IIHMR UNIVERSITY

ENERGY AUDIT REPORT

2024-2025

Prepared by

EHS ALLIANCE

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

IIHMR UNIVERSITY

EHS alliance

TABLE OF CONTENT

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CERTIFICATE

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CERTIFICATE

PRESENTED TO

IIHMR UNIVERSITY

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

That 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 2024-25

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 appreciable and noteworthy.

SIGNATURE

EHS ALLIANCE SERVICES GURGAON

17.03.2025
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 for assigning this important work of Energy Audit. We appreciate the co-operation to the teams for completion of assessment.

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

We would also like to thank **Dr. Susheela Sharma, Chief Administrative Officer & Audit Coordinator** for her 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

Dr. Gautam Sadhu	Professor
Dr. Aarti Sharma	IQAC Coordinator

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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 college 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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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 Meter

OVERVIEW OF THE COLLEGE

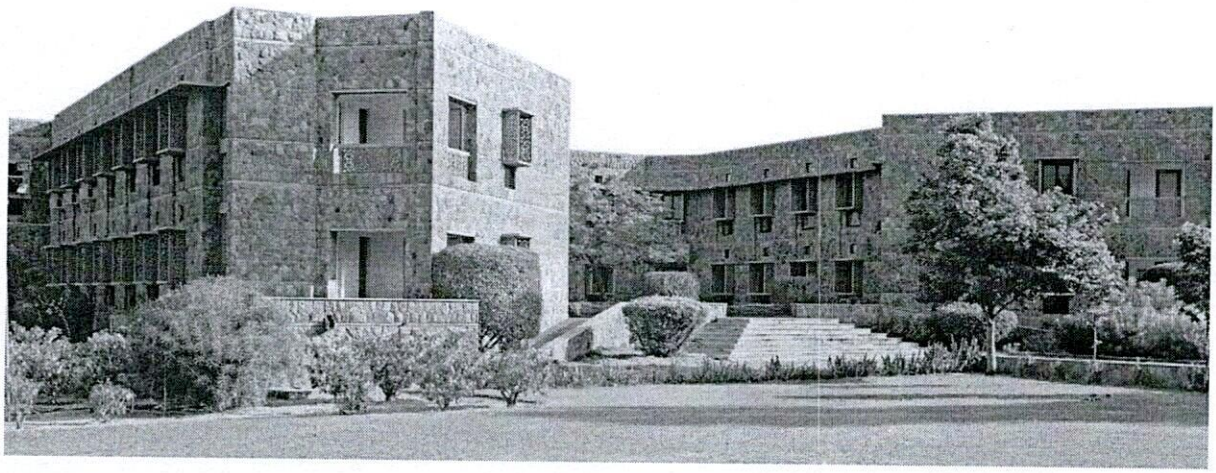
The genesis of IIHMR University dates to October 5, 1984, when its sponsoring body, the Indian Institute of Health Management Research, was established. In 2014, IIHMR University was established and incorporated as a postgraduate research university by the Government of Rajasthan vide the IIHMR University,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

The University has five 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)
- School of Digital Health (SDH)

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), and MBA (Healthcare Analytics). The Johns Hopkins Bloomberg School of Public Health, USA, offers an MPH program in cooperation with IIHMR University, Jaipur. IIHMR University offers an MPH (Implementation Science) program under the WHO-TDR postgraduate training scheme.

IIHMR University 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

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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. IIHMR University offers the following executive programs: Executive MPH, Executive MHA, Executive MBA (CSR & ESG Management), Certificate Course on Digital Health and Executive Master of Public Health Management (EMPMH) for Government of Odisha.

Student diversity at IIHMR University reflects the institution's commitment to providing a holistic and inclusive learning environment. This diversity, spanning geography, culture, academic backgrounds, gender, career aspirations, age, and experience, is a testament to the University's dedication to preparing future healthcare leaders who are well-rounded, culturally sensitive, and equipped to address the complex challenges of the healthcare sector on a global scale. It contributes to a vibrant, intellectually stimulating campus life that prepares students for successful healthcare management and research careers.

Vision

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

Mission

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

Facilities in the campus

Amenities at IIHMR provide far more than academic and administrative facilities on campus. It is dedicated to providing students with an exceptional infrastructure for learning as well as facilities for simplifying the procurement of fundamental skills. To accomplish this goal, IIHMR University offers the following:

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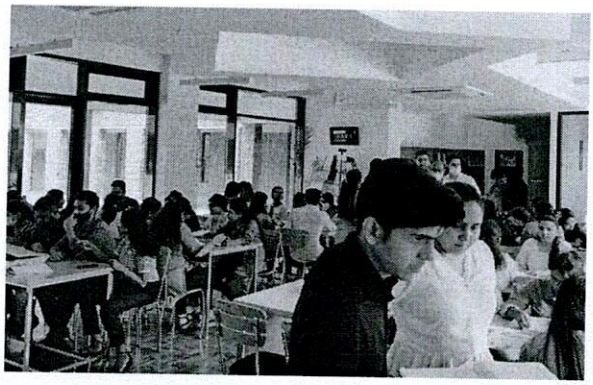
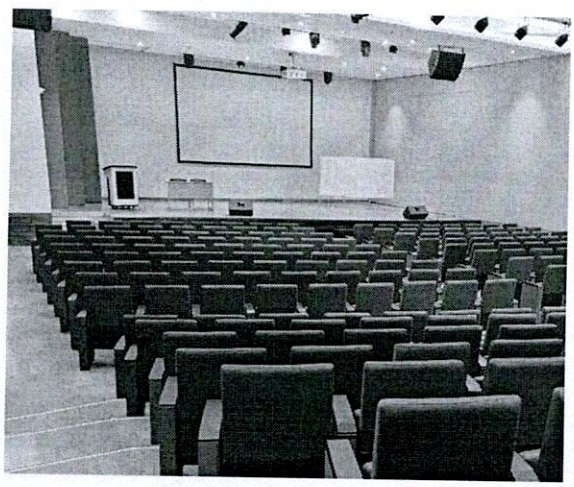


Library

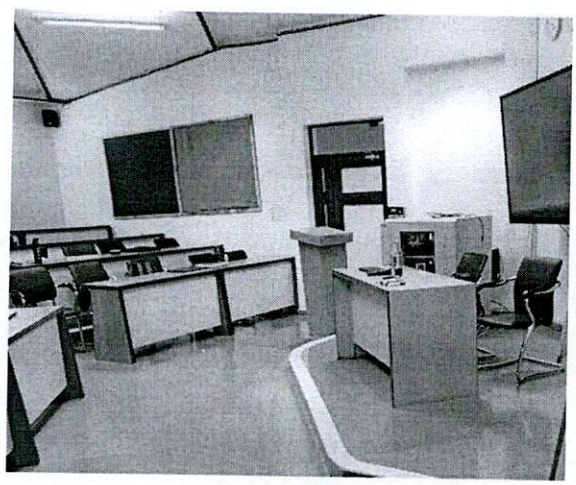
Hostel room

LIBRARY: The University's library is housed in a centrally located main University building in 3 floors (Basement, Ground floor and First floor). Spacious reading halls and latest IT infrastructure provide the right ambiance for reading and research in the library. The library is developing a comprehensive collection of print, digital and media resources on Public Health, Health Systems, Health & Hospital Management, Digital Health, Pharmaceutical Management, and Development Studies, to fulfil the teaching and research needs of the University.

HOSTEL: IIHMR University offers a separate hostel facility for Boys and Girls on the campus and provides accommodation to students on a first-come-first-served basis. The hostel offers excellent lodging and boarding facilities to cater to the needs of both male and female students. Every hostel is supervised by a warden, who ensures that the utmost care is taken to provide the best amenities to the students.



Auditorium



Smart Class room

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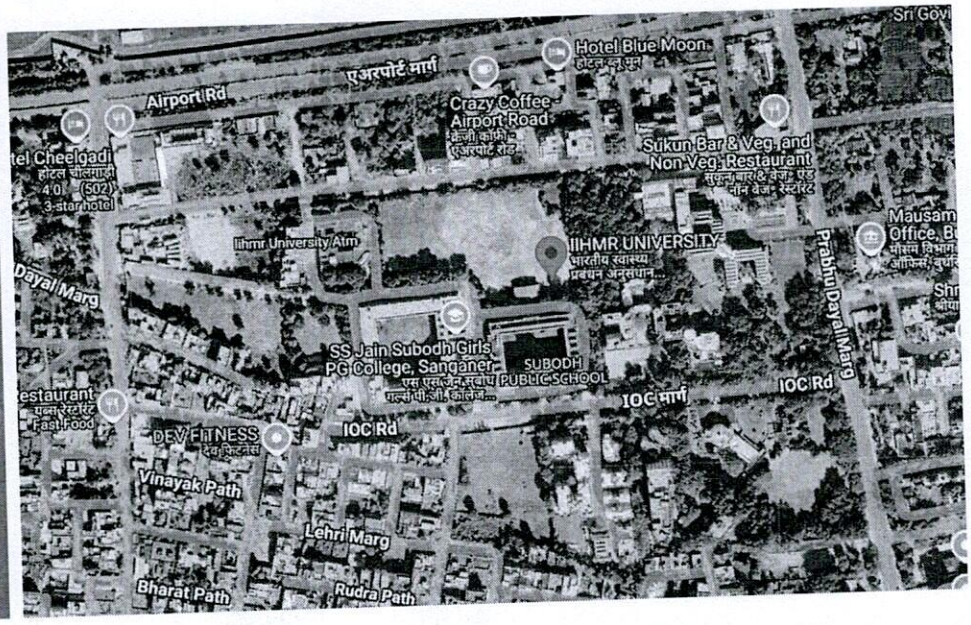
Geo Location
Geo Coordinates from Google maps:
26.820599, 75.814775



AUDIT PARTICIPANTS

On behalf of IIHMR University

Name	Designation
Dr. P. R. Sodani	*President, IIHMR University Jaipur*
Dr. Susheela Sharma	*Chief Administrative Officer*
Dr. Gautam Sadhu	*Professor*
Dr. Aarti Sharma	*IQAC Coordinator*
Mr. Binay Kumar Jha	*Sr. Manager, Housekeeping*
Mr. Sanjay Gupta	*Admin Officer*
Ms. Baishakhi Roy	*Admin Department*
Mr. Mohan Murari Awasthi	*Supervisor, Admin*
Mr. Tarun Kumar Gupta	*IQAC Team*

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 the 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.

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ENERGY AUDIT - ANALYSIS

1. ENERGY CONSUMPTION

To understand the Energy Consumption trends and to analyze the average monthly consumption we have collected electricity energy bills from April 2024 to March 2025.

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

Name - Indian Institute of Health Management

CA No. - 211464033162

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 April 2024 to March 2025

Month	Grid Units	Amount	Solar Units	Export kWh	Total Units	Amount
Apr-24	38200	10.00	15288	0	53488	534880
May-24	39500	10.00	14236	0	53736	537360
Jun-24	62070	10.00	14672	0	76742	767420
Jul-24	61660	10.00	12808	0	74468	744680
Aug-24	68420	10.00	11396	0	79816	798160
Sep-24	76110	10.00	7900	0	84010	840100
Oct-24	87200	10.00	13576	0	100776	1007760
Nov-24	95590	10.00	6416	0	102006	1020060
Dec-24	79410	10.00	11492	0	90902	909020
Jan-25	50720	10.00	11240	0	61960	619600
Feb-25	42465	10.00	9732	0	52197	521970
Mar-25	46725	10.00	15028	0	61753	617530
SUM	**748070**	**120**	**143784**	**0.00**	**891854**	**8918540**

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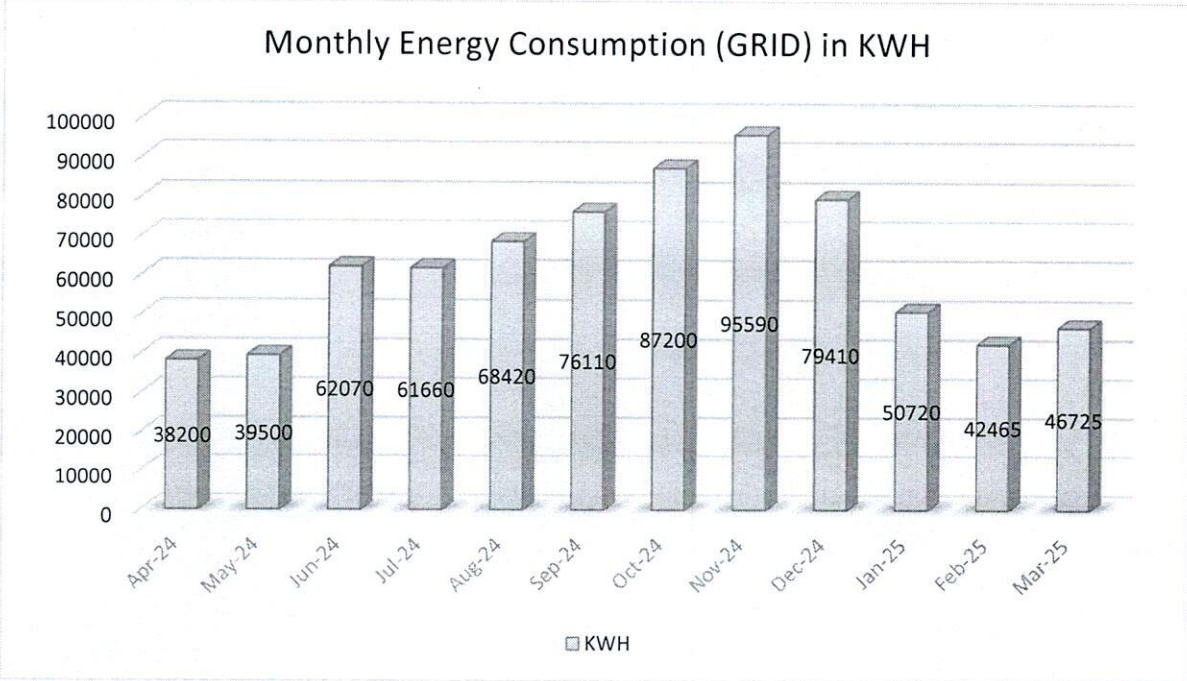

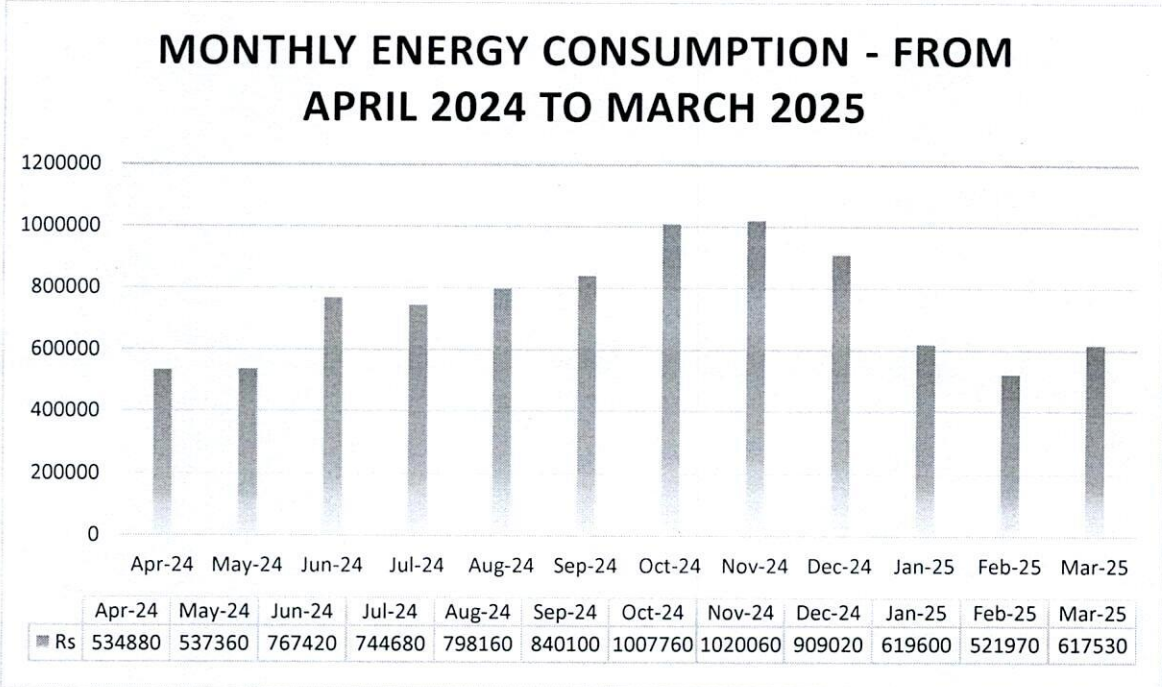

	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25
Rs	534880	537360	767420	744680	798160	840100	1007760	1020060	909020	619600	521970	617530

Analysis of electricity consumption for the last 3 years is shown below

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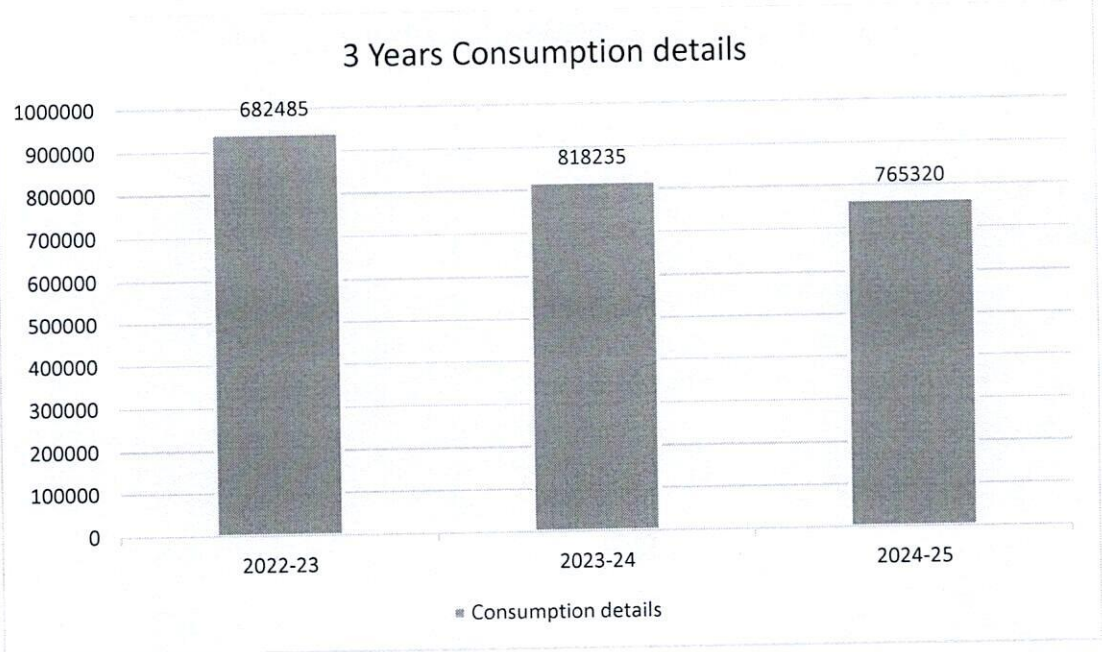

2. DIESEL CONSUMPTION

From April 2024 to March 2025, IIHMR University has consumed 3200 liters of fuel.

Month	Diesel in Liters
Apr-24	333
May-24	525
Jun-24	675
Jul-24	363
Aug-24	642
Sep-24	493
Oct-24	1275
Nov-24	55
Dec-24	166
Jan-25	465
Feb-25	525
Mar-25	300
Total	**5817**

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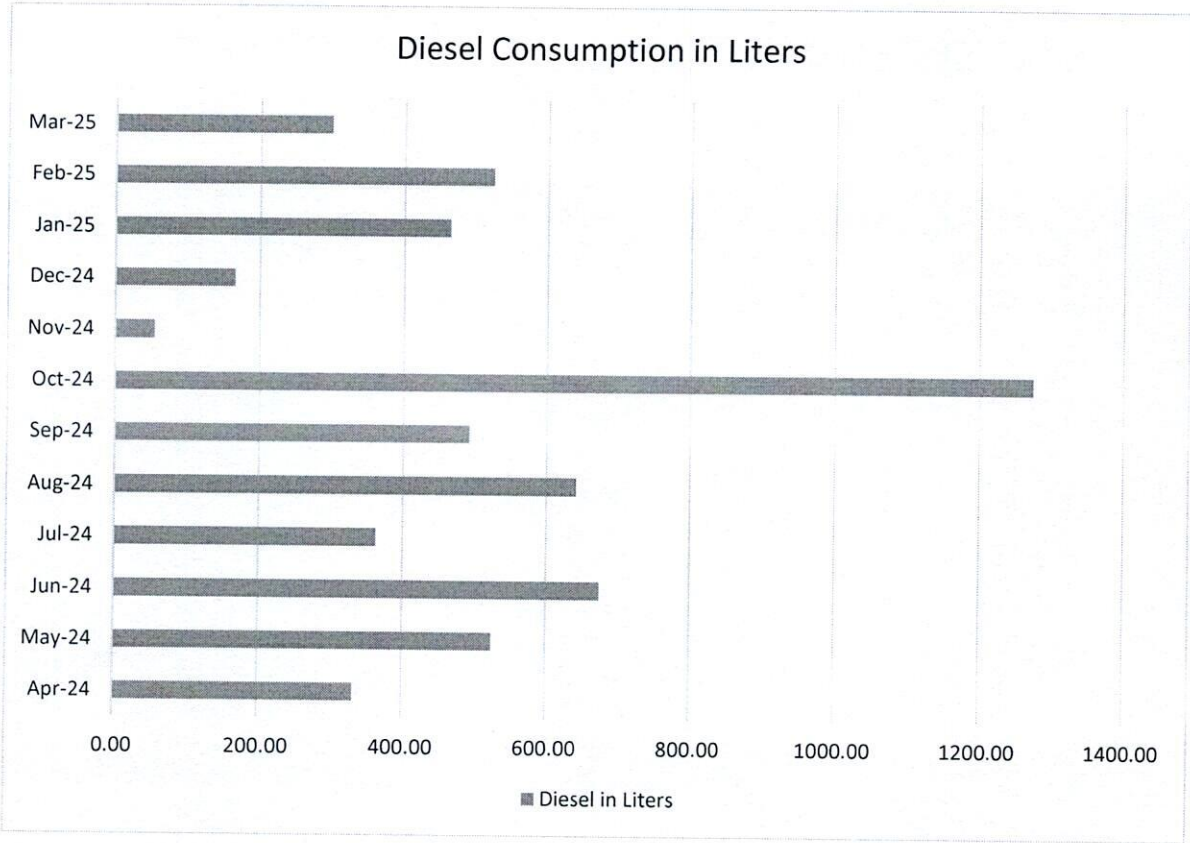
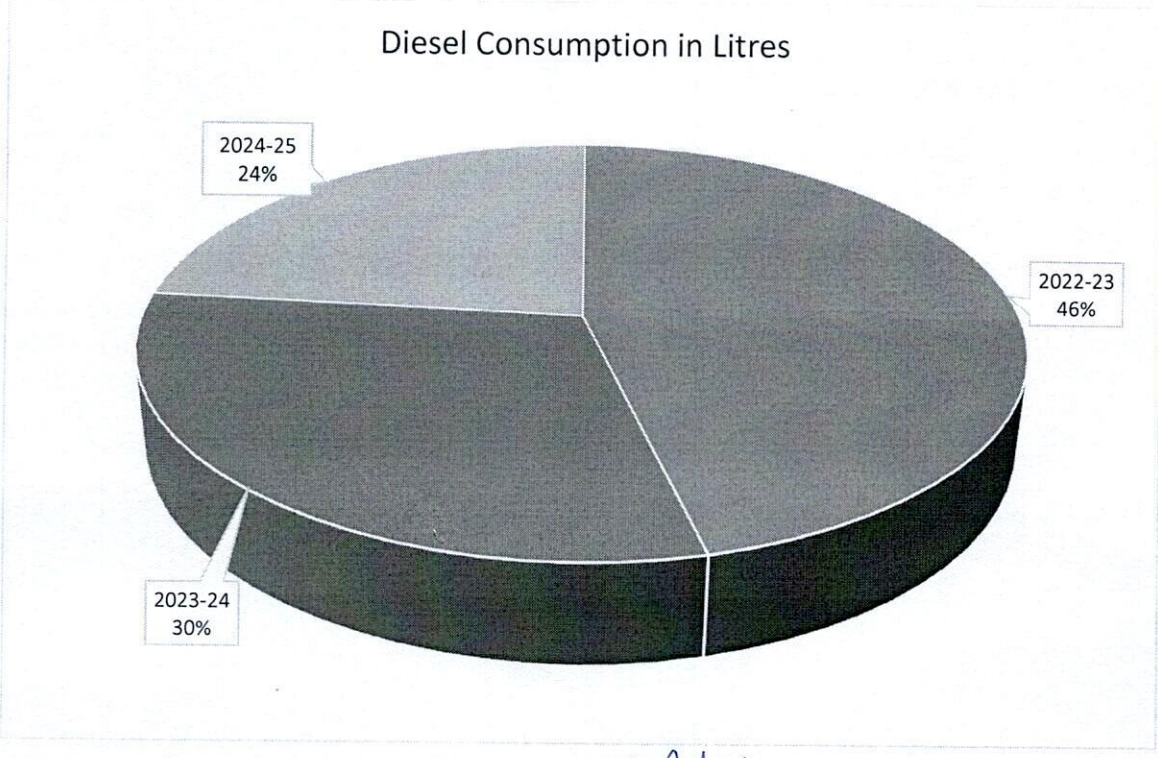


Three-year usage pattern is shown below



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 KVA	320 KVA
Hz		50	50
Sl No.		NIIL528578	N21D178391
Make		Sudhir (Cummins)	Sudhir (Cummins)
Volts	Volts	415 Volts	415 volts
PF		0.8	
Phase		3 Phase	3 Phase
RPM		1500	1500
Amps	Amps	250	250
Mfg.		2015	2021

DG Set Operation details		
Operating hours during testing	Hours	0.50
% Loading	%	62.76
Energy Generation	kWh	34.98
Load	kVA	91.74
Fuel consumption during testing	Litre	8
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 in the institution.

As per the trial taken during the energy audit the percentage loading of DG set is 62.76% 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 college to initiate stack monitoring of DG set through authorized lab.

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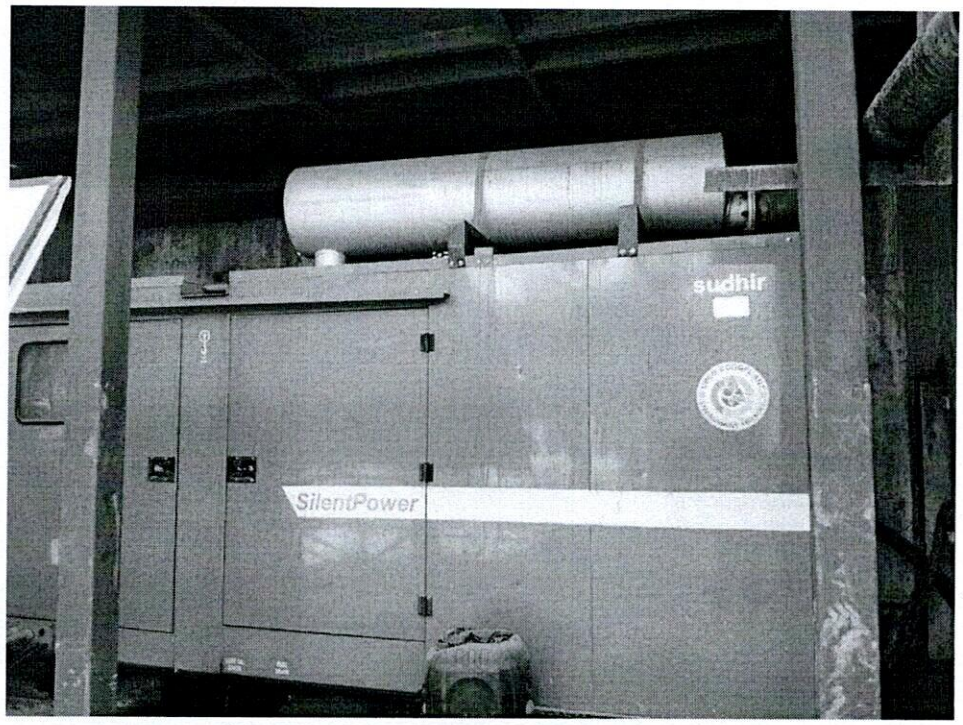

4. AC SYSTEM

Energy Efficiency Ratio (EER): The 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 443 ACs installed in IIHMR University in various areas of various capacity which detail is given below: -

Sl No.	Location/Identification	Type(Windows/ Split/ VRV, Tower AC / Cassette AC)	(Qty.)	TR	Room Temp. (°C)	AC-Tout (°C)	AC-Tin (°C)	Room-RH (%)	Area (m2)	Air velocity (m/s)	Enthalpy Hout	Enthalpy Hin	Heat Load in TR	KW supplied	(Eff.)Power per Ton (KW/TON)	EER
1	Admin/ Account/ HR Block	v	2	26.00	24	11.5	19	53	0.03	2.3	23	38	0.36	0.75	1.81	1.94

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2	New Auditorium	v	3	184.00	24	12	20	52	0.03	2.2	25	38	0.32	2	1.72	2.04
3	New Canteen	v	2	20.00	24	11	19	52	0.03	2.6	24	37	0.38	1.5	1.52	2.31
4	UPS	s	2	5.00	24	10	18	52	0.03	2.4	24	37	0.35	1.5	1.53	2.3
5	Class Room-1	s	2	0.75	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
6	Class Room-1	s	4	2.00	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03
7	Class Room-1	s	1	1.50	23	12	19	52	0.03	2.3	24	37	0.33	1.5	1.74	2.02
8	Vacant room near to Class room 1	s	1	1.50	23	13	20	52	0.03	2.5	26	38	0.31	2	1.87	1.88
9	Class Room-2 & 3	s	4	2.00	24	12	21	52	0.03	2.2	24	39	0.34	2	1.92	1.83
10	Class Room-4	s	4	2.00	23	12	20	52	0.03	2.5	25	38	0.34	3	1.87	1.88
11	Class Room-5	s	2	1.50	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
12	Class Room-6 (OLD Auditorium)	s	1	2.00	24	11	20	52	0.03	2.3	22	38	0.38	1.5	1.69	2.08
13	Class Room-6 (OLD Auditorium)	p	1	10.00	23	12	20	52	0.03	2.5	25	38	0.34	2	1.87	1.88
14	Class Room-6 (OLD Auditorium)	p	1	3.00	24	12	20	53	0.03	2.5	25	38	0.34	1.5	1.79	1.97
15	Class Room-7 (Conference Hall)	p	1	7.00	22	11.5	22	52	0.03	2.1	23	43	0.44	2	1.77	1.99
16	Class Room-8	c	2	1.50	24	12	20	53	0.03	2.4	25	38	0.33	1.5	1.78	1.98
17	Class Room-8	s	1	1.50	23	11	21	52	0.03	2.4	24	40	0.4	2	1.8	1.95
18	Class Room-9	s	2	2.00	23	12	20	52	0.03	2.5	25	38	0.34	1.5	1.86	1.89
19	Class Room-9	s	2	1.50	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
20	Class Room-10	s	2	2.00	24	11	19	52	0.03	2.6	24	37	0.38	2	1.52	2.31
21	Class Room-10	s	2	1.50	24	10	18	52	0.03	2.4	24	37	0.35	2	1.53	2.3
22	Class Room-11	s	1	2.00	23	12	20	52	0.03	2.3	25	38	0.33	2	1.67	2.11
23	Class Room-11	c	3	1.50	24	11	18	52	0.03	2.4	22	37	0.38	0.75	1.69	2.08
24	Class Room-12	s	1	2.00	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
25	Class Room-12	s	4	2.00	23	13	20	52	0.03	2.3	26	38	0.31	2	1.74	2.02
26	Class Room-13	s	4	2.00	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03
27	Class room 16 (New Auditorium)	c	4	2.00	23	12	19	52	0.03	2.3	24	37	0.33	2	1.74	2.02
28	Medical room	w	1	0.75	22	11.5	22	52	0.03	2.1	23	43	0.44	0.75	1.77	1.99
29	UPS Room- Academic Building	s	1	2.00	24	11	20	52	0.03	2.3	22	38	0.38	2	1.69	2.08
30	Marketing Office	s	2	2.00	24	12	20	53	0.03	2.5	25	38	0.34	2	1.79	1.97
31	Tutorial 2 (Currently Placement Office)	s	2	2.00	24	12	20	53	0.03	2.4	25	38	0.33	2	1.78	1.98
32	Examination Block	s	4	2.00	23	12	20	52	0.03	2.5	25	38	0.34	2	1.87	1.88
33	Room No.- ..... Arindam Das	w	1	0.75	22	11.5	22	52	0.03	2.1	23	43	0.44	2	1.77	1.99
34	Room No.- 305, Vinod Tejwani	s	1	2.00	23	11	19	53	0.03	2.4	22	38	0.4	1.5	2.02	1.74
35	Room No.- 302	s	1	2.00	23	11	21	53	0.03	2.5	24	40	0.42	1.5	1.77	1.99
36	Room No.- 304 (Tutorial 1 - 2nd Floor)	s	1	2.00	24	11.5	19	53	0.03	2.3	23	38	0.36	0.75	1.81	1.94

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37	Room No. 306	s	1	2.00	24	12	20	52	0.03	2.2	25	38	0.32	2	1.72	2.04
38	Room No. 307	s	1	2.00	24	11	19	52	0.03	2.6	24	37	0.38	1.5	1.52	2.31
39	EPBAX Room	s	1	1.50	24	10	18	52	0.03	2.4	24	37	0.35	1.5	1.53	2.3
40	Chairman Office	s	2	1.50	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
41	old Open area/ Placement Office	s	1	1.50	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03
42	Office Rajeev JI	w	1	0.75	23	12	19	52	0.03	2.3	24	37	0.33	1.5	1.74	2.02
43	Admin Block	s	2	2.00	23	13	20	52	0.03	2.5	26	38	0.31	2	1.87	1.88
44	Room No. 217	w	1	0.75	24	12	21	52	0.03	2.2	24	39	0.34	0.75	1.92	1.83
45	Room No. 219	w	1	0.75	23	12	20	52	0.03	2.5	25	38	0.34	3	1.87	1.88
46	Room No. ..... Tripti Biswas	s	1	1.50	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
47	President Office- PA	w	1	0.75	24	11	20	52	0.03	2.3	22	38	0.38	1.5	1.69	2.08
48	Room No. 222- President Office	s	1	2.00	23	12	20	52	0.03	2.5	25	38	0.34	2	1.87	1.88
49	Room No.-227- President Waiting Lounge	s	1	2.00	24	12	20	53	0.03	2.5	25	38	0.34	1.5	1.79	1.97
50	Room No.- President Room	s	1	2.00	22	11.5	22	52	0.03	2.1	23	43	0.44	2	1.77	1.99
51	First Floor- Admin Work Station	s	2	2.00	24	12	20	53	0.03	2.4	25	38	0.33	1.5	1.78	1.98
52	Board Room	s	2	2.00	23	11	21	52	0.03	2.4	24	40	0.4	2	1.8	1.95
53	Studio 1	s	1	1.50	23	12	20	52	0.03	2.5	25	38	0.34	1.5	1.86	1.89
54	Studio 2	s	1	1.50	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
55	Work Station of Studio Rooms	s	1	1.50	24	11	19	52	0.03	2.6	24	37	0.38	2	1.52	2.31
56	Room No. ..... Mr. Ashok Agarwal	w	1	0.75	24	10	18	52	0.03	2.4	24	37	0.35	2	1.53	2.3
57	Room No. ..... Mr. Niraj Shrivastava	s	1	2.00	23	12	20	52	0.03	2.3	25	38	0.33	2	1.67	2.11
58	Room No. ..... Mr. Hem Bhargava (Registrar)	w	1	0.75	24	11	18	52	0.03	2.4	22	37	0.38	0.75	1.69	2.08
59	Room No. ..... Chair person's Office	w	1	0.75	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
60	Room No. ..... Mr. SD Gupta	s	1	2.00	24	11.5	19	53	0.03	2.3	23	38	0.36	0.75	1.81	1.94
61	Room No. ..... HR Office (Old)	s	1	2.00	24	12	20	52	0.03	2.2	25	38	0.32	2	1.72	2.04
62	Room No. ..... Raj Kr. Pathak	w	1	0.75	24	11	19	52	0.03	2.6	24	37	0.38	1.5	1.52	2.31
63	Room No. 115D	w	1	0.75	24	10	18	52	0.03	2.4	24	37	0.35	1.5	1.53	2.3
64	Society's Account Office	w	1	0.75	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
65	Room No. 201	w	1	0.75	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03
66	Room No. 202	w	1	0.75	23	12	19	52	0.03	2.3	24	37	0.33	1.5	1.74	2.02
67	Room No. 203	w	1	0.75	23	13	20	52	0.03	2.5	26	38	0.31	2	1.87	1.88

68	Room No. 204	w	1	0.75	24	12	21	52	0.03	2.2	24	39	0.34	0.75	1.92	1.83
69	Room No. 205	w	1	0.75	23	12	20	52	0.03	2.5	25	38	0.34	3	1.87	1.88
70	Room No. 206	w	1	0.75	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
71	Research Wing A 1	s	1	1.50	24	11	20	52	0.03	2.3	22	38	0.38	1.5	1.69	2.08
72	Research Wing A 2	s	1	1.50	23	12	20	52	0.03	2.5	25	38	0.34	2	1.87	1.88
73	Research Wing B	s	1	2.00	24	12	20	53	0.03	2.5	25	38	0.34	1.5	1.79	1.97
74	Room No. 207	w	1	0.75	22	11.5	22	52	0.03	2.1	23	43	0.44	2	1.77	1.99
75	Room No. 208	w	1	0.75	24	12	20	53	0.03	2.4	25	38	0.33	1.5	1.78	1.98
76	Room No. 209	w	1	0.75	23	11	21	52	0.03	2.4	24	40	0.4	2	1.8	1.95
77	Room No. 210	w	1	1.50	23	12	20	52	0.03	2.5	25	38	0.34	1.5	1.86	1.89
78	Room No. 211	w	1	0.75	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
79	Room No. 212	w	1	0.75	24	11	19	52	0.03	2.6	24	37	0.38	2	1.52	2.31
80	Room No. 214	s	1	2.00	24	10	18	52	0.03	2.4	24	37	0.35	2	1.53	2.3
81	Room No. 215	w	1	0.75	24	11.5	19	53	0.03	2.3	23	38	0.36	0.75	1.81	1.94
82	Guest Faculty 1st Floor	s	1	2.00	24	12	20	52	0.03	2.2	25	38	0.32	2	1.72	2.04
83	Faculty- Monika Choudhary	w	1	0.75	24	11	19	52	0.03	2.6	24	37	0.38	1.5	1.52	2.31
84	Faculty- Sumit Jain	s	1	2.00	24	10	18	52	0.03	2.4	24	37	0.35	1.5	1.53	2.3
85	Guest Faculty	s	1	2.00	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
86	Room No.- 315	s	1	2.00	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03
87	Room No. 506	s	1	1.50	23	12	19	52	0.03	2.3	24	37	0.33	1.5	1.74	2.02
88	Room No. 507	s	1	2.00	23	13	20	52	0.03	2.5	26	38	0.31	2	1.87	1.88
89	UPS Room- IT Building	s	1	2.00	24	12	21	52	0.03	2.2	24	39	0.34	2	1.92	1.83
90	Computer Lab- 1	s	6	2.00	23	12	20	52	0.03	2.5	25	38	0.34	3	1.87	1.88
91	Computer Lab- 2	s	2	2.00	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
92	Computer Lab- 3	w	1	1.50	24	11	20	52	0.03	2.3	22	38	0.38	1.5	1.69	2.08
93	Computer Lab- 3	t	1	3.00	23	12	20	52	0.03	2.5	25	38	0.34	2	1.87	1.88
94	Computer Lab- 3	s	1	2.00	24	12	20	53	0.03	2.5	25	38	0.34	1.5	1.79	1.97
95	Room No. 318	s	2	2.00	22	11.5	22	52	0.03	2.1	23	43	0.44	2	1.77	1.99
96	BCT Office	s	5	2.00	24	12	20	53	0.03	2.4	25	38	0.33	1.5	1.78	1.98
97	Gym Area	s	3	2.00	23	11	21	52	0.03	2.4	24	40	0.4	2	1.8	1.95
98	Hostel C Block	s	7	1.50	23	12	20	52	0.03	2.5	25	38	0.34	1.5	1.86	1.89
99	Hostel C Block	s	2	2.00	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
100	Hostel C Block	w	3	1.50	24	11.5	19	53	0.03	2.3	23	38	0.36	0.75	1.81	1.94
101	Hostel C Block	s	12	1.00	24	12	20	52	0.03	2.2	25	38	0.32	2	1.72	2.04
102	Club House- Dinning Area	s	4	2.00	24	11	19	52	0.03	2.6	24	37	0.38	1.5	1.52	2.31
103	Club House-Seminar Hall	w	2	1.50	24	10	18	52	0.03	2.4	24	37	0.35	1.5	1.53	2.3
104	Club House-Seminar Hall	t	3	3.00	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
105	Club House- Guest House Area	s	2	1.50	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03

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106	Club House- PMA Office	s	2	1.50	23	12	19	52	0.03	2.3	24	37	0.33	1.5	1.74	2.02
107	Club House- PMA Office	s	1	2.00	23	13	20	52	0.03	2.5	26	38	0.31	2	1.87	1.88
108	Club House- PMA Office	w	1	1.00	24	12	21	52	0.03	2.2	24	39	0.34	1	1.92	1.83
109	Club House- Director Bunglow	s	6	2.00	23	12	20	52	0.03	2.5	25	38	0.34	3	1.87	1.88
110	Hostel K Block	s	28	1.00	22	10	19	52	0.03	2.2	20	37	0.39	2	1.99	1.77
111	B Block Guest House	s	1	1.00	24	11	20	52	0.03	2.3	22	38	0.38	1.5	1.69	2.08
112	B Block Guest House	s	15	1.50	23	12	20	52	0.03	2.5	25	38	0.34	2	1.87	1.88
113	B Block Guest House	w	5	1.00	24	12	20	53	0.03	2.5	25	38	0.34	1.5	1.79	1.97
114	B Block Guest House	w	5	1.50	22	11.5	22	52	0.03	2.1	23	43	0.44	2	1.77	1.99
115	hostel 2nd D,E,F	s	24	1.00	24	11.5	19	53	0.03	2.3	23	38	0.36	0.75	1.81	1.94
116	hostel 1st A,B,C	s	54	0.75	24	12	20	52	0.03	2.2	25	38	0.32	2	1.72	2.04
117	Hostel J Block	s	80	0.75	24	11	19	52	0.03	2.6	24	37	0.38	1.5	1.52	2.31
118	Hostel J Block	v	1	10.00	24	10	18	52	0.03	2.4	24	37	0.35	1.5	1.53	2.3
119	Hostel J Block	v	1	4.50	23	11	19	52	0.03	2	22	37	0.33	2	1.74	2.02
120	Hostel J Block	s	9	2.00	23	12	20	52	0.03	2.2	25	38	0.32	2	1.74	2.03
121	Hostel J Block	s	2	1.50	23	12	19	52	0.03	2.3	24	37	0.33	1.5	1.74	2.02
122	Hostel J Block	s	16	1.00	23	13	20	52	0.03	2.5	26	38	0.31	2	1.87	1.88
123	Hostel J Block	s	1	1.00	24	12	21	52	0.03	2.2	24	39	0.34	1	1.92	1.83
124	Accounts Department	s	1	1.50	23	12	20	52	0.03	2.5	25	38	0.34	3	1.87	1.88
125	Accounts Department	w	4	1.50	24	12	21	52	0.03	2.2	24	39	0.34	1.5	1.92	1.83

Remarks: - We have checked the Energy Efficiency Ratio of AC's and the EER of AC's is fairly OK. But in the future, you should purchase 5-Star rated invertor-based split AC's because the power consumption of inverter-based BEE 5-Star rated AC's is less than non-star rated AC's.

Also, we recommend IIHMR University to organize a periodic maintenance schedule and take corrective actions for insulating of AC's refrigerant lines to protect against energy losses.

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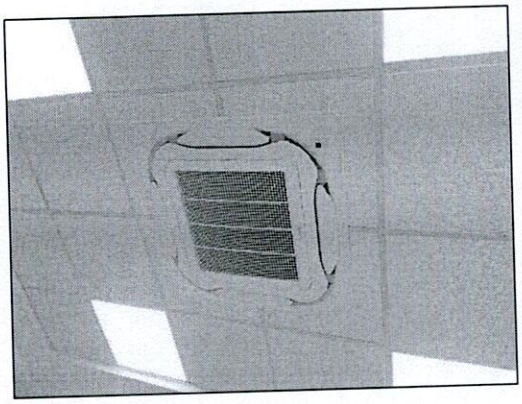

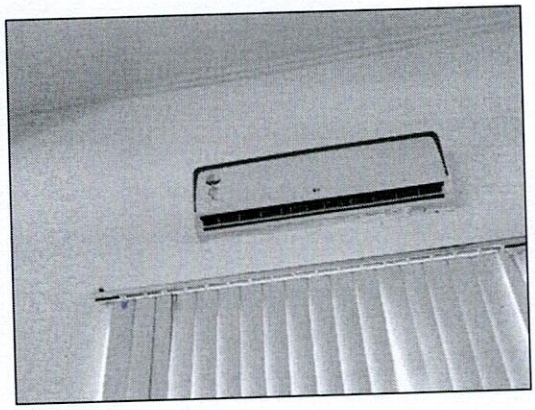

5. FANS ANALYSIS

In the IIHMR University, there are 886 Ceiling Fans are installed, out of which 403 fans are of 80W and 367 fans are 60W. The observations and suggestions are given below.

Location/ Identification	Ceiling Fan-60W	Ceiling Fan-32W	Wall Hanging Fan 80W
V Tejwani	1		
Room No. - Placement	2		
Room No. - NK Sharma	1		
Conference Hall	32		4
Room No. 225	1		
Room No. 306	1		
Faculty Wing 1,2 & Rooms	27		
Class Room 1	11		2
Corridor CLASS(1-4)	2		
Class Room 2 & 3	11		
Class Room 4	8		
Class Room 5	5		
Corridor- Studio	2		
Class Room 8		4	
Class Room 9	8		
Class Room 10	8		
Class Room 11		8	
Class Room 12	9		
Class Room 13	9		
Hostel 1			72
Hostel 2			24
Hostel 3			96
Hostel 4 (J Block)			159
Hostel 5 (K Block)			36

Guest House (B Block)	40		
Canteen Area	62		1
Director Bungalow	8		1
MDp Centre	23		
Staffs Quarters (C Block)	18		
Guest Office	5		1
BCT BASEMENT	10		1
GYM AREA	11		
COMPUTER LAB	14		
SADANI'S SIR WING	12		
NEERAJ SIR WING	12		
PGDM BASEMENT	6		2
RECEPTION AREA	2		1
Admin/Accounts/HR Block- New		21	
Library (Basement, Ground & first Floor)		25	3
New Auditorium (Basement, Ground & first Floor)		31	
New Admin Block & SDGSPM	6	27	
Total	**367**	**116**	**403**

Total no of Ceiling Fans (60W)	367
Total no of Ceiling Fans (80W)	403
Total wattage of 60W Ceiling Fans	22020
Total wattage of 80W Ceiling Fans	32240
Total wattage of BEE 5 Star rated Fans (30W)	11010
Total saving in Wattage after replacement	43250
Operating hours per day	6
Operating days per annum	180
Energy charges per unit in Rs.	10
Saving in Rs./annum	467100
Investment INR	2012500
Payback period: - Months	4.31

Observation and Suggestions: -

In the college, most of the ceiling fans are of 80 W and 60W but BEE 5 Star Rated of 30W Ceiling Fans are present in the market. Considering the buy back period of 5 Star rated 30W fans, we recommend to consider purchasing 5 star BEE fans for all future purchases.

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

6. ANALYSIS OF LIGHTING SYSTEM

6.1 BRIEF DESCRIPTION OF EXISTING SYSTEM

For assessing the energy efficiency of the lighting system, an 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 the working level has been done.

6.2 INVENTORY OF LIGHTING

Light Wattage	Count
200W-LED High Mast	5
03 W LAMP	198
05W LED	113
5 W BULB	38
07W LED	570
8 W SURFACE LIGHT	88
60W LED	29
10 W	7
12W	78
14 W	64
15 W	302
18W	24
18W LED Light	239
12 W LED Round	71
25 W	17
30W / 36W LED	453
36W Tube light	740
40 W TUBE LIGHT	98
18W LED Flood	70
20 W LED	633
CFL	25
22W	202
28 W	1
2 X 2 LED Panel	46
50W / 100W	1
Faux Light	35
Foot Light	33
Total	**4057**

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

The college has initiated an LED-based lighting solution, but still, there are 740(36W) tube lights. LEDs save energy, the life span is much greater, and emit virtually no heat. We recommend replacing the tube lights with LEDs.

Additionally, we recommend increasing motion sensor-based lights in common areas such as libraries, washrooms, corridors, etc.

Table - Luminous Performance Characteristics of Commonly Used Luminaries					
Type of Lamp	Lumens/Watt		Colour Rendering 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 coating (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, and car parking. floodlighting	5000

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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 warehouses, factories, street lighting	6000 - 12000
Low-pressure sodium (LPSV) SOX	101-175	150	Poor (10)	Roadways, tunnels, canals, street lighting	6000 - 12000
Metal halide lamps	75-125	100	Good (70)	Industrial bays, spotlighting, floodlighting, retail stores	8000
LED Lamps	30-50	40	Good (70)	Reading lights, desk lamps, night lights, spotlights, security lights, signage lights, etc.	40000 - 100000

7. OTHER POWER CONSUMPTION

7.1 INVENTORY OF IT INFRASTRUCTURE

Sl No.	Location / Identification	Desktop	Laptop	Printers	Scanners	Servers	Projectors	Wi-Fi Access points	Network Switches	Digital Display	Online UPS
1	Faculty	10	33	28							
2	Accounts	13	5	5	1						
3	Administration	12	7	8							
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	140		18							
12	HR	3	5	2	1						
13	Classrooms	20					20				
14	IT Store	33	57								
15	President sir Home	1		1							
16	Trustee sir Home	1		1							
17	Dr. Agarwal office	1	2								
18	President office	6	2	4							
19	Registrar office	2	3	3							
20	IQAC	2	1	1							
21	Account Society	4	1	2							
22	NFHS East West	2		1							
23	NFHS Uttarakhand	1		1							
24	SDS Meeting Room	1									
25	Campus							102	97	15	6
		312	133	97	3	4	20	102	97	15	6

7.2 WATER PUMP DETAILS

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

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7.3 OTHER LOADS

Sl No.	Location/ Identification	60W Exhaust Fan	160W Exhaust Fan	Water Cooler-200W	180W-Desert Cooler	Water Cooler-575W	Air Ducting	UPS		
								90 KVA	20 KVA	6 KVA
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 Class room 8	1								
8	Toilet near Class room 9	1							2	
9	Toilet near Class room 13	1								
10	Hostel 4 (J Block)		48							
11	Hostel 5 (K Block)	32								
12	Guest House (B Block)									
13	Canteen Area					3	2			
14	Director Bungalow	3			1					
15	MDp Centre		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 Block	4								
20	2nd Floor Toilet	4								

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21	New Auditorium 2nd Floor	1								
22	Examination Department-Toilet BASEMENT	5								
23	Toilet-Board Room	1								
24	Toilet-Reception Area	1			1					
25	Corridor CLASS (1-4)	5				1				
26	New Auditorium (Basement, Ground & first Floor)	4						1		
27	New Admin Block & SDGSPM	3								
30	IT Department								1	1
	Total	**81**	**54**	**1**	**2**	**4**		**1**	**3**	**1**

ANALYSIS

There should be a regular maintenance schedule of equipment like pumps, exhaust fans, and IT equipment. Electronics such as computers, printers, scanners, etc. more than 3 years or 5 years old (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 ******