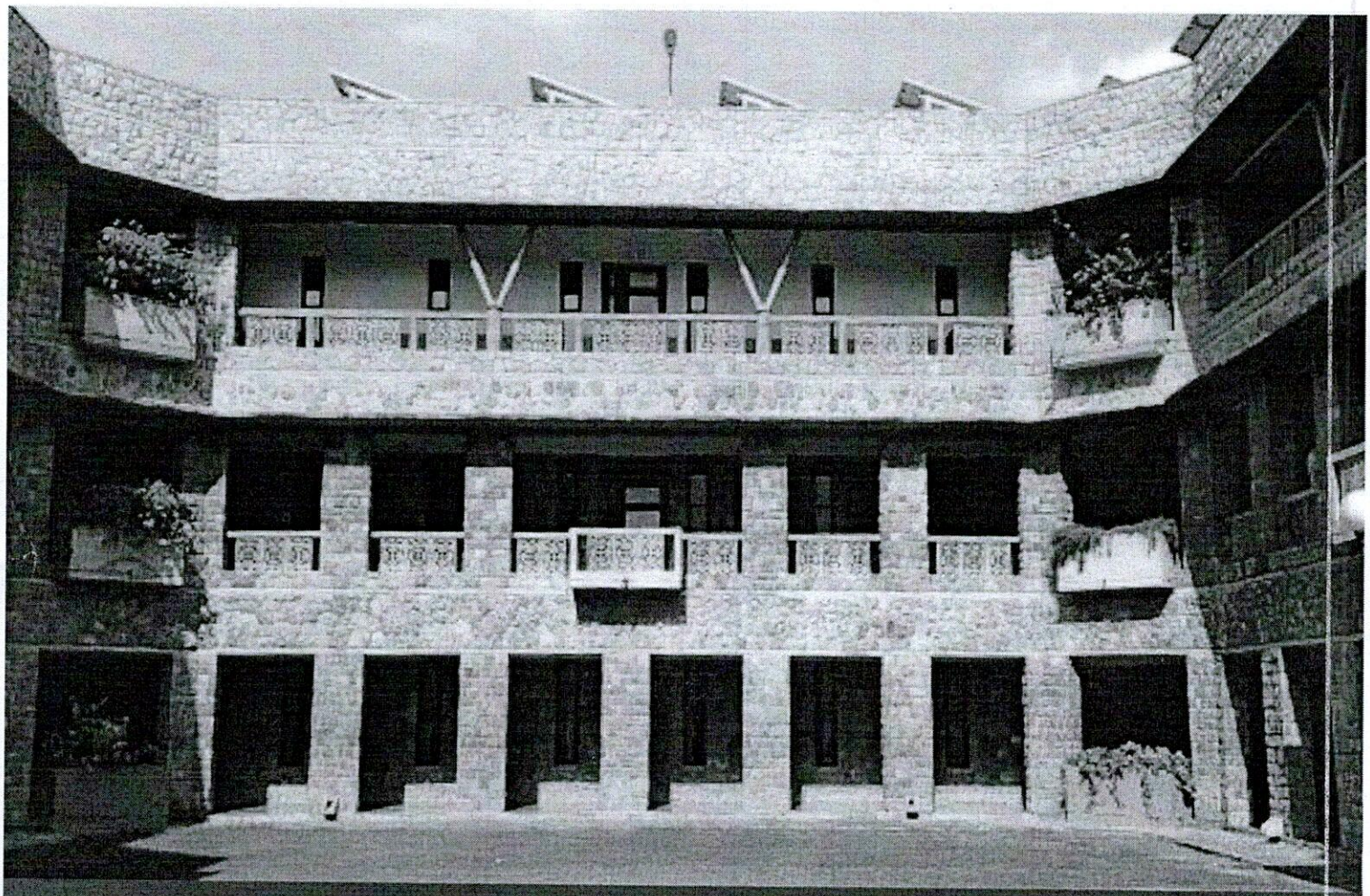
IIHMR UNIVERSITY



IIHMR UNIVERSITY

ENERGY AUDIT REPORT

2021-2022

PREPARED BY

EHS ALLIANCE SERVICES

Registrar
The IIHMR University
1, Prabhu Dayal Marg
Near Sanganer Airport, Jaipur

Contents

Registrar
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1, Prabhu Dayal Marg
Near Sanganer Airport, Jaipur-302029

CERTIFICATE

EHS alliance

CERTIFICATE

PRESENTED TO

IIHMR UNIVERSITY

1, Prabhu Dayal Marg,Near Sanganer Airport, Jaipur - 302029

Has been assessed by EHS Alliance Services for the comprehensive study of Energy Audit on institutional working framework to fulfill the requirement of

ENERGY AUDIT

ACADEMIC YEAR 2021-22

The energy-saving initiatives carried out by the institution have been verified in the report submitted and were found to be satisfactory.

The efforts taken by management and faculty towards all types of energy used in the institution and sustainability are highly appreciated and noteworthy.

EHS ALLIANCE SERVICES GURGAON

SIGNATURE

16.09.2022
DATE OF AUDIT

EHS ALLIANCE SERVICES, PLOT A-72, SURYA VIHAR, GURUGRAM, 122001
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ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of IIHMR University, Jaipur for assigning this important work of Energy Audit. We appreciate the cooperation to the teams in the completion of the assessment.

First of all, we would like to thank **Dr. P. R. Sodani, President, IIHMR University** for allowing us to evaluate the environmental performance of the campus.

We would like to thank **Dr. Goutam Sadhu, Audit Coordinator** for his continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

Mr. Hem K. Bhargava	**Registrar**
Dr. Tripti Bisawa	**Coordinator, IQAC**
Dr. Hemant Kumar Mishra	**Faculty Member**
Mr. Ramavtar Sahu	**Accounts Department**

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DISCLAIMER

EHS Alliance Services Energy Audit Team has prepared this Energy Audit Report for IIHMR University based on input data submitted by the representatives of the University complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements, or forecasts in the report.

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EHS ALLIANCE SERVICES GURGAON

Vijay Singh
Lead Auditor EMS & Energy

Dr. Uday Pratap
Co-Auditor EMS & Energy

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ABBREVIATION

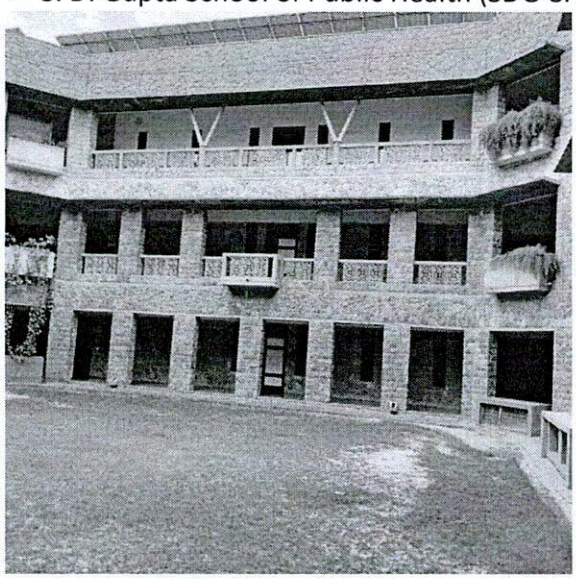
A	Amps
AC	Air Conditioner
AC	Alternating Current
AMET	Academy of Maritime Education and Training
CFL	Compact fluorescent lamp
CIP	Comprehensive Inspection Program
DC	Direct Current
HSD	High-Speed Diesel
Hz	Hertz
kg	Kilogram
kVA	kilo-volt-ampere
kW	kilo Watts
kWh	kilowatt hour
kWp	Kilowatt peak
LED	Light Emitting Diode
LPG	Liquefied Petroleum Gas
MMS	Module mounting structure
MPPT	Maximum Power Point Tracker
NAAC	The National Assessment and Accreditation Council
SEC	Specific Energy Consumption
SPV	Solar Photovoltaic
STC	Standard Test Condition
TV	Television
V	Volts
W	Watts
W/m2	watt per square metre

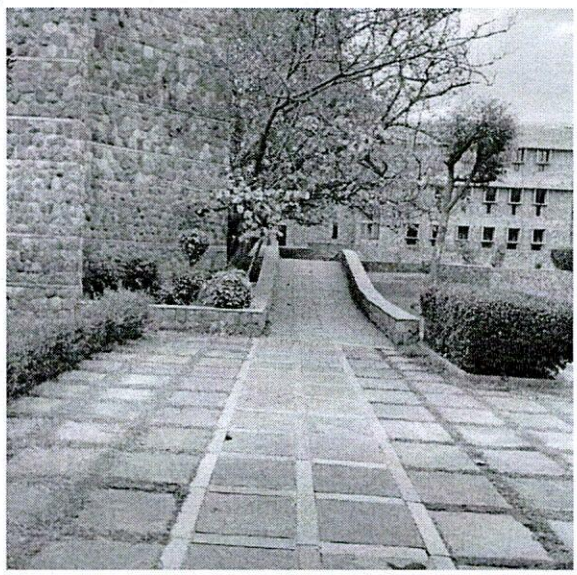
OVERVIEW OF THE UNIVERSITY

The genesis of IIHMR University dates to October 5, 1984, when its sponsoring body, the Indian Institute of Health Management Research, was established. In 2014, IIHMR University was established and incorporated as a postgraduate research university by the Government of Rajasthan vide the IIHMR University, Jaipur Act, 2014 (Act No. 3, of 2014).

The University has four Schools:

- Institute of Health Management Research (IHMR)
- School of Pharmaceutical Management (SPM)
- School of Development Studies (SDS)
- S. D. Gupta School of Public Health (SDG-SPH)





IIHMR University has a multi-disciplinary faculty team that is extensively engaged in academics, research, training, consultancy, partnerships, and collaborations. IIHMR University offers the following postgraduate programs: MBA (Hospital and Health Management), MBA (Pharmaceutical Management), MBA (Development Management). IIHMR University also offers Ph.D. programs in public health, health management, hospital management, digital health, and development studies.

IIHMR University has significantly contributed to the Executive Development and Management Development Programs by consistently engaging in EDPs/MDPs for national and international participants, working with government, national and international NGOs, and private sector organizations. Participants from more than 40 countries benefitted from the EDPs/MDPs.

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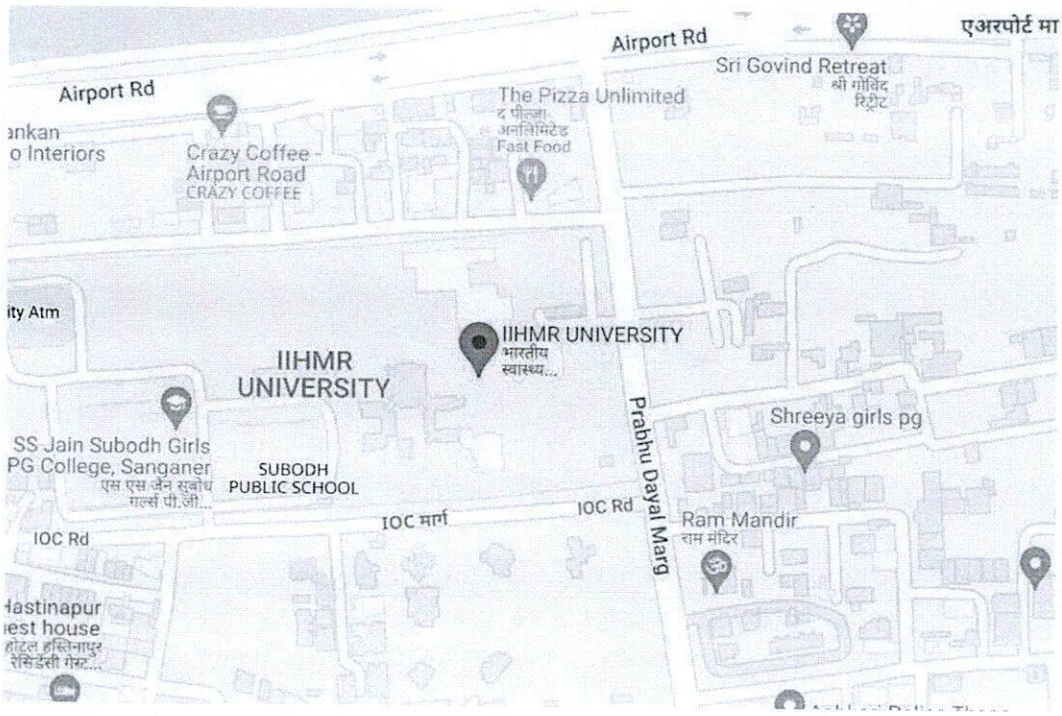
MISSION

IIHMR University is dedicated to the improvement in standards of health through better management of health care and related programs. It seeks to accomplish this through management education, research, training, consultation, and institutional networking in a national and global perspective.

VISION

To become a world-class higher education institution by promoting education and research for the betterment of society.



Geo Coordinates from Google Maps: 26.820572, 75.816055

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AUDIT PARTICIPANTS

On behalf of the University

Name	Designation
Dr. P.R. Sodani,	President
Sh. Hem K Bhargava	Registrar
Dr. Goutam Sadhu	Audit Coordinator
Dr. Tripti Bisawa	Coordinator, IQAC
Dr. Hemant Kumar Mishra	Faculty Member
Mr. Ramavtar Sahu	Account Department

On behalf of EHS Alliance Services

Name	Position	Qualifications
Mr. Vijay Singh	Lead Auditor	M.Sc. M. Tech (Environment Science & Engineering), Energy Auditor, Post Diploma in Industrial Safety Management
Dr. Uday Pratap	Co-Auditor	Ph.D., EMS: Lead Auditor ISO14001:2015, QCI–WASH

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EXECUTIVE SUMMARY

The purpose of this Energy Audit was to seek opportunities to improve the energy efficiency of the IIHMR University. Reducing energy consumption despite improving the human comfort, health and safety were of primary concern.

Beyond just identifying the energy consumption pattern, this audit sought to detect and categorize the most energy efficient appliances. Additionally, some daily practices relating common appliances have been shared which may help reducing the energy consumption. Data collection for energy audit of the campus was carried out by the EHS Alliance Team. The Energy Audit Report accounts for the energy consumption patterns of the institution on actual survey and detailed analysis during the audit.

The work comprehends the area wise consumption traced using suitable equipment. The analysis was carried out by our team with the support of the staff members from IIHMR University. The report provides a list of possible actions to preserve and efficiently access the available source, resources and their saving potential was also identified. We look forward towards optimization that the authorities, students and staff members would follow the recommendations in the best possible way. The report is based on certain generalizations including the approximations wherever necessary. The views conveyed may not reveal the general opinion. They merely represent the opinion of the team guided by the interviews of clients. We are happy to submit this Energy audit report to the IIHMR University.

ENERGY AUDIT - ANALYSIS

1. ENERGY CONSUMPTION

To understand the Energy Consumption trends and for analyzing the average monthly consumption we have collected electricity energy bills from July 2021 to June 2022

The details of **"Meter Connection"** at **"IIHMR University"** are as follows-

Name	-	Indian Institute of Health Management
CA No.	-	211464033162

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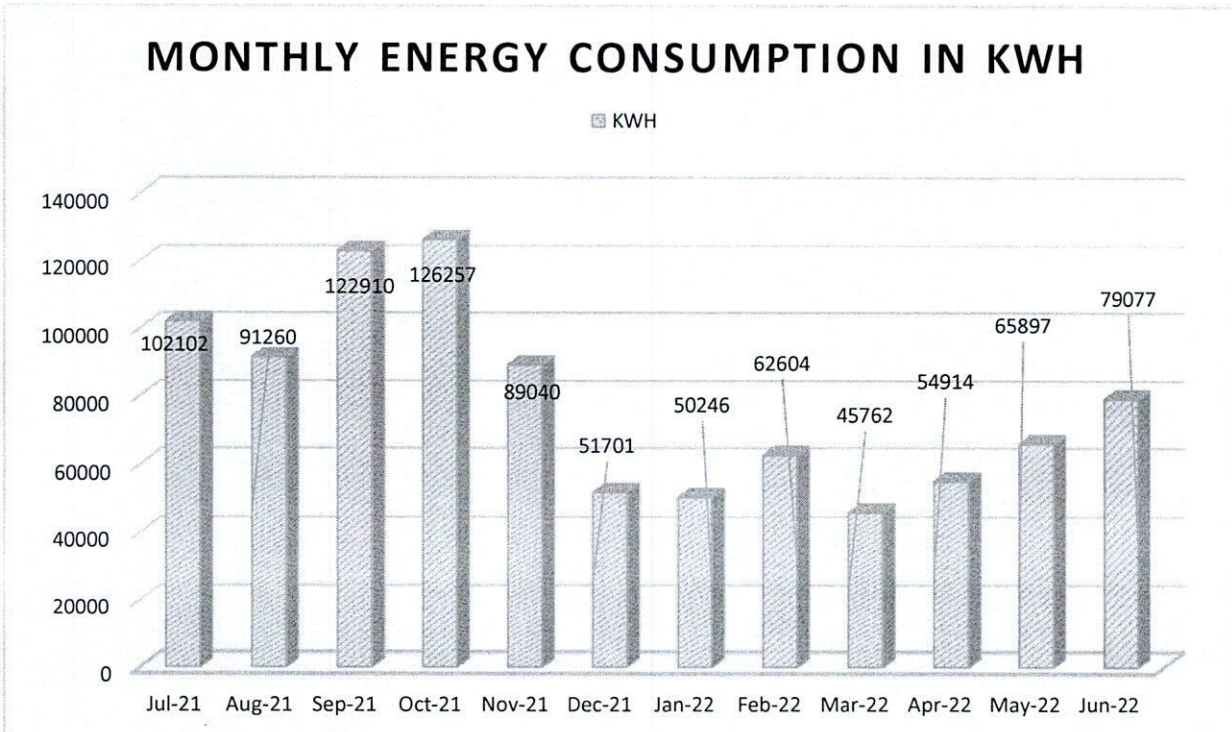
1.1 Summary of Monthly Electricity Consumption and Total Bill Amount

To understand the Energy consumption trend and for developing the baseline parameter we have collected monthly energy bill for the 12 months i.e. from July 2021 to June 2022

Month	Grid Billing	Solar PV	Total Readin	Rate INR	Amount in IN
Jul-21	102102	10876	112978	8.50	960313
Aug-21	91260	11900	103160	8.50	876860
Sep-21	122910	11872	134782	8.50	1145647
Oct-21	126257	13524	139781	8.50	1188137
Nov-21	89040	9740	98780	8.50	839630
Dec-21	51701	10880	62581	8.50	531937
Jan-22	50246	10252	60498	8.50	514236
Feb-22	62604	12364	74968	8.50	637228
Mar-22	45762	13600	59362	8.50	504577
Apr-22	54914	13950	68864	8.50	585347
May-22	65897	14280	80177	8.50	681507
Jun-22	79077	14640	93717	8.50	796592
SUM	**941770**	**147878**	**1089648**		**9262012**



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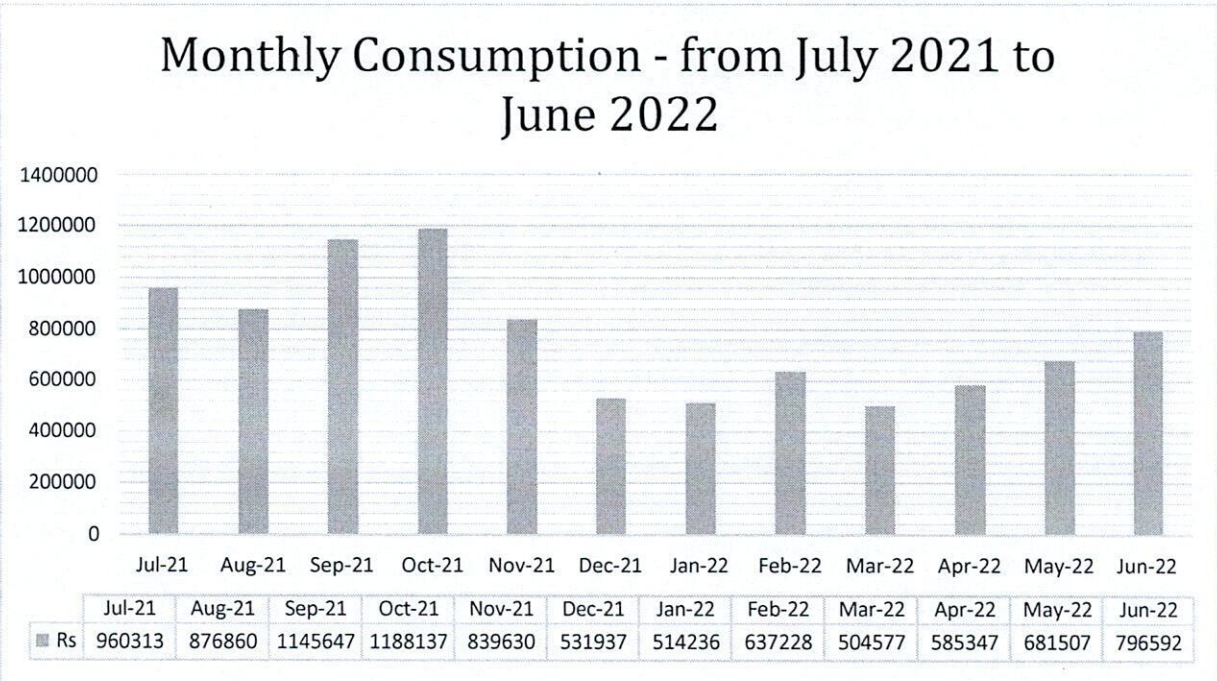

2. DIESEL CONSUMPTION

Below is the diesel consumption details in litres from July 2021 to June 2022.

Period	Diesel consumption (in litres)
Jul-21	720
Aug-21	600
Sep-21	600
Oct-21	222
Nov-21	474
Dec-21	480
Jan-22	480
Feb-22	240
Mar-22	630
Apr-22	662
May-22	550
Jun-22	620
Total	**6278.00**

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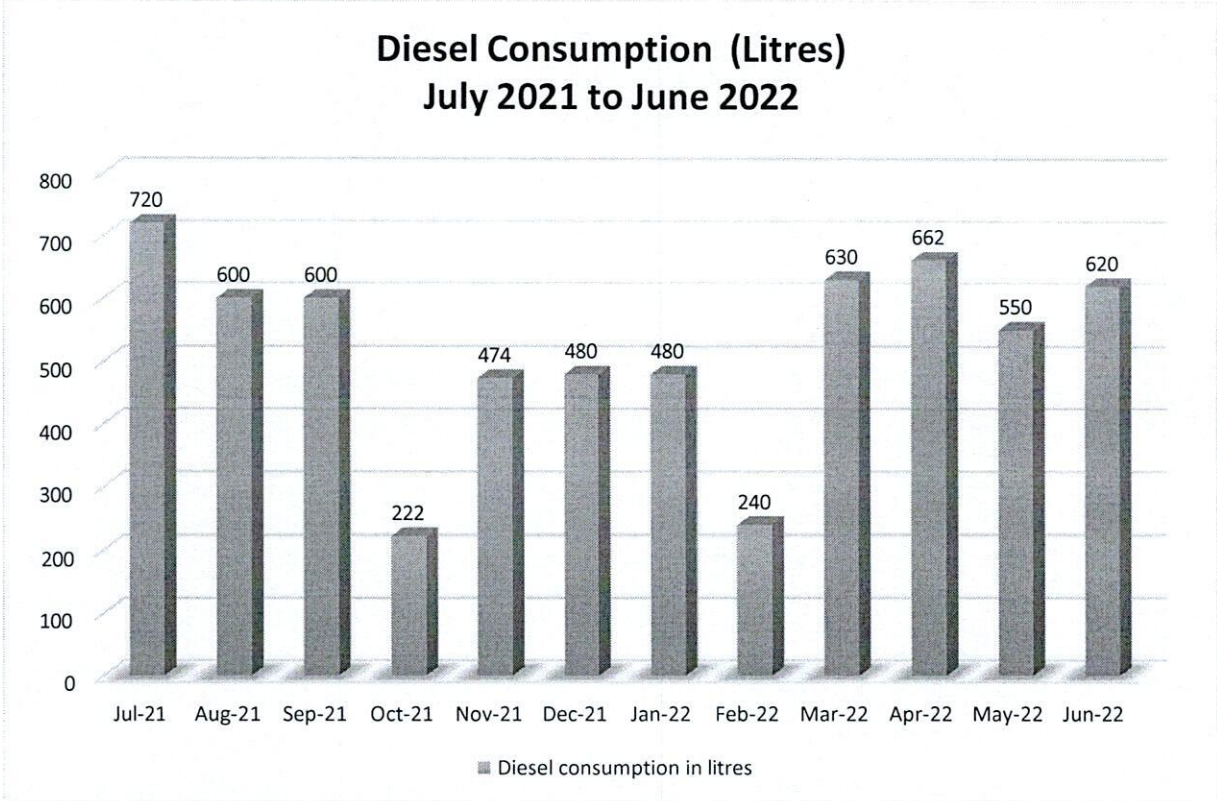

3. ANALYSIS OF DG SETS

In the campus, there are two Diesel Generator (DG) set for its electrical power needs in case of Grid power failure. DG sets capacity is 570 kVA.

DG Set Design Details			
Description	***Unit***	***DG at Station 1***	***DG at Station 2***
Rated capacity	kVA	250	320
Hz		50.6	50
Sl No.		NIIL528578	N21D178391
Make		Sudhir (Cummins)	Sudhir (Cummins)
Volts	Volts	415	415
PF			
Phase		3 Phase	3 Phase
RPM		1500	1500
Amps	Amps	250	250
Mfg.		2015	2021

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DG Set Operation details		
Operating hours during testing	Hours	0.50
% Loading	%	63.75
Energy Generation	kWh	34.21
Load	kVA	91.73
Fuel consumption during testing	Litre	9
Specific energy generation	kWh/litre	3.15

Observation and Suggestions: -

Soundproof silent generators are an efficient tool to keep both noise and vibration at low levels. For the power backup of the institution, the soundproof model is installed.

As per the trial taken during the energy audit the percentage loading of DG set is 63.75% which is ok and specific energy consumption of DG Sets 3.15 kWh/Litre which is satisfactory because as per manufacturer recommendation, best practices for SEC in DG sets range from 3.0 to 3.5 kWh/Litre and above.

We recommend university to initiate periodic maintenance schedule and stack monitoring of DG set through authorized lab.

Diesel Generator

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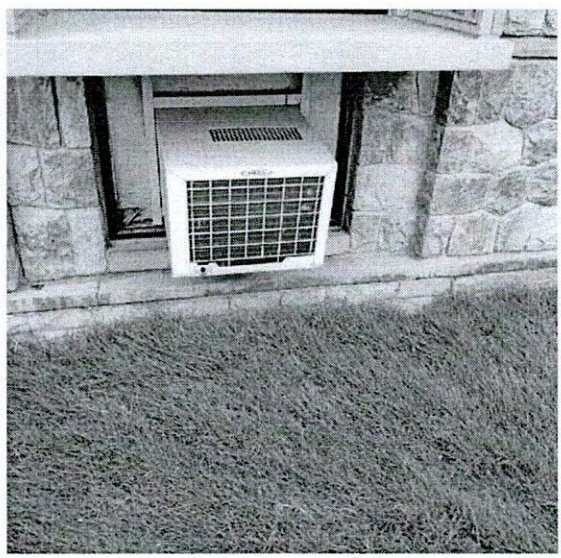
4. AC SYSTEM

Energy Efficiency Ratio (EER): Performance of smaller chillers and rooftop units is frequently measured in EER rather than kW/ton. EER is calculated by dividing a chiller's cooling
Capacity (in Btu/h) by its power input (in watts) at full-load conditions. The higher the EER, the More efficient the unit. The cooling effect produced is quantified as tons of refrigeration (TR). The above TR is also called as air-conditioning tonnage.

There are 404 ACs installed in IIHMR University in various areas of various capacity which detail is given below: -

Split AC - 341
Windows AC – 42
Cassette AC – 9
Package – 3
Tower AC – 4
VRV - 3

We recommend IIHMR University to organize periodic maintenance schedule and take corrective actions for insulating of AC's refrigerant lines in order to protect energy losses.



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5. FANS ANALYSIS

In the IIHMR University, there are 838 fans installed. The details are given below.

Ceiling fans 60W – 360

Ceiling fan 32W – 87

Wall hanging fan 80W - 391

Observation and Suggestions: -

BEE 5 Star Rated of 30W Ceiling Fans are present in the market. We recommend to consider purchasing BEE 5 Star rated 30W fans for future purchases.

Note:- Energy saving will increase or decrease if operating hours of machine /equipment will be increased or decreased and payback period will also increase or decrease if cost of investment (Cost of machine/equipment/accessories of machine) will increase or decrease because cost of investment is taken on tentative basis.

6. ANALYSIS OF LIGHTING SYSTEM

6.1 Brief description of existing system

For assessing energy efficiency of lighting system, Inventory of the Lighting System has been noted / collected, with the aid of a lux meter, measurement and documentation of the lux levels at various locations at working level has been done.

6.2 Inventory of Lighting

Wattage	Count
03 W LAMP	198
05W LED	113
5 W BULB	38
07W LED	393
8 W SURFACE LIGHT	108
60W LED	9
10 W	7
12W	36
14 W	26
15 W	100
18W	20
18W LED Light	239

12 W LED Round	59
25 W	3
30W LED	137
36W Tube light	893
40 W TUBE LIGHT	103
18W LED Flood	20
20 W LED	506
CFL	276
22W	320
28 W	1
100W	1

6.3 Lux Measurement

Description	Lux	Remark
Class Rooms	120 to 235	Acceptable
Offices	130 to 240	Acceptable
Corridors	35 to 90	Acceptable
Washrooms	45 to 76	Acceptable
Outdoor	36 to 95	Acceptable
Computer Lab	150 to 289	Acceptable
Parking area	45 to 94	Acceptable
Canteen	69 to 185	Acceptable

Observation

University has initiated LED based lighting solution, but still there are 551 (36W) tube lights. LEDs save energy, the life span is much greater and emit virtually no heat. We recommend to replace the tube lights with LEDs.

Additionally, we recommend to install motion sensor-based lights in common areas such as library, washrooms, corridors, etc.

We also recommend to use solar lights for open areas like parking, ground, street lights, etc. Table below shows the performance characteristics comparison of all luminaries.

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Table - Luminous Performance Characteristics of Commonly Used Luminaries					
Type of Lamp	Lumens/Watt		Colour Renderi Index	Typical Application	Typical Life
	Range	Avg.			
Incandescent	8-18	14	Excellent (100	Homes, restaurants, general lighting emergency lighting	1000
Fluorescent lamps	46-60	50	Good w.r.t coati (67-77)	Offices, shops, hospitals, homes	5000
Compact fluorescent Lamps (CFL)	40-70	60	Very Good (85	Hotels, shops, homes, offices	8000-10000
High pressure mercury (HPMV)	44-57	50	Fair (45)	General lighting in factories, garages, car parking. flood lighting	5000
Halogen lamps	18-24	22	Excellent (100	Display, flood lightening stadium exhibition grounds, construction areas	2000 - 4000
High pressure sodium (HPSV) SON	67-121	90	Fair (22)	General lighting in ware houses, factories, street lighting	6000 - 12000
Low pressure sodium (LPSV) SOX	101-175	150	Poor (10)	Roadways, tunnels, cana street lighting	6000 - 12000
Metal halide lamps	75-125	100	Good (70)	Industrial bays, spot lighting, flood lighting, retail stores	8000
LED Lamps	30-50	40	Good (70)	Reading lights, desk lam night lights, spotlights, security lights, signage lights, etc.	40000 - 10000

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7. OTHER POWER CONSUMPTION

7.1 Inventory of IT Infrastructure

Sl No.	Location/ Identificati	Desktop	Laptop	Printers	Scanners	Servers	Projector	Wi-Fi Acce points	Network Switches	Digital Disp	Online UP
1	Faculty	6	27	19							
2	Accounts	13	5	5	1						
3	Administration	9	5	4							
4	Academic	7	2	3							
5	Examination	5	2	3							
6	Library	14	1	5	1						
7	IT	13	6	3		4					
8	Placement	5	3	3							
9	Marketing	5	1	3							
10	Research officers	11	2	2							
11	Computer Labs	126		13							
12	HR	3	5	2	1						
13	Classrooms	14					12				
14	IT Store	29	42								
15	Trustee Office	1		1							
16	Dr. Agarwal office	1	2								
17	President office	7	2	5							
18	Registrar office	2	3	3							
19	IQAC	2	1	1							
20	Account Society	4	1	2							
21	SDS Meeting Room	1									
22	*NFHS EW Project*	2		1							
23	*NFHS UK Project*	1		1							
24	Campus							86	74	9	5
	Total	**281**	**110**	**79**	**3**	**4**	**12**	**86**	**74**	**9**	**5**

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7.2 Water pump details

Details	Rated Power of Motor	Motor Eff.	Discharge Head	Suction Head	Pump Type
Unit	KW	%	m	m	Submersible/ Monoblock/ Centrifugal Etc.
Pump No.-1	7.5	58	50-60	48-53	Submersible
Pump No.-2	7.5	61	70-75	50-60	Open Well Motor/Pump
Pump No.-3	3.5	55	55	48-53	Submersible
Pump No.-4	5	51	55	48-53	Submersible
Pump No.-5	3.5	46	55	48-53	Open Well Motor/Pump

7.3 Exhaust fan details

Sl N	Location/ Identification	60W Exhaust F	160W Exhaust F	Water Cooler-200W	180W-Desert Cooler	Water Cooler-575W
1	2nd Floor Placement Dept.	1				
2	Room No. 225	1				
3	Class Room Toilet	2				
4	Toilet near 1	2				
5	Class Room Toilet	1				
6	Virtual Studio-Toilet (M & F)	3				
7	Toilet near Classroom 8	1				
8	Toilet near Classroom 9	1				
9	Toilet near Classroom 13	1				
10	Hostel 4 (J Block)		48			
11	Hostel 5 (K Block)	32				
12	Guest House (B Block)		3		1	

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13	Canteen Area					
14	Director Bungalow	3			1	
15	MDp Center		2			
16	Toilet in C Block (C-2)	1		1		
17	GYM AREA		4			
18	1st Floor Toilet Admin Block	4				
19	Ground Floor Toilet Admin Bloc	4				
20	2nd Floor Toilet	4				
21	New Auditorium 2nd Floor	1				
22	Examination Department- Toilet BASEMENT	4				
23	Toilet- Board Room	1				
24	Toilet- Reception Area	1			1	
25	Corridor CLASS (1-4)	1				
26	New Auditorium (Basement, Ground & first Floor)	1				
27	New Admin Block & SDGSPM	2				
	Total	**72**	**57**	**1**	**3**	**7**

ANALYSIS

There should be regular maintenance schedule of equipment like pumps, exhaust fans and IT equipment. Electronics such as computers, printers, scanners, etc. more than 3 year or 5 years (as per their life) should be replaced with new computers/laptops. Ideal Temperature should be maintained for all electronic appliances.

8. CAPACITOR BANK

Sl. No.	Location/ Identification	Capacity in KVAR
1	J Block	50
2	New Auditorium	150
3	Old Electric Service station	75
4	Old Electric Service station (Dead)	25
	TOTAL	**300**

***** END OF THE REPORT ******

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