Fifth floor room- 505	109	85
103	Fifth floor room- 506	90	65
104	Fifth floor room- 507	120	90
105	Fifth floor room- 508	160	140
106	Fifth floor room- 509	105	95
107	Fifth floor room- 510	104	89
108	Fifth floor room- 511	107	98
109	Fifth floor room- 512	114	99
110	Fifth floor room- 513	113	103
111	Fifth floor room- 514	98	89

Sr No	Location	Lux Level	
		Max.	Min.
112	Fifth floor room- 515	112	109
113	Fifth floor room- 516	124	110
114	Fifth floor room- 517	110	98
115	Fifth floor room- 518	112	88
116	Fifth floor room- 519	96	85
117	Fifth floor room- 520	109	98
118	Fifth floor room- 521	116	99
119	Fifth floor room- 522	112	97
120	Fifth floor room- 523	121	95
121	Sixth floor facility room	112	87
122	Sixth floor wash room	109	85
123	Sixth floor room- 501	90	65
124	Sixth floor room- 502	120	90
125	Sixth floor room- 503	160	140
126	Sixth floor room- 504	105	95
127	Sixth floor room- 505	104	89
128	Sixth floor room- 506	107	98
129	Sixth floor room- 507	114	99
130	Sixth floor room- 508	113	103
131	Sixth floor room- 509	98	89
132	Sixth floor room- 510	112	109
133	Sixth floor room- 511	124	110
134	Sixth floor room- 512	110	98
135	Sixth floor room- 513	112	88
136	Sixth floor room- 514	96	85
137	Sixth floor room- 515	109	98
138	Sixth floor room- 516	116	99
139	Sixth floor room- 517	112	97
140	Sixth floor room- 518	121	95
141	Sixth floor room- 519	112	87
142	Sixth floor room- 520	109	85
143	Sixth floor room- 521	104	89
144	Sixth floor room- 522	107	98
145	Sixth floor room- 523	114	99

Girl's Hostel building

Sr No	Location	Lux Level	
		Max.	Min.
1	Ground floor warden office	120	110
2	Ground floor medical room	140	121
3	Ground floor cafeteria	90	65
4	Ground floor departmental shop	120	90
5	Ground floor laundry shop	90	86
6	Ground floor driver rest room	85	75
7	First floor facility room	90	65
8	First floor wash room	120	90
9	First floor common room	110	105
10	First floor gymnasium hall	160	140
11	First floor room- 101	105	95
12	First floor room- 102	104	89
13	First floor room- 103	107	98
14	First floor room- 104	114	99
15	First floor room- 105	113	103
16	First floor room- 106	98	89
17	First floor room- 107	112	109
18	First floor room- 108	124	110
19	First floor room- 109	110	98
20	First floor room- 110	112	88
21	Second floor facility room	96	85
22	Second floor wash room	109	98
23	Second floor room- 201	116	99
24	Second floor room- 202	112	97
25	Second floor room- 203	121	95
26	Second floor room- 204	112	87
27	Second floor room- 205	109	85
28	Second floor room- 206	90	65
29	Second floor room- 207	120	90
30	Second floor room- 208	160	140
31	Second floor room- 209	105	95
32	Second floor room- 210	104	89
33	Second floor room- 211	107	98
34	Second floor room- 212	114	99
35	Second floor room- 213	113	103
36	Second floor room- 214	98	89
37	Second floor room- 215	112	109
38	Second floor room- 216	124	110
39	Second floor room- 217	110	98
40	Second floor room- 218	112	88
41	Third floor facility room	96	85

Sr No	Location	Lux Level	
		Max.	Min.
42	Third floor wash room	109	98
43	Third floor room- 301	116	99
44	Third floor room- 302	112	97
45	Third floor room- 303	121	95
46	Third floor room- 304	112	87
47	Third floor room- 305	109	85
48	Third floor room- 306	104	89
49	Third floor room- 307	107	98
50	Third floor room- 308	114	99
51	Third floor room- 309	113	103
52	Third floor room- 310	98	89
53	Third floor room- 311	120	110
54	Third floor room- 312	105	95
55	Third floor room- 313	104	89
56	Third floor room- 314	107	98
57	Third floor room- 315	114	99
58	Third floor room- 316	113	103
59	Third floor room- 317	98	89
60	Third floor room- 318	112	109
61	Fourth floor facility room	124	110
62	Fourth floor wash room	110	98
63	Fourth floor room- 401	112	88
64	Fourth floor room- 402	96	85
65	Fourth floor room- 403	109	98
66	Fourth floor room- 404	116	99
67	Fourth floor room- 405	112	97
68	Fourth floor room- 406	121	95
69	Fourth floor room- 407	112	87
70	Fourth floor room- 408	109	85
71	Fourth floor room- 409	105	95
72	Fourth floor room- 410	104	89
73	Fourth floor room- 411	107	98
74	Fourth floor room- 412	114	99
75	Fourth floor room- 413	113	103
76	Fourth floor room- 414	98	89
77	Fourth floor room- 415	112	109
78	Fourth floor room- 416	124	110
79	Fourth floor room- 417	110	98
80	Fourth floor room- 418	112	88
81	Fifth floor facility room	96	85
82	Fifth floor wash room	109	98
83	Fifth floor room- 501	116	99
84	Fifth floor room- 502	112	97

Sr No	Location	Lux Level	
		Max.	Min.
85	Fifth floor room- 503	121	95
86	Fifth floor room- 504	112	87
87	Fifth floor room- 505	109	85
88	Fifth floor room- 506	90	65
89	Fifth floor room- 507	120	90
90	Fifth floor room- 508	160	140
91	Fifth floor room- 509	105	95
92	Fifth floor room- 510	104	89
93	Fifth floor room- 511	107	98
94	Fifth floor room- 512	114	99
95	Fifth floor room- 513	113	103
96	Fifth floor room- 514	98	89
97	Fifth floor room- 515	112	109
98	Fifth floor room- 516	124	110
99	Fifth floor room- 517	110	98
100	Fifth floor room- 518	112	88
101	Sixth floor facility room	96	85
102	Sixth floor wash room	109	98
103	Sixth floor room- 601	116	99
104	Sixth floor room- 602	112	97
105	Sixth floor room- 603	121	95
106	Sixth floor room- 604	112	87
107	Sixth floor room- 605	109	85
108	Sixth floor room- 606	90	65
109	Sixth floor room- 607	120	90
110	Sixth floor room- 608	160	140
111	Sixth floor room- 609	105	95
112	Sixth floor room- 610	104	89
113	Sixth floor room- 611	107	98
114	Sixth floor room- 612	114	99
115	Sixth floor room- 613	113	103
116	Sixth floor room- 614	98	89
117	Sixth floor room- 615	112	109
118	Sixth floor room- 616	124	110
119	Sixth floor room- 617	110	98
120	Sixth floor room- 618	112	88

4.2 OBSERVATIONS

It was observed that the building has opted the Energy efficient lighting system that is LED which was good option to save energy and we personally felt good to observe it and checked whether the lux level we are getting is sufficient or not and was observed that the lux level was good.

It was observed that the lux level in some of the areas is within limits and in some areas it is bit more.

4.3 RECOMMENDATION

LED lights are highly recommended as they are the best in technology available in the illumination market and will provide good amount of energy and monetary savings since major lighting includes halogens which are the most inefficient light in the market. So please go for the Led lights for the areas where it is still remaining to go for 100% LED lightings.

LED's also help in heat load reduction since the heat dissipated by the halogens is much higher than the heat dissipated by LED lights thus intangible savings by reduction in cooling can be easily be achieved. Also we recommend to not using GLS Bulbs as they are inefficient lights and also dissipates heat increase HVAC load.

It is recommended to install photo sensor for all the outdoor light and also in working floor near to the glasses envelope in the building.

It is recommended to install occupancy sensor in Stores/office cabins and toilets to save energy.

It is recommended to install the day light sensor on the outdoor lights for automation and control of the lights and this will also help us reduce the unwanted running hours of the lights.

6. DIESEL GENERATOR

5 Diesel Generator

There are two DG of 365 & 125 KVA are installed at site to cater the electrical load of building during power failure and the details for last one year are as below.

DG Location	DG SET No. 1		
DG Capacity	365KVA		
Month	DG. Running (Hr)	DG Fuel Consumption(Ltr)	Average Con. (Ltr/hr)
Jan-20	18:50:00	435	23.51
Feb-20	12:10:00	290	23.96
Mar-20	0:18:20	8.33	5.74
Apr-20	0:18:20	8.33	5.74
May-20	0:18:20	8.33	5.74
Jun-20	3:50:00	80	22.9
Jul-20	…	…	…
Aug-20	…	…	…
Sep-20	…	15	…
Oct-20	…	10	…
Nov-20	…	65	…
Dec-20	…	45	…
Jan-21	…	25	…

DG Location	DG SET No. 2		
DG Capacity	125KVA		
Month	DG. Running (Hr)	DG Fuel Consumption(Ltr)	Average Con. (Ltr/hr)
Jan-20	16:40:00	240.00	14.63
Feb-20	5:50:00	90.00	16.36
Mar-20	10:35:00	108.33	9.46
Apr-20	10:35:00	108.33	9.60
May-20	10:35:00	108.33	9.46
Jun-20	12:55:00	135.00	10.76
Jul-20	20:45:00	175.00	8.56
Aug-20	30:25:00	300.00	9.91
Sep-20	15:10:00	120.00	7.94
Oct-20	17:15:00	180.00	10.49
Nov-20	6:15:00	60.00	9.75
Dec-20	11:45:00	115.00	10.04
Jan-21	10:05:00	95.00	9.45

7. AIR CONDITIONING

6 Air Conditioning

The Building is having the Ceiling fans for air circulation and AHU/FCU to get comfort air conditioning.

List of Fan:

Sr. No.	Type	Location	Qty.
1	Ceiling Fan (60 W)	Girls Hostel	133
4	Ceiling Fan (60 W)	Bots Hostel	181
	Ceiling Fan (60 W)	Outer Area	5
	Ceiling Fan (60 W)	Academic Block	386
Total			184

We can replace the existing ceiling fans with the energy efficient BLDC fans

Savings calculated listed below:

Parameters	Units	Value
Average power consumption of the ceiling fan at present	Watt	60
Average power consumption of energy efficient star rated (BLDC) fans	Watt	28
Equivalent Power saving per fan	Watt	32
Numbers of fans to be replaced	Nos	705
Working Hours Per annum	Hr	3000
Overall electric Power Cost	Rs/KWH	21.95
Annual Energy Saving	KWH	67680
Monetary saving	Rs/Year	1485576
Investment	Rs	1692000
Payback	Month	13.67

It is recommended to replace the girls and boys hostel fan with BLDC fan immediately and plan to replace the all fan with BLDC fan.

8. AREA OF IMPROVEMENT

Energy Management has become crucial to the competitors of the facility. Rising fuel costs coupled with increased global competition is forcing industries/buildings and other facilities to slash energy costs. It was aimed at obtaining a detailed idea about the various end use energy consumption activities and identifying, enumerating and evaluating the possible energy savings opportunities. However, Energy conservation is a continuous process and there is always scope for further improvements. With this objective the Energy Audit team with the active involvement of office we have identified the following Energy Conservation Opportunities (ECO's). Implementation of the ECO's can further help improve the energy consumption

The following energy saving/conservation measures were identified for the plant.

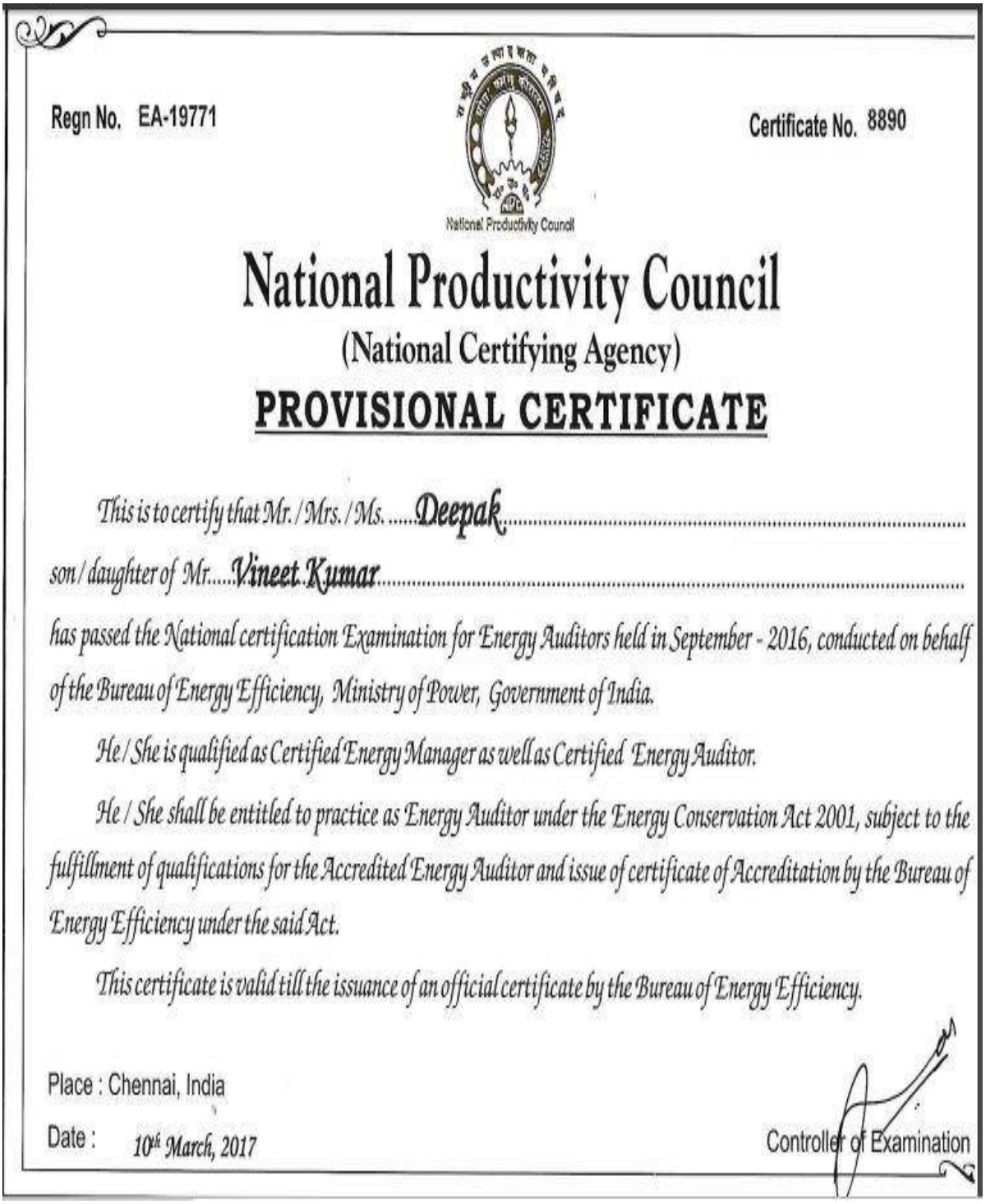
Table: List of Energy saving / conservation recommendations

Sr. No.	Recommended Measure
1	Replace the boys and girls hostel ceiling fan with BLDC fan
2	Recommended to maintain the power factor near unity
3	Reduce contract demand from 1080KVA to 800 KVA
4	It is recommended to install occupancy sensor in office cabins and toilets to save energy
5	It is recommended to install the day light sensor on the outdoor lights for automation and control of the lights and this will also help us reduce the unwanted running hours of

Some Energy Saving measure already taken by Institute as listed below:

- The institute has a very clear environmental vision and trying to reduce the energy
- The institute has planted a lot of trees and has maintained very good greenery.
- The institute generates more than 5 percent of energy through solar power plant for its domestic needs.
- It was observed that the building has opted the Energy efficient lighting system that is LED which was good option to save energy and we personally felt good to observe it.
- Most of the building have sufficient day light which saves the energy in the institutes.

9. ENERGY AUDITOR CERTIFICATES



Regn No. EA-19771

Certificate No. 8890

National Productivity Council

National Productivity Council

(National Certifying Agency)

PROVISIONAL CERTIFICATE

This is to certify that Mr. / Mrs. / Ms. Deepak

son / daughter of Mr. Vineet Kumar

has passed the National certification Examination for Energy Auditors held in September - 2016, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India.

He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.

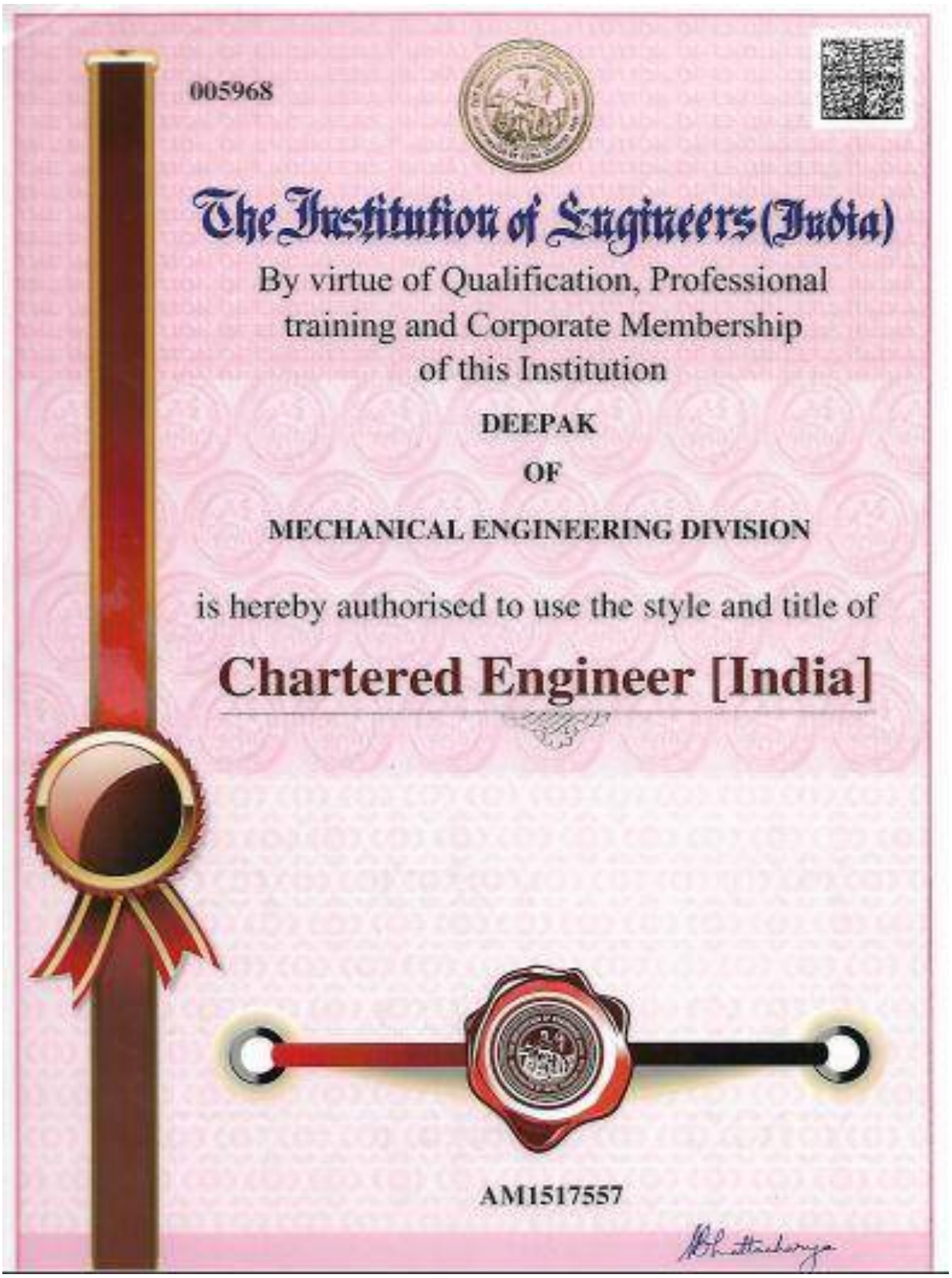
He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for the Accredited Energy Auditor and issue of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.

Place : Chennai, India

Date : 10th March, 2017

Controller of Examination



005968

The Institution of Engineers (India)

By virtue of Qualification, Professional training and Corporate Membership of this Institution

DEEPAK

OF

MECHANICAL ENGINEERING DIVISION

is hereby authorised to use the style and title of

Chartered Engineer [India]

AM1517557

THANKS

ENVIRONMENT AUDIT REPORT

(July, 2020)

Institute Of Management Studies, Ghaziabad

NH-24, Adhyatmik Nagar
Ghaziabad (U.P)

ZERO SQUARE ENERGY SOLUTIONS PVT. LTD.
Level 5 Tower C Green boulevard, block-B 9/A,
Sector-62, Noida, INDIA
Mob: 0120-6608186
Email: Pankaj.gupta@zerosquare.co.in, web: www.zerosquare.co.in

1 Contents

2 ACKNOWLEDGEMENT

Zero Square Energy Solution Pvt. Ltd. acknowledges the cooperation and supports of the management and staff of **Institute Of Management Studies, Ghaziabad,** in particular, the support and disposition of the Dr. Sapna Rakesh (Director), Dr. Gagan Varshney (Professor), Prof. Sanjay Sharma (Assistant Professor) & Teaching & Supporting Staff of Collage has been invaluable to the success of this report. Zero Square Energy Solution Pvt. Ltd. wishes to stress that in line with its policy, all information obtained in the course of this Audi exercise as well as those contained in this report will be accorded the strictest confidentiality.

3 DISCLAIMER

This Environment audit report of **INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD** is prepared by Zero Square Energy Solution Pvt. Ltd., Noida on interest of the organization.

This report need not necessarily represent the views of building management and its employees. The building management, any employee of **INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD** nor any person acting on behalf of any of them makes no warranty or representation whatsoever express or implied with respect to use of any information, process, method or similar item disclosed in this report and assumes no legal liability for the information in this report, nor does any party represent that the use of this information will not infringe upon privately owned rights.

All calculations in this report are done based on the data provided by plant administration, the necessary measurements taken during the study, and the operating conditions prevailing during the study period. The accuracy of the report is subject to these limitations.

The circulation of report copy is limited to **INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD**. No part of this report or thereof shall be reproduced, stored in a retrieval system or transmitted in any form or by any means (Electronic, Mechanical, Photocopying and Recording) without the prior written permission from **INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD.**

Using/Reproducing Information:

All requests to use or reproduce any part of this report should be directed to:

The Director

INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD,

University Courses Campus

4 INTRODUCTION

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Environment audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

5 OVERVIEW OF INSTITUTE

INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD was founded in 1990 by a group of visionaries and intellectuals to impart quality education in a stimulating and innovative environment where students are empowered with knowledge and professional skills while upholding the values of integrity, tolerance and mutual respect. INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD has attained a matchless and a reputable place amongst the best professional education institutions in India over the past 30 years. Since its inception, the group has promoted education in the diversified areas of Management Sciences, International Business, Information Technology, Biosciences, Engineering, and Journalism through its three educational campuses equipped with state-of-the-art infrastructure and modern technology. Located strategically in the NCR, INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD delivers the real-world experience for succeeding in today's competitive global marketplace. With over 35000+ Alumni base it has added many feathers to its cap by bagging many awards and accolades. The Group has three campuses- INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD (University Courses Campus), INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD and INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD Engineering College.

Institute Of Management Studies, Ghaziabad, (University Courses Campus) offers undergraduate and post graduate programmes affiliated to **CCS University, Meerut**. Courses of study are **MIB, M.Sc. Biotechnology, BBA, BCA, BJMC, B.Sc. (Hons.) Biotechnology and B.Sc. (Hons.) Microbiology**. It has consistently produced University toppers which speaks volume about the quality of education imparted by its erudite faculty. Regular sessions are organized for preparation of competitive exams/entrance exams for higher studies and jobs. The institute is **ISO 9001:2008 certified** and **NAAC accredited**. The institute has been ranked amongst top **B-Schools of India** and has been bestowed with number of awards in various categories by **Times B-School Survey, ASSOCHEM, CSR, CEGR, GESA, CIAC Global, Integrated Chambers of Commerce and Industry**, and **Asia Pacific Education and Technology Awards**.

Lecture Room

Lecture Rooms | Air-conditioned lecture rooms with the latest audio-visual aids & multimedia technology enable us to provide interactive teaching sessions that makes the learning easy and engrossing.

Knowledge Resource Centre

24*7 access to updated online digital library and well-stocked reading material help the students to keep themselves updated with the latest developments.

Library users at INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD can access

- More than 18,000 books from various streams predominantly related to Management, Information Technology, Mass Communication, Bio Sciences, corporate trainings and its allied subjects.
- 50 full text International and National journals.
- 35 Magazines and Newspapers.

- Rich online database covering titles published by the aggregators like EBSCO, ICFAI University Press, IEEE, Emerald, Mc-Graw Hill, NDLA (National Digital Library of India), J-Gate and DELNET etc.

Online Public Access Catalogue (OPAC) enables users to find out the real-time availability of library materials from their own computer terminals. Faculty and students are also encouraged to send request for new acquisition in the Library through the OPAC.

The library has always received great applause from various panels of leading educational bodies like NAAC, AICTE, CCS University to name a few.

IT Lab Facilities

School of Information Technology offers great infrastructure and an excellent IT environment with well-equipped computer labs consisting of the latest microprocessor-based computers and updated software for academic and intellectual growth of the students. The wide collection of latest versions of software like Tally, Visual Studio, VLC, FoxPro, Win-Rar, Adobe Photoshop, Adobe Reader, Turbo C, Microsoft, AVAST etc enables the students to keep themselves well versed with the latest technology and develop the technical acumen and competencies.

School of Journalism at INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD owns well equipped 'Mass Media Studio - 'Expressions' which has photography section, news reading room, radio & video editing room for hands-on experience. Live Reporting, radio shows, panel discussion, movie reviving, anchoring, photography sessions etc are regularly held with the aid of latest technology and equipment.

Availability of latest updated versions of software enable the students to gain expertise in film making and news making. The institute has its 'Campus Radio' to provide a professional training platform for the students to achieve greater heights. Besides these, studio has sound mixer, teleprompter, still and video cameras to promote experiential learning by giving practical exposure to the students.

Bio-Science Laboratories

School of Biosciences supports multi-disciplinary collaborative research in biology, biochemistry, engineering, computer, and information sciences, carried out using the state-of-the-art in-house research infrastructural facilities. The core research disciplines are focused on areas like microbiology, biotechnology, environmental sciences and bioinformatics.

Labs are equipped with modern equipment like Gel Documentation System, P.C.R, B.O.D Incubators, Ultracentrifuges, Colorimeter, UV-VIS Spectrophotometers, Digital weighing balance, Binocular Microscopes, Water-Baths, Colony counter, Laminar air flow, Digital pH meter, Tissue Culture Facilities and Auto-claves etc. dedicated for obtaining practical knowledge of the subject.

Accommodation

INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD University Courses Campus has in-campus separate hostel accommodation for boys and girls which provides safe, comfortable and healthy environment to the hostelers. The overall charge of student's discipline and hostel administration vests in the Chief Warden. Key highlights of the accommodation are:

- 24*7 Wi-Fi connectivity
- Reading rooms
- Indoor sports facilities like table-tennis rooms, chess and carom rooms
- Outdoor sports centres for lawn-tennis, basket-ball, volley-ball and badminton.
- Tuck shops for daily essentials.
- 24 hours Power back up along with water heaters, water coolers etc.

Auditorium

Air-conditioned auditorium with 250+ capacity with the latest audio-visual systems and green room. It enables maximum audience to attend the Seminars, conferences, workshops, guest lectures, technical and cultural events are regularly organized in the auditorium.

Seminar Hall

INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD has another Seminar Hall fully air-conditioned with 100+ capacity which is also equipped with the latest audio-visual systems. It enables the institute to organize various events and workshops simultaneously for different departments.

Medical Facility

INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD University Courses Campus has an in campus medical centre with a full-time medical attendant to look after the well-being of students and hostelers with basic facilities like first aid and medication. Institute also has tie-ups with a number of hospitals in NCR to provide health insurance benefits to its students as well as employees. An independent Ambulance round the clock is available to render emergency services in the campus.

Transportation Facilities

INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD University Courses Campus has its own fleet of buses & cars facility for the interested candidates on various routes depending on the minimum availability of the students. Transportation facility is also available for our hostelers during the end semester examinations.

Cafeteria

Canteen at institute provides fresh snacks and food items to students & visitors at nominal cost. Tasty and wholesome nourishing food ensures well balanced diet. Special attention is paid to maintain hygienic environment. There are 3 food junctions available in the campus:

1. **Maggie Hot Spot**
2. **Canteen** which stocks multicuisine menu
3. **Mess facility for providing lunch** at subsidized rates.

Sports & Recreational Facilities

Unparalleled recreational and sports activities such as basketball court, volley ball court, outdoor and indoor playground for sports and athletics are key features of the campus. Students are encouraged to indulge in regular sports activities. Set ups for the Indoor games such as Table Tennis, Billiards, Chess and Carom etc

as well as various outdoor games such as Badminton, Lawn tennis, Football, Basket Ball and Cricket are available in the campus. In-house Sports Coach train the students. Our students have participated in various sports events at national and international level.

Other Infrastructure Facilities

Wi-Fi Campus & Classrooms | Wi-Fi enabled campus with a high-speed internet connection over 100 mbps bandwidth being provided by 'A' class ISP, and complete bandwidth management is being controlled by hardware Fortinate Firewall 310B (UTM).The campus is also enabled with Cisco brand Wi-Fi setup with high speed (throughput) along with the help of Cisco Wi-Fi Controller.

Free Laptops | Laptops for enhancing learning and digital literacy

MDP Room | Micro Air-conditioned auditorium with 60+ capacity with IT support.

6 OBJECTIVES

The Environment Audit of an institution is becoming a paramount important these days for self-assessment of the institution, which reflects the role of the institution in mitigating the present environmental problems. The college has been putting efforts to keep the environment clean since its inception. But the auditing of this non-scholastic effort of the college has not been documented. Therefore, the purpose of the present environment audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

1. To document the quality drinking water
2. The document the quality of recycled waste water for gardening
3. To document the solid Waste disposal system
4. To document the ambient environmental condition of air, water and noise in the campus.
5. Benchmarking for environmental protection initiatives
6. Reduction in resource use
7. Financial savings through a reduction in resource use

7 AUDIT TEAM

Audit was conducted by the EFS team:

Name	Position	Qualification
Deepak Bajpai	Lead Auditor	B.Tech (Mechanical Engineering) Bureau of Energy Efficiency Certified Energy Auditor, Chartered Engineer
Sandeep Sharma	Safety Auditor	Certification in Industrial Hygiene, NEBOSH National General Certificate. Advance Diploma in Fire & Safety Engineering. And Environmental Management
Om Pal	Auditor	B. Tech
Shubham Agarwal	Auditor	B. Tech
Rajay Katiyar	Auditor	B. Tech

8 EXECUTIVE SUMMARY

An environmental audit is a snapshot in time, in which one assesses campus performance in complying with applicable environmental laws and regulations. Though a helpful benchmark, the audit almost immediately becomes outdated unless there is some mechanism in place to continue the effort of monitoring environmental compliance.

This is very first environmental audit of institute for NAAC affiliation; QS Programme and doing their bid towards environmental protection and environmental awareness at local and global front. Audit criterion is environmental cognizance, waste minimization and management, biodiversity conservation, water conservation, energy conservation and environmental legislative compliance by the campus. A questionnaire is used during audit. This audit report contains observations and recommendations for improvement of environmental consciousness.

9 AREA OF IMPROVEMENTS

- Water Meter should be installed and maintain the inventory of water resource
- Stack height should be as per DG Rules.
- Internal inspection system should be developed for various equipments available in campus.
- Waste Management plan should be prepared for the campus.
- Environmental drills for response against spillage and leakage of chemicals in the campus
- The monthly inventory of e-waste is required to be maintained in formats on regular basis.
- Storage of LPG cylinder as per Gas Cylinders Rules.

10 ENVIRONMENTAL AUDIT -QUESTIONARE

The areas of eco/environmental/green auditing to be followed/practiced by participating institutions:

I. Waste Minimization and Recycling
II. Greening
III. Energy Conservation
IV. Water Conservation
V. Clean Air
VI. Animal Welfare
VII. Environmental Legislative
VIII. General Practices

Dose any Environmental Audit conducted earlier?

No, this is first time a systematic way of monitoring their environmental eminence initiative taken by INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD for environment protection.

What is the total permanent population of the Institute?

Particulars	Total
Students	**2227**
Teachers	**65**
Non-Teaching Staff	**60**
Sub Total	**2352**
Approximate Number of Visitors (Per day)	**10**

Where is the campus located?

It is situated on National Highway 24, Near Dasna, Adhyatmik Nagar, Ghaziabad, Uttar Pradesh, India and is 25 km (16 miles) from Delhi.

Which of the following are available in your institute?

1	Garden area	Available
2	Play ground	Available
3	Kitchen	Available
4	Toilets	Available
5	Garbage Or Waste Store Yard	Available
6	Laboratory	Available
7	Canteen	Available
8	Hostel Facility (numbers)	Yes
9	Guest House	Available

Which of the following are found near your institute?

1	Municipal dump yard	Not in vicinity of institute
2	Garbage heap	No Garbage heaps
3	Public convenience	Yes , public convenience is available
4	Sewer line	STP installed (Cap 01 Lakh Ltr/Day)
5	Stagnant water	No stagnant water
6	Open drainage	No
7	Industry – (Mention the type)	No
8	Bus / Railway station	Yes
9	Market / Shopping complex / Public halls	Yes

I – WASTE MINIMIZATION AND RECYCLING

<table>
<tr><td>1.</td><td>Does your institute generate any waste?
If so, what are they?</td><td colspan="2">Yes, Solid waste Canteen waste, paper, plastic, Horticulture Waste etc</td></tr>
<tr><td>2.</td><td>What is the approximate amount of waste generated per day? (in Kilograms/month) (approx.)</td><td>Dry Waste
250 kg</td><td>Wet Waste
300 Kg</td></tr>
<tr><td>3.</td><td>How is the waste generated in the institute managed? By
1 Composting
2 Recycling
3 Reusing
4 Others (specify)</td><td colspan="2">Reuse of one side printed Paper for internal communication. Sewage water used for gardening. Two types of Waste bins are provided at campus for biodegradable and non-biodegradable waste. Horticulture waste is also disposed by the Ghaziabad Authority.</td></tr>
<tr><td>4.</td><td>Do you use recycled paper in institute?</td><td colspan="2">Yes</td></tr>
<tr><td>5.</td><td>Do you use reused paper in institute?</td><td colspan="2">Yes</td></tr>
<tr><td>6.</td><td>How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.</td><td colspan="2">Done in locality for awareness of resource crunches</td></tr>
<tr><td>7.</td><td>Can you achieve zero garbage in your institute? If yes, how?</td><td colspan="2">Not yet achieved. Possible through waste management plan.</td></tr>
</table>

II – GREENING THE CAMPUS

8.	**Is there a garden in your institute?**	**Yes, about Approx. 6299.00 Sq. Meter areas are developed as Gardens.**	
9.	Do students spend time in the garden?	2-4 Hours during winters	
10.	Total number of Plants in Campus	Plant type	Approx. number
		Trees	963
		Ornamental	50
11.	Suggest plants for your campus. (Trees, vegetables, herbs, etc.)	Fycer Riznald, Black Fycus, Nerofoliya, Boganvilia Boganvilia Kezreena and many more as per geographical regime.	
12.	Is the university campus have any Horticulture Department	Yes	
	Number of Staff working in Horticulture Department	Tree Gardeners, One Engineer and Services of External Experts are also taken	
13.	Number of TreePlantation Drives organized by college per annum. (If Any)	Yes, Two Tree Plantation Drives are Organized Annually. 20 trees and 50 shrubs planted in this financial year.	
14.	Number of Trees Planted in Last FY.	50	
	Survival Rate	99%	
15.	Plant Distribution Program for Students and Community	Yes, Saplings are distributed to Students and visitors at various Occasions. Besides this landscape of some area in city are developed by Institute.	
16	Plant Ownership Program	Various Trees are Planted and owned by Visitors as well as students. The Name plates are also displayed near the plants.	

III – ENERGY

17.	List ten ways that you use energy in your institute. (Electricity, LPG, firewood, others). Using this list, try to think of ways that you could use less energy every day.	Electricity saves by use of CFL/LED bulbs for illumination, LPG saves by use of Pressure cookers for cooking food. Alternate source of energy i.e. Solar Heater Installed.
18.	Are there any energy saving methods employed in your institute? If yes, please specify. If no, suggest some	Yes, Renewable source of energy through solar plant (12.5 KW) in commissioning phase. Massages are displayed at various locations to Aware the Peoples about Energy Savings. Use of Natural Lights and Natural Ventilation are promoted.
19.	How many CFL/LED bulbs has your institute installed?	100 % of Total Conventional bulbs are replaced by LED Lights.
20.	Are any alternative energy sources employed / installed in your institute? (photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.	Yes, photovoltaic cells for solar energy, energy efficient stoves
21.	Do you run "switch off" drills at institute?	Yes
22.	Are your computers and other equipment's put on power-saving mode?	Yes, In Practice
23.	Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby modes most of the time? If yes, how many hours?	Yes (6 to 9 Hr)

IV – WATER CONSERVATION

24.	List four uses of water in your institute	Basic use of water in campus: 1. Drinking – 50 KL/month 2. Gardening – STP treated water 3. Kitchen and Toilets – 200 KL/month 4. Others – 250 KL/month
25.	How does your institute store water? Are there any water saving techniques followed in your institute?	06 Nos of Overhead Water Tanks installed for storage of water. Avoid overflow of water controlled valves are provided in water supply system. Close supervision for water supply system. Rain water harvesting pit 03
26.	If there is water wastage, specify why and How can the wastage be prevented / stopped?	No
27.	Locate the point of entry of water and point of exit of waste water in your institute. Entry- Exit-	Entry- Water comes from Submersible Pumps at campus Exit- From Water Drainage System to STP(STP treated water used for gardening)
28.	Write down four ways that could reduce the amount of water used in your institute	Basic Four ways: 1. Close the taps after usage 2. Maintenance and monitoring of valves in supply system to avoid overflow, leakage and spillage 3. Water Conservation awareness for new Students 4. Reuse STP water for gardening
29.	Record water use from the institute water meter for six months (record at the same time of each day). At the end of the period, compile a table to show how many liters of water have been used.	No, Water Meters available for calculation of usage of total quantity only.

30.	Does your institute harvest rain water?	Three number of Modern rain water harvesting system are available.
31.	Is there any water recycling System.	Yes

V – CLEAN AIR

32.	**Are the Rooms in Campus are Well Ventilated?**	**Yes**				
33.	Window Floor ratio of the Rooms	**Very Good**				
34.	What is the ownership of the vehicles used by your school? (Please Tick ✓ only one)		Yes			
			Operator-owned vehicles			
		✓	School-owned vehicles			
			A combination of campus-owned and operator-owned vehicles			
35.	Provide details of school-owned motorised vehicles?	Buses	Cars	Vans	Bike +Other	Total
	No. of vehicles	0	1	0	0	1
	No. of vehicles more than five years old	0	0	0	0	0
	No. of Non Air conditioned vehicles	0	0	0	0	1
	PUC done	Yes	Yes	Yes	Yes	Yes
36.	Specify the type of fuel used by your school's vehicles:	Buses	Cars	Vans	Other	
	Diesel	0	0	0	0	
	Petrol+CNG	0	0	0	0	
	CNG	0	0	0	0	
	LPG	0	0	0	0	
	Petrol	0	1	0	1	
	Electrical	0	0	0	0	
37.	Air Quality Monitoring Program (If Any)	Yes, Monitoring is being done by approved Laboratory				
38.	Students suffer from respiratory ailments? (If Any)	No				
39.	Details of Genset	Yes, 02 Numbers of Silent DG Set The capacities of DG's are 365 & 125 KVA				

VI – ANIMAL WELFARE

40	List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.)	Birds and Squirrels are commonly found in campus. A variety of birds species and other flora and fauna available but these are not harmful to human so institute doing their bid for its conservation.
41.	How many dogs in your area have undergone Animal Birth Control - Anti Rabies (ABC - AR)?	Not required
42.	Does your institute have a Biodiversity Programme or a KARUNA CLUB?	Not Available

VII – ENVIRONMENTAL LEGISLATIVE COMPLIANCE

43.	Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
44.	Does your institute have any rules to protect the environment? List possible rules you could include.	No
45.	Dose Environmental Ambient Air Quality Monitoring conducted by the Institute?	No
46.	Dose Environmental Water and Wastewater Quality monitoring conducted by the Institute?	Yes
47.	Dose stack monitoring of DG sets conducted by the Institute?	No
48.	Is any warning notice, letter issued by state government bodies?	No
49.	Dose any Hazardous waste generated by the Institute? If yes explain its category and disposal method	Yes (Disposal of hazardous waste by dilution method)
50.	Dose any Bio medical waste generated by the Institute? If yes explain its category and disposal method	No

VIII – GENERAL

46.	Are you aware of any environmental Laws pertaining to different aspects of environmental management?	Yes
47.	Does your institute have any rules to protect the environment? List possible rules you could include.	No
48.	Does housekeeping schedule in your campus?	Yes, Swatch Bharat movement
49.	Are students and faculties aware of environmental cleanliness ways? If Yes Explain	Yes, Periodically pollution reduction, plantation, energy conservation awareness campaigns carried out by institute
50.	Dose Important Days Like World Environment Day, Earth Day, and Ozone Day etc. eminent in Campus?	Yes
51.	Dose Institute participated in National and Local Environmental Protection Movement?	Yes, Swatch Bharat Abhiyan by students at campus.
52.	Dose Institute has any Recognition/certification for environment friendliness?	No
53.	Dose Institute using renewable energy?	Yes
54.	Dose Institution conducts a green/environmental audit of its campus?	No, This is first environmental audit done by institution
55.	Has the institution been audited / accredited by any other agency such as NABL, NABET, TQPM, NAAC etc.?	No

11 BEST PRACTICES/INITIATIVES FOR ENVIRONMENT

A	**Renewable Energy** A clean source of energy is utilized at campus. Efforts towards **Carbon Neutrality**	The capacity of 12.5 KW Solar plant on building roofs is already installed.
B	**Biodiversity Conservation** Flora and fauna conservation	It is in schedule plan of Campus Environment committee
C	**Tree Plantation Drives** Two Drives Annually as well as Every Guest is honored by Tree Plantation at Campus.	Yes
D	**Ground Water Recharge** 03 units of Rain Water Harvesting System.	Yes
E	**Pollution Reduction** Personal Vehicles (Students) not allowed at campus	Reduction in Air Pollution through vehicular emission.
F	**E Waste Management**	Handover Authorized recycler
G	**Solid Waste Management** Lifting of garbage from INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD campus daily by Ghaziabad Authority.	Yes
H	**Adoption of Village School** CSR	No
I	**Water Conservation**	Yes, The STP treated water used for gardening in campus.
J	**Corporate Resource Center (CRC)**	INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD College Corporate Resource Center (CRC) is dedicated to nurturing future leaders
K	**Mitigation measures for Air pollution at construction stage and operation stage by developing adequate green belt.**	Yes
L	**Mitigation measures for noise pollution by isolation of noise generation activities**	Yes
M	**Disaster management plan**	Yes
N	**Fire protection system**	Yes

12 RECOMENDATIONS

- Environmental Monitoring i.e. (Ambient Air Quality monitoring, Stack Monitoring of DG sets, Water and wastewater monitoring need to be conducted by Haryana State Pollution Control Board, approved laboratory with frequency of six month.
- E-waste monthly inventory be maintained at campus as per E waste rules 2016.
- Water Meter should be installed at institute for monitoring of water consumption per capita.
- Environment/Green committee formation for regulating eco-friendly initiatives at campus premises and periphery as already Unnat Bhrat Abhiyan and NSS team exits.
- LPG Cylinder storage as per **"The Gas Cylinders Rules"**

13 CONCLUSION

This audit involved extensive consultation with all the campus team, interactions with key personnel on wide range of issues related to Environmental aspects. The INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD has Environmental Committee for sustainable use of resources. The audit has identified several observations for making the campus premise more environmental friendly. The recommendations are also mentioned with observations for college campus team to initiate actions.

The audit team opines that the overall site is maintained well from environmental perspective. There is no major observations but few things are important to initiate urgently are waste management records by monthly inventory of hazardous waste, water balance cycle and periodic inspection of buildings and initiation of composting at campus.

14 REFERENCE

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle
- Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control Of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Water [Prevention & Control Of Pollution] Cess Act-1977 (Amended 2003) and Rules-1978
- The Air [Prevention & Control Of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

15 *ANNEXURE* – PHOTOGRAPHS OF ENVIRONMENT CONSIOUSNESS

Cloth donation and Awareness camp on Hygiene and Sanitation

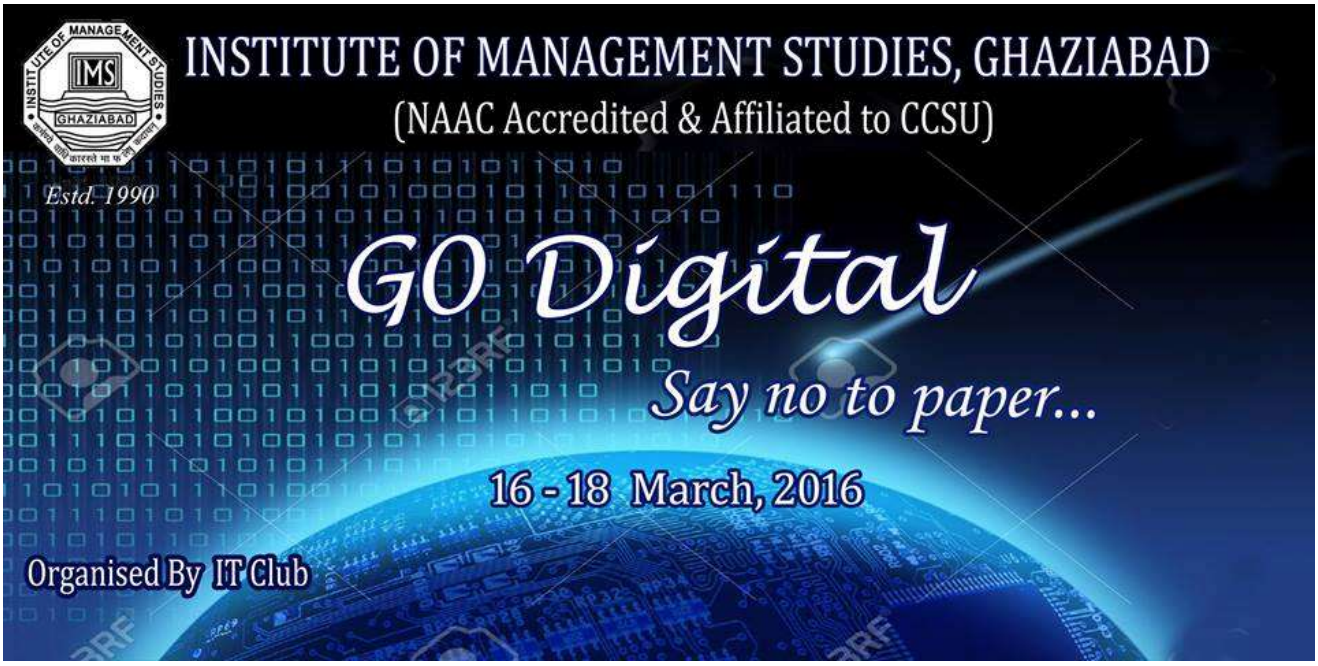
Blood Donation Camp

Emotional Outburst to Settled Living

Green Consumer Day

Tree Plantation Drive at INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD , University Courses Campus

Go Digital-say no to paper



THANKS

GREEN AUDIT REPORT

(July, 2020)

Institute Of Management Studies, Ghaziabad

NH-24, Adhyatmik Nagar
Ghaziabad (U.P)

ZERO SQUARE ENERGY SOLUTIONS PVT. LTD.
Level 5 Tower C Green boulevard, block-B 9/A,
Sector-62, Noida, INDIA
Mob: 9810387133
Email: Pankaj.gupta@zerosquare.co.in, web: www.zerosquare.co.in

Table of Contents

1. Acknowledgements

Zero Square Energy Solutions Pvt. Ltd. acknowledges the cooperation and support of the management and staff of **Institute Of Management Studies, Ghaziabad**, in particular, the support and disposition of the Dr. Sapna Rakesh (Director), Dr. Gagan Varshney (Professor), Prof. Sanjay Sharma (Assistant Professor) & Teaching/Supporting Staff of institute has been invaluable to the success of this report. Zero Square Energy Solutions Pvt. Ltd. wishes to stress that in line with its policy, all information obtained in the course of this Audit exercise as well as those contained in this report will be accorded the strictest confidentiality.

2. Executive Summary:

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crisis. On this background it becomes essential to adopt the system of the green campus for the institute which will lead to sustainable development. Institute Of Management Studies, Ghaziabad is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher studies, the college has initiated 'The Green Campus' programme few years back that actively promote the various projects for the environment protection and sustainability.

The purpose of this audit was to ensure that the practices followed in the campuses are in accordance with the green policy adopted by the institution, it works on several facets of Green Campus including water conservation, electricity conservation, tree plantation, waste management, paperless work, mapping of biodiversity. With these issues in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on students' health and learning, college operational costs and the environment. The criteria, methods and recommendation used in the audit were based on the identified risks.

3. Introduction

Green Audit is a systematic, documented, periodic and objective review by regulated entities of facility operations and practices related to meeting environmental requirements (EPA, 2003). In other words, it is a management tool comprising of systematic, documented, periodic and objective evaluation of organization, which management and equipment are performing with the aim of helping to safeguard the environment by facilitating management control of practices and assessing compliance with company policies which would include regulatory requirements and standards applicable (lnternational Chamber of Commerce, 1989).

Green auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Depending on the types of standards and the focus of the audit, there are different types of audit. Organizations of all kinds now recognize the importance of environmental matters and accept that their environmental performance will be scrutinized by a wide range of interested parties.

4. Utility of Green Audit

These are used to help improve existing human activities, with the aim of reducing the adverse effects of these activities on the environment. An environmental auditor will study an organization's environmental effects in a systematic and documented manner and will produce a green audit report.

5. Objectives of the Study

The main objectives of the green audit are to promote the environment management and conservation in the institute campus. The purpose of the audit is to identify, quantify, describe and prioritize the framework of environment sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out green audit are-

- To introduce and make aware students to real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost.
- To bring out a present status report on environmental compliance.

6. Methodology

In order to perform green audit, the methodology included different techniques such as physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following area to summarize the present status of environment management in the campus:

- Water consumption and management
- Air quality assessment and management
- Electricity consumption and management
- Sound pollution monitoring
- Waste management
- Biodiversity status of the campus

7. Water Consumption & Management

Total Number of Water Taps and dust bin in the Academic Block

Sr No	GROUND FLOOR RECEPTION SIDE	BOYS WASHROOMS	GIRLS WASHROOMS	WATER COOLER	STAFF WASHROOMS	FACULTY W/ROOM	FLOOR TOTAL	D/ OFFICE W/ROOM CHAIRMAN SIR OFFICE	TOTAL TAP	TOTAL DUSTBIN
1	BIB COCK BRASS TAP	3	4	1	1	1		1	1	12	
2	PILLOR BRASS TAP	3	4		1	1		1	1	11	
3	ANGLE BRASS TAP	6	8	1	2	2		2	2	23	
4	PUSH COCK			2						2	
5	Brass Concealed Stop Valve	3				1		1	1	6	
6	DUSTBIN	1	3	1	1	1	44	1	1		48
GROUND FLOOR HOSTEL SIDE											
1	BIB COCK BRASS TAP	3	4							7	
2	PILLOR BRASS TAP	3	4							7	
3	ANGLE BRASS TAP	6	8	1						15	
4	PUSH COCK			2						2	
5	Brass Concealed Stop Valve	3								3	
6	DUSTBIN	1	4	1							6
1st FLOOR RECEPTION SIDE											
1	BIB COCK BRASS TAP	3	4	1	1	1				10	
2	PILLOR BRASS TAP	3	4		1	1				9	
3	ANGLE BRASS TAP	6	8	1	2	2				19	
4	PUSH COCK			2						2	
5	Brass Concealed Stop Valve	3				1				4	
6	DUSTBIN	1	4	1	1	1	26				28
1st FLOOR HOSTEL SIDE											
1	BIB COCK BRASS TAP	3	4							7	
2	PILLOR BRASS TAP	3	4							7	
3	ANGLE BRASS TAP	6	8	1						15	
4	PUSH COCK			2						2	
5	Brass Concealed Stop Valve	3								3	
6	DUSTBIN	1	4	1							0
2nd FLOOR RECEPTION SIDE											
1	BIB COCK BRASS TAP	3	4	1	1	1		6	5	21	
2	PILLOR BRASS TAP	3	4		1	1				9	
3	ANGLE BRASS TAP	6	8	1	2	2				19	
4	PUSH COCK			2						2	
5	Brass Concealed Stop Valve	3				1				4	
6	DUSTBIN	1	4	1	1	1	27	1	1		31

Sr No	GROUND FLOOR RECEPTION SIDE	BOYS WASHROOMS	GIRLS WASHROOMS	WATER COOLER	STAFF WASHROOMS	FACULTY W/ROOM	FLOOR TOTAL	D/ OFFICE W/ROOM CHAIRMAN SIR OFFICE	TOTAL TAP	TOTAL DUSTBIN
2nd FLOOR HOSTEL SIDE										
1	BIB COCK BRASS TAP	3	4						7	
2	PILLOR BRASS TAP	3	4						7	
3	ANGLE BRASS TAP	6	8	1					15	
4	PUSH COCK			2					2	
5	Brass Concealed Stop Valve	3							3	
6	DUSTBIN	1	4	1						0
3rd FLOOR RECEPTION SIDE										
1	BIB COCK BRASS TAP	3	4	1	1	1			10	
2	PILLOR BRASS TAP	3	4		1	1			9	
3	ANGLE BRASS TAP	6	8	1	2	2			19	
4	PUSH COCK			2					2	
5	Brass Concealed Stop Valve	3				1			4	
6	DUSTBIN	1	4	1	1	1	28			30
3rd FLOOR HOSTEL SIDE										
1	BIB COCK BRASS TAP	3	4						7	
2	PILLOR BRASS TAP	3	4						7	
3	ANGLE BRASS TAP	6	8	1					15	
4	PUSH COCK			2					2	
5	Brass Concealed Stop Valve	3							3	
6	DUSTBIN	1	4	1						0
4th FLOOR RECEPTION SIDE										
1	BIB COCK BRASS TAP	3	4	1	1	1			10	
2	PILLOR BRASS TAP	3	4		1	1			9	
3	ANGLE BRASS TAP	6	8	1	2	2			19	
4	PUSH COCK			2					2	
5	Brass Concealed Stop Valve	3				1			4	
6	DUSTBIN	1	4	1	1	1	31			33
4th FLOOR HOSTEL SIDE										
1	BIB COCK BRASS TAP	3	4						7	
2	PILLOR BRASS TAP	3	4						7	
3	ANGLE BRASS TAP	6	8	1					15	
4	PUSH COCK			2					2	
5	Brass Concealed Stop Valve	3							3	
6	DUSTBIN	1	4	1						0

Total Number of Water Taps in the Girls & Boys Hostel (Ground Floor)

Sr No	Location	UOM	Description					
			Wash basin	Tap	shower	western Toilet	Indian Toilet	urinal
1	Mess -	Nos	12	12				
2	Toilet	Nos	2	4		2		
3	Warden office	Nos	1	2		1		
4	Medical Room	Nos	1	2		1		
5	Common	Nos	2	4				
6	washroom Room	Nos	2	4		2		1
7	washroom	Nos	2	4			2	3
8	Staff & Guest Room	Nos	5	15	5	5		

Total Number of Water Taps in the Girl Hostel (Girl Hostel First Floor to six floors)

Girl Hostel First Floor to six floor			
Sr No	Description	UOM	Qty
1	Wash basin	Nos	6
2	washing machine	Nos	1
3	shower	Nos	5
4	washbasin tab	Nos	6
5	toiler tab	Nos	10
6	bathroom tab	Nos	6
7	water cooler	Nos	1
8	western Toilet	Nos	5
9	Indian Toilet	Nos	1
10	Bathroom	Nos	5

Total Number of Water Taps in the Boys Hostel (Girl Hostel First Floor to six floors)

Boys Hostel First Floor to six floor			
Sr No	Description	UOM	Qty
1	Wash basin	Nos	9
2	shower	Nos	7
3	washbasin tab	Nos	9
4	toiler tab	Nos	14
5	bathroom tab	Nos	8
6	western Toilet	Nos	7
7	Indian Toilet	Nos	1
8	Bathroom	Nos	7

Comments

Approximate per capita average consumption and usage per day is 109 L of water.

8. Water Storage Profile

Water Storage Tanks Details					
Sr No	**Location**	**UOM**	**Qty**	**Capacity in Ltr**	**Total storage In Ltr**
1	Academic Block	Nos	4	5000	20000
2	Academic Block	Nos	1	1000	1000
3	Boys Hostel	Nos	4	5000	20000
4	Girls Hostel	Nos	4	5000	20000
5	Girls Hostel	Nos	1	1000	1000
6	Near STP Plant	Nos	1	1000	1000
Total					63000

9. Electricity consumption (in Units) and management

BILLING MONTH	KWH CONSUMPTION
Jul-19	137850
Aug-19	186465
Sep-19	199590
Oct-19	216480
Nov-19	121425
Dec-19	58830
Jan-20	51825
Feb-20	52830
Mar-20	49980
Apr-20	30960
May-20	10650
Jun-20	12495
Total	**156915**
Average	**31383**

10. Total electricity consumption per year

Yearly Electrical Consumption (Pashchiimanchal Vidyit Vitran Nigam Limited) **156,915** KWh

11. Solar Generation

Solar Plant Power generation detailed below:

MONTH	Solar Generation (KWH)
Jul-19	1436
Aug-19	1506
Sep-19	1439
Oct-19	1478
Nov-19	1080
Dec-19	888
Jan-20	1138
Feb-20	1493
Mar-20	2021
Apr-20	1750
May-20	1989
Jun-20	1764
Total	**10155**

Comments: Approximate per capita average consumption per day is 71 units (Including solar power generation and Pashchimanchal Vidyit Vitran Nigam Limited).

12. Sound Pollution Monitoring

The human ear is constantly being assailed by man-made sounds from all sides, and there remain few places in populous areas where relative quiet prevails. There are two basic properties of sound, (1) loudness and (2) frequency. Loudness is the strength of sensation of sound perceived by the individual. It is measured in terms of Decibels. Just audible sound is about 10 dB, a whisper about 20 dB, library place 30 dB, normal conversation about 35-60 dB, heavy street traffic 60-75 dB, boiler factories 120 dB, jet planes during take-off is about 150 dB, rocket engine about 180 db. The loudest sound a person can stand without much discomfort is about 80 db. Sounds beyond 80 dB can be regarded as pollutant as it harms hearing system. The WHO has fixed 45 dB as the safe noise level for a city to avoid sleep disturbances. For international standards a noise level up to 65 dB is considered tolerable. Frequency is defined as the number of vibrations per second. It is denoted in Hertz (Hz).Sound pollution is another important parameter that is taken into account for green auditing of the College Campus. Different sites were chosen for the monitoring purpose.

Academic building:

Sr No	Location	Sound Level (db)
1	College visitor entry gate	52
2	Reception area	59
3	Admission counselors office	52
4	Accounts & administration office	46
5	Faculty-I office	42
6	Chairmen office	40
7	Chairmen office conference room	38
8	Vice Chairmen office	39
9	Director office	42
10	Library	37
11	Digital library	37
12	Admission cell office	38
13	Fee counter	40
14	MDP office	46
15	EWL room	50
16	Green room	57
17	Auditorium	54
18	Main store room	47
19	First floor faculty office-II	34
20	First floor class room - 101	48
21	First floor class room - 102	49
22	First floor class room - 103	48

Sr No	Location	Sound Level (db)
23	First floor class room - 104	45
24	First floor class room - 105	52
25	First floor class room - 106	51
26	First floor class room - 107	48
27	First floor class room - 108	51
28	First floor computer lab-02	45
29	First floor server room	44
30	First floor computer lab-01	46
31	Second floor faculty office- III	52
32	Second floor class room - 201	56
33	Second floor class room - 202	54
34	Second floor class room - 203	52
35	Second floor class room - 204	56
36	Second floor class room - 205	52
37	Second floor class room - 206	49
38	Second floor class room - 207	48
39	Second floor class room - 208	49
40	Second floor class room - 209	53
41	Second floor expressions (studio)	48
42	Second floor expressions (studio) photography room	44
43	Second floor expressions (studio) TV studio	46
44	Second floor computer lab-04	44
45	Second floor microbiology lab	41
46	Second floor bio technology lab	42
47	Second floor computer lab-03	44
48	Third floor CRC & CDC office	58
49	Third floor class room- 301	52
50	Third floor class room- 302	51
51	Third floor class room- 303	49
52	Third floor class room- 304	54
53	Third floor class room- 305	52
54	Third floor class room- 306	51
55	Third floor class room- 307	50
56	Third floor class room- 308	52
57	Third floor class room- 309	45
58	Third floor class room- 310	51
59	Third floor class room- 311	56
60	Third floor class room- 312	54
61	Third floor class room- 313	52
62	Third floor mini auditorium	54
63	Fourth floor faculty office-IV	54
64	Fourth floor class room - 401	52
65	Fourth floor class room - 402	53
66	Fourth floor class room - 403	52
67	Fourth floor class room - 404	51

Sr No	Location	Sound Level (db)
68	Fourth floor class room - 405	52
69	Fourth floor class room - 406	56
70	Fourth floor class room - 407	52
71	Fourth floor class room - 408	54
72	Fourth floor class room - 409	49
73	Fourth floor class room - 410	51
74	Fourth floor class room - 411	52
75	Fourth floor class room - 412	53
76	Fourth floor class room - 413	51
77	Circulating area & two wheeler parking area	52
78	Circulating area & four wheeler parking area	54
79	Mess kitchen room	53
80	S.T.P. plant area	49
81	Mess staff residence room	48
82	Generator room	51
83	Electrical panel room	47
84	Basketball court	44
85	Play ground	49

Boys Hostel building:

Sr No	Location	Sound Level (db)
1	Ground floor akashay patra(mess)	56
2	Ground floor digital library	37
3	First floor facility room	42
4	First floor wash room	48
5	First floor gymnasium hall	49
6	First floor room- 101	50
7	First floor room- 102	43
8	First floor room- 103	47
9	First floor room- 104	48
10	First floor room- 105	51
11	First floor room- 106	49
12	First floor room- 107	52
13	First floor room- 108	49
14	First floor room- 109	51
15	First floor room- 110	54
16	First floor room- 111	51
17	First floor room- 112	52
18	First floor room- 113	51
19	First floor room- 114	52
20	First floor room- 115	53
21	Second floor facility room	51
22	Second floor wash room	49

Sr No	Location	Sound Level (db)
23	Second floor room- 201	42
24	Second floor room- 202	48
25	Second floor room- 203	49
26	Second floor room- 204	50
27	Second floor room- 205	43
28	Second floor room- 206	47
29	Second floor room- 207	48
30	Second floor room- 208	51
31	Second floor room- 209	49
32	Second floor room- 210	52
33	Second floor room- 211	49
34	Second floor room- 212	51
35	Second floor room- 213	54
36	Second floor room- 214	51
37	Second floor room- 215	52
38	Second floor room- 216	51
39	Second floor room- 217	52
40	Second floor room- 218	53
41	Second floor room- 219	51
42	Second floor room- 220	49
43	Second floor room- 221	43
44	Second floor room- 222	47
45	Second floor room- 223	48
46	Third floor facility room	51
47	Third floor wash room	49
48	Third floor room- 301	49
49	Third floor room- 302	50
50	Third floor room- 303	43
51	Third floor room- 304	47
52	Third floor room- 305	48
53	Third floor room- 306	51
54	Third floor room- 307	49
55	Third floor room- 308	52
56	Third floor room- 309	49
57	Third floor room- 310	51
58	Third floor room- 311	54
59	Third floor room- 312	51
60	Third floor room- 313	52
61	Third floor room- 314	51
62	Third floor room- 315	52
63	Third floor room- 316	53
64	Third floor room- 317	51
65	Third floor room- 318	49
66	Third floor room- 319	50
67	Third floor room- 320	43

Sr No	Location	Sound Level (db)
68	Third floor room- 321	47
69	Third floor room- 322	48
70	Third floor room- 323	51
71	Fourth floor facility room	49
72	Fourth floor wash room	52
73	Fourth floor room- 401	49
74	Fourth floor room- 402	51
75	Fourth floor room- 403	54
76	Fourth floor room- 404	51
77	Fourth floor room- 405	52
78	Fourth floor room- 406	51
79	Fourth floor room- 407	52
80	Fourth floor room- 408	53
81	Fourth floor room- 409	51
82	Fourth floor room- 410	49
83	Fourth floor room- 411	42
84	Fourth floor room- 412	48
85	Fourth floor room- 413	49
86	Fourth floor room- 414	50
87	Fourth floor room- 415	43
88	Fourth floor room- 416	47
89	Fourth floor room- 417	48
90	Fourth floor room- 418	51
91	Fourth floor room- 419	49
92	Fourth floor room- 420	52
93	Fourth floor room- 421	49
94	Fourth floor room- 422	51
95	Fourth floor room- 423	54
96	Fifth floor facility room	51
97	Fifth floor wash room	52
98	Fifth floor room- 501	51
99	Fifth floor room- 502	52
100	Fifth floor room- 503	53
101	Fifth floor room- 504	51
102	Fifth floor room- 505	49
103	Fifth floor room- 506	42
104	Fifth floor room- 507	48
105	Fifth floor room- 508	49
106	Fifth floor room- 509	50
107	Fifth floor room- 510	43
108	Fifth floor room- 511	47
109	Fifth floor room- 512	48
110	Fifth floor room- 513	51
111	Fifth floor room- 514	49
112	Fifth floor room- 515	52

Sr No	Location	Sound Level (db)
113	Fifth floor room- 516	49
114	Fifth floor room- 517	51
115	Fifth floor room- 518	54
116	Fifth floor room- 519	51
117	Fifth floor room- 520	52
118	Fifth floor room- 521	51
119	Fifth floor room- 522	52
120	Fifth floor room- 523	53
121	Sixth floor facility room	51
122	Sixth floor wash room	49
123	Sixth floor room- 501	42
124	Sixth floor room- 502	48
125	Sixth floor room- 503	49
126	Sixth floor room- 504	50
127	Sixth floor room- 505	43
128	Sixth floor room- 506	47
129	Sixth floor room- 507	48
130	Sixth floor room- 508	51
131	Sixth floor room- 509	49
132	Sixth floor room- 510	52
133	Sixth floor room- 511	49
134	Sixth floor room- 512	51
135	Sixth floor room- 513	54
136	Sixth floor room- 514	51
137	Sixth floor room- 515	52
138	Sixth floor room- 516	51
139	Sixth floor room- 517	52
140	Sixth floor room- 518	53
141	Sixth floor room- 519	51
142	Sixth floor room- 520	49
143	Sixth floor room- 521	43
144	Sixth floor room- 522	47
145	Sixth floor room- 523	48

Girl's Hostel building

Sr No	Location	Sound Level (db)

Sr No	Location	Sound Level (db)
1	Ground floor warden office	56
2	Ground floor medical room	37
3	Ground floor cafeteria	42
4	Ground floor departmental shop	48
5	Ground floor laundry shop	49
6	Ground floor driver rest room	49
7	First floor facility room	42
8	First floor wash room	48
9	First floor common room	51
10	First floor gymnasium hall	49
11	First floor room- 101	50
12	First floor room- 102	43
13	First floor room- 103	47
14	First floor room- 104	48
15	First floor room- 105	51
16	First floor room- 106	49
17	First floor room- 107	52
18	First floor room- 108	49
19	First floor room- 109	51
20	First floor room- 110	54
21	Second floor facility room	51
22	Second floor wash room	52
23	Second floor room- 201	51
24	Second floor room- 202	52
25	Second floor room- 203	53
26	Second floor room- 204	51
27	Second floor room- 205	49
28	Second floor room- 206	42
29	Second floor room- 207	48
30	Second floor room- 208	49
31	Second floor room- 209	50
32	Second floor room- 210	43
33	Second floor room- 211	47
34	Second floor room- 212	48
35	Second floor room- 213	51
36	Second floor room- 214	49
37	Second floor room- 215	52
38	Second floor room- 216	49
39	Second floor room- 217	51
40	Second floor room- 218	54
41	Third floor facility room	51
42	Third floor wash room	52
43	Third floor room- 301	51
44	Third floor room- 302	52
45	Third floor room- 303	53

Sr No	Location	Sound Level (db)
46	Third floor room- 304	51
47	Third floor room- 305	49
48	Third floor room- 306	43
49	Third floor room- 307	47
50	Third floor room- 308	48
51	Third floor room- 309	51
52	Third floor room- 310	49
53	Third floor room- 311	49
54	Third floor room- 312	50
55	Third floor room- 313	43
56	Third floor room- 314	47
57	Third floor room- 315	48
58	Third floor room- 316	51
59	Third floor room- 317	49
60	Third floor room- 318	52
61	Fourth floor facility room	49
62	Fourth floor wash room	51
63	Fourth floor room- 401	54
64	Fourth floor room- 402	51
65	Fourth floor room- 403	52
66	Fourth floor room- 404	51
67	Fourth floor room- 405	52
68	Fourth floor room- 406	53
69	Fourth floor room- 407	51
70	Fourth floor room- 408	49
71	Fourth floor room- 409	50
72	Fourth floor room- 410	43
73	Fourth floor room- 411	47
74	Fourth floor room- 412	48
75	Fourth floor room- 413	51
76	Fourth floor room- 414	49
77	Fourth floor room- 415	52
78	Fourth floor room- 416	49
79	Fourth floor room- 417	51
80	Fourth floor room- 418	54
81	Fifth floor facility room	51
82	Fifth floor wash room	52
83	Fifth floor room- 501	51
84	Fifth floor room- 502	52
85	Fifth floor room- 503	53
86	Fifth floor room- 504	51
87	Fifth floor room- 505	49
88	Fifth floor room- 506	42
89	Fifth floor room- 507	48
90	Fifth floor room- 508	49

Sr No	Location	Sound Level (db)
91	Fifth floor room- 509	50
92	Fifth floor room- 510	43
93	Fifth floor room- 511	47
94	Fifth floor room- 512	48
95	Fifth floor room- 513	51
96	Fifth floor room- 514	49
97	Fifth floor room- 515	52
98	Fifth floor room- 516	49
99	Fifth floor room- 517	51
100	Fifth floor room- 518	54
101	Sixth floor facility room	51
102	Sixth floor wash room	52
103	Sixth floor room- 601	51
104	Sixth floor room- 602	52
105	Sixth floor room- 603	53
106	Sixth floor room- 604	51
107	Sixth floor room- 605	49
108	Sixth floor room- 606	42
109	Sixth floor room- 607	48
110	Sixth floor room- 608	49
111	Sixth floor room- 609	50
112	Sixth floor room- 610	43
113	Sixth floor room- 611	47
114	Sixth floor room- 612	48
115	Sixth floor room- 613	51
116	Sixth floor room- 614	49
117	Sixth floor room- 615	52
118	Sixth floor room- 616	49
119	Sixth floor room- 617	51
120	Sixth floor room- 618	54

Recommended sound level as set in CPCB-Environmental Standards- Noise (ambient standards) dB (A)

SCHEDULE

(see rule 3(1) and 4(1))

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note:- 1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

13. Waste Disposal

Waste disposal include the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.

Waste can be solid, liquid, or gas, each type has different methods of disposal and management. Waste management deals with all types of waste, including industrial, biological and household. In some cases, waste can pose a threat to human health. Waste is produced by human activity, for example, the extraction and processing of raw materials. Waste management is intended to reduce adverse effects of waste on human health, the environment or aesthetics.

Waste management practices are not uniform among countries (developed and developing nations) regions (urban and rural areas), and residential and industrial sectors can all take different approaches.

A large portion of waste management practices deal with municipal solid waste which is the bulk of the waste that is created by household, industrial, and commercial activity.

Institute Of Management Studies, Ghaziabad has employed waste bins for proper segregation of solid wastes in the campus.

Number of dustbins at INSTITUTE OF MANAGEMENT STUDIES, GHAZIABAD listed below:

Details of dustbin & approx. waste disposal

1. No of dustbin: - 252
2. Waste disposal quantity 550 KG approx. per Month

14. List of Trees in Campus

Trees Details			
Location	**Description**	**UOM**	**Qty**
GATE NO 1/METER ROOM AREA	Fycer Riznald	Nos	225
	Kezreena	Nos	12
	Fostal Paas	Nos	6
	Fonix Palm	Nos	10
	Fycus Logoland	Nos	10
	Cyprus	Nos	1
BIG PARK	Black Fycus	Nos	180
	Momshree	Nos	26
VOLLEYBALL GROUND	Black Fycus	Nos	88
GATE NO. 1 TO 2	NEEM	Nos	2
	Retusa	Nos	14
	Kezreena	Nos	12
	Fonix	Nos	4
ATTACHED WITH HOSTEL	Nerofoliya	Nos	225
OUTSIDE ATTACHED TO CAMPUS WALL	Champa	Nos	32
	BARH	Nos	1
NEW UNDER PREPARATION UNDER POTS	Green Fycus	Nos	65
	Champa	Nos	12
	Boganvilia	Nos	38
Total		**Nos**	**963**

15. Biodiversity status of the college campus

Introduction

Institute Of Management Studies, Ghaziabad situated in the vicinity of farms and agricultural areas is rich in biodiversity. To conserve this biodiversity, our first need is to learn about the existing diversity of the place. Unless we know whom to conserve, we will not be able to plan proper conservation initiatives. Also, it is important to have an understanding of the bio-diversity of an area so that the local people can be aware of the richness of bio-diversity of the place they are living in and their responsibility to maintain that richness.

In today's world, among the popular conservation measures which are taken to spread wildlife and environmental awareness, butterfly gardens can be placed in a significant position. To create butterfly garden, we need to know which associate plants and other fauna are present in the surrounding. This study allows us to understand the faunal and floral diversity of the surrounding areas of the college premises and their inter-relationship.

Objectives

The main objective of this study is to get a baseline data of bio-diversity of the area which will include:

- Documentation of the floral diversity of the area, its trees, herbs, shrubs and climbers.
- Documentation of the major faunal groups like mammals, reptiles, amphibians, birds and butterflies.
- Documentation of the specific interdependence of floral and faunal life.

Method of Study

Brief methodology for the floral and faunal survey is given below.

1. Sampling was done mostly in random manner.
2. The total area was surveyed by walking at daytime.
3. Surveys were conducted for the maximum possible hours in daytime.
4. Tree species were documented through physical verification on foot.
5. For faunal species we emphasized mainly on the direct sighting. Also call of various birds and amphibians and nesting of some faunal species were considered as direct evidences.
6. Observing mammals depend critically on the size of the species and its natural

history. Diurnal species are common and highly visible. Nocturnal species, however, are rare and difficult to detect. Small mammals like the field rats were found near their burrows, particularly during their entry or exit times in or out from their burrows respectively. In some cases, dung deposits and footprints were also observed that served as a potential clue for the presence and absence of the concerned species. These secondary evidences were all noted with time and space co-ordinates.

7. Birds are often brightly colored, highly vocal at certain times *of the* year and relatively easy to see. Sampling was done on the basis of direct sighting, call determination and from the nests of some bird species.
8. Reptiles were found mostly by looking in potential shelter sites like the under surface of rocks, logs, tree hollow sand leaf litter and also among and underneath the hedges. Sometimes some species, particularly the garden lizards were also observed in open spaces (on twigs and branches and even on brick constructions) while they were basking under direct and bright sunlight.
9. Amphibians act as potential ecological indicators. However, most of them are highly secretive in their habits and may spend the greater part of their lives underground or otherwise inaccessible to biologists. These animals do venture out but typically only at night. They were searched near pond, road beside wetland and in other possible areas. Diurnal search operations are also *succes*sful.
10. Active invertebrates like the insects require more active search. For larger winged insects like butterflies, random samplings were carried and point sampling was also done.
11. The easiest way to observe many of the invertebrates is simply looking for them in the suitable habitat or microhabitat. Searching was carried out under stones, logs, bark, in crevices in the walls and rocks and also in leaf litter, dung etc. Slugs and snails are more conspicuous during wet weather and especially at night when they were found using a torch.

Faunal Species

The list of Fauna indicates that the college campus is significantly rich in faunal diversity. We have seen a significant number of bird nests at many places. We have not been able to document other insect groups during this survey. The yearlong survey will add some more fauna in the checklist for sure after the seasonal survey.

Table 01: Checklist of Faunal groups with species number

1.	Birds	15	Table-2
2.	Reptiles	1	Table-3
3.	Amphibians	2	Table-4
4.	Butterflies	22	Table-5

Table 02: Checklist of Birds

No.	Common Name	Scientific Name	Family
1	Common HawkCuckoo	Hierococcyx varlus	Cuculidae
2	Common Hoopoe	Upupa epops	Upupidae
3	Common Iora	Aegithrna tipsia	Aegithinidae
4	Common Kingfisher	Alcedo atthis	Alcedinidae
5	Common Myna	Acridotheres tristis	Sturnidea
6	Common Pigeon	CoInmba livia	Columbidae
7	Common Sandpiper	Actitis hypoleucos	Scolopacidae
8	Common Tailorbird	Orthotomus sutortus	Cisticolidae
9	Coppersmith Barbet	Megalaima haemacephala	Ramphastidae
10	House Crow	Corvus splendens	Corvidae
11	House Sparrow	Passer domesticus	Passeridae
12	Indian Cormorant	Pholocrocorax fuscicollis	Phalacrocoracidae
13	Pale-billedElowerpecker	Dicoeum erythrorynchos	Dicaeidae
14	Taiga flycatcher	Ficedula albicilla	Muscicapidae
15	Yellow-footed Green Pigeon	Treron phoen icoptera	Columbibae

Table 03: Checklist of Reptiles

No.	Common Name	Scientific Name	Family
1.	Rat Snake	Zamenis longissimus	Colubridae

Table 04: Checklist of Amphibians

No.	Common Name	Scientific Name	Family
1	Indian Toad	Duttaphrynus melanostictus	Bufonidae
2	Frog	Enphldctis cyanophlyctis	Dicroglossidae

Table 05: Checklist of Butterflies

No.	Common Name	Scientific Name	Family
1	Blue Mormon	Papilio polymnestor	Papilionidae
2	Common Jay	Graphium doson	Papilionidae
3	Common Mime	Papilo clytia	Papilionidae
4	Common Mormon	Papilo polytes	Papilionidae
5	Common Rose	Pachliopta aristolochiae	Papilionidae
6	Lime Butterfly	Papitto demolis	Papilionidae
7	Tailed Jay	Graphium agamemnon	Papilionidae
8	Small Grass Yellow	Furema brigitta	Pieridae
9	Common Grass Yellow	Eurema hecabe	Pieridae
10	Common Gull	Cepora nerissa	Pieridae
11	Indian Jezebel	Delias eucharis	Pieridae
12	Indian Wanderer	Pareronia hippia	Pieridae
13	Lemon Emmigrant	Catopsila Pomona	Pieridae
14	Mottled Eemigrant	Catopsilia pyranthe	Pieridae
15	Psyche	Leptosia nina	Pieridae
16	Common Cerulean	Jamides celeno	Lycaenidae
17	Common Lineblue	Prosotosnora	Lycaenidae
18	Tailless Lineblue	Prosotas dubiosa	Lycaenidae
19	Common Pierrot	Castalius rosimon	Lycaenidae
20	Common Quaker	Neopithecops zalmora	Lycaenidae
21	Dark Grass Blue	Zizeeria karsandra	Lycaenidae
22	Forget-me-not	Catochrysops strabo	Lycaenidae

Floral species:

Number of Floral species observed: 125

The list of FIora indicates a significant diversity of plants which indicates the overall richness of the place. We have classified the overall flora in 8 groups. The most diverse group is the tree whereas there are 1 species of ornamental plant which shows the least diversity.

Table 06: Checklist of Floral groups with species number

1	Trees	14	Table 7
2	Grasses	2	Table 8
3	Herbs	36	Table 9
4	Shrubs	28	Table 10
5	Creepers	24	Table-11
6	Ornamental Plants	1	Table 12
7	Palms	7	Table 13
8	Fern & Season flower	13	Table-14

Table 7: Checklist of Trees

No.	Common Name	Scientific Name	Family
1	Ficus	Ficus Sp.	Moraceae
2	Amla	Emblica officinalis	Euphorbiaceae
3	Guava	Psidiiim guajava	Myrtaceae
4	Rosemallows	Hibiscaceae	Hibiscus
5	Champaca	Magnolia champaca	Magnoliaceae
6	Cycas	Cycas	Cycadaceae
7	Crepe Jasmine	Tabernaemontana Divaricata	Apocynaceae
8	pomegranate	Punica granatum	Punicaceae
9	Ashoka Tree	Saraca asoka	Fabeceae
10	Kadam	Anthocephalus chinen sis	Rubiaceae
11	Indian Almond	Terminalia catappa	Combretaceae
12	Lichi	Litchi chinensis	Sapindaceae
13	Vilayati Babul	Pithecolobium duIce	Mimosaceae
14	Neem Tree	Azadirach ta indica	Meliaceae

Table 8: Checklist of Grasses

No.	Common Name	Scientific Name	Family
1	Common Carpetgrass	Axo nopus sp.	Poaceae
2	Durba	Cynodon dcatyl on	Graminae

Table 9: Checklist of Herbs

No.	Common Name	Scientific Name	Family
1	Curry tree	Murraya koenigii	Rutaceae
2	White cedar	Thuja occidentali	Cupressaceae
3	Banyan tree	Ficus benghalensis	Moraceae
4	Yellow oleander	Cascabela thevetia	Apocynaceae
5	Aloe vera	Aloe vera	Asphodelaceae
6	Barberry	Berberis vulgaris L	Berberidaceae
7	Lemon	Citrus Limonum	Rutaceae
8	China rose	Hibiscus rosa-sinensis	Malvaceae
9	Neem	Azardirchata - indica	Mahaceae
10	Tulsi	Ocimum sanctum	Lamiaccac
11	Toon	Toona sinensis	Meliaceae
12	Ashok	Saraca Asoca	Caesalpinanceac
13	Amla	Emblica officinalis	Euphorbiaceac
14	Henna/mehndi	Lawsennia iermis	lytharaceae
15	Marigold	Tagetes erecta	Asteraceae
16	Tej Patta	Cinnamomum tamala	Lauraceae
17	Arjun	Terminalia arjuna	Combretaceae
18	Aswagandha	Withania Somnifera	Solanaceae
19	Jamun	Syzygium cumini	Myrtaceae
20	Candyleaf	Stevia rebaudiana	Asteraceae
21	Tamarind (Imli)	Tamarindus indica	Fabaceae
22	Drumstick-Tree	Moringa oleifera	Moringaceae
23	Kachnar	Bauhinia variegata	Fabaceae
24	Lemon grass	Cymbopogon citratus	Poaceae
25	Safed aak	Calotropis Gigantea	Apocynaceae
26	Datura (Yellow)	Datura stramonium	Solanaceae
27	Datura (Black)	Datura stramonium	Solanaceae
28	Red oleander	Cascabela thevetia	Apocynaceae

29	Sudarshana	Crinum latifolium	Amaryllidaceae
30	Kapur	Cinnamomum camphora	Lauraceae
31	Babri	Eclipta prostrata	Asteraceae
32	Common guava	Psidium guajava	Myrtaceae
33	Rose	Rosa rubiginosa	Rosaceae
34	Bakaian	Melia azedarach	Mahogany
35	Rangoon creeper	Quisqualis indica	Combrataceae
36	Bael (Wood apple)	Aegle marmelos	Rutaceae

Table 10: Checklist of Shrubs

No	Common Name	Scientific Name	Family
1	Giant Milkweed	Calotropis gigantea	Asclepiadaceae
2	Ban jamir	Glycosmis pentophyla	Ruraceae
3	Fever tea	Lippia javanica	Verbenaceae
4	Fever tea	Lippia javanica	Verbenaceae
5	Jasmine	Jusm inum pubescens	Oleaceae
6	Clerodendrum	Clerodendrum viscosum	Verbenaceae
7	Ground Fig	Ficus heterophylla	Moraceae
8	Bleeding Heart	Clerodendrum tiomsoniae	Lamiaceae
9	Stinking Cassia	Cassio tora	Fabaceae
10	Chitrak	Plumbago zeyla nica	Plumbaginaceae
11	Duranta	Duranta repens	Verbenaceae
12	GardenCosmos	Cosmos bipinna tus	Asteraceae
13	Devil's Trumpets	Datura sp.	Solanaceae
14	Dracaena	Pleomele reflea	Asparagaceae
15	Lagerstroemia	Lagerstroemia indica	Lythraceae
16	Citrus/Citron	Citrus medica	Rutaceae
17	Rose	Rosa sp. Var.	Rosaceae
18	Wild Pmumeria	Plumeria pudica	Apocynaceae
19	Wild Eggplant	Solanum Totvum	Solanaceae
20	Indian heliotrope	Heliotropium indiciim	Boraginaceae
21	Heliconia	Strelitzia sp.	Musaceae
22	Common Wireweed	Sida acuta	Malvaceae
23	Thuja	Thuja orientalis	Cupressaceae
24	Chinese Rose	Hibiscus rosa -sinensi's	Malvaceae
25	Lime	Citrus acida	Rutaceae
26	Orange Jasmine	Mn rraya paniculata	Rutaceae
27	Oleander	Nerium oleander	Apocynaceae
28	Karipata	Murraya Koenigii	Rutaceae

Table 11: Checklist of Creepers

No.	Common Name	Scientific Name	Family
1	Aparajita	Clitoria ternatea	Fabaceae
2	Birdfoot Grape-Vine	Cayratia pedata	Vitaceae
3	Passion Flower	Passiftora suberosa	Passifloraceae
4	Cayratia	Coratia trifolia	Vitaceae
5	Corkystem Passionflower	Passiflora suberosa	Passiflozaceae
6	Birdfoot Grape-Vine	Cayratia sp.	Vitaceae
7	Gulanchalata	Tinospora cordifolia	Menispermaceae
8	Titakunja	Wattakaka votubillis	Asclepiaceae
9	Bengal Trumpet Vine	Thunbergia grandiflora	Acanthaceae
10	lpomoea	lpomoea aquatic	Convolvulaceae
11	I ndian Stinging Nettle	Tragia in volucrato	Euphorbiaceae
12	Money Plant, Ivy Arum	Epipremn um aureum	Areceae
13	Snake Vine	Stephania japonica	Menispermaceae
14	Philodendron	Philodendron sp.	Areceae
15	Chinese creeper	Micania micrantha	Asteraceae
16	White Morning Glory	lpomoea obscura	Convolvulaceae
17	Telakuchu	Coccinia grand is	Cucurbitaceae
18	Tiliacora	Tiliacora racemosa	Menispermaceae
19	Roundleaf Bindweed	Evolvulus Nummularius	Convolvulaceae
20	Justicia	Justicia simplex	Acanthaceae
21	Hemigraphis	Hemigraphis hirta	Acanthaceae
22	Climbing Mallotus	Nlallotus repandus	Euphorbiaceae
23	Bougainvillea	Bougainviflea sp.	Nyc‹aginaceae
24	Allamanda	Allamanda sp.	Apocynaceae

Table 12: Checklist of Ornamental Plant

No.	Common Name	Scientific Name	Family
1	Dracena (Red)	Dracenarnahatma	Liliaceae

Table 13: Checklist of Palms

No.	Common Name	Scientific Name	Family
1	Areca Palm	Dypsis Intescens	Arecaceae
2	Bottle Palm	Hyoyhorbe lagenicaulis	Arecaceae
3	Indian Datepalm	Phoenix sylvestris	Palmae
4	Coconut	Cocos nucifera	Arecaaceae
5	Palmyra Palm	Borassusflabe Hifer	Palmae
6	Areca	Areca catechu	Arecaceae
7	Palmyra Palm	Borassusflabellifer	Arecaceae

Table 14: Checklist of Ferns and Seasonal Flowers

No.	Common Name	Scientific Name	Family	Type
1	Bircl- nest Fern	Asplenium Sp.	Aspleniaceae	Fern
2	Fishtail Fern	Microsorum punctatum	Polypodiaceae	Fern
3	Oakleaf Ferm	Drynoriaquercifolia	Polyqodiaceae	Fern
4	Snapdragon	Antirrhinum majus	Scrophulariaceae	Season
5	Garden stock	Matthiola incana	Brassicaceae	Season
6	Gazania	Gazania sp.	Asteraceae	Season
7	Gladiolus	Gladiolus sp.	Iridaceae	Season
8	Flaming Kaaty	Kalanchoeblossfeldiana	Crassulaceae	Season
9	Miaden Pink	Dianthus deltoids	Carryophyllaceae	Season
10	Amaryllis	Hippeastrum Sp	Amaryllideceae	Season
11	Pansy	Viola tricolor var.	Violaceae	Season
12	Petunin	Petunia hybrida	Solanaceae	Season
13	Verbena	Vei-hena sp.	Verbenaceae	Season

Conclusion:

Biodiversity status of college campus found satisfactory.

16. Suggestions and Recommendations

- The campus is no doubt biodiversified but more plantations especially medicinal plantations are required in the campus. Plantation of fruit plants will attract more birds.
- There is urgent need to form a Green Monitoring Committee. The priority of this body is to maintain the greenery of the college campus.
- The Green Monitoring Team should consist of members from teaching staffs, non-teaching staffs, and students and if possible, try to include some local interested people.
- Vermicompost facility may be practiced, the product of which can be used as manure or fertilizer for plantation purpose.
- Sustainable use of resource and ecology balance of the college campus must be maintained through the year.
- Dry leaves can be used as compost fertilizer.
- The prolific use of insecticides/pesticides should be checked as these harmful chemicals are detrimental and instrumental for killing of insects/butterflies which are natural prey for the birds.
- Enact stricter laws to control the capture or exploitation of females of any endangered species and enforce them.

17. BIBLIOGRAPHY

1. Groves, C.P. (2005). Wilson, D.E.; Reeder, D.M., eds. Mammal Species of the World: A Taxonomic and Geographic Reference (3rded.).

2. Kumar, A., Yongzu, Z., Molur, S. (2008). "Semnopithecus schistaceus". IUCN Red List of Threatened Species. Version 2010.4. International Union for Conservation of Nature.

3. Groves, C.P., Molur, S. (2008). "Semnopithecus ajax". IUCN Red List of Threatened Species. Version 2010.4. International Union for Conservation ofNature.

4. Roonwal, M.L (1984). Tail form and carriage in Asian and other primates, and their behavioral and evolutionary significance. Current primate research. JodhpurUniversity.

5. Ripley S. (1967). "The leaping of langurs: a problem in the study of locomotor adaptation". Am J PhysAnthropol.

6. Molur, S.; Singh, M. & Kumar, A. (2008). "Semnopithecus priam". IUCN Red List of Threatened Species. Version 2010.4. International Union for Conservation ofNature.

7. Nag, C.; Karanth, P. (2011). "Taxonomic Implications of a Field Study of Morphotypes of Hanuman Langurs (Semnopithecus entellus) in Peninsular India." (PDF). International Journal of Primatology.

8. Nag, C.; Praveen, K. K.; Vasudeva, G. K. "Delineating Ecological Boundaries of Hanuman Langur Species Complex in Peninsular India Using Max Ent Modeling Approach".

9. Mathur, R.; Manohar, B.R. (1990). "Density of Macaca mulatta and Presbytis entellus in the old city of Jaipur: a three year survey". Applied Animal Behaviour Science.

10. Srinivasulu C, Nagulu V (2001). "Status of primates in Andhra Pradesh". ENVIS Bull: Wildl Protec Area.

11. Singh, M. & Molur, S. (2008). "Semnopithecus hypoleucos". IUCN Red List of Threatened Species. Version 2010.4. International Union for Conservation ofNature.

12. Chaudhuri S, Murmu A, Talukder B, Alfred JR (2004). "A population survey of Hanuman langurs in the district of Purulia, west Bengal". Rec Zool SurvIndia.

13. Macdonald, D.W. (2006) The Encyclopedia of Mammals. Oxford University Press,Oxford.

14. Francis, C.M. (2008) A Field Guide to the Mammals of South-East Asia. New Holland Publishers, London.

15. CITES (July,2009)

16. Firouz, E. (2005) The Complete Fauna of Iran. I. B. Tauris Publishers,London.

17. Hellyer, P. and Aspinall, S. (2005) The Emirates: A Natural History. Trident Press Limited.

18. Jennings, A.P. (2011) Pers.comm.

19. Adler, K., Hobart M. Smith, S. H. Prince, P. David & D. Chiszar 2000. Russell's Viper: Daboia russelii not Daboia russellii, due to Classical Latin rules.Hamadryad

20. Adler, Kraig. 2015. The planning and publication history of Patrick Russell's classic book, "Indian Serpents".

21. Chan-ard,T.; Grossmann,W.; Gumprecht,A. & Schulz,K. D. 1999. Amphibians and reptiles of peninsular Malaysia and Thailand - an illustrated checklist [bilingual English and German]. Bushmaster Publications, Würselen,Gemany,

22. Ali, Waqas; Arshad Javid, Syed Makhdoom Hussain, Hamda Azmat and Ghazala Jabeen 2016. The Amphibians and Reptiles Collected from Different Habitat Types in District Kasur, Punjab, Pakistan. Pakistan J.Zool.

23. Arunachalam, K.; P. Radha, A. Ramya, K. Senthilvel and T.J. Harikrishnan 2010. A report on endo and ecto parasitism in an Indian Rat Snake (Ptyas mucosa) from Namakkal District of TamilNadu.

24. Auliya, M. 2010. CONSERVATIONSTATUS AND IMPACT OF TRADE ON THE ORIENTAL RAT SNAKE PTYAS MUCOSA IN JAVA, INDONESIA. TRAFFIC, Southeast Asia, Petaling Jaya, Selangor,Malaysia.

25. Bergman, R.A.M. 1952. L'anatomie du genre Ptyas a Java. Riv. Biol.Colon.

26. Cantor, T. E. 1839. Spicilegium serpentium indicorum [part 1]. Proc. Zool.Soc.

27. Cox, Merel J.; Van Dijk, Peter Paul; Jarujin Nabhitabhata & Thirakhupt,Kumthorn 1998. A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand. Ralph CurtisPublishing,

28. D'Abreu, E.A. 1918. On an undescribed colour variety of the Snake (Zaocys mucosas) from the Central Provinces. J. Bombay Nat.Hist.

29. Das, Abhijit; Uttam Saikia, B. H. C. K. Murthy, Santanu Dey and Sushil K. Dutta 2009. A herpetofaunal inventory of Barail Wildlife Sanctuary and adjacent regions, Assam, north-eastern India.Hamadryad

30. Günther, A. 1864. The Reptiles of British India. London (Taylor &Francis).

31. Rishi, Kumar; Anindya, Sinha; Sindhu, Radhakrishna (2013). "Comparative Demography of Two Commensal Macaques in India: Implications for Population Status and Conservation". Folia Primatologica.

32. Handbook on Indian Lizard by B.K. Tikader, R.C.Sharma.

33. Indian Snakes by EdwardNicholson.

THANKS