



IMS ENGINEERING COLLEGE GHAZIABAD
(YEAR OF ESTABLISHMENT - 2002)
[Approved by AICTE & Affiliated to AKTU, Lucknow]



Supporting Document

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

7.1.6.1 The institutional environment and energy initiatives are confirmed through the following:

- 1.Green audit**
- 2.Energy audit**
- 3.Environment audit**
- 4.Clean and green campus recognitions/awards**
- 5.Beyond the campus environmental promotional activities**

Options:

- A. 4 or All of the above ✓**
- B. Any 3 of the above
- C. Any 2 of the above
- D. Any 1 of the above
- E. None of the above

S.no	Content	Page No
1	Green audit	2-41
2	Energy audit	42-79
3	Environment audit	80-108
4	Beyond the campus environmental promotional activities	109-110
5	Complete audit certificate	111

GREEN AUDIT REPORT

(Jan, 2021)



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

Audit Conducted By:

EFS Engineering Facility Services

O-806, Amarpali Zodiac, Sector-120, Noida (Uttar Pradesh) India,
Pin Code 201301

[Email: info@engineeringfacilityservices.com](mailto:info@engineeringfacilityservices.com)



Table of Contents

1. Acknowledgements	4
2. Executive Summary:	5
3. Introduction	6
4. Utility of Green Audit	7
5. Objectives of the Study	7
6. Methodology	8
7. WATER SAVING POTENTIAL & BEST MANAGEMENT PRACTICES	9
Faucets.....	9
GENERAL RECOMMENDATIONS	13
8. Water Storage Profile.....	15
9. Electricity consumption (in Units) and management	16
10. Total electricity consumption per year.....	16
11. Solar Generation	16
12. Sound Pollution Monitoring.....	17
13. Waste Disposal.....	23
14. List of Trees in Campus.....	25
15. Biodiversity status of the college campus.....	28
Introduction	28
Objectives	28
Method of Study	28
Faunal Species.....	30
Table 01: Checklist of Faunal groups with species number	30
Table 02: Checklist of Birds.....	30
Table 03: Checklist of Reptiles	31
Table 04: Checklist of Amphibians	31
Table 05: Checklist of Butterflies.....	31
Floral species:.....	32
Table 06: Checklist of Floral groups with species number.....	32
Table 7: Checklist of Trees	32
Table 8: Checklist of Grasses.....	33
Table 9: Checklist of Herbs.....	33
Table 10: Checklist of Shrubs.....	34
Table 11: Checklist of Creepers	35
Table 12: Checklist of Ornamental Plant.....	35
Table 13: Checklist of Palms	36

Green Audit Report – IMS Engineering College, Ghaziabad

Table 14: Checklist of Ferns and Seasonal Flowers 36
Conclusion: 36
Biodiversity status of college campus found satisfactory..... 36
16. Suggestions and Recommendations 37
17. BIBLIOGRAPHY 38

1. Acknowledgements

Engineering Facility Services acknowledges the cooperation and support of the management and staff of **IMS Engineering College, Ghaziabad**, in particular, the support and disposition of the Energy Audit Coordinator – Dr. Vijay Kumar (HOD Electrical & Electronics), Environment Audit Coordinator – Dr. Narendra Kumar (HOD Biotech) & Green Audit Co-coordinator – Mr. S. P. Garg (Admin Department) & Teaching/Supporting Staff of institute has been invaluable to the success of this report. Engineering Facility Services 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. IMS Engineering College, 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 (International 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 SAVING POTENTIAL & BEST MANAGEMENT PRACTICES

Best management practices (BMPs) are a set of hands-on recommendations that help to identify opportunities and implement programs to save water in college. BMPs are developed for the various water-use categories in the office buildings and for monitoring and operational procedures. They are grouped according to indoor water use, outdoor water use, and monitoring and operational procedures. We can tailor water-saving program by using part or all the BMPs depending on budget and environmental requirements. Tips and information are provided on water-saving amounts and cost recovery to help in prioritizing measures and make the most knock for buck.

Based on the information collected and observations, the following can be recommended to reduce water use and increase its efficiency.

Faucets

Lavatory, bathing and hand wash facilities faucets average water use in the workshop buildings is approximately 28% of the total water received. In some of the faucets water run around 9 litre per minute. Faucets flows can easily be reduced without affecting the comfort of the water user by using appropriate flow regulator technology for these fixtures. This will result in impressive savings of around 50 percent of faucets water use. Flow regulators, especially the aerators are inexpensive and are easy to install and maintain. This is why they are often considered as the low hanging fruits of water saving programs.



Here are the recommended best management practices for achieving water savings for faucets at office building.

- Use pressure compensating and tamper proof aerators that can only be removed with a 'special' tool to reduce vandalism and theft.

- Regularly clean faucets as sediments may accumulate and reduce the flow.

Recommend flow rate for different type of uses	
Public hand-washing faucet or self-closing faucet	≤ 4.5 litres /min ≤ 1.0 litres /cycle
Restroom faucet	≤ 4.5 litres /min
Kitchen faucet	≤ 8.3 litres/min

Flow per minutes could be set to 2 or 3 or...6 Litres or more as per the requirement. The Flow Control aerator generates thin streams (like shower aerator) of water to cover wider area for rinse, when compared to conventional aerators. This results in lesser-run time of faucet and easiness for user and ultimately water saving. Flow Control Aerator can easily be installed in existing faucets.

Urinals

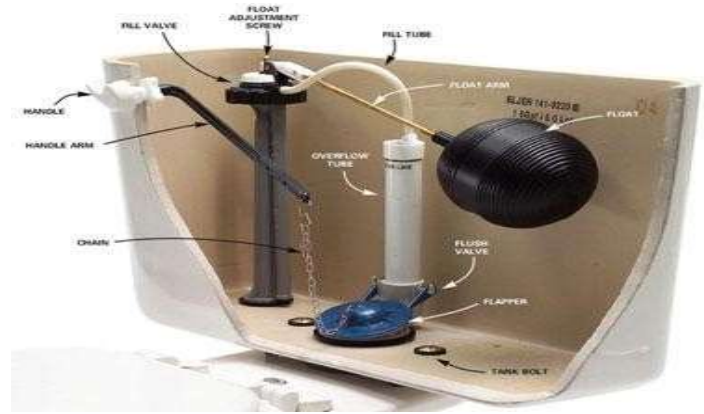
Low water use urinals: In some of the standard systems, water is applied automatically through a continuous drip-feeding system or by automated flushing at a set frequency, 24x7, regardless of whether the urinal has been used. Water consumption varies with the system model at an average of 4 litres per flush. Water-efficient urinals use 2.8 litres per flush and in recent times smart flush systems using 0.8 litres per flush have also been launched.

Waterless urinals: There are various technologies available for waterless urinals. In oil barrier technology, the urinals operate using an oil wall between the urine and the atmosphere, preventing odor from escaping. In another technology, the barrier has been replaced by a seal with a collapsible silicone tube that closes after the fluid has passed through it, to prevent gases from flowing into room. A third system uses biological blocks which include microbial spores and surfactants which can be placed into any urinal, thus eliminating water use. By breaking down the urine into components, buildup of sludge and crystals which causes blockages is prevented. Bidets and urinals water use accounts for 3 percent of office buildings water use. These standards shown in the table offer a good water-saving opportunity for water saving in office buildings.

Toilets

A dual-flush toilet is a variation of the flush toilet that uses two buttons or handles to flush different levels of water. A significant way to save water in buildings is to replace single-flush toilets with dual flush toilets. The standard dual-flush toilets use six litres of water on full and three litres on a half-flush.

Replacing old toilets will result to a reduction of 35 percent of toilet water. More cost-effective results can be achieved by replacing only the toilet trim system.



Saving Water through Monitoring and Operational Procedures

Identifying and Fixing Leaks

The hidden water leaks can cause loss of considerable water and energy without anyone being aware of it. A small leak can amount to large volumes of water loss. Leaks become larger with time, and they can lead to other equipment failure. Fix that leaky pipe, toilet, faucet, or roof top tank to save considerable amount of money and water. The establishment of a leak detection and repair program would be a most cost-effective way to save money and water in the workshop building. Following are some best practices to identify and fixing leaks.

The Management must be committed for providing the staff and resources needed to maintain plumbing fixtures and equipment on a regular basis and assuring prompt identification and repair of leaks.

- Repair staff is given the tools needed and is trained to make leak repair a priority activity.
- Staffs are taught to report leaks and other water-using equipment malfunctions promptly.
- Staffs are rewarded for success.
- Rooftop tank overflow or leakage water should flow to rainwater gutter system not to sewage system to allow detection of rooftop water loss.
- Records of the type, location, number, and repair of leaks are kept in a central location.

Water Metering and Sub-metering

The metering and sub-metering of Main incoming line is essential to understand the water consumption pattern inside the college and hostel building. The accurate measurements enable management to understand maximum and minimum consumption area in the College building and improve water efficiency in the college and hostel building. Monitoring of the water usage allows management to know where and when water is being used and where the best opportunities for water savings exist. Thus, it is recommended to install water meters on each consumption area in the building.

GENERAL RECOMMENDATIONS

Based on the physical inspection and document reviewed on water distribution system of Building, EFS recommends the following recommendations for using water efficiently at College & Hostel Building.

Implementation of water accounting & management system

It was noticed during the audit that water flow meters are nowhere installed at College and Hostel Building. Therefore, it is highly recommended to install digital water flow meters on all the main lines. Digital water meters are also required to install in each sections to monitor the section wise water consumption and planning for effective water management. It is also recommended to appoint internal Water Audit team who can inspect water distribution system and for the accounting of water usage in the hostel and college building.

Minimization of leakage water

Leakages were observed in Valves at hostel and college building resulting in water loss. It is recommended to close out these leakages by replacing faulty valves to avoid wastage of water. It is also recommended to regularly check for leakages and fix them on urgent basis.

Regular Maintenance of toilet system and use of water efficient fixtures

Regular maintenance of the toilets should be carried out. Test for leaks and make necessary repairs promptly. Keep the toilet in working order by periodically inspecting and replacing flappers and other defective parts. Water efficient fixtures such as aerator and water efficient taps need to be used to reduce water consumption.

Capacity building of Staff Involved in Water Distribution

The Management of college may arrange capacity building and awareness programs for the staff engaged in water distribution

OVERALL AIM FOR WATER CONSERVATION: ON THE WAY FORWARD WITH THE 3-R CONCEPT

“Water conservation is defined as any action that reduces the amount of water withdrawn from water supply sources, reduces consumptive use, reduces the loss or waste of water,

improves the efficiency of water use, increases recycling and reuse of water, or prevents the pollution of water”.

Reduce

Reduction at Source

- Better operating controls such as arresting leakages
- Installation of water saving devices such as water tank alarm at all overhead tanks
- Change of device/ equipment such as replacement of water pumps and motor with energy efficient pumps and motors
- Process modification such as use of sprinklers for watering plants and garden

Recycle & Reuse

- Use of treated water in toilets flushing, gardening, fountains, fire fighting equipment's
- Use of storm water as Cooling Tower make-up water after treatment.
- Using storm water & sanitary water as fire water after treatment.
- Reduction of Fresh Water usage supplemented through waste water treatment.
- Direct use of Rain Water Harvesting through storage tanks

Recharge

- Installation of recharge wells / rain water harvesting pits for recharging ground water tables.
- Total recharging capacity (during rain time) to be estimated in m³/hr.
- Rain Water Harvesting and conservation.

8. Water Storage Profile

Sr No	Description	UOM	Qty	Capacity Each (Ltr)	Totao storage capacity (Ltr)
1	RCC Over head tank	Nos	1	20000	20000
2	PVC storage tank	Nos	33	5000	165000

9. Electricity consumption (in Units) and management

MONTH	KWH CONSUMPTION
Jan-20	56908
Feb-20	41382
Mar-20	95152
Apr-20	59376
May-20	33664
Jun-20	30200
Jul-20	30924
Aug-20	36572
Sep-20	41382
Oct-20	29736
Nov-20	18384
Dec-20	22908
TOTAL	398298
Average	41382

10. Total electricity consumption per year

Yearly Electrical Consumption (Pashchiimanchal Vidyit Vitran Nigam Limited) **398,298** KWh

11. Solar Generation

Solar Plant Power generation detailed below:

MONTH	Solar Plant Generation (KWH)
Jan-20	13092
Feb-20	18256
Mar-20	15933
Apr-20	27796
May-20	17620
Jun-20	7945
Jul-20	7945
Aug-20	7945
Sep-20	23223
Oct-20	20559
Nov-20	15580
Dec-20	15305
Total	191200

Comments: Approximate per capita average consumption per year is 232.72 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.

SO. NO	LOCATION NAME	SOUND (db) MEASUREMENT	
		MIN	MIX
	Shivalik Boys Hostel		
1	Chief Warden office	43	55
2	G floor Lobby	45	53
3	G Floor room no 101	50	56
4	1st Floor Lobby	48	52
5	1st Floor room no 201	49	55
6	2nd Floor Lobby	50	54
7	2nd Floor room no 301	50	55
8	3rd Floor Lobby	52	55
9	3Floor room no 404	50	55
	Nilgiri Boys Hostel		
10	G Floor Lobby	48	54
11	G Floor room no 101	50	53
12	1st floor lobby	49	55
13	1st floor room no 201	50	54
14	2nd floor lobby	50	55
15	2nd floor room no 301	52	55
16	3rd floor lobby	53	56
17	3rd floor room no 401	50	55
	Aravali boys Hostel		
18	Aravali boys Hostel	50	55
19	G floor lobby	53	56
20	G floor room no 101	45	51

Green Audit Report – IMS Engineering College, Ghaziabad

SO. NO	LOCATION NAME	SOUND (db) MEASUREMENT	
		MIN	MIX
21	1st floor lobby	49	55
22	1st floor room no 201	50	55
23	2nd floor lobby	52	58
24	2nd floor room no 301	50	58
25	3rd floor lobby	52	55
26	3rd floor room no 401	50	55
	Block B		
27	BLOCK -B G floor		
28	Material testing lab-B006	50	55
29	Auto mobile lab-B008	50	56
30	Fluid mechanics & machine lab-b021	50	55
31	CAM lab robotics lab-B017	51	56
32	Basic electrical lab B-004	52	55
33	Geotechnical lab	50	55
34	Electrical workshop	52	58
35	Dean academic	52	55
36	Electrical & electronics lab-B104	50	55
37	Center office	50	56
38	Exam cell VLSI	50	55
39	Class room -B102	50	55
40	Thermodynamics lab	51	55
41	lot & 3D printing lab	50	55
42	CE. CAD. lab	51	54
43	ME CAD lab	50	55
44	Civil Engineer department	50	58
45	HMT &RAC lab	48	55
46	Mechanical engineer lab	50	55
47	Electrical I& communication engg	50	56
48	Common room	49	55
49	Class room -B212	49	55
50	Class room -B210	50	55
51	Class room -B208	50	55
52	Class room -B206	50	58
53	Class room -B204	50	55
54	Class room -B202	48	52
55	Project Lab/ PC/BL/lab	50	55
56	Music Lab	50	55
57	Tutorial room -B211	50	55
58	Class room -B213	49	53
59	Class room -B215	50	55
60	Class room -B217	50	58
61	M/C drawing lab	52	55
62	Class room -B220	50	55
63	Class room -B218	50	55

Green Audit Report – IMS Engineering College, Ghaziabad

SO. NO	LOCATION NAME	SOUND (db) MEASUREMENT	
		MIN	MIX
64	Class room -B216	50	55
65	Class room -B214	53	55
	BLOCK -C		
66	Tutorial room	50	54
67	Class room -104	50	54
68	Class room -103	48	51
69	Faculty room -102	55	58
70	Faculty room -101	50	56
71	Computer science lab	50	56
72	Faculty room -3	51	54
73	Faculty room -1	50	55
74	class room -108	52	55
75	class room -107	51	53
76	class room -106	50	55
77	class room-201	48	52
78	class room-202	48	50
79	class room-203	50	55
80	class room-204	50	55
81	class room-205	50	56
82	class room-206	50	55
83	tutorial center	50	55
84	computer lab-4	53	56
85	computer lab-3	50	54
86	class room-207	51	55
87	faculty cabin	50	55
88	computer lab-1	50	56
89	computer lab-2	50	55
90	IT & MICRO WEB LAB	50	55
91	Class room -301	50	58
92	Class room -302	48	53
93	Class room -303	49	54
94	Class room -304	48	55
95	Class room -305	51	55
96	Class room -306	50	55
97	computer lab -305	50	58
98	computer lab -306	50	55
99	computer lab -307	50	56
100	computer lab -308	50	55
101	computer server room	50	56
102	AB lab -307	48	55
103	Exam cell	49	55
104	Class room -308	50	55
105	Class room -307	50	58
106	Class room -311	50	55

Green Audit Report – IMS Engineering College, Ghaziabad

SO. NO	LOCATION NAME	SOUND (db) MEASUREMENT	
		MIN	MIX
107	Power electronic & network -407-A	51	54
108	Control lab -407-B	49	52
109	micro proses lab-406	50	56
110	Digital lab-404	48	54
111	Class room-401	50	54
112	Class room-402	49	55
113	Class room-403	50	58
114	Class room-405	50	55
115	Class room-408	50	56
116	Class room-409	48	56
117	Class room-410	48	55
Mandakine Girls Hostel			
118	G floor lobby	50	55
119	G floor room no- 101	50	58
120	1st floor lobby	48	55
121	1st floor room no-201	48	54
122	2nd floor lobby	50	55
123	2nd floor room -301	50	56
124	3rd floor lobby	50	55
125	3rd floor room-401	50	58
126	Common room	50	54
127	Doctor room	49	55
128	warden office	50	54
BLOCK -A			
129	Workshop	48	55
130	A-105	50	56
131	Panel room	48	53
132	English labA-014	50	54
133	Engineering Phy lab A-010	51	55
134	office	48	55
135	Registrar office	50	55
136	Account office	52	57
137	Class room-A-011	49	55
138	Class room-A-013	52	58
139	A-124	51	57
140	Class room-A-122	48	53
141	Class room-A-120	50	54
142	Class room-A-118	48	52
143	M Tech lab	51	55
144	Engineering graphics A-116	50	56
145	Common room	52	58
146	Faculty A-105	50	55
147	Faculty A-104	50	56
148	Seminar	48	52

Green Audit Report – IMS Engineering College, Ghaziabad

SO. NO	LOCATION NAME	SOUND (db) MEASUREMENT	
		MIN	MIX
149	class room A-103	50	56
150	AS& H Department	50	57
151	Programing room	52	55
152	Projecting lab -1	52	57
153	Class room A-119	54	58
154	Class room A-121	50	55
155	Micro biology & Enzyme Engg lab	55	577
156	micro biology & immunology lab	52	58
157	Genetics & molecular Biology lab	48	55
158	Class room -A218	51	58
159	Class room -A216	50	55
160	Class room -A214	51	54
161	Class room -A221	50	54
162	Class room -A219	50	55
163	Class room -A217	49	53
164	Faculty room- A212	51	54
165	MBA Class -A200	50	58
166	MBA 2 year -A201	51	55
167	MBA Department	53	58
168	MBA Library- 213	51	55

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.



Green Audit Report – IMS Engineering College, Ghaziabad

IMS Engineering College, Ghaziabad has employed waste bins for proper segregation of solid wastes in the campus.

Number of dustbins at IMS ENGINEERING COLLEGE, GHAZIABAD listed below:

Details of dustbin & approx. waste disposal

1. No of dustbin: - 290
2. Waste disposal quantity 3500 KG approx. per Month

14. List of Trees in Campus

S.NO	NAME	UOM	COUNT
1	SILVER OFF	Nos	36
2	KADAM	Nos	9
3	MOLSIRI	Nos	55
4	ASHOK	Nos	157
5	CHAMPA	Nos	13
6	RATUSA	Nos	42
7	WASHINGTONIA	Nos	18
8	SEMAL	Nos	2
9	SAFEDA	Nos	100
10	VISHMARKAPAAM	Nos	1
11	CHINAPAAM	Nos	17
12	AMLA	Nos	1
13	ESHIKAPAAM	Nos	20
14	PHOENIXPAAM	Nos	50
15	KEJUNA	Nos	48
16	NURA	Nos	42
17	CHEEKU	Nos	4
18	ELAICHI	Nos	2
19	CRYSTALPAAM	Nos	13
20	BANANNA	Nos	5
21	ALSTONIA	Nos	3
22	ENGLISH GULAAB	Nos	21
23	SYCUSPAAM	Nos	9
24	SMALL TIKONAGORI	Nos	1
25	CHRISTMAS TREE	Nos	10
26	VICTORIA G.V	Nos	4
27	BOTTLE BRUSH	Nos	2
28	LONGA SLEND	Nos	16
29	PILI KANER	Nos	2
30	GUAVA	Nos	10
31	GILOY SMALL,BIG	Nos	2
32	PHYCUS	Nos	489
33	NEROPHOLIYA,LONJIPHOLIYA	Nos	144
34	GOLDEN BOTTLE BURUSH	Nos	1
35	GUDHAL	Nos	12
36	BOGANBOLIYA	Nos	10
37	COBRA	Nos	4
38	Z BUTTON PLANT	Nos	5
39	REPISHPAAM	Nos	110
40	MADHUMALTI BAEL	Nos	75
41	KRESHULA	Nos	2
42	KONOKARPUSH	Nos	181
43	MIRCH BAEL	Nos	6
44	RAAT KI RANI V	Nos	31

Green Audit Report – IMS Engineering College, Ghaziabad

S.NO	NAME	UOM	COUNT
45	PHYCUS PANDA	Nos	88
46	PEELA PHYCUS	Nos	83
47	SUPARI BONESIZE	Nos	10
48	RAAT KI RANI L	Nos	1
49	SAFLESH V.G	Nos	1
50	CHIPKALI BAEL	Nos	50
51	GREEN CHANDNI	Nos	81
52	UNIPERSH	Nos	5
53	NUNYULINA	Nos	4
54	LEMON GRASS	Nos	2
55	DESI GULAB	Nos	28
56	SNOF INDIA	Nos	15
57	TANDKESHIA	Nos	5280
58	CHOTA SNAKEPLANT	Nos	680
59	SANGONIYUM DAWRAF	Nos	50
60	SANGONIYUM WHITE	Nos	70
61	BHOPU LILI RED & WHITE	Nos	85
62	BHOPU LILI ZAMEEN WALE	Nos	2000
63	BIG SNAKE PLANT	Nos	240
64	DESI SANGONIYUM	Nos	6000
65	VIFOTIYA MILI	Nos	1
66	CHOLOROFIYTAM	Nos	4000
67	RED SANGONIYUM	Nos	107
68	HAWELIA	Nos	308
69	ATTWALIFA	Nos	980
70	BAEL UNIPERSE	Nos	1100
71	ISFURTIYAPAAM	Nos	14
72	SANTARI FLORA	Nos	10
73	JATUYA	Nos	8
74	TURANTA GOLDEN	Nos	95
75	PETRA	Nos	481
76	FLENDRA	Nos	1130
77	WHITE CHANDNI	Nos	1203
78	RUHELIA	Nos	12
79	BLACK GRASS	Nos	3065
80	SAFLERA GREEN	Nos	100
81	LONGA SLEND GREEN	Nos	5000
82	FARKERIA	Nos	9
83	SADABAHAR	Nos	40
84	MONEY PLANT	Nos	177
85	EGLONIMA	Nos	10
86	BADELIYA	Nos	1103
87	NEEM	Nos	6
88	AAM	Nos	3
89	SHEESHAM	Nos	13
90	BIG SHEERSH	Nos	1

Green Audit Report – IMS Engineering College, Ghaziabad

S.NO	NAME	UOM	COUNT
91	BIGNONIA BANSATA	Nos	5
92	LIVANTRA	Nos	40
93	GENDA	Nos	450
94	DAHELIA	Nos	50
95	KRESHULA	Nos	2
96	SHARBI BAEI	Nos	2
97	QUALIS STAR	Nos	2
98	FISHPAAM	Nos	1
99	PENDENASH	Nos	3
100	PITONIA	Nos	10
101	TULSI	Nos	7
102	PORCHULA	Nos	11
103	PATTHAR CHATTA	Nos	50
104	ASHWAGANDHA	Nos	1
105	NAAGFANI	Nos	1
106	KAALABASHA	Nos	1
107	ENRAMI	Nos	1000
108	KADI PATTI	Nos	5
109	DIFAN PLANT	Nos	17
110	DRESINA	Nos	11
111	GULDAWRI	Nos	125
112	FLOKAS	Nos	209
113	ALOEVEERA	Nos	25
114	PELILANTHUS	Nos	300
115	KELI	Nos	50
116	LEMON	Nos	1
117	GAJRA	Nos	2
Total			37915

15. Biodiversity status of the college campus

Introduction

IMS Engineering College, 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 *successful*.
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	Colnmba 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	Phalacrocorax 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	Bufoidea
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 Flora 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	Psidium 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	Fabaceae
10	Kadam	Anthocephalus chinensis	Rubiaceae
11	Indian Almond	Terminalia catappa	Combretaceae
12	Lichi	Litchi chinensis	Sapindaceae
13	Vilayati Babul	Pithecolobium dulce	Mimosaceae
14	Neem Tree	Azadirachta indica	Meliaceae

Table 8: Checklist of Grasses

No.	Common Name	Scientific Name	Family
1	Common Carpetgrass	Axonopus sp.	Poaceae
2	Durba	Cynodon dactylon	Graminae

Table 9: Checklist of Herbs

No.	Common Name	Scientific Name	Family
1	Curry tree	Murraya koenigii	Rutaceae
2	White cedar	Thuja occidentalis	Cupressaceae
3	Banyan tree	Ficus benghalensis	Moraceae
4	Yellow oleander	Cassipouira 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	Azadirachta indica	Mahaceae
10	Tulsi	Ocimum sanctum	Lamiaceae
11	Toon	Toona sinensis	Meliaceae
12	Ashok	Saraca Asoca	Caesalpiniaceae
13	Amla	Emblica officinalis	Euphorbiaceae
14	Henna/mehndi	Lawsonia inermis	Lythraceae
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	Cassipouira 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 pentophylla	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 indicim	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	Passiflora 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	Ipomoea	Ipomoea aquatic	Convolvulaceae
11	Indian Stinging Nettle	Tragia involucrata	Euphorbiaceae
12	Money Plant, Ivy Arum	Epipremnum aureum	Araceae
13	Snake Vine	Stephania japonica	Menispermaceae
14	Philodendron	Philodendron sp.	Araceae
15	Chinese creeper	Micania micrantha	Asteraceae
16	White Morning Glory	Ipomoea obscura	Convolvulaceae
17	Telakuchu	Coccinia grandis	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	Mallostus repandus	Euphorbiaceae
23	Bougainvillea	Bougainvillea sp.	Nyctaginaceae
24	Allamanda	Allamanda sp.	Apocynaceae

Table 12: Checklist of Ornamental Plant

No.	Common Name	Scientific Name	Family
1	Dracena (Red)	Dracena nana	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	Arecaceae
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	Microsorium punctatum	Polypodiaceae	Fern
3	Oakleaf Fern	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.
- Enact stricter laws for single use plastic.

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 of Nature.
4. Roonwal, M.L (1984). Tail form and carriage in Asian and other primates, and their behavioral and evolutionary significance. Current primate research. Jodhpur University.
5. Ripley S. (1967). "The leaping of langurs: a problem in the study of locomotor adaptation". Am J Phys Anthropol.
6. Molur, S.; Singh, M. & Kumar, A. (2008). "Semnopithecus priam". IUCN Red List of Threatened Species. Version 2010.4. International Union for Conservation of Nature.
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 of Nature.
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 Surv India.
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, Germany,
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. Hari Krishnan 2010. A report on endo and ecto parasitism in an Indian Rat Snake (*Ptyas mucosa*) from Namakkal District of Tamil Nadu.
24. Auliya, M. 2010. CONSERVATION STATUS 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 Curtis Publishing,
28. D'Abreu, E.A. 1918. On an undescribed colour variety of the Snake (*Zaocys mucosus*) 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 Edward Nicholson.

THANKS



ENERGY AUDIT REPORT

Jan'21



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

Audit Conducted By:
EFS Engineering Facility Services



O-806 , Amarpali Zodiac, Sector-120, Noida (Uttar Pradesh) India, Pin Code 201301 e
mail;info@engineeringfacilityservices.com

ACKNOWLEDGEMENT

We take the opportunity to express our deep sense of gratitude towards Energy Audit Coordinator – Dr. Vijay Kumar (HOD Electrical & Electronics), Environment Audit Coordinator – Dr. Narendra Kumar (HOD Biotech) & Green Audit Co-coordinator – Mr. S. P. Garg (Admin Department) and Teaching & Supporting Staff of Collage for awarding the work of executing Energy Audit in IMS Engineering College, Ghaziabad. In particular we wish to thank him for his timely initiative, advice and valuable support extended to the project.

Engineering Facility Services is special thankful to Mr. Anil K Garg , Group Head - HR & Admin for providing us an opportunity to conduct an Audit conducting of their college & providing the coordination with officers and staff.

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 IMS Engineering College, Ghaziabad.

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 IMS Engineering College, Ghaziabad is prepared by Engineering Facility Services, 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 IMS Engineering College, Ghaziabad 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 IMS Engineering College, Ghaziabad. 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 IMS Engineering College, Ghaziabad.

Using/Reproducing Information:

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

The Director

IMS Engineering College, Ghaziabad

TEAM MEMBERS

Project Team	Name
IMS ENGINEERING COLLEGE, GHAZIABAD	Dr. Vijay Kumar
	Dr. Narendra Kumar
	Mr. S. P. Garg , Teaching & Supporting Staff of Collage
Engineering Facility Services , Noida	Mr. Deepak Bajpai (BEE Certified -Energy Auditor)
	Mr. Om Pal (Executive- Energy Audit)
	Mr. Deepak Kumar (Engineer-Energy Audit)
	Mr. Pawan (Technician)

TABLE OF CONTENTS

1	ABOUT ENGINEERING FACILITY SERVICES.....	7
1.1	PROFILE OF THE COMPANY	7
1.2	VISION & MISSION	7
1.3	APPROVALS/CREDENTIALS	7
1.4	PRODUCTS & SERVICES	7
1.5	ENERGY AUDIT & MANAGEMENT.....	8
2	INTRODUCTION TO ENERGY AUDIT & METHODOLOGY	10
2.1	OBJECTIVE OF ENERGY AUDIT IN IN IMS ENGINEERING COLLGE, GHAZIABAD	10
2.2	SCOPE OF WORK	10
2.3	METHODOLOGY	10
2.4	APPROACH	10
2.5	INSTRUMENTS USED IN ENERGY AUDIT	12
3	BASELINE ENERGY DESCRIPTION.....	14
4	LIGHTING SYSTEM	28
4.1	LUMINARY DETAILS.....	28
4.2	OBSERVATIONS	32
4.3	RECOMMENDATION.....	32
5	AIR CONDITIONING.....	34

1. ABOUT ENGINEERING FACILITY SERVICES

1 ABOUT Engineering Facility Services

1.1 PROFILE OF THE COMPANY

“Engineering Facility Services” 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 IN IMS ENGINEERING COLLEGE, GHAZIABAD

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 Engineering Facility Services 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

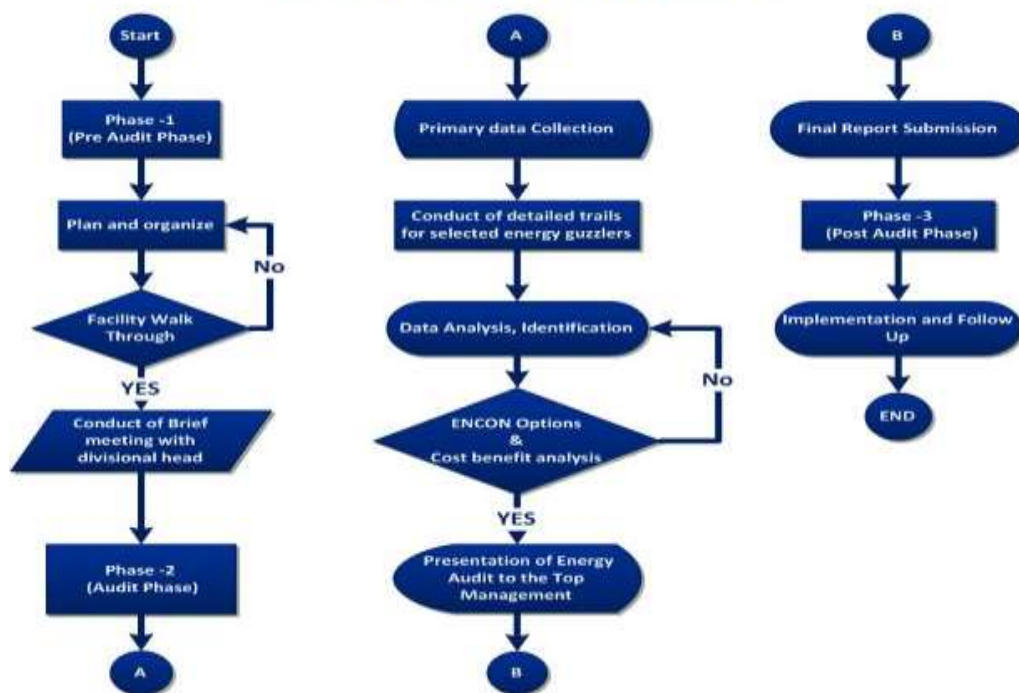
This part involves preparation of Investment Grade proposal, based on the identified Energy Conservation Options with cost benefits and vendor details

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

Energy Audit Approach



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

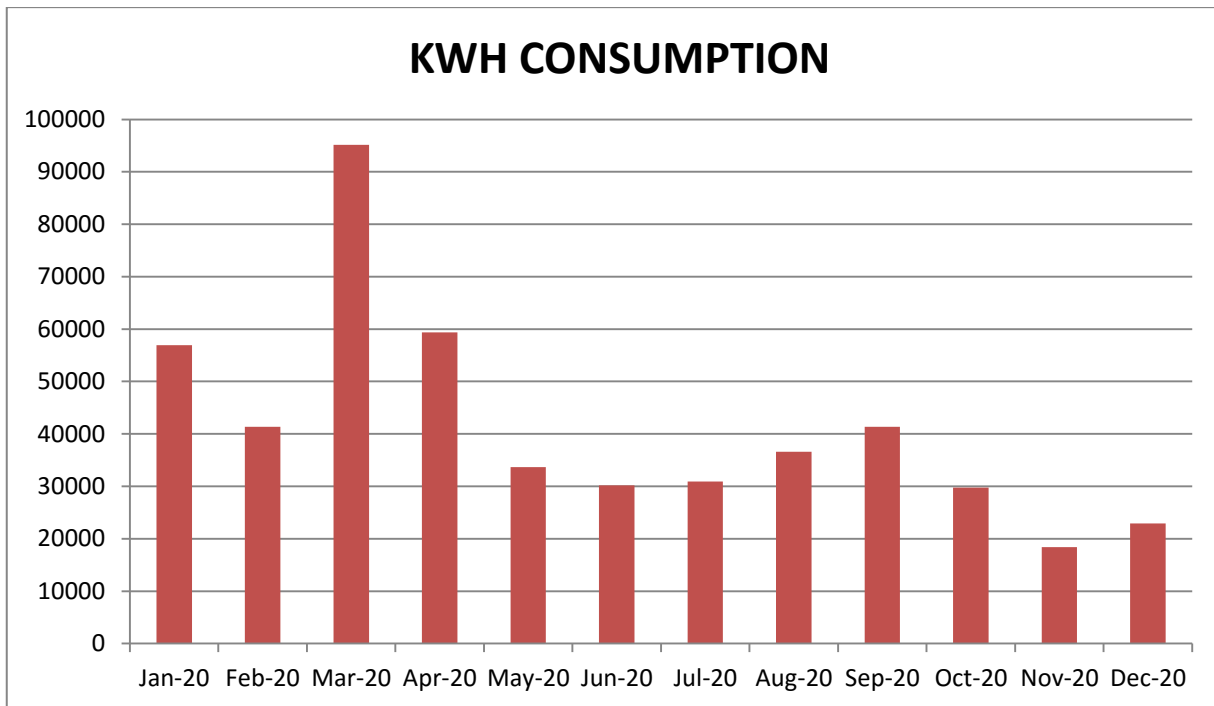
3. BASELINE ENERGY CONSUMPTION

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 (1250 KVA) 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	398298	72.2 %
2	Solar	KWH	191200	27.8 %

Billing details of Institute is given below:

DETAILS OF ELECTRICITY CONSUMPTION FOR THE YEAR 2020								
MONTH	KWH CONSUMPTION	KVAH CONSUMPTION	DEMAND CHARGES	ENERGY CHARGES (INR)	PF	CONTRACT DEMAND (KVA)	BILL DEMAND (KVA)	BILL AMOUNT (INR)
Jan-20	56908	60184	215108	520942	0.946	667	128.3	787118
Feb-20	41382	46468	2151075	3880235	0.870	667	131.0	574571
Mar-20	95152	102696	215108	890501	0.927	667	226.5	977921
Apr-20	59376	67384	215108	583993	0.881	667	185.7	777725
May-20	33664	40320	215108	349078	0.835	667	124.8	369116
Jun-20	30200	35006	215108	310872	0.863	667	80.8	428820
Jul-20	30924	33400	215108	239012	0.926	667	90.2	536671
Aug-20	36572	38844	215108	336266	0.942	667	129.1	508021
Sep-20	41382	46468	2151075	3580235	0.891	667	135.0	574571
Oct-20	29736	33408	215108	270472	0.890	667	153.9	521998
Nov-20	18384	24540	215108	159263	0.749	667	98.2	397593
Dec-20	22908	28904	215108	19838	0.793	667	92.6	440731
TOTAL	496588	557622	4517257	11140706				6894856
Average	41382	46469	537769	928392	0.876	667	131.4	574571

It is observed that average bill demand is 131.4 KVA but Pashchimanchal Vidyut Vitran Nigam Limited charge minimum 80% of sanction demand. If we reduce the contract demand from 667 KVA to 300 KVA by installing MDI controller than the saving calculation is given below:

Parameters	Units	Value
Existing contract demand	KVA	667
Proposed contract demand	KVA	300
Demand Saved	KVA	367
Demand Charges	Rs./KVA	430
Savings as per reduced	Rs./Month	157810
Savings per year after reducing demand	Rs./Year	1893720

Building is getting the power supply from Pashchimanchal Vidyut Vitran Nigam Limited through 11kV line which directly feeds into the transformer that is of 1250 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)	1250	HV-11/LV-0.433

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

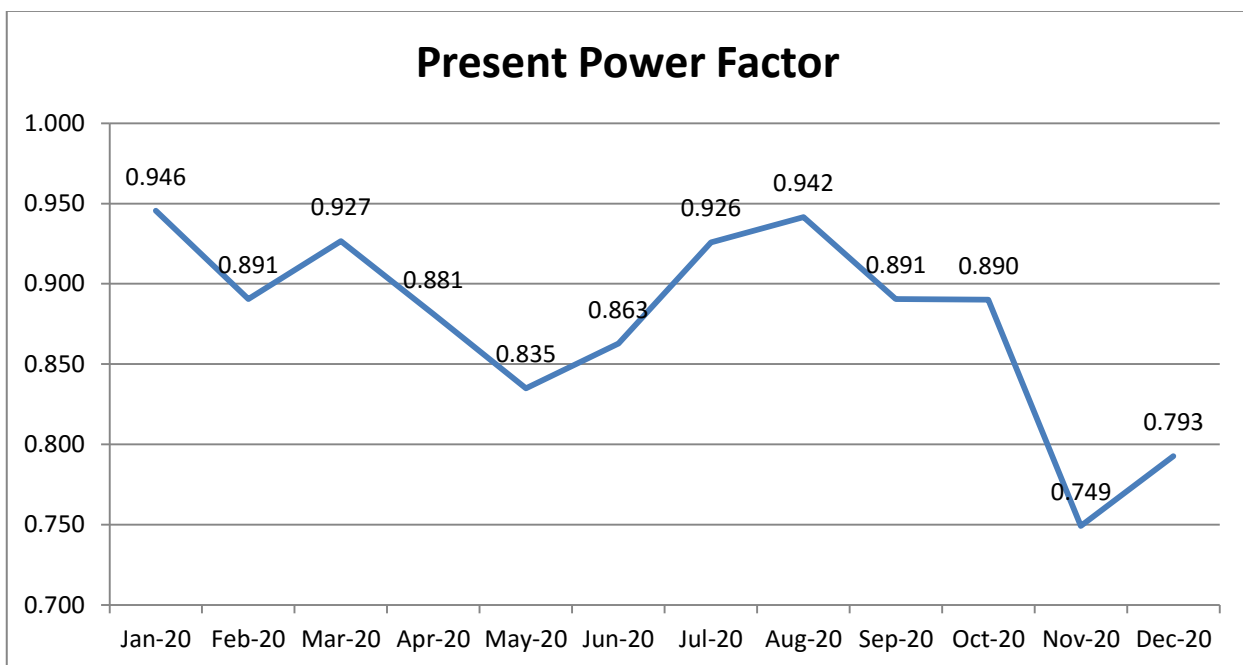
Description	Avg. Unit Price (Rs./KVAh)
Unit charge	Rs 8.68 per KVAh
Fix Charge	Rs 430 per KVA per month

Per unit charge for the building is Rs 13.88/KWh

Months	Avg. Unit Price (Rs./KWh)
Jan 2020 – Dec 2020	13.88

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

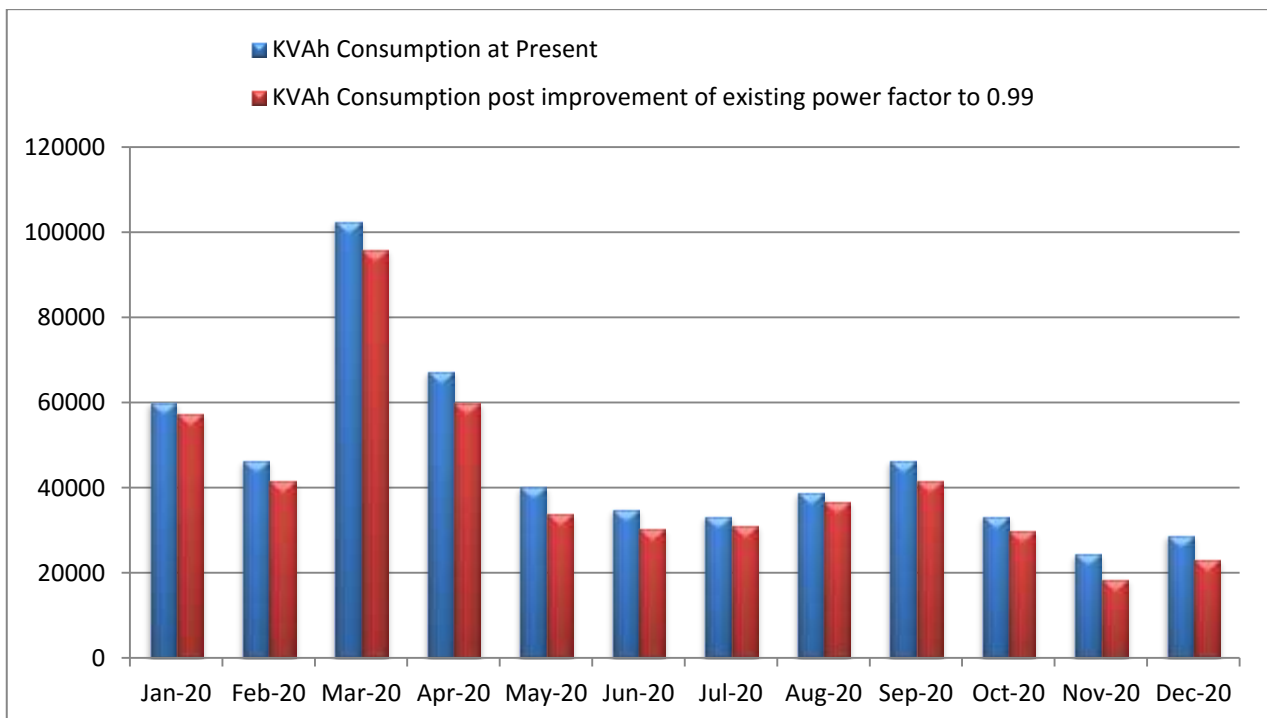
Present Power Factor graphical representation is shown below:



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 Monetary Benefit (Rs)
Jan-20	60184	0.946	57483	2701	23446	23446
Feb-20	46468	0.891	41800	4668	40518	40518
Mar-20	102696	0.927	96113	6583	57139	57139
Apr-20	67384	0.881	59976	7408	64304	64304
May-20	40320	0.835	34004	6316	54823	54823
Jun-20	35006	0.863	30505	4501	39068	39068
Jul-20	33400	0.926	31236	2164	18780	18780
Aug-20	38844	0.942	36941	1903	16514	16514
Sep-20	46468	0.891	41800	4668	40518	40518
Oct-20	33408	0.890	30036	3372	29266	29266
Nov-20	24540	0.749	18570	5970	51822	51822
Dec-20	28904	0.793	23139	5765	50037	50037
Total	557622		501604			486236

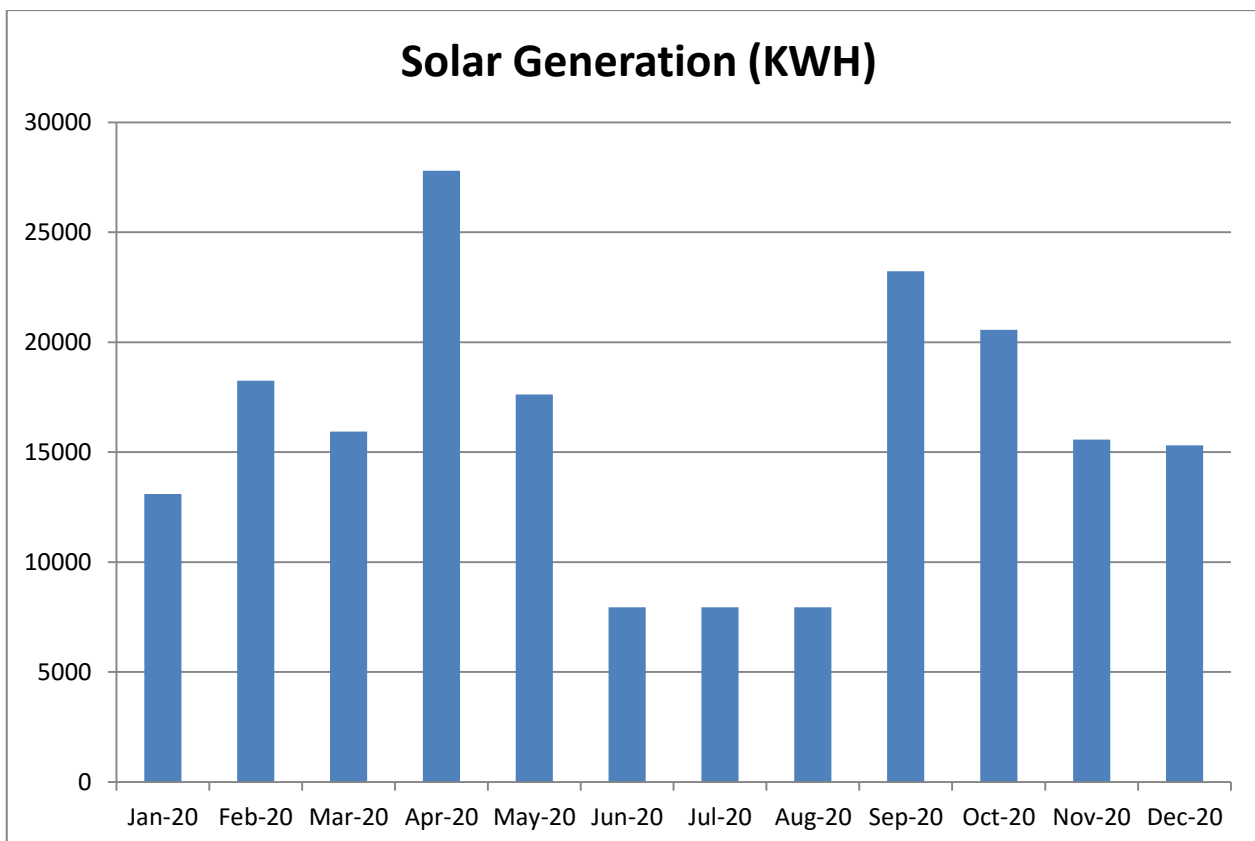
Graphical representation of reduction in KVAh after maintaining the power factor 0.99



Solar Plant (184 KWH) Power generation detailed below:

MONTH	KWH BILLED UNITS
Jan-20	13092
Feb-20	18256
Mar-20	15933
Apr-20	27796
May-20	17620
Jun-20	7945
Jul-20	7945
Aug-20	7945
Sep-20	23223
Oct-20	20559
Nov-20	15580
Dec-20	15305
Total	191200

Solar Plant 184 KWH, power generation in KWH:



4. ELECTRICAL LOAD MEASUREMENT

ELECTRICAL LOAD CALCULATION

Asset details of IMS Engineering College are given below:

BLOCK -B				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	Tube Light	40 w	152	6080
2	LED Light	18 w	6	108
3	LED Light (Panel)	36 w	20	720
4	Tube Light (2/2)	80 w	92	7360
5	Ceiling fans	70 w	276	19320
6	Metal Lights	800 w	3	2400
7	Metal Lights	400 w	1	400
8	LED Lights	150 w	1	150
9	LED Lights	65 w	6	390
10	Ventilation fans	45 w	9	405
11	Exhaust fans -12	90 w	9	810
12	Water Cooler	1550 w/1650 w	2	3200
13	Computer With CPU + Laptop	200 w +25 w	123 +27	24600 +675
14	Projector	203 w	10	2030
15	Motor (fire fighting)	9.3 kw/12.5HP	1	9300
16	Electrical lab +civil lab (B00-3)	11852		11852
17	Electrical M/C lab (B00-4)	26946		26946
18	Automobile lab (B008)	3750		3750
19	Fluid Mechanics lab (B-021)	17561		17561
20	Mat. Science &Testing lab(B006)	4949		4949
21	Advanced Comm. lab (-017)	7620		7620
22	Transportation Engg .lab CE(B-005)	3672		3672
23	Heat & Mass Transfer (RAC-LAB)	36846		36846
24	Light (2/2)New Room-G	108 w	4	432
25.a	Air Conditioner (window)	1.5/2/T/2100/2600w	3/8 (11)	27100
25.b	Air Conditioner (Split)	2 ton/2200 w	1	2200
25.c	Air Conditioner (cassette)	2 ton/2200 w	6	13200
BLOCK -C				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED Panel (2/2)	36 w	86	3096
2	LED Lights (4)	18 w	19	342
3	Tube Lights	40 w	38	1520
4	Ceiling Fans	70 w	288	20160
5	Ceiling Fans	100 w	51	5100
6	Wall fans	500 w	8	4000
7	Exhaust Fans - 12	90 w	13	1170
8	Water coolers	1600 w/600 w	4	5400
9	Water chiller	2746 w	1	2746

10	Computer with CPU.LCD.LED Type	200 w	266	53200
11	Computer with CPU.PRT. Type	230 w	27	6210
12	Projectors	290 w/203 w	28	5771
13	Air conditioners Split Type	1.5/2 Ton	4	9050
14	Air conditioners Cassette outdoor units	15.4kw/18kw	12-Jun	292800
15	Air conditioners Cassette Indoor units	53 w	93	4982
16	A.C (cassette) in door units-computer lab-2nd	100 w	4	400
17	A.C (Duct Type)O.D Outdoor units	10200 w	3	30600
18	A.C Duct Type O.D In door units	746 w	3	2238
19	LED Bulbs(O.D)	14 w	50	700
20	CFL (O.D)	23 w	4	92
21	Focus Lights (Dimmer Light) O.D	500 w	24	12000
22	Focus Lights (Dimmer Light)O.D	1000 w	2	2000
23	R.O	500/1000 w	2	1500
24	Motor (Fire Fights)	9.3kw/12.5HP	1	9300
25	Motor	3HP/2.2KW	1	2200
26	Metal Lights	800 W	2	1600
27	Metal Lights	400 W	5	2000
28	Sound System	3000W/3KW	1	3000
29	LED Lights	150 W	3	450

BLOCK -KAVERI

Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	CFL Lights Set (2/2)	80 w	92	7360
2	LED Lights	18	21	378
3	Tube Light	40 w	76	3040
4	Tube Light Set (2/2)	80 w	8	640
5	CFL	23 w	23	529
6	Ceiling Fans	70w/100w	87,8	6890
7	Exhaust Fans(12.18.24)	90,350,550	11	2690
8	Water Cooler	1550 w/600w	2	2150
9	Computer with CPU (Center Lib & comp. labs)	200w	96	19200
10	Xerox Machines	1500 w	3	4500
11	Geysers	2000 w	1	2000
12	A.C Duct Type (Hitachi)	7.5Ton/8000 w	11	88000
13	A.C Duct Type (L.G)For Computer labs	6020 w/5.5 Ton	1	6020
14	Girls Mass Extra M/C Load /Deep Freezer man		6	1872
15	A.C (Hit) Indoor Units for center library	500 w	11	5500
16	Motor	3HP/2.2KW	1	2200
17	Kaveri Center (Freezer)	467w,1000w,1000w	3	2467
18	Air curtain	150 w	5	750
19	R.O	500+1000w=1500w	1	1500

20	Wall Fan	55w	1	55
21	Fly catchers	40 w	4	160
MANDAKINI HOSTEL LOAD				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBELIGHT	18 W	410	7380
2	CEILLING FAN	70 W	612	42840
3	EXHAUST FAN 12	90 W	36	3240
4	BOILER	4000 W	14	56000
5	GYSER	2000 W	2	4000
6	WATER COOLER	1550 W	4	6200
7	WATER COOLER	1250 W	1	1250
8	AIR CONDITION 1.5 TON	1600 W	14	22400
9	AIR CONDITION SPLIT	2000 W	1	2000
10	FIRE MOTOR -7.5 HP	5000 W	2	10000
11	RO MOTOR -0.7 HP	500 W	1	500
12	RO MOTOR -1.50 HP	1000 W	1	1000
13	COMPUTER	200 W	14	2800
14	GYM LIGHT	18 W	23	414
15	GYM FAN	70 W	10	700
16	GYM MACHINE	700 W	5	3500
17	LIGHT -2/2 COMMON ROOM	36 W	11	396
18	EXHAUST FAN -9	50 W	4	200
19	WASHING MACHINE	360 W	8	2880
20	GAN- LIBRARY	70 W	10	700
21	TUBELIGHT-LIBRARY	18 W	16	288
22	CFL 15 W	15 W	570	8550
23	CFL 15 W POINT	100 W	570	57000
24	UPS		2	0
25	IRON PRESS	1000 W	4	4000
26	HOT PLATES	1500 W	4	6000
27	METAL LIGHT	400 W	2	800
28	CFL LIGHT	70 W	2	140
NILGIRI HOSTEL LOAD				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBE LIGHT	18 W	200	3600
2	CEILLING FAN	70 W	292	20440
3	EXHAUST FAN -12	90 W	24	2160
4	BOILER	4000 W	6	24000
5	WATER COOLER	1550 W	2	3100
6	AIR CONDITION 1.5 TON	1600 W	1	1600
7	FIRE MOTOR -7.5 HP	5000 W	1	5000
8	RO MOTOR -0.75 HP	500 W	2	500
9	RO MOTOR -1.50 HP	1000 W	1	1000
10	COMPUTER IN LAB	200 W	12	2400

11	METAL LIGHT -800 W	800 W	2	1600
12	METAL LIGHT -400 W	400 W	3	1200
13	METAL LIGHT -250 W	250 W	1	250
14	LED LIGHT	150 W	2	300
15	SUMERSIBLE PUMP -2HP	1500 W	1	1500
16	CFL 15 POINT	15 W	398	5970
17	OTHER LOAD POINT	100 W	398	39800

ARVALI HOSTEL LOAD

Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBE LIGHT	18 W	192	3456
2	CEILLING FAN	70 W	252	17640
3	EXHAUST FAN -12	90 W	28	2520
4	BOILER	4000 W	5	20000
5	CHILLER	1550 W	1	1550
6	WATER COOLER -40/80	875 W	1	875
7	AIR CONDITION 1.5 TON	1600 W	9	14400
8	FIRE MOTOR -7.5HP	5000 W	1	5000
9	RO MOTOR -0.75 HP	500 W	1	500
10	RO MOTOR -1.50 HP	1000 W	1	1000
11	CPMPUTERS & TV	200 W	4	800
12	LEDFLASH LIGHT	200 W	4	600
13	AODIUM LIGHT	150 W	2	500
14	WASHING MACHINE	250 W	10	3600
15	SUMERSIBLE PUMP-3HP	360 W	1	1750
16	CFL 15 W POINT	1750 W	330	4950
17	UPS	15 W	1	0
18	OTHER LOAD POINTS	100 W	330	33000

SHIVALIK HOSTEL LOAD

Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBE LIGHT	18 W	226	4068
2	CEILLING FAN	70 W	301	21070
3	EXHAUST FAN -12	90 W	26	2340
4	BOILER	4000 W	5	20000
5	WATER COOLER	1550 W	1	1550
6	CHILLER	1550 W	1	1550
7	AIR CONDITION 1.5 TON	1600 W	4	6400
8	FIRE MOTOR -7.5HP	5000 W	1	5000
9	RO MOTOR -0.75 HP	500 W	1	500
10	RO MOTOR -1.50 HP	1000 W	1	1000
11	METAL LIGHT -400 W	400 W	3	1200
12	METAL LIGHT -250 W	250 W	3	750
13	LED LIGHT	150 W	0	0
14	CFL 15 W POINT	15 W	391	5865
15	OTHER LOAD POINT	100 W	391	39100

BOYS MESS LOAD				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBE LIGHT	18	32	576
2	LED TUBE LIGHT	22	24	528
3	CEILLING FAN	70	45	3150
4	EXHAUST FAN -24	200	2	400
5	WATER COOLER	1550	1	1550
6	HEATING BLOWER -50 HP	375	2	750
7	HEATING BLOWER -3HP	1750	2	3500
8	HEATING BLOWER -5HP	3750	1	3750
9	DISH WASHER	3500	1	3500
10	ROTI MAKER	2000	3	6000
11	VAN MARRY	3000	4	12000
12	AIR CURTAIN	150	4	600
13	FLY CATCHER MACHINE	60	6	360
14	INVERTOR	200	1	200
15	MACHINE	1500	3	4500
16	DEEP FRIDGER	1550	1	1550
BOYS GYM LOAD				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBE LIGHT	18	14	252
2	LED TUBE LIGHT -2/2	36	11	396
3	CEILLING FAN	70	35	2450
4	EXHAUST FAN -12	90	1	90
5	EXCERSIE MACHINE	700	5	3500
6	LED LIGHTPORCH	150	2	300
7	TV	200	2	400
STORE LOAD				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBE LIGHT	18	2	36
2	CEILLING FAN	70	1	70
3	COMPUTER	200	1	200
STP & DG ROOM				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	BLOWER-ROOF	11000	15	165000
2	BLOWER-ROOF	11000	15	165000
3	MOTOR -TREATED WATER TANK	3700	5	18500
4	MOTOR -TREATED WATER TANK	3700	5	18500
5	MOTOR -FILTER FEED TANK	3700	5	18500
6	MOTOR -FILTER FEED TANK	3700	5	18500
7	MOTOR -EQUALIZATION TANK	3700	5	18500
8	MOTOR -EQUALIZATION TANK	3700	5	18500

9	MOTOR -EQUALIZATION TANK	3700	5	18500
10	MOTOR -EQUALIZATION TANK	3700	5	18500
11	MOTOR -SMALL TANK (SLUDGE BED)	1750	3	5250
12	MOTOR -FILTER PRESS	1500	2	3000
13	ECYCLING MOTOR	1500	2	3000
14	SCRIPER MOTOR	750	1	750
15	MOTOR DIESEL TANK	750	1	750
16	MOTOR C BLOCK (SEWAGE)	1750	3	5250
17	MOTOR KAVERI TANK (SEWAGE)	1750	3	5250
18	MOTOR MANDAKINI BLOCK (SEWAGE)	1750	3	5250
19	TUBE LIGHT	270	15	4050
20	CEILLING FAN	140	2	280
21	METAL LIGHT -400 W	400	1	400
22	EXHAUST FAN DG	90	1	90
SHOP LOAD				
Sr No	Name of electrical Items	Power (watts)	Quantity	Total Power (watts)
1	LED TUBELIGHT	18 W	2	36
2	CEILLING FAN	70 W	2	140
3	FRIDGE	750 W	1	750
4	OVEN	1200 W	1	1200
General				
Sr No	Electric Item	Power (watts)	Quantity	Total Power Watts)
1	Tube lights	40	425	17000
2	Ceiling fan	70	402	28140
3	LED Light	18	74	1332
4	LED Light	20	120	2400
5	LED Light	10	48	480
6	Porch Light (Round)	18	4	72
7	Double Fitting Light (Reception	20	20	400
8	Small Light (Sport Type)	3,5,8,14,16	80	554
9	CFL Pin Type	23	39	897
10	2/2 Light Set	80	29	2320
11	Ventilation Fan	45&40	11	695
12	Exhaust Fan 15; & 18;	150&150	14+6=20	3000
13	Wall fans	55	4	220
14	Light Pipe & Strip	220+100	0	350
15	Photostat Machine	676	2	1352
16	water coolers	600	5	3000
17	Air Conditioner			
a	Window Type	220,023,001,600	21	46300
b	SPLIT Type /Tone 1.5,2		12	28040
c	Duct Type 7.5 Tone	8000	2	16000
d	Cassette Type	2,2,5,3,Tone	8	25400
e	Cassette Type for class room			

f	LG Make Outdoor	15.14	3	45520
g	LG Make Indoor	53	15	795
h	Daikin Outdoor	14.2(2)16.4(2),17.5(1)	5	78700
i	Daikin indoor	53	25	1325
j	Hitachi outdoor(MBA)	2 Tone /3250	2	6500
k	Hitachi indoor	25	2	50
18	Motors	9.3km/9300	3	27900
19	Computers	200	201	40200
20	Projector	203/204	10	2031
21	Welding Set	6600	1	6600
22	Innova Light (C.H.CDC)	11	84	924
23	Halogen Light (C.H 1st floor	50	30	1500
24 a	(1)Physics Lab	Total Load 600	8	600
a	(2) Chemistry Lab	2000	8	1600
b	(3)Pantry (Refrigerator)	100	1	100
25	Lath Machine, grinder Wooden	Different Watts	13	34114
26	Biotech lab	Different Watts	13	25073
27	Gupta canteen & book shop	Other instrument watts	3	2000
28	Deep Freezer Hot Case counter	750,1000,575&10	4	2335
29	LED Light (Below Signboard) Top	65	6	390

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

Sr. No.	LOCATION NAME	LUX MEASUREMENT	
		MIN	MIX
	Shivalik Boys Hostel		
1	Chief Warden office	90	98
2	G floor Lobby	110	125
3	G Floor room no 101	115	128
4	1st Floor Lobby	120	135
5	1st Floor room no 201	137	145
6	2nd Floor Lobby	128	145
7	2nd Floor room no 301	124	143
8	3rd Floor Lobby	132	154
9	3Floor room no 404	110	120
	Nilgiri Boys Hostel		
10	G Floor Lobby	155	170
11	G Floor room no 101	160	175
12	1st floor lobby	143	160
13	1st floor room no 201	139	155
14	2nd floor lobby	155	166
15	2nd floor room no 301	124	154
16	3rd floor lobby	165	180
17	3rd floor room no 401	170	186
	Aravali boys Hostel		
18	Aravali boys Hostel	132	145
19	G floor lobby	135	155
20	G floor room no 101	143	140
21	1st floor lobby	165	180
22	1st floor room no 201	152	165
23	2nd floor lobby	135	150
24	2nd floor room no 301	120	130
25	3rd floor lobby	135	150
26	3rd floor room no 401	145	150
	Block B		
27	BLOCK -B G floor		
28	Material testing lab-B006	97	105

Sr. No.	LOCATION NAME	LUX MEASUREMENT	
		MIN	MIX
29	Auto mobile lab-B008	110	120
30	Fluid mechanics & machine lab-b021	110	125
31	CAM lab robotics lab-B017	125	150
32	Basic electrical lab B-004	125	136
33	Geotechnical lab	108	123
34	Electrical workshop	110	145
35	Dean academic	110	125
36	Electrical & electronics lab-B104	110	135
37	Center office	110	125
38	Exam cell VLSI	124	135
39	Class room -B102	120	130
40	Thermodynamics lab	130	145
41	lot & 3D printing lab	80	95
42	CE. CAD. lab	90	110
43	ME CAD lab	105	115
44	Civil Engineer department	132	140
45	HMT &RAC lab	140	156
46	Mechanical engineer lab	138	164
47	Electrical I& communication engg	165	180
48	Common room	125	135
49	Class room -B212	135	145
50	Class room -B210	132	140
51	Class room -B208	130	140
52	Class room -B206	165	190
53	Class room -B204	145	167
54	Class room -B202	138	127
55	Project Lab/ PC/BL/lab	130	142
56	Music Lab	125	130
57	Tutorial room -B211	140	155
58	Class room -B213	130	154
59	Class room -B215	125	140
60	Class room -B217	135	140
61	M/C drawing lab	125	145
62	Class room -B220	154	165
63	Class room -B218	110	135
64	Class room -B216	110	145
65	Class room -B214	110	120
	BLOCK -C		
66	Tutorial room	135	140
67	Class room -104	125	135
68	Class room -103	130	145
69	Faculty room -102	120	135

Sr. No.	LOCATION NAME	LUX MEASUREMENT	
		MIN	MIX
70	Faculty room -101	110	135
71	Computer science lab	124	135
72	Faculty room -3	135	145
73	Faculty room -1	130	145
74	class room -108	110	125
75	class room -107	110	124
76	class room -106	125	132
77	class room-201	121	130
78	class room-202	120	131
79	class room-203	125	135
80	class room-204	135	128
81	class room-205	142	149
82	class room-206	121	150
83	tutorial center	120	130
84	computer lab-4	125	134
85	computer lab-3	135	155
86	class room-207	121	124
87	faculty cabin	130	140
88	computer lab-1	110	124
89	computer lab-2	132	142
90	IT & MICRO WEB LAB	130	140
91	Class room -301	115	126
92	Class room -302	118	131
93	Class room -303	122	135
94	Class room -304	135	145
95	Class room -305	125	135
96	Class room -306	135	145
97	computer lab -305	110	134
98	computer lab -306	116	145
99	computer lab -307	110	125
100	computer lab -308	120	125
101	computer server room	135	145
102	AB lab -307	130	143
103	Exam cell	130	140
104	Class room -308	145	150
105	Class room -307	130	140
106	Class room -311	130	140
107	Power electronic &network -407-A	124	145
108	Control lab -407-B	130	135
109	micro proses lab-406	125	145
110	Digital lab-404	130	145
111	Class room-401	125	130

Sr. No.	LOCATION NAME	LUX MEASUREMENT	
		MIN	MIX
112	Class room-402	130	138
113	Class room-403	135	150
114	Class room-405	130	150
115	Class room-408	125	130
116	Class room-409	130	140
117	Class room-410	135	145
	Mandakine Girls Hostel		
118	G floor lobby	130	140
119	G floor room no- 101	125	145
120	1st floor lobby	135	148
121	1st floor room no-201	110	130
122	2nd floor lobby	125	138
123	2nd floor room -301	120	130
124	3rd floor lobby	125	135
125	3rd floor room-401	130	135
126	Common room	145	155
127	Doctor room	110	135
128	warden office	135	155
	BLOCK -A		
129	Workshop	65	78
130	A-105	58	78
131	Panel room	75	80
132	English labA-014	78	89
133	Engineering Phy lab A-010	78	89
134	office	67	89
135	Registrar office	65	89
136	Account office	65	80
137	Class room-A-011	110	125
138	Class room-A-013	125	140
139	A-124	120	130
140	Class room-A-122	125	137
141	Class room-A-120	127	143
142	Class room-A-118	142	154
143	M Tech lab	135	140
144	Engineering graphics A-116	138	140
145	Common room	132	145
146	Faculty A-105	110	118
147	Faculty A-104	125	130
148	Seminar	90	105
149	class room A-103	135	140
150	AS& H Department	110	125
151	Programing room	97	110

Sr. No.	LOCATION NAME	LUX MEASUREMENT	
		MIN	MIX
152	Projecting lab -1	110	132
153	Class room A-119	110	118
154	Class room A-121	108	118
155	Micro biology & Enzyme Engg lab	108	122
156	micro biology & immunology lab	103	110
157	Genetics & molecular Biology lab	109	125
158	Class room -A218	107	126
159	Class room -A216	110	125
160	Class room -A214	113	134
161	Class room -A221	125	130
162	Class room -A219	120	135
163	Class room -A217	118	125
164	Faculty room- A212	117	132
165	MBA Class -A200	150	168
166	MBA 2 year -A201	140	158
167	MBA Department	140	160
168	MBA Library- 213	145	158

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. AIR CONDITIONING

5 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	Name of electrical Items	Power (watts)	Quantity	Total Power (KW)
1	Ceiling Fans	70	2654	185.78

Total 2654 ceiling fan installed at site. It is recommended to replace 1500 conventional fan which has higher utilization with BLDC fan.

Savings calculated listed below:

Parameters	Units	Value
Average power consumption of the ceiling fan at present	Watt	70
Average power consumption of energy efficient star rated (BLDC) fans	Watt	28
Equivalent Power saving per fan	Watt	42
Numbers of fans to be replaced	Nos	1500
Working Hours Per annum	Hr	3000
Overall electric Power Cost	Rs/KWH	13.88
Annual Energy Saving	KWH	189000
Monetary saving	Rs/Year	2623320
Investment	Rs	3600000
Payback	Month	16.47

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.

7. 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.


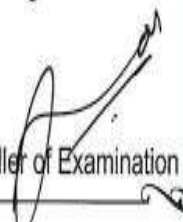
Table: List of Energy saving / conservation recommendations

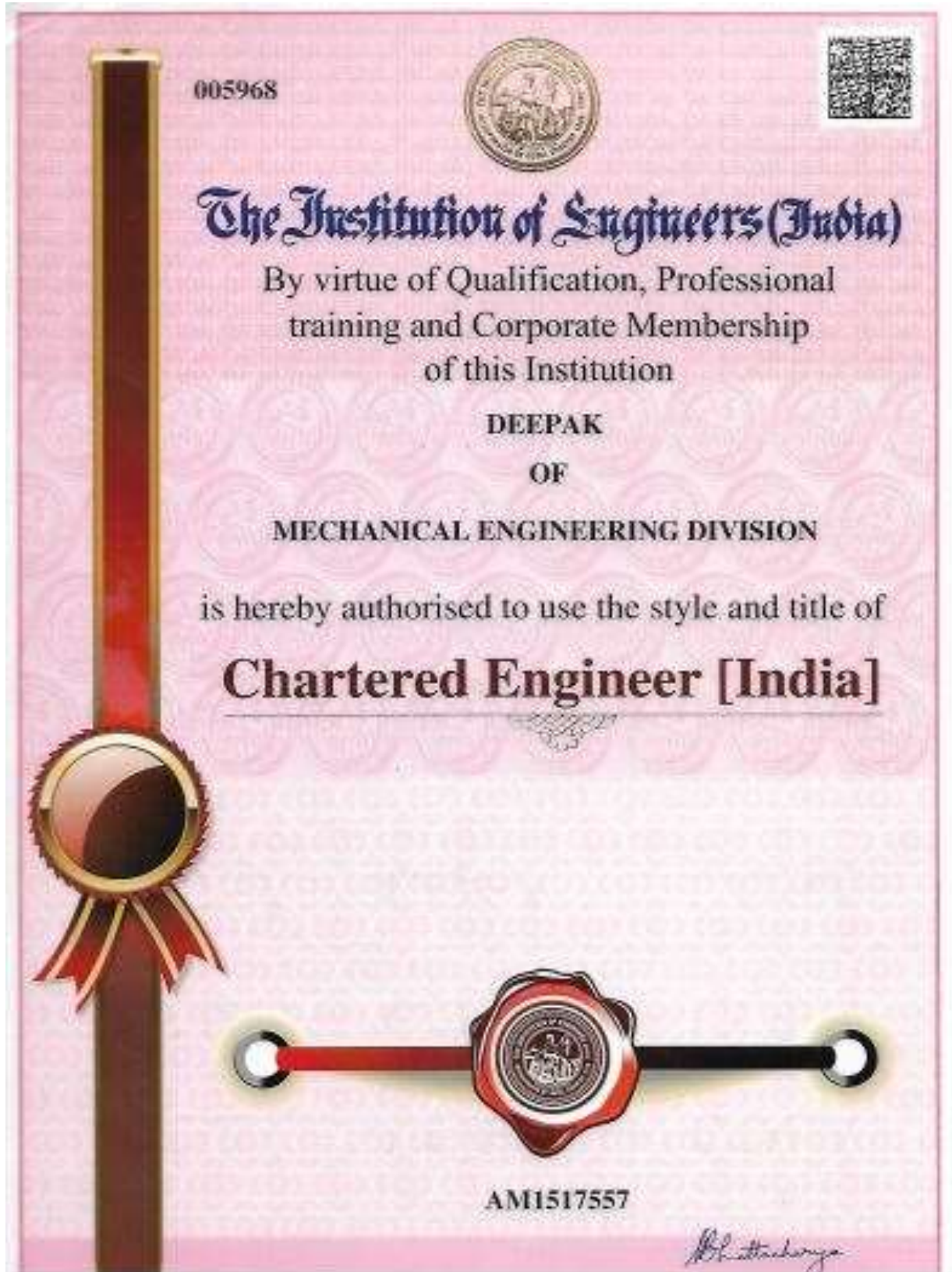
Sr. No.	Recommended Measure
1	Replace the boys and girls hostel ceiling fan with BLDC fan
2	Recommended to maintain the power factor near unity
3	Reduce contract demand from 667 KVA to 300 KVA
4	It is recommended to install occupancy sensor in office cabins and toilets to save energy
5	It is recommended 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 the

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 25 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.

8. ENERGY AUDITOR CERTIFICATES

Regn No. EA-19771	 National Productivity Council	Certificate No. 8890
<h3 style="margin: 0;">National Productivity Council</h3> <p style="margin: 0;">(National Certifying Agency)</p> <h3 style="margin: 0;"><u>PROVISIONAL CERTIFICATE</u></h3>		
<p><i>This is to certify that Mr./Mrs./Ms.Deepak.....</i></p> <p><i>son / daughter of Mr.....Vineet Kumar.....</i></p> <p><i>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.</i></p> <p><i>He / She is qualified as Certified Energy Manager as well as Certified Energy Auditor.</i></p> <p><i>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.</i></p> <p><i>This certificate is valid till the issuance of an official certificate by the Bureau of Energy Efficiency.</i></p>		
Place : Chennai, India	Date : 10 th March, 2017	 Controller of Examination



THANKS



ENVIRONMENT AUDIT REPORT

(Jan, 2021)



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

Audit Conducted By:

EFS Engineering Facility Services

O-806 , Amarpali Zodiac, Sector-120, Noida (Uttar Pradesh) India,
Pin Code 201301 e mail;info@engineeringfacilityservices.com



1 Table of Contents

2	ACKNOWLEDGEMENT.....	3
3	DISCLAIMER	4
4	INTRODUCTION.....	5
5	OVERVIEW OF INSTITUTE.....	6
6	OBJECTIVES	7
7	AUDIT TEAM.....	8
8	EXECUTIVE SUMMARY	9
9	AREA OF IMPROVEMENTS.....	10
10	ENVIRONMENTAL AUDIT -QUESTIONARE	11
11	BEST PRACTICES/INITIATIVES FOR ENVIRONMENT	20
12	RECOMENDATIONS.....	21
13	CONCLUSION	22
14	REFERENCE	23
15	ANNEXURE – PHOTOGRAPHS OF ENVIRONMENT CONSIIOUSNESS.....	24

2 ACKNOWLEDGEMENT

Engineering Facility Services acknowledges the cooperation and supports of the management and staff of **IMS Engineering College, Ghaziabad** in particular, the support and disposition of the Energy Audit Coordinator – Dr. Vijay Kumar (HOD Electrical & Electronics), Environment Audit Coordinator – Dr. Narendra Kumar (HOD Biotech) & Green Audit Co-coordinator – Mr. S. P. Garg (Admin Department) & Teaching & Supporting Staff of Collage has been invaluable to the success of this report. Engineering Facility Services 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.

Engineering Facility Services is special thankful to Mr. Anil K Garg , Group Head - HR & Admin for providing us an opportunity to conduct an Audit conducting of their college & providing the coordination with officers and staff.

3 DISCLAIMER

This Environment audit report of **IMS ENGINEERING COLLEGE, GHAZIABAD** is prepared by Engineering Facility Services, 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 **IMS ENGINEERING COLLEGE, 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 **IMS ENGINEERING COLLEGE, 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 **IMS ENGINEERING COLLEGE, GHAZIABAD**.

Using/Reproducing Information:

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

The Director

IMS ENGINEERING COLLEGE, GHAZIABAD

4 INTRODUCTION

Environment 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

Located in the industrial city of Ghaziabad, IMS Engineering College is known for quality technical and management education, centres of excellence, innovative teaching pedagogy, discipline, and other creative efforts.

IMSEC Ghaziabad is one of the top-notch Engineering college in North India, providing technical education and 100% employability prospects to its students. It is ranked 4th in North Region wise ranking and 16th in Top 100 private Engineering College by Times Engineering Institute Ranking Survey 2020. Ranked 3rd in Uttar Pradesh amongst Private Engineering College 2019 by Outlook , Ranked 3rd in Uttar Pradesh by CSR-GHRDC Engineering College Survey 2019 and Ranked 6th in North Zone Times of India Ranking Survey 2019 . IMSEC is bestowed with "Excellence in Overall Performance" Award jointly by AICTE & UP Govt.(National UP Education Award).

IMSEC Ghaziabad is NAAC Accredited with 'A' Grade for 5 years form maintaining world-class quality in Education & Infrastructure and one of its courses, B. Tech. (Bio-Technology) is NBA accredited (2019-21).Highly experienced and dedicated faculty team, state-of-art laboratories, computer centres, learning resource centres and wholesome pedagogic skills/pedagogical techniques provide the students highly exciting and gainful opportunities to acquire knowledge and technical expertise necessary for grooming and orienting their creative young minds. IMSEC Ghaziabad is a TCS Accredited college for Placements & Project Activities.

Faculty at IMS Engineering College have been recruited as per quality policy ensuring that the faculty members have educational and technical backgrounds from institutions of national/international repute and none is below a master degree. A large number of them are being regularly deputed to undergo training programs and attending conferences and seminars to enhance their expertise. The IMSEC motto of imparting quality education is reflected by its academic results and placement. IMS Engineering College, an endeavor of IMS Society, wants its students to become perfect adventurers, confident technical experts and determined path-finders in 21st century corporate global scenario.

The objective of IMSEC of imparting quality education is reflected in its consistently good academic results and placement records. IMS Engineering College, a brain- child of IMS Society, is continuously endeavoring to make its students technically skilled, innovative, behaviorally disciplined, and morally ethical to excel in the global corporate scenario.

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
Deepak Gupta	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 IMS ENGINEERING COLLEGE, GHAZIABAD for environment protection.

What is the total permanent population of the Institute?

Particulars	Total
Students	2329
Teachers	159
Non-Teaching Staff	81
Sub Total	2569
Approximate Number of Visitors (Per day)	12

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 300 KLD)
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

<p>1. Does your institute generate any waste? If so, what are they?</p>	<p>Yes, Solid waste Canteen waste, paper, plastic, Horticulture Waste etc</p>	
<p>2. What is the approximate amount of waste generated per day? (in Kilograms/month) (approx.)</p>	<p>Dry Waste 1500 kg</p>	<p>Wet Waste 2000 Kg</p>
<p>3. How is the waste generated in the institute managed? By 1 Composting 2 Recycling 3 Reusing 4 Others (specify)</p>	<p>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.</p>	
<p>4. Do you use recycled paper in institute?</p>	<p>Yes</p>	
<p>5. Do you use reused paper in institute?</p>	<p>Yes</p>	
<p>6. How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.</p>	<p>Done in locality for awareness of resource crunches</p>	
<p>7. Can you achieve zero garbage in your institute? If yes, how?</p>	<p>Not yet achieved. Possible through waste management plan.</p>	

II – GREENING THE CAMPUS

8.	Is there a garden in your institute?	Yes, about Approx. 30% 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 & Ornamental	37915
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	Ten Gardeners, One Supervisor 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. 35 trees and 50 shrubs planted in this financial year.	
14.	Number of Trees Planted in Last FY.	35	
	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 plant 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 (184 KW) in commissioning phase. Messages 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/CFL 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 (5 to 7 Hr)

IV – WATER CONSERVATION

24.	List four uses of water in your institute	<p>Basic use of water in campus:</p> <ol style="list-style-type: none"> 1. Drinking – 375 KL/month 2. Gardening – STP treated water 3. Kitchen and Toilets – 500 KL/month 4. Others – 3500 KL/month
25.	How does your institute store water? Are there any water saving techniques followed in your institute?	<p>34 Nos of Overhead Water Tanks installed for storage of water.</p> <p>Avoid overflow of water controlled valves are provided in water supply system. Close supervision for water supply system.</p> <p>Rain water harvesting pit 20</p>
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-	<p>Entry- Water comes from Submersible Pumps at campus</p> <p>Exit- From Water Drainage System to STP(STP treated water used for gardening)</p>
28.	Write down four ways that could reduce the amount of water used in your institute	<p>Basic Four ways:</p> <ol style="list-style-type: none"> 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?	Twenty number of 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	2	3
	No. of vehicles more than five years old	0	0	0	0	2
	No. of Non Air conditioned vehicles	0	0	0	2	2
	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	1	0	1	
	Petrol+CNG	0	0	0	0	
	CNG	0	0	0	0	
	LPG	0	0	0	0	
	Petrol	0	0	0	2	
	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 380 KVA each.				

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?	Yes
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 184 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 IMS ENGINEERING COLLEGE, 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)	IMS ENGINEERING COLLEGE, 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 exists.
- 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 IMS ENGINEERING COLLEGE, 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 CONSOIOUSNESS





Educational Programme on Environmental Management Organised by IMSEC, Ghaziabad in Purve Madhyamic Vidayalya, Nahal, Razapur, Ghaziabad, Uttar Pradesh, India.



IMS Engineering College (IMSEC) Ghaziabad organized an Educational tour in Purve Madhyamic Vidayalya (U.P.S. Nahal Middle School) in Village Nahal on Tuesday, 4th February 2020.

This school was established in 1997 by the State Government. U.P.S. Nahal Middle School (UPS NMS) located at Nahal, Ghaziabad. This school is counted among the top-rated Schools in Uttar Pradesh with an excellent academic track record. School type is Co-educational. Medium of instruction is Hindi. The name of school Head Master is Mr. Fazar Mohammad and there are 4 teachers besides him. There are approx 300 students in this school and ratio of boys and girls is 70 & 30 percent. A total of approx 150 students had attended this educational program based on environmental management. The students belong to 6th to 8th standard.

Dr Suman Gupta, the faculty of IMSEC conducted a very informative session on removal of dust and smoke from polluted air by traditional Indian medicinal plantation method in villages and rural area without spending extra money and labour. Dr. Suman introduced the students to various enriching, purifying & medicinal aspects of traditional plants and trees as Bargad (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Goolar (*Ficus glomerata*), Neem (*Azadirachta indica*) & Ghiqar (*Aloe vera*). She has explained the phenomenon of air purification which occurs in the plants and trees. She has given the informative talk on topics that included Medicinal uses,



Air pollution management and Soil fertility improvement with the help of these traditional trees and plants.█

At the end of the session questions were asked from the students. They also given answers and were very happy. Students were very enthusiastic. They took keen interest. Overall objective of the team was to create awareness about health and environment pollution among the children, who are the future of the nation.

Head Master and teachers had also taken keen interest in this traditional information. They appreciated this valuable information. It was a very informative, interesting and a successful Educational Programme. Mr. Sudhir Chaudhary (PI Coordinator), Mr. Amit Tyagi, Mr. Jitendra Kumar and Mr. Nishant (student of MBA) are supportive members from IMSEC for this meaningful program. School Head Master, Teachers and students extended their respect and thanks to Dr. Sraban Mukherjee, Director of IMSEC for conducting such informatics educational program and providing all support & guidance.



IMSEC also thanks to School Head - Master Mr. Fazar Mohammad who provided all the required facilities for this educational program. We would also like to thank to school teachers who helped in maintaining the discipline for smoothly running of whole program.

UMEEDON KO PANKH (WINGS) Foundation – IMSEC Chapter
ANNUAL REPORT (2019-20)

WINGS have two chapters based in Ghaziabad. The IMSEC College Chapter has an overall count of students 35 (approx..) which are from class 1-10. Outside college chapter known as Crossing chapter has overall strength of 15 (approx..) having majority students from class 3, 4 and 5.

Following events were organized for kids in academic year 2019-20.

- LAKSHYA 2020 (16.02.2020)
- 15 AUGUST FLAG HOSTING (15.08.2019)

LAKSHYA

Umeedon Ko Pankh foundation (IMSEC Chapter) has organised LAKSHYA, a sports fest, in collaboration with Sports Promotion Organization of India on 16th February 2020.

The main objectives of the event:

- To showcase the talents & boost the sports spirit of the children living in slums
- This type of participation will prepare our children for the outer experiences of team spirit, sportsmanship and healthy competition.
- To provide a platform for organisations working in the same direction to work together.

Main Events:

- Relay race
- kho-kho
- kabadi
- 100 m race
- 200 m race

15 AUG NUKKAD NATAK

The 15 August flag hosting was supported by the brilliant performance of the volunteers in nukkad natak named as “HUMEIN KYA”. Which depicted the sheer ignorance of the society on the burning issues of the country that seem to destroy it. In total 15 volunteers were part of the arrangement.

LOCKDOWN CLASSES

In this fear struck era of COVID-19 where everything was at stop. We tried our best to keep our students studies not get hampered. Our volunteers are working from their homes and giving online classes to the students. There are a total of 7 to 8 students, who attend an hour class to maintain the balance of their education and vacation all together.

THANKS







How well do you know about Earth's Environment? Take the Quiz & Find out

'My Planet' Quiz

- 15 Questions online Quiz
- Questions based on Environment Conservation
- Know your score immediately after quiz submission
- **No Registration fee**
- **E-certificates for all the participants**
- To take the quiz, visit the link:

<https://forms.gle/iMFJYVAy7g8JpEeNA>

Department of MBA

IMS Engineering College, Ghaziabad

Call / Whatsapp: 8299419974

e-mail: info.mba@imsec.ac.in



ENGINEERING FACILITY SERVICES

O-806, Amarpali Zodiac, Sector-120, Noida (Uttar Pradesh) India, 201301

E-mail: efs_info@yahoo.com; Mo: 8826682703

Energy Service Companies empaneled with Bureau of Energy Efficiency (BEE)

EFS/2021/01/18

Date: 15th January, 2021

TO WHOM IT MAY CONCERN

It is to certify that Engineering Facility Services, Sector 120, Noida, (U.P.) has conducted the Energy Audit, Green Audit & Environment Audit in Jan 2021 for the session 2020-2021.

Audit Site: IMS Engineering College, Ghaziabad
Address: NH-24, Adhyatmik Nagar, Ghaziabad (U.P)

Signature

Deepak

+91 8826682703

Certified Energy Auditor from Bureau of energy efficiency (EA19771)

Chartered Engineer (AM1517557) from "The Institute of Engineers (India)