

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

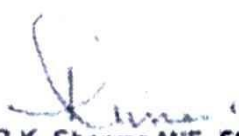
Option: A. Any 4 of the Above

Green/Environment Audit Certificate



CERTIFICATE

This is to confirm that "GJIMT" performed a detailed Green Audit of their campus during the 2022-2023 academic year and submitted all required data and credentials for evaluation. Based on the report submitted, the campus's actions and measures have been verified and found to be satisfactory. The efforts made by staff and students in the areas of environment and sustainability are much appreciated and encouraged.


ER. R.K. Sharma MIE, FIV
Green Building Accredited Professional
For R.K. Electricals and Energy Audit Services

Date 10/8/23

R.K. ELECTRICALS & ENERGY AUDIT SERVICES
ER. R.K. SHARMA MIE, FIV
BEE'S Energy Auditor (En-10000)
IPCC VI Eng. Energy Auditor Mr. Sharma
Dist. Regd. Valuer & Chartered Engineer

Energy Audit Certificate



ENERGY AUDIT CERTIFICATE

This is to certify that the R.K. ELECTRICALS & ENERGY AUDIT SERVICES conducted the Energy Audit of "GIAN JOYTI INSTITUTE OF MANAGEMENT AND TECHNOLOGY, PHASE-2 Mohali Punjab", from 19th May to 25th May for the academic year 2022-2023. This audit involved extensive consultation with all the related team, office record, data collection, measurements and cost benefit analysis

The study exhibited the Annual Energy saving potential of 0.35 Lacs KWH with annual monetary saving: Rs 3.13 Lacs by investing Rs. 1.95 Lacs



For R.K. ELECTRICALS & ENERGY AUDIT SERVICES

Date
10/8/23

Er. R. K. Sharma MIE, FIV
BEE's Energy Auditor (EA-10080) MoP, GoI
HP Govt. Emp Energy Auditor, DoE, Shimla
Green Building Accredited Professional (IGBC)
Govt. Regd. Valuer & Chartered Engineer



R.K. ELECTRICALS & ENERGY AUDIT SERVICES

(Energy Consultant, Energy Audits, Thermography, Valuation P & M)

GSTIN: 04ADBPK4732B1Z9

ISO 50001: 2018 CERTIFIED
ISO 9001: 2015 CERTIFIED
ISO 14001: 2015 CERTIFIED

ER. R.K.SHARMA MIE, FIV

A/Xen (Retd) UT Electricity, Chandigarh Admn.
BEE's C/Energy Auditor (EA-10080) MoP, GoI
HP Govt. Emp Energy Auditor, DoE, Shimla
Indian Green Building Accredited Professional
Govt.Regd.Valuer & Chartered Engineer

RKS/CHD/L. /36 /2023

Dated 24.07.2023

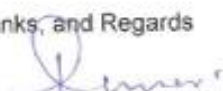
To
The Director
Gian Joyti Institute of Management & Technology,
Phase – 2, Mohali

Sub: Submission of Final Energy Audit report & Green Audit report in r/o of GJIMT, Mohali

Sir

Here by we submit Final Energy Audit report & Green Audit report in r/o your good institution in duplicate along with certificates vide W/O No. dated 19.05. 2023. Also enclosed invoice - 68 No. dated for making payment in our bank account. The details of the bank is as below
Bank-Axis, Sector-32 Chandigarh
A/C No.-917020075331888
IFS Code-UTIB0001606

Thanks, and Regards


For R.K. Electricals & Energy Audit Services

R.K. ELECTRICALS & ENERGY AUDIT SERVICES
ER. R.K. SHARMA MIE, FIV
BEE's C/Energy Auditor (EA-10080)
HP GOVT. Emp. Energy Auditor, DoE, Shimla
Govt. Regd. Valuer & Chartered Engineer

Clean and green campus recognitions/awards



Energy Swaraj Foundation has awarded Silver Certificate of Appreciation for making more than 500 people Energy Literate



**Energy Swaraj Foundation has awarded Certificate of Appreciation for participating in
“National Wrinkle Acche Hain”**



Second position awarded to GJIMT in the category of Educational Institutes (Government & Private Buildings) for its efforts in the field of Energy Conservation.

Beyond the campus environmental promotional activities

S. No	Name of the Activity	Date	Purpose
1.	Tree Plantation Activity by NCC and NSS Students	27 th July, 2024	To sensitize students and the community about the importance of trees in maintaining environmental balance.
2.	“SWACHHATA HI SEWA” Campaign - “Zero Waste Event”	1 st October, 2024	To make student aware about sustainable practices but also inspired them to maintain a clean and green environment.
3.	Clean and Green Environment Awareness - wall painting Activity	10 th March, 2025	To create widespread awareness about environmental issues and their impact. To educate the community on sustainable practices, including waste management and energy conservation.
4.	Swachh Bharat, Swasth Bharat - Cleanliness Drive	19 th March, 2025	To promote cleanliness, hygiene, and responsible civic behaviour among students and the community and to raise awareness about the importance of cleanliness for a healthy society.

Tree Plantation Activity by NCC and NSS Students

As part of our institution's commitment to environmental sustainability and community service, a Tree Plantation Activity was organized last year, led by our Students, faculty members, and National Cadet Corps (NCC) and National Service Scheme (NSS) students who enthusiastically participated and organized this event near industrial area, sector 73 and Phase-2 Residential areas (outside the campus).

Purpose of the Event:

- To sensitize students and the community about the importance of trees in maintaining environmental balance.
- To align with our institution's mission of contributing to sustainable development.

Location: Sector-73-Industrial Area and Phase-2 (Residential Areas outside campus)

Date of Event: 27th July, 2024



Tree Plantation Drive dated 27 July 2024

Learning Outcomes:

- The event aimed to promote ecological balance, enhance green cover, and create awareness about the importance of tree conservation
- Such initiatives reflect our institution's dedication to sustainable practices and holistic education

“SWACHHATA HI SEWA” Campaign - “Zero Waste Event”

Swachh Bharat Mission (SBM), Swachh Bharat Abhiyan, or Clean India Mission is a country-wide campaign initiated by the Government of India on 2 October 2014 to eliminate open defecation and improve solid waste management and to create Open Defecation Free (ODF) villages

Our institute recently organized a “SWACHHATA HI SEWA” Campaign - “Zero Waste Event” under the Swachh Bharat Abhiyan initiative outside the Campus area, demonstrating our commitment to environmental sustainability and effective waste management.

Purpose of the Event:

Students and volunteers actively participated in the event, focusing on reducing single-use plastic, segregating waste at the source, and encouraging the use of reusable materials. They set up dedicated bins for biodegradable and non-biodegradable waste, conducted awareness sessions, and ensured that all participants followed zero-waste guidelines.

Location: Phase-2 (Residential Areas outside campus)

Date of Event: 01st October, 2024

GJIMT celebrates Swachhata Hi Sewa campaign week

MOHALI (LK BANSAL): Gian Jyoti Institute of Management and Technology (GJIMT) celebrated the Swachhata Hi Sewa Campaign Week, hosting a variety of activities to promote cleanliness and community engagement. Throughout the week, different events took place at campus, where students not only cleaned the premises but also the surrounding areas. They actively raised awareness about the importance of cleanliness in Phase 2, Mohali Market. On the final day of the campaign, a vibrant Flash Mob was performed by 50 enthusiastic NSS volunteers. Through lively and energetic dance routines, the volunteers aimed to spread the message of cleanliness and sanitation. The flash mob was set to the popular local song "Charche Mohali Shehar De", adding a regional flavor to the engaging awareness activity.



Newspaper clippings of GJIMT celebrating the Swachhata Hi Sewa campaign dated 1st October 2024

Learning Outcomes:

The "Zero Waste Event" not only educated students about sustainable practices but also inspired them to maintain a clean and green environment. Such initiatives reflect our institution's dedication to environmental consciousness and responsible citizenship.

Clean and Green Environment Awareness - wall painting Activity

As part of our institution's on-going commitment to promoting environmental consciousness, our students recently conducted a "Clean and Green Environment Awareness wall painting Activity" in two villages. This initiative aimed to sensitize villagers about the importance of maintaining a clean and green environment through visually engaging and informative posters.

Purpose of the Event:

- To create widespread awareness about environmental issues and their impact.
- To educate the community on sustainable practices, including waste management and energy conservation.

Location: Village Ballomajra and Jagatpura

Date of Event: 10 March, 2025



Educational Wall Paintings on Cleanliness and Sustainability made by GJIMT Students dated 10th March 2025

Learning Outcomes:

The "Clean and Green Environment Awareness wall painting Activity" served as a powerful medium for spreading environmental awareness, inspiring the local community to adopt eco-friendly practices. Such initiatives reflect our institution's dedication to nurturing socially responsible and environmentally conscious individuals.

Swachh Bharat, Swasth Bharat - Cleanliness Drive

As part of the nationwide Swachh Bharat Abhiyan and our institution's commitment to community service and environmental health, NSS Volunteers organized Cleanliness Drive and enthusiastically cleaned the campus and surrounding areas, picking up litter, sweeping pathways, and educating the local community about maintaining cleanliness spreading the message of "Swachh Bharat, Swasth Bharat."

Purpose of the Event:

- The objective of this initiative was to promote cleanliness, hygiene, and responsible civic behavior among students and the community and to raise awareness about the importance of cleanliness for a healthy society.

Location: Phase-2 (Market area outside campus)

Date of Event: 19th March. 2025



NSS Wing of GJIMT participating in the Swachh Bharat Abhiyan on 19th March 2025

Learning Outcomes:

This drive marks the beginning of a week filled with impactful activities, reinforcing the values of selfless service and civic engagement.

This initiative not only transformed the area but also encouraged the residents to adopt clean and green practices.



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ER. R.K. Sharma MIE, FIV
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For R.K. Electricals and Energy Audit Services

Date 10/8/23

R.K. ELECTRICALS & ENERGY AUDIT SERVICES
ER. R.K. SHARMA MIE, FIV
BEE'S C Energy Auditor (EA-10000)
HP GOVT. Engg. Energy Auditor (Dr. Sharma)
Govt. Regd. Valuer & Chartered Engineer

GREEN AUDIT REPORT



Gian Jyoti Institute of Management and Technology, Phase 2, Mohali

CONDUCTED BY:

R.K. ELECTRICALS & ENERGY AUDIT SERVICES (An ISO Co.)

Er. R. K. Sharma MIE, FIV
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2022-23

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ACKNOWLEDGEMENTS

R.K. ELECTRICALS & ENERGY AUDIT SERVICES places on record its sincere thanks to the management of “**Gian Joyti Institute of Management & Technology, Mohali**” for entrusting the project of Green audit of the building of GJIMT, Mohali particularly: -

Dr. J S Bedi: Chairman

Dr. Aneet Bedi: Director

We express our thanks to the following:

Prof. Gurdeepak Singh: Director International Studies

Assistant Prof. Sh. Sanjay Gupta

Assistant Prof. Sh. Vivek Sharma

Without whose constant support, we could not have carried out this audit.

ER. R.K, Sharma MIE, FIV

BEE's C/ Energy Auditor (EA-10080) MoP, GoI

1. EXECUTIVE SUMMARY

ER. R.K, Sharma MIE, FIV BEE's C/ Energy Auditor (EA-10080) MoP, GoI was entrusted the Green audit of GJIMT. The management of the campus is conscious to improve sustainability and complementary to its Green Policy. 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. Keeping in view 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.

GJIMT aims to minimize the environmental impact of its operations and move towards restoring environmental integrity, promote social justice, equity and diversity, contribute to human health and maintain its financial viability.

As part of its commitment to sustainability, GJIMT developed a Sustainability Policy and Sustainability Strategy and is now developing a series of Sustainability Action Plans on energy and greenhouse, water, transport and waste to support implementation of the Policy and Strategy.

This document deals with Green Audit of GJIMT, Mohali for the year 2023-2024

2. THE BRIEF DESCRIPTION OF PREMISES

Project Title: Green Audit of the building of the Gian Jyoti Institute of Management and Technology.	
Client: Director, Gian Jyoti Institute of Management and Technology, Mohali	
Contact Person: Mr. Sanjay Gupta (Asst Prof.)	
Date of Audit: 23 & 24 May 2023	
Source: Data collection from the staff & Physical verification/Inspection	
Date of report: 19.06.2023; Report Number: RKS/GA-26/2023	
Work Carried out by: (Team Composition)	Er. R.K. Sharma (BEE's Energy Auditor) EA-10080, Accredited Professional (IGBC) Mrs. Savita Sharma M.Sc. (Ecology Environment) Er. Varun Sharma B. Tech (EE), MBA, PGD (Indl Safety)

3. INTRODUCTION

3.1. Gian Jyoti Institute of Management & Technology (GJIMT) was established under the aegis of Gian Jyoti Educational Society (GJES) in the year 1998. GJIMT is an ISO 9001:2008 certified. approved by All India. Council of Technical Education (AICTE), New Delhi and affiliated to IKG Punjab Technical University (PTU), Kapurthala. Being Best Colleges in Mohali & North India's premier destination in the fields of management and computer applications, located in the heart of Mohali City, GJIMT has been setting milestones in academics and placements.

GJIMT imparts holistic management and technical education to nurture and develop human resources globally. standards, capable of serving the industry and society productively. Hence, a conscious effort made to give latest and practical exposure to its students of *MBA, MCA, BBA, BCA & B.Com* programs.

GJIMT has maintained the Top B-Schools of the country rankings for more than a decade now in surveys conducted by the various prestigious publications like Business Standard (2017), Outlook (2016) and Bureaucracy Today (2015). These surveys have been carried out on various parameters involving academics, pedagogy, infrastructure, training, and placement.

The Institute aims to make value addition to the professional skills of its students from day one by introducing the Employment Readiness Program (ERP). GJIMT maintains strong. industry connections that help students to get industry exposure before their final placements.

3.2. Green Analysis can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyses environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. Through Green Audit, one gets direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Analysis. Green auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards

3.3 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. The audit team will study an organization's environmental effects in a systematic and documented manner and will Produce a green audit report.

4. OBJECTIVE OF THE STUDY

The main objective of the green analysis is to promote the Environment Management and Conservation in the university Campus. The purpose of the analysis 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 Analysis are:

- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requiring high cost and To bring out a present status report on environmental compliance
- To introduce and 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 of the campus.

5. METHODOLOGY

Methodology adopted for achieving the desired objectives viz: 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:

- I. Geographical Metrological parameters
- II. Water consumption and management
- III. Electricity consumption and management
- IV. Air quality assessment and management
- V. Sound pollution monitoring
- VI. Waste management
- VII. Biodiversity status of the campus

6. GEOGRAPHICAL AND METROLOGICAL PARAMETERS

Mohali, with Latitude: 29.983 Longitude: 75.083 is located at about 5 KM from state capital Chandigarh and is a prominent district headquarter city of Punjab. In Mohali, during the entire year, the rain falls for about 95 days and records up to 850mm.

The district lies in the South-western region of the State and is near the Shivalik ranges in the North of the state. The city is well connected by road to Chandigarh both by road and rail and also with prominent places like Delhi, Amritsar, Jalandhar, Ludhiana, Patiala, Ambala, Jammu etc.

6.1. Weather Bins

This area has a humid subtropical climate characterized by a seasonal rhythm: hot summers, cold winters, good amount of rainfall and great variation in temperature. Mohali weather by month weather averages:

During the three months of monsoon season from July to September, the moist air of oceanic origin penetrates the district and causes high humidity, cloudiness and good monsoon rainfall. The period from October to November constitutes the post monsoon season. The cold weather season prevails from December to February followed by the hot weather season or Pre-monsoon season which ends up to the last week of June.

6.1.1. Rain fall

The normal annual rainfall of Mohali District is about 850mm in 60 days which is unevenly distributed over the district. The southwest monsoon sets in the last week of June and withdraws towards end of September and contributes about 80% of annual rainfall. July and August are the rainiest months. The remaining 20% of the annual rainfall occurs during the rest of the year in the form of thunderstorms and western disturbances. Rainfall in the district increases from southwest to northeast. Therefore, climatically, the district is very hot in summer and frequently scorching heat is in full swing. The climate of Mohali district can be classified as tropical steppe, semi-arid and hot which is mainly dry except in rainy months and characterized by intensely hot summer and cold winter. During three months of monsoon season from July to September, the moist air of oceanic origin penetrates the district and causes high humidity, cloudiness and good monsoon

7. WATER CONSUMPTION AND MANAGEMENT

7.1. Water extraction and Storage

The College gets water for drinking and other purposes from the supply line of Municipal Corporation which is duly metered. The water is stored in underground tanks initially after which it is pumped up to overhead tanks using electric motor – pump sets.



Motor – Pump sets transporting water from underground tanks to overhead water tanks



GJIMT extracts water for consumption from MC's metered supply line

Details of Pumps installed in University Campus

Sr.No.	Name	Quantity (Nos)	Capacity HP/KW	Location
1	Mono Block Pump	2	1 HP Each	In corridor between main building and parking area.

7.2 Drinking water and quality

Reverse Osmosis Plant - Reverse osmosis (RO) is a membrane separation process, driven by a pressure gradient, in which the membrane separates the solvent (generally water) from other components of a solution. The membrane configuration is usually crossflow. The campus has provided purified R.O. drinking water to all the students and staff residing on the campus by setting up the R.O plant. In addition to drinking purpose, R.O water is provided to the hostel mess for cooking foods.

At GJIMT Campus, RO units have been installed at various locations along with Water coolers so that faculty, staff and students can have access to clean drinking water. The RO systems are serviced regularly from authorized agencies.



Measured pH value and TDS Value of filtered drinking water

Auditors checked the quality of the drinking water after it is treated from RO Plant by taking a sample and found the quality water which is as under:

SR NO.	Particulars of checked item	Value	Remarks
1	Sample of drinking water for testing PH Value	7.8	Good
2	Sample of drinking water for testing TDS (total dissolved solids) Value	130 ppm	Good

Findings:

1. The PH value of safe drinking water lies between 6.5 & 8.5
Tested the sample of drinking water and found to be 7.8 which is Neutral PH value for safe drinking water
2. The TDS value of safe drinking water is less than 300 ppm
The TDS value of tested sample found to be 130 which is good and safe for drinking water

7.3 Water Conservation

GJIMT has 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.



Fig: Automatic sensor-based Water urinals being used in building of GJIMT

7.4.1. Use of Efficient Water Urinals/Fixtures

- **Low water use urinals:** Use of the standard systems urinals. Water is applied automatically through a continuous drip-feeding system or by automated flushing at a set frequency; 24x7. Water consumption varies with the system model at an average of 4 litres per flush.
- **Smart flush systems:** Now a days smart flush system 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 odour 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 the room.
- **Other system** uses biological blocks which include microbial spores and Surfactants which can be placed into any urinal, thus eliminating water use

Other Areas which need attention for water conservation include

1. Identifying and Fixing Leaks
2. Review Leakages periodically & take corrective measures
3. Re-use Water
4. Recycle water

7.4.2. 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.

7.4.3. Review Leakages periodically & take corrective measures

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.

7.4.4. Rain Water Harvesting and conservation

One of the mediums of harvesting rainwater is providing the incoming rainwater directly to the ground. This will increase the ground water level of the location and also helps in achieving the ground water at same or at less level than the existing level,

7.4.5. Rain fall

The normal annual rainfall of Mohali District is 408 mm in 20 days which is unevenly distributed over the district. The southwest monsoon sets in the last week of June and withdraws towards end of September and contributes about 82% of annual rainfall. July and August are the rainiest months. The remaining 18% of the annual rainfall occurs during the rest of the year in the form of thunderstorms and western disturbances. Rainfall in the district increases from southwest to northeast. It is the nearest to the Tar Desert of Rajasthan and far away from the Major rivers lines that run through the state. Therefore, climatically, the district is very hot in summer and frequently scorching heat is in full swing. The climate of Mohali district can be classified as tropical steppe, semi-arid and hot which is mainly dry except in rainy months and characterized by intensely hot summer and cold winter.

During the three months of monsoon season from July to September, the moist air of oceanic origin penetrates the district and causes high humidity, cloudiness and good monsoon rainfall. The period from October to November constitutes the post monsoon season. The cold weather season prevails from December to February followed by the hot weather season or Pre-monsoon season which ends up to the last week of June.

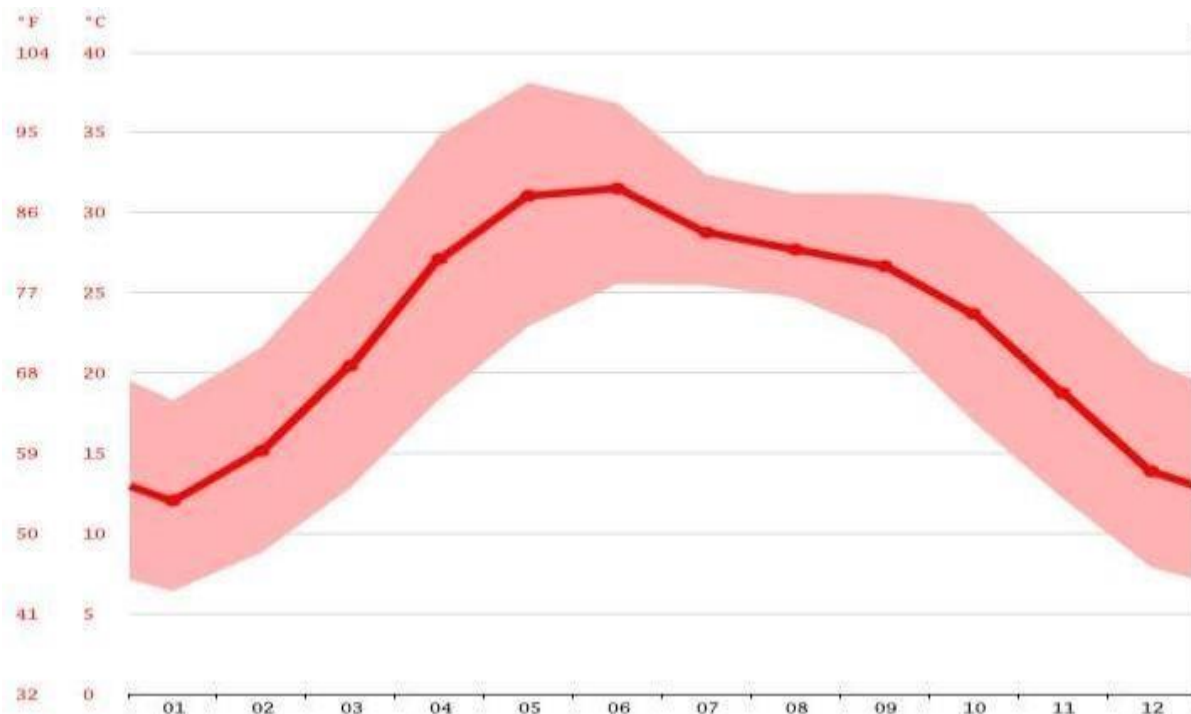
Yearly Weather Scenario of Mohali Area

January February March April May June July August September October November December

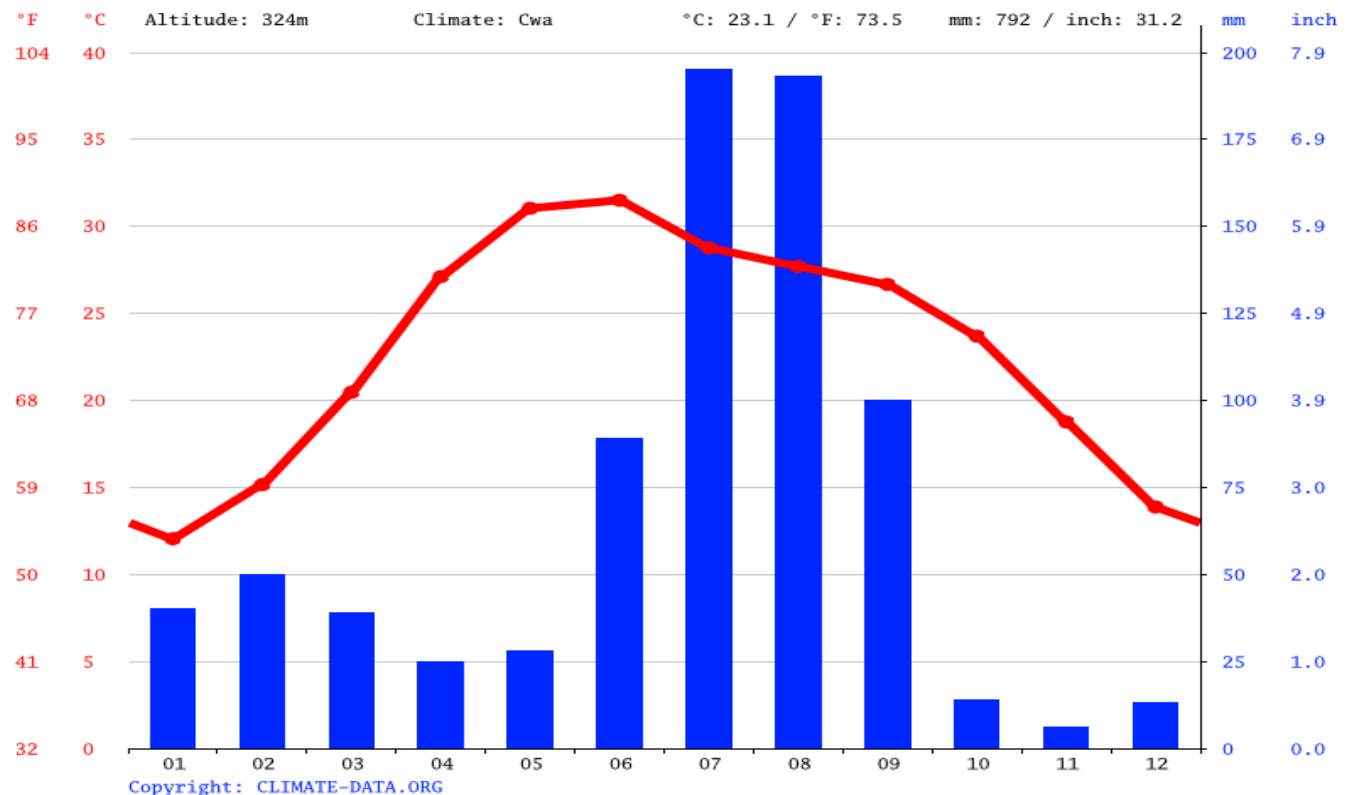
Avg. Temperature °C (°F)	12 °C (53.7) °F	15.2 °C (59.3) °F	20.5 °C (68.8) °F	27.1 °C (80.8) °F	31 °C (87.9) °F	31.5 °C (88.7) °F	28.8 °C (83.8) °F	27.7 °C (81.9) °F	26.7 °C (80) °F	23.7 °C (74.7) °F	18.8 °C (65.8) °F	13.9 °C (57) °F
Min. Temperature °C (°F)	6.4 °C (43.5) °F	8.8 °C (47.9) °F	12.8 °C (55.1) °F	18.4 °C (65.1) °F	22.9 °C (73.2) °F	25.6 °C (78) °F	25.5 °C (77.8) °F	24.7 °C (76.4) °F	22.4 °C (72.3) °F	17 °C (62.6) °F	12.2 °C (54) °F	7.9 °C (46.2) °F
Max. Temperature °C (°F)	18.3 °C (64.9) °F	21.6 °C (70.9) °F	27.7 °C (81.8) °F	34.8 °C (94.7) °F	38.1 °C (100.6) °F	36.8 °C (98.3) °F	32.4 °C (90.3) °F	31.2 °C (88.2) °F	31.2 °C (88.1) °F	30.5 °C (87) °F	26 °C (78.8) °F	20.8 °C (69.4) °F
Precipitation / Rainfall mm (in)	40 (1)	50 (1)	39 (1)	25 (0)	28 (1)	89 (3)	195 (7)	193 (7)	100 (3)	14 (0)	6 (0)	13 (0)
Humidity(%)	73%	65%	50%	30%	30%	46%	75%	80%	73%	55%	56%	66%
Rainy days (d)	3	4	4	4	5	8	16	16	8	1	1	1
avg. Sun hours (hours)	8.4	9.4	10.6	11.6	12.2	11.8	10.2	9.6	9.8	10.1	9.4	8.7

The hot season lasts for 2.6 months, from April 22 to July 8, with an average daily high temperature above 36°C. The hottest month of the year in Mohali is June, with an average high of 40°C and low of 27°C.

The cool season lasts for 2.6 months, from December 3 to February 21, with an average daily high temperature below 24°C. The coldest month of the year in Mohali is January, with an average low of 9.5°C and high of 20.5°C.



Average Temperature of Mohali Area



Climate graph // Weather by Month Mohali

7.4.6. Rain water Harvesting: GJIMT has constructed one rain water harvesting tank near main block of college campus which can store up to 5000 Lts of rain water which can be used for landscape irrigation.

UNDERGROUND RAINWATER HARVESTING TANK CONSTRUCTED IN GJIMT



Installed By: -Bantair India Private Limited

Year	Average Rainfall
2022	730 mm

Thus, it is observed that after rain water harvesting and recharging system i.e., Installation of recharge wells / rain water harvesting pits for recharging groundwater tables is completed, the arrested water can be utilized for landscape irrigation in campus.

D

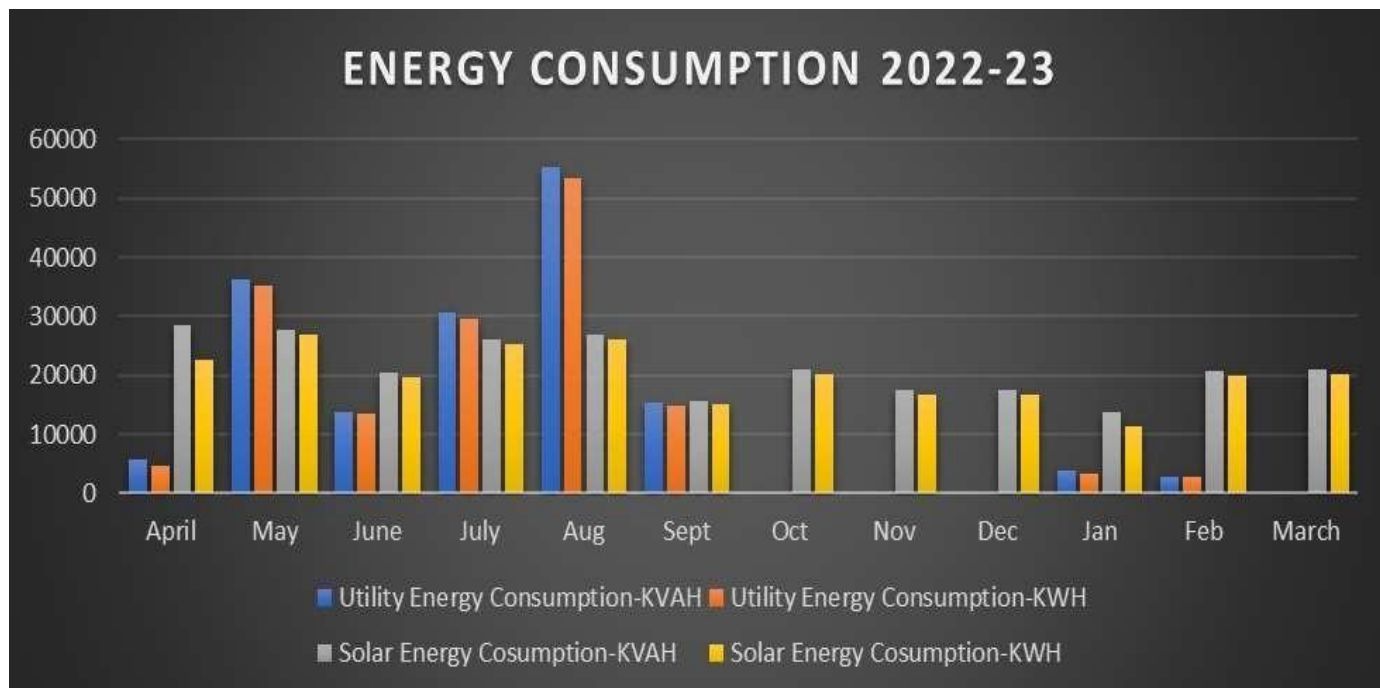
8. ELECTRICITY CONSUMPTION AND MANAGEMENT

Gian Jyoti College of Engineering and Management, Mohali draws power from PSPCL through dedicated feeder at 11 KV. The campus has two transformers of 315 KVA to step down the voltage from 11 KV to 433V.

8.1. Detail electricity billing using Solar power

MONTH	SOLAR GENERATION	SOLAR EXPORT	UTILITY CONSUMPTION	NET UTILITY CONSUMPTION	NET SOLAR CONSUMPTION	TOTAL CONSUMPTION
	KWH	KWH	KWH	KWH	KWH	KWH
22.MAR-21.APR	24946	6556	14548	7992	18390	26382
21.APR-19 MAY	18840	1963	22412	20449	16877	37326
19. MAY-20. JUNE	26852	1300	33716	32416	25552	57968
21.JUN-18. JUL	19736	3248	15640	12392	16488	28880
18.JULY-22.AUG	25276	3232	29688	26456	22044	48500
22.AUG-30. SEPT	26024	2224	51292	49068	23800	72868
30.SEPT-21.OCT	15070	2436	15356	12920	12634	25554
21. OCT-22. NOV	20108	11256	-2228	-13484	8852	-4632
22.NOV-22.DEC	16756	9116	8380	-736	7640	6904
22.DEC-21.JAN	11467	6124	10628	4504	5343	9847
21. JAN-22. FEB	19913	8644	10248	1604	11269	12873
22.FEB-22.MAR	20217	9708	7504	-2204	10509	8305
TOTAL	245205	65807	217184	151377	179398	330775

Thus, 54% saving in energy by using solar power in the campus



8.2 Energy conservation measures

GJIMT has installed 200 KWp capacity power plant for use of Renewable energy Resources



Solar Power plant (200 KWP) installed in campus



8.3. Findings & Comments

As seen from the above table, only 47% of electricity power purchased from the utility and 53% power consumed which is generated by solar power plant installed in the GJIMT

The authorities of GJIMT is very conscious about energy conservation and has already replaced conventional lighting with LED lighting and some street lights and Geysers with solar street lights and solar water heaters and installed 200 Kw solar plant to facilitate and promote energy efficiency in the campus.



Solar Inverters installed to convert Solar energy generated by solar panels into useful energy for utilization in campus.

9. AIR QUALITY ASSESMENT

9.1. The Air Quality Index

The **Air Quality Index** (AQI) is an index for reporting daily air quality. It tells us how clean or polluted the air is, and what associated health effects might be a concern. The AQI focuses on health effects which may be experienced within a few hours or days after breathing polluted air.

9.2. IN DOOR ENVIRONMENTAL QUALITY

Health and comfortable life are the topmost priority of every building user. Corresponding to health and wellbeing, the quality of a built environment for its occupant inside a building is referred to as indoor environmental quality. Indoor environmental quality involves noise disturbance, occupant density, indoor lighting, day lighting, ventilation, room temperature, cleanliness and indoor humidity. All these factors add up and form indoor environmental quality.

The AQI is divided into three categories. **CO₂, TVOC & HCHO** Each category has health concerns. This is shown below in the table.

AQI Basics for Pollution			
CO ₂	TVOC	HCHO	Description of Air Quality
< 600 ppm	< .6mg/m ³	< .0.08mg/m ³	Air quality is excellent, and air pollution poses no risk.
>600 < 1000 ppm	>0.6 < 1.6mg/m ³	>0.08 < 0.12mg/m ³	Air quality is good. and air pollution poses no risk..
>1000 ppm	>1.6 mg/m ³	>0.12 mg/m ³	Air quality is not good. Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.

9.3. Auditors measured some air quality parameters at different locations in the buildings

Sr No.	Location	CO ₂ (PPM)	TVOC (mg/m ³)	HCHO (mg/m ³)	Temperature in °C	Relative Humidity in %
1	Main Block GF	628	0.111	0.020	33	32
2	Park near Main gate	628	0.112	0.017	33	32
3	Parking Area (back of main building)	629	0.111	0.020	34	32

From the above table, it is found that above all the parameters are within the comfortable limits. Also, the ventilation and day lighting are in good conditions

Index	Nitrogen Dioxide, Hourly mean (µg/m ³)	Sulphur Dioxide, (µg/m ³)	PM _{2.5} Particles, 24 hour mean (µg/m ³)	PM ₁₀ Particles, 24 hour mean (µg/m ³)
1	0–67	0–88	0–11	0–16
2	68–134	89–177	12–23	17–33
3	135–200	178–266	24–35	34–50
4	201–267	267–354	36–41	51–58
5	268–334	355–443	42–47	59–66
6	335–400	444–532	48–53	67–75
7	401–467	533–710	54–58	76–83
8	468–534	711–887	59–64	84–91
9	535–600	888–1064	65–70	92–100
10	≥ 601	≥ 1065	≥ 71	≥ 101

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

Auditors also measured the outdoor quality of air which has been depicted below

AQI ($\mu\text{g}/\text{m}^3$)	PM 10 ($\mu\text{g}/\text{m}^3$)	PM 2.5 ($\mu\text{g}/\text{m}^3$)	CO (ppm)	NO2 (ppb)	O3 (ppb)	SO2 (ppb)
108	108	70	0.15	10	9	5.48



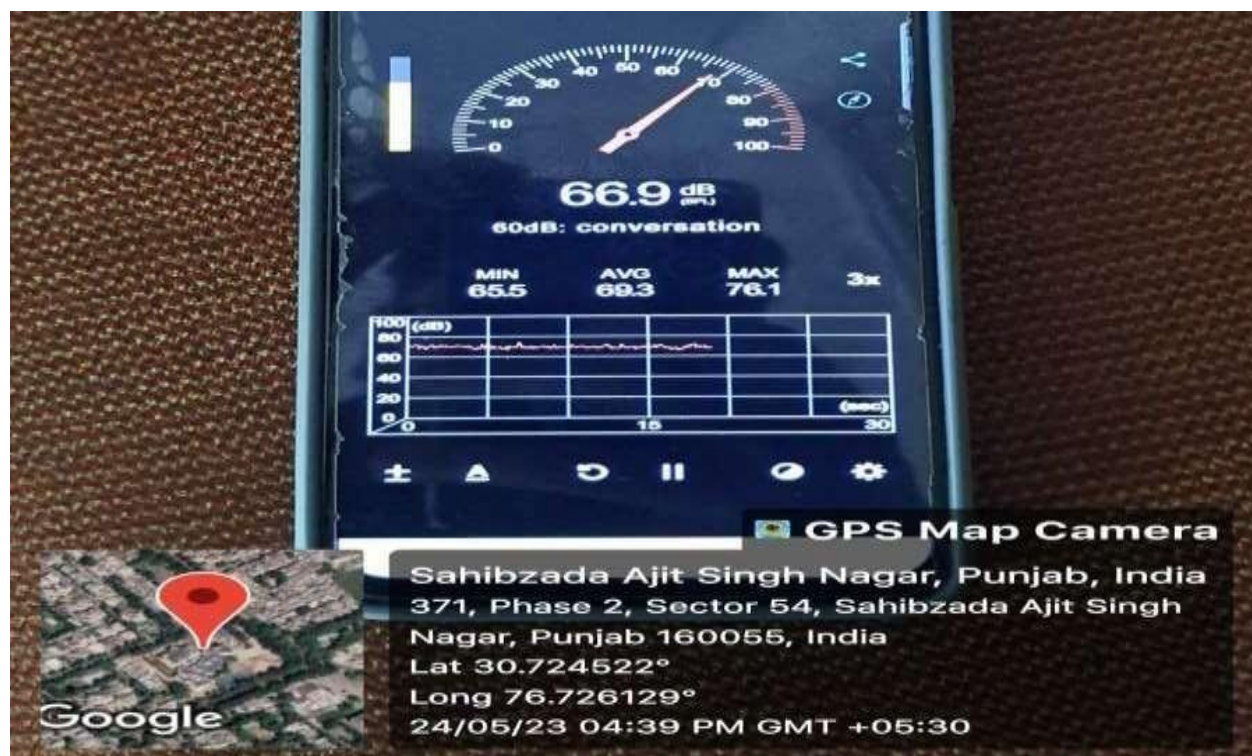
Measuring Air Quality Index and Other Environmental Parameters

2.5 and PM 10 parameters are not healthy and hence pollution control measures are advised.

10. 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 considered for green auditing of the Campus. Different sites were chosen for the monitoring purpose.

The Auditors measured sound level at different location as under:



S.No	Description	db (Min)
1	Administration block Lobby area GF	66.9
2	Administration block FF (Conf Hall)	55
3	Outdoor (Near Main Gate)	75
4	First Floor Corridor	78

Findings: Sound level found satisfactory

11. WASTE MANAGEMENT

Waste management includes 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.

3R (reduce, reuse and recycle) waste management initiatives had positive effects on people's attitudes about resources, waste management and consciousness of the need to avoid waste, but these initiatives did not affect recycling and waste management behaviour. A voluntary approach-only cannot bring about behavioural change. Incentive measures showed a greater positive effect on waste reduction to landfills. Nevertheless, the demonstration projects helped to increase the overall campus recycling from 10 to 12 per cent.

11.1. Dust Bins & Lifting of Waste

GJIMT has placed waste bins for proper segregation of solid wastes in the different locations of the campus. About 20 nos. of Diplast Make dustbins of capacity 20 liters have been placed at various locations so that staff and students can easily put their trash in them.



11.2. Kitchen Waste

The Canteen in GJIMT, Management runs for all the students, Staff and supporting Staff and has a policy of zero food waste policy. It has created awareness for the same through posters in the canteen. The food waste log is maintained daily and makes sure people produce less food waste and as a community GJIMT excels in reducing food waste.

For taking care of Solid waste (Dry and Wet) from various buildings, kitchens, canteens, hostels etc., GJIMT management has tie up for lifting garbage and waste from campus with a local Municipal contractor. The waste collection vehicle of this contractor visits the campus on a daily basis for collection of waste which is already separated in Green and Blue dustbins (separate for dry and wet waste). Approximate

waste collection tunes to 150-200 Quintals per day



Waste Collection by Authorized person from GJIMT Campus for proper disposal

1.3. Sewage Disposal

Since GJIMT campus is located within municipal limits of Mohali City, it has proper Sewage pipeline through which sewage waste is passed off to Municipal Corporation's sewage plant and same is billed to GJIMT.

12. BIODIVERSITY IN CAMPUS

Introduction

GJIMT campus has lush green area, hence, is rich in biodiversity. To conserve this biodiversity, it is important to understand 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 university premises and their inter-relationship.

12.1. 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 Landscape area use

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.

12.2. Method of Study

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

- The total area was surveyed by walking during the daytime.
- Sampling was done mostly in random manner
- Surveys were conducted for the maximum possible hours in the daytime.
- Tree species were documented through physical verification.

For faunal species we emphasized mainly direct sighting. Also, the call of various birds and amphibians and nesting of some faunal species were considered as direct evidence.

Reptiles were found mostly by looking in potential shelter sites like the under surface of rocks, logs, tree hollow sand leaf litter and 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. Active invertebrates like insects require more active search. For larger winged insects like butterflies, random samplings were carried out and point sampling was also done.

12.3. Landscape Use

The baseline landscape consumption is calculated as 12.5 Litres/m²/day. Whereas the actual landscape requirement is done as per the plantation species/trees/turf grass. Also, during the actual calculation the annual impending rainwater is also considered.

However, as part of landscape demand is catered with the treated water from STP. Hence, the treated water is reduced from the total landscape demand for more feasible solution.

LOCATION	AREA (SQ FT)
Front of Main Campus	2500
Parking Side	9000
Ground Side	90000
TOTAL	1,01,500



The total landscape area 101500 Sq ft in the campus premises utilize sprinklers and natural ditches to irrigate the green area

Land scape watering schedule

In Summer season – Alternate days

Others-Twice week irrigation



 LANDSCAPE WATERING GUIDELINES		Seasonal Frequency - Days Between Waterings				Water This Deeply (Typical Root Depth)
How Much & How Often Water to the outer edge of the plant's canopy and to the depth indicated. Watering frequency will vary depending on season, plant type, weather and soil.		Spring Mar - May	Summer May - Oct	Fall Oct - Dec	Winter Dec - Mar	
Trees	Desert adapted	14-30 days	7-21 days	14-30 days	30-60 days	24-36 inches
	High water use	7-12 days	7-10 days	7-12 days	14-30 days	24-36 inches
Shrubs	Desert adapted	14-30 days	7-21 days	14-30 days	30-45 days	18-24 inches
	High water use	7-10 days	5-7 days	7-10 days	10-14 days	18-24 inches
Groundcovers & Vines	Desert adapted	14-30 days	7-21 days	14-30 days	21-45 days	8-12 inches
	High water use	7-10 days	2-5 days	7-10 days	10-14 days	8-12 inches
Cacti and Succulents		21-45 days	14-30 days	21-45 days	if needed	8-12 inches
Annuals		3-7 days	2-5 days	3-7 days	5-10 days	8-12 inches
Warm Season Grass		4-14 days	3-6 days	6-21 days	15-30 days	6-10 inches
Cool Season Grass		3-7 days	none	3-10 days	7-14 days	6-10 inches

These guidelines are for established plants (1 year for shrubs, 3 years for trees). Additional water is needed for new plantings or unusually hot or dry weather. Less water is needed during cool or rainy weather. Drip run times are typically 2 hours or more for each watering.

The best irrigation system is sprinkler, which is one of effective way to save water, better yield and possibility of using soluble fertilizers and chemicals ☐ problem of clogging of sprinkler nozzles due to sediment laden water

12.4. Findings

Matching with the green and sustainable practices, the university campus has facilities for proper sewage disposal, RO drinking water points, solid waste management system and separate parking facilities for 2 and 4 wheelers. Around 60 percent of the total campus area is covered with lush green lawns & plantations covering more than 410 plants & tree species, thus giving adequate oxygen to the students.

12.5. Faunal Species

The list of Fauna indicates that the university campus is significantly rich in faunal diversity. A significant number of bird nests can be seen at many places.

Faunal groups with species number



12.6. List of Butterflies

No.	Common Name	Scientific Name
1	Common Rose	Pachliopta aristolochiae
2	Lime Butterfly	Papitto demolish
3	Tailed Jay	Grapheme agamemnon
4	Small Grass Yellow	Furema Brigitte
5	Common Grass Yellow	Eurema hecabe
6	Common Quaker	Neopithecops Zamora
7	Dark Grass Blue	Zizeeria karsandra
8	Indian Wanderer	Pareronia hippie

9	Lemon Emmigrant	Catopsila Pomona
10	Mottled Emmigrant	Catopsila pyranthe

12.7. List of Birds

No.	Common Name	Scientific Name
1	House Crow	Corvus splendens
2	House Sparrow	Passer domesticus
3	Common Iora	Aegithrta tipsia
4	Common Kingfisher	Alcedo atthis
5	Common Myna	Acridotheres tristis
6	Common Pigeon	Columba livia
7	Common Sandpiper	Actitis hypoleucos
8	Common Tailorbird	Orthotomus sutortus
9	Coppersmith Barbet	Megalaima haemacephala
10	Common Hawk Cuckoo	Hierococcyx varlus
11	Common Hoopoe	Upupa epops

12.7. List of Amphibians

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

1.	Birds	15
2.	Reptiles	1
3.	Amphibians	2
4.	Butterflies	22

12.8. Floral species:

The list of Flora indicates a significant diversity of plants which indicates the overall richness of the place. The most diverse group is tree total 374 trees list as below:

TYPES OF PLANT SPECIES		
Sr.No	Species name	Quantity
Potted Plants		
1	Areca Palm	30
2	Chandni Dwarf	25

3	Ficus Panda	30
4	Vinca	30
5	Zinia	45
SHRUBS		
6	Bottle Brush	10
7	Hamelia	10
8	Bougainvillea	15
9	Hibiscus	20
10	Caner	10
11	Pulmeria Alba	10
TREES		
12	Silver Oak	50
13	Chakrasia	50
14	Cajurina	25
15	Amla, Neem, Gulmohar and Papdi	25
16	Palm and Others	25

Besides above, there are some plants / Flowers

List of Grasses

No.	Common Name	Scientific Name
1	Common Carpet grass	Axonopus sp.
2	Durba	Cynodon dactylon

Findings:

The biodiversity status of GJIMT campus found satisfactory.

GREEN CAMPUS POLICY OF GJIMT, MOHALI IS AS UNDER:



Ref No. GJIMT/409488/23

Dated: 03.06.2023

Green/Environmental Policy

GJIMT, Mohali is an adobe of knowledge and a beacon beam of enlightenment. This renowned institute of higher education mainly focuses on Information Technology and Management studies. GJIMT is located amidst lush green environment making it pollution free and an eco-friendly campus. 40% of the campus under its 'Green Initiative' has been dedicated to playgrounds, lawns and gardens. Huge part of campus area has been kept in its natural form and acts as a natural habitat for biodiversity with a large variety of species of herbs, shrubs and trees.

OUR VISION

Our vision is to be an Institute of Excellence providing beyond-the-classroom stimulating experiences that are holistic and responsive to the current needs of the Global Society.

OUR MISSION

- Impart holistic management & technical education
- Nurture and develop human resources of global standards
- Serve the industry and society productively
- Inculcating sense of honesty, morality, transparency and integrity

Objectives of the Policy

- To protect and conserve ecological systems and resources in institute.
- To ensure judicious use of environmental resources.
- To integrate environmental concerns into policies and plans for social development.
- To conduct environmental audits.
- To minimize the use of paper work.

Building Careers since 1998

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Phase-2, Mohali
Sector 54, Chandigarh
Phone: 0172-2264566
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Web: www.gjimt.ac.in



Scope of the Policy

Clean Campus Initiatives

1. Institute conducts awareness seminars/workshops and other interactive sessions to facilitate effective implementation of the Green Campus and Environment policies.
2. To organize awareness programs through conducting various activities like poster making, slogan writing competitions etc. on the various occasions like Environmental Day.
3. Waste material management and compost pit for preparing manure are done on regular basis

Landscaping Initiatives

More than 200 trees & 300 shrubs are on campus along with grass cover, which provides clean and cool air. The diverse green cover of Institute is also home to a number of birds creating a campus rich in biodiversity. 'Cleanliness and Plantation Drives' are regularly conducted by NSS and Green Campus Club of institute in which students & staff members actively participate.

Clean Air Initiatives

Institute encourages students and staff to use public and institute's transportation to control air pollution. Restricted entry of vehicles inside the campus reduces the air and noise pollution. All vehicles parked in parking area have air pollution clearance certificates.

Smoking and use of tobacco in campus is strictly prohibited.

Infrastructural Initiatives

Renewable Sources of Energy

To minimize the consumption and manage the use of electricity, Institute has its own non-renewable resources. The institute is already switched to solar energy and energy saving and energy efficient equipment's such as LED's for purpose of lighting. Further, water conservation is done through ultra-modern Rainwater Harvesting System.

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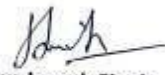
Waste Management Processes

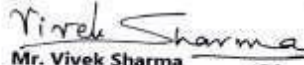
Institute strives to have a minimal impact on the environment and is dedicated to reduce and manage the waste generated by the institute campus by following specific procedure there by catering to solid and liquid waste management :

- Systematically engage with 3R's of environment friendliness i.e. Reduce, Reuse and Recycle.
- Collect paper wastage produced on campus and collaborate with scrap dealers for recycling.
- Reduce use of paper by supporting digitization of attendance and internal assessment records along with the entire admission process through NPF software.
- Reduce requirements of printed books by updating the e-books and e-journals collection.
- Encourage the students and teachers to use emails, MS-Teams and whatsapp groups for office work, examination, attendance, weekly report and E-contents etc.
- Minimize the use of water by maintain leak proof water fixtures and timely repairing water leakage from tapes/pipes/flush.


Dr. Annet Bedi
Director
Gian Jyoti Institute of
Management & Technology
Phase-2, Mohali


Mr. Sanjay Gupta
Asst. Professor & Convener
Green Campus Club


Dr. Gurdeep Singh
Director (Intl. Studies)


Mr. Vivek Sharma
Asst. Professor

Building Careers since 1998

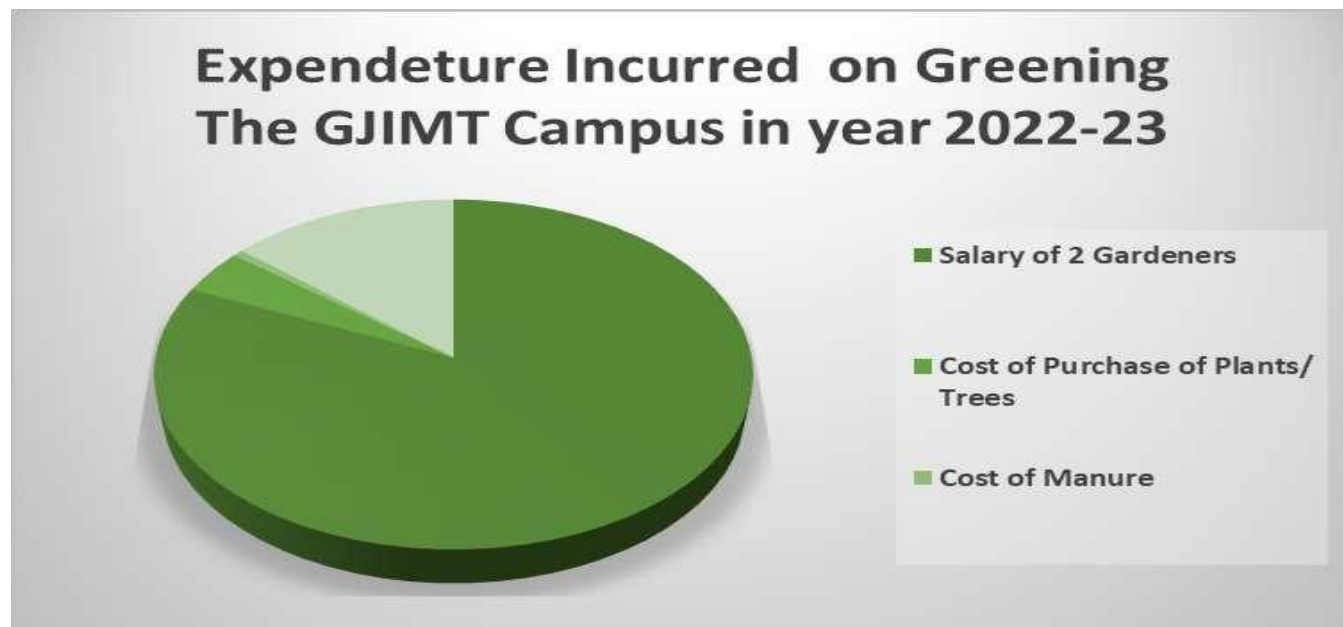
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Expenditure Summary incurred on tree plantation activities / green initiatives taken in last year (Aug-2022 to April-2023)

S.NO	Name of Activity	Expenditure (Average)
1	Salary of Gardeners	Rs. 360000
2	Cost of Purchase of Plants/ Trees	Rs. 18000
3	Cost of Manure	Rs. 2800
4	Miscellaneous (Tractor, Trolley, Diesel & Maintenance cost)	Rs. 60000

Average Annual Expenditure: Rs. **6,69,600/-** (Rupees six lakh sixty-nine thousand and six hundred only)



13. RECOMMENDATIONS

- The college campus is no doubt bio diversified but more plantations especially medicinal plantations are required in the campus. Plantation of fruit plants will attract more birds.
- The Green Monitoring Team should consist of members from teaching staff, non-teaching staff, and students and if possible, try to include some local interested people.
- 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 for single use plastic.
- Sound and air quality monitoring be done on regular basis, especially during crop harvesting season as this area is prone to pollution caused by burning of crop residue by farmers.
- More scope of Rainwater harvesting be proposed for the campus.
- Balance conventional lighting be replaced with LED lighting.
- More awareness camps be organized by college students and staff in nearby Villages for subtle (crop residue) management.
- Management may consider installing solar water heaters in canteens, mess and harness renewable Solar energy.

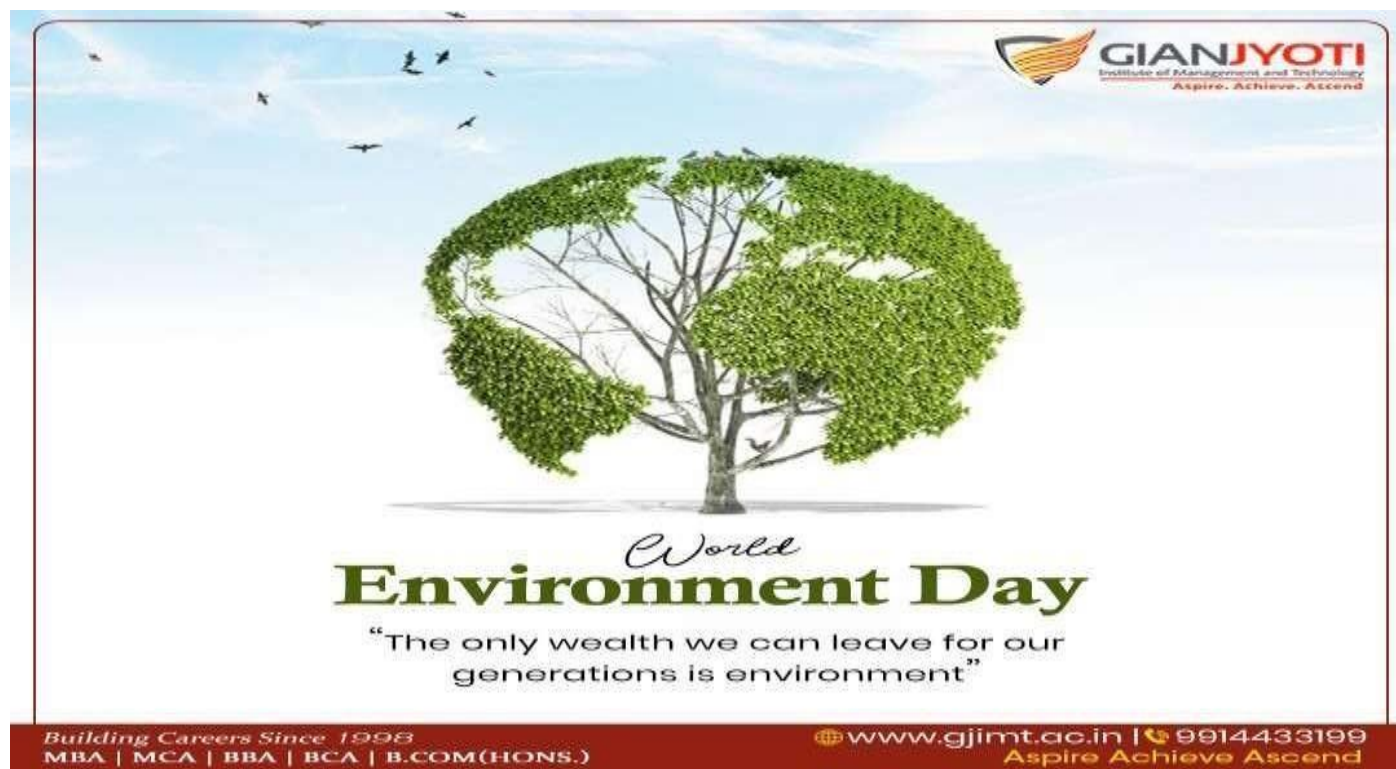
14. PROGRAMME AND INITIATIVES

Programme and Initiatives taken by GJIMT Management and Students for promotion of Green and clean Environment in and around the Campus





Environmental & health awareness drives are conducted on regular basis in campus by staff and students







Tree Plantation and Clean India Drives Are conducted in and in nearby areas of GJIMT Campus by Staff and students

Anti-Pollution and Water conservation drives are regularly conducted by GJIMT students and staff

Pollution awareness workshop held



MOHALI, JULY 11

NCC wing of Gian Jyoti Institute of Management and Technology organized workshop under the theme Save Water Save Generation under the banner of 3PB (INDP) COY NCC, Ropar. Dr. Karmandeep Singh Ghuman, Associate Professor, LM Thapar School of Management, Thapar University, Patiala was keynote speaker on the occasion. Dr. Anesh Bedi, Director,

GJIMT presided over the event. Col. Manu Solanky, Commanding Officer, 3PB (INDP) COY NCC, Ropar along with member of their PI Staff, ANO's and over 250 NCC cadets from SPS School, Paragon School, Deon International School, Sant Iyter Singh Public School, Infant Jyoti School, and students of Gian Jyoti Global School, etc attended the event. On this occasion ANO's Cadets and Students took the Pledge to Save Water.

ter Save Generation. They further pledged to Conserve Water and Sustain Sanitation and Hygiene. Painting & poster making, debate, quiz, competitions were also held. In the end prizes were also awarded to the winners.

Key note Speaker, Dr. Karmandeep Singh Ghuman said at the moment that the level of drinking water on the earth is getting down and dirty because of various industrial sources day by day.

‘ਪਾਣੀ ਬਚਾਓ, ਪੀੜ੍ਹੀਆਂ ਬਚਾਓ’ ਵਿਸ਼ੇ ‘ਤੇ ਸੈਮੀਨਾਰ



ਪਾਣੀ ਬਚਾਓ ਦਾ ਪ੍ਰਣ ਲੈਂਦੇ ਹੋਏ ਵਿਦਿਆਰਥੀ, ਸਟਾਫ਼ ਮੈਂਬਰ ਅਤੇ ਹੋਰ।

ਮੋਹਾਲੀ, (ਜਿਯੋਤੀ)-ਵਿਦਿਆਰਥੀ ਸੈਮੀਨਾਰ ਵਿਖੇ ਪਾਣੀ ਬਚਾਓ ਅਤੇ ਪੀੜ੍ਹੀਆਂ ਬਚਾਓ ਦੇ ਮਹੱਤਵ ਬਾਰੇ ਸੈਮੀਨਾਰ ਦਿੱਤਾ ਗਿਆ। ਇਸ ਮੌਕੇ ਤਿੰਨ ਪੰਜਾਬ ਦੇ ਸੈਮੀਨਾਰ ਦੇ ਸੰਗਠਿਤ ਨਾਲ ਕੰਮ ਕਰ ਰਹੇ ਸਨ। ਇਸ ਮੌਕੇ ਤਿੰਨ ਪੰਜਾਬ ਦੇ ਸੈਮੀਨਾਰ ਦੇ ਸੰਗਠਿਤ ਨਾਲ ਕੰਮ ਕਰ ਰਹੇ ਸਨ।

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‘ਪਾਣੀ ਬਚਾਓ, ਪੀੜ੍ਹੀਆਂ ਬਚਾਓ’ ਵਿਸ਼ੇ ‘ਤੇ ਸੈਮੀਨਾਰ

ਪੰਜਾਬੀ ਸਾਹਿਤ ਟੀਮ, ਆਸਟੇਰਾ ਨਗਰ : ਸਿੱਖਤਾ ਦੇ ਮਹੱਤਵ ਬਾਰੇ ਸੈਮੀਨਾਰ ਦਿੱਤਾ ਗਿਆ। ਇਸ ਮੌਕੇ ਤਿੰਨ ਪੰਜਾਬ ਦੇ ਸੈਮੀਨਾਰ ਦੇ ਸੰਗਠਿਤ ਨਾਲ ਕੰਮ ਕਰ ਰਹੇ ਸਨ। ਇਸ ਮੌਕੇ ਤਿੰਨ ਪੰਜਾਬ ਦੇ ਸੈਮੀਨਾਰ ਦੇ ਸੰਗਠਿਤ ਨਾਲ ਕੰਮ ਕਰ ਰਹੇ ਸਨ।



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ਗਿਆਨ ਜੋਤੀ ਵਿਖੇ ‘ਪਾਣੀ ਬਚਾਓ, ਪੀੜ੍ਹੀਆਂ ਬਚਾਓ’ ਵਿਸ਼ੇ ‘ਤੇ ਸੈਮੀਨਾਰ



ਸੈਮੀਨਾਰ ਵਿਖੇ ਪਾਣੀ ਬਚਾਓ ਅਤੇ ਪੀੜ੍ਹੀਆਂ ਬਚਾਓ ਦੇ ਮਹੱਤਵ ਬਾਰੇ ਸੈਮੀਨਾਰ ਦਿੱਤਾ ਗਿਆ। ਇਸ ਮੌਕੇ ਤਿੰਨ ਪੰਜਾਬ ਦੇ ਸੈਮੀਨਾਰ ਦੇ ਸੰਗਠਿਤ ਨਾਲ ਕੰਮ ਕਰ ਰਹੇ ਸਨ। ਇਸ ਮੌਕੇ ਤਿੰਨ ਪੰਜਾਬ ਦੇ ਸੈਮੀਨਾਰ ਦੇ ਸੰਗਠਿਤ ਨਾਲ ਕੰਮ ਕਰ ਰਹੇ ਸਨ।

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11th July 2019

NCC wing of Gian Jyoti Institute of Management and Technology organized a seminar on the theme “Save Water Save Generation- Mega Pollution Awareness Pakhwada” under the banner of 3PB (INDP.) COY NCC, Ropar today at its campus in Phase-2, Mohali. Dr. Karminderjit Singh Ghuman, Associate Professor, LM Thapar School of Management, Thapar University, Patiala was the guest speaker on the occasion. Dr. Aneet Bedi, Director, Gian Jyoti Institute of Management and Technology presided over the event.



30th July 2019

Gian Jyoti Institute of Management and Technology organized a ‘Tree Plantation Drive’ under the initiative of Govt. of Punjab “Ghar Ghar Hariyali Yojana at its Campus in Phase-2, Mohali. Sh. Balbir Singh Sidhu, Health and Family Welfare and Labour, Minister was the Chief Guest on this occasion.

Sh. Balbir Singh Sidhu, Health and Family Welfare and Labour Minister speaking on the occasion said that now a days pollution has become the biggest problem in the Punjab and to counter this we need to plant as many as plants that we can. Because only fresh air, trees and save our lives from the sides effects of Pollution. So this is the moral duty of each one of us to plant trees and save their mother land.



Tree Plantation drive being organized in GJIMT Campus

15. CONCLUSION

Considering the diversity of GJIMT, there is significant environmental research both by faculty and students. Environmental awareness initiatives are substantial. The installation of solar power plant and solar water heater system are noteworthy. Besides, the environmental awareness program initiated by the administration shows how the campus is going green. Few recommendations are added to curb the menace of strategic management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus & thus sustainable environment and community development

For R.K. Electricals and Energy Audit Services

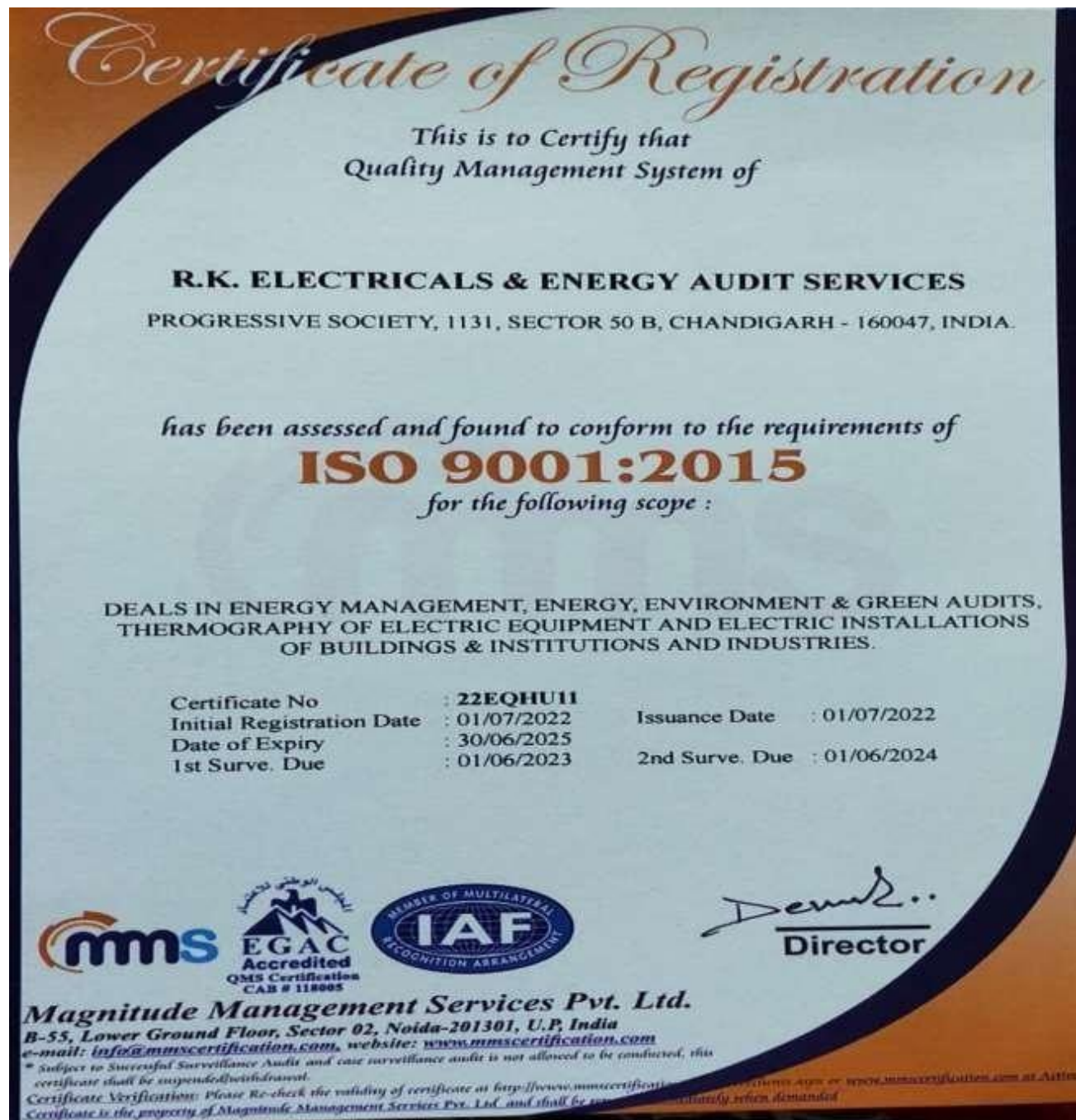
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16. CREDENTIALS IN R/O “R.K. ELECTRICALS AND ENERGY AUDIT SERVICES”

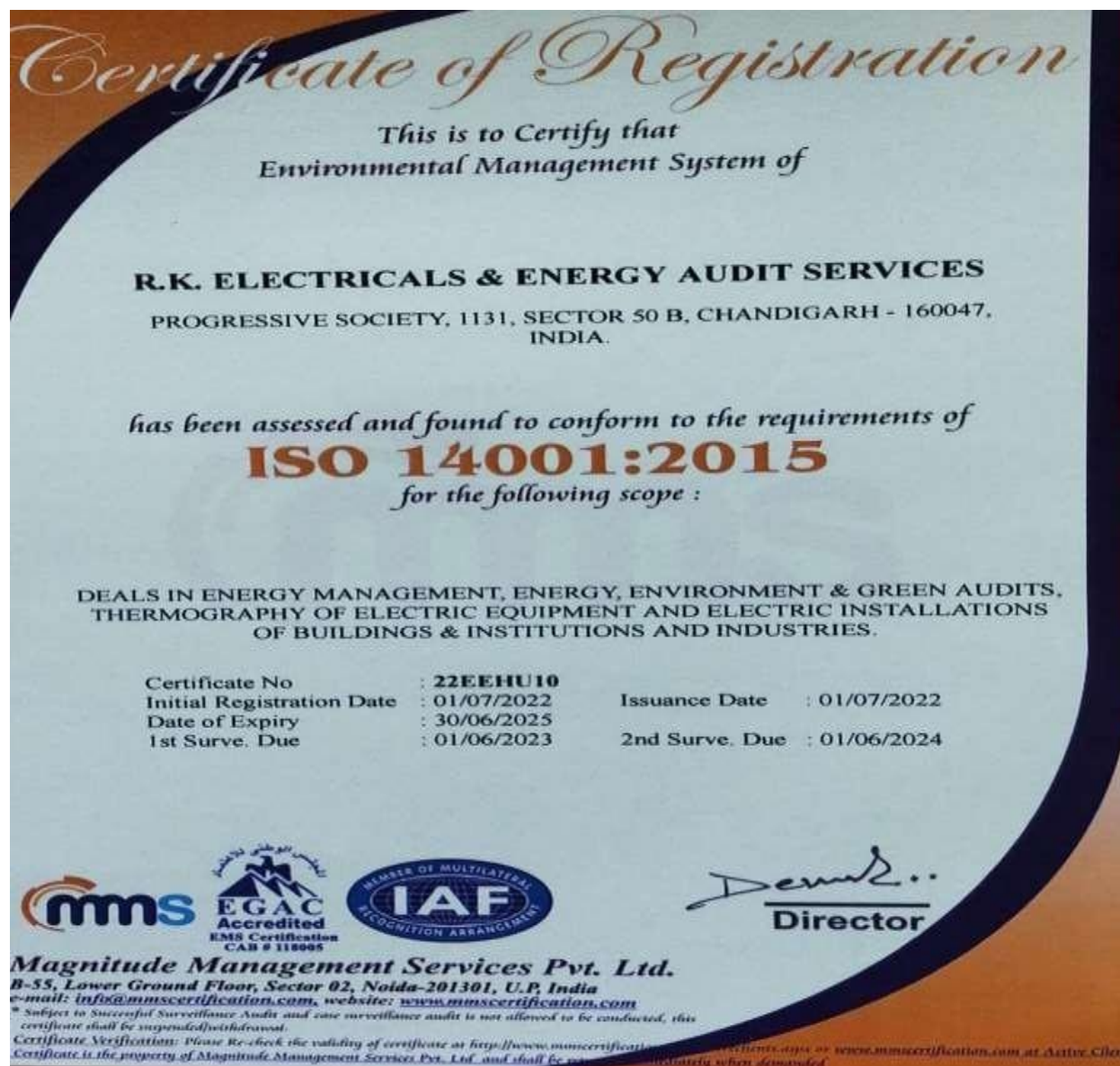
16.1. Certificate ISO50001:2018(Energy Management Services)



16.2. Certificate ISO 9001:2015(Quality Management System)



16.3. Certificate ISO 14001:2015 (Environmental Management System)



16.4. Certificate EA-10080 (Energy Auditor Certificate MoP, GoI)



16.5. Certificate of IGBC Accredited Professional (IGBC India)





ENERGY AUDIT CERTIFICATE

This is to certify that the R.K. ELECTRICALS & ENERGY AUDIT SERVICES conducted the Energy Audit of "GIAN JOYTI INSTITUTE OF MANAGEMENT AND TECHNOLOGY, PHASE-2 Mohali Punjab)", from 19th May to 25th May for the academic year 2022-2023. This audit involved extensive consultation with all the related team, office record, data collection, measurements and cost benefit analysis

The study exhibited the Annual Energy saving potential of 0.35 Lacs KWH with annual monetary saving: Rs 3.13 Lacs by investing Rs. 1.95 Lacs

For R.K. ELECTRICALS & ENERGY AUDIT SERVICES

Date

10/8/23

Er. R. K. Sharma MIE, FIV
BEE's Energy Auditor (EA-10080) MoP, GoI
HP Govt. Emp Energy Auditor, DoE, Shimla
Green Building Accredited Professional (IGBC)
Govt. Regd. Valuer & Chartered Engineer

ENERGY AUDIT REPORT

GIAN JOYTI INSTITUTE OF MANAGEMENT AND TECHNOLOGY, PHASE-2, MOHALI



CONDUCTED BY:

R.K. ELECTRICALS & ENERGY AUDIT SERVICES (An ISO Co.)

Er. R. K. Sharma MIE, FIV
BEE's Energy Auditor (EA-10080) MoP, GoI
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Academic
Year
2022-23

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ACKNOWLEDGEMENT

R.K. ELECTRICALS & ENERGY AUDIT SERVICES places on record its sincere thanks to the management of “**Gian Joyti Institute of Management & Technology, Mohali**” for entrusting the project of Energy audit of the building of GJIMT, Mohali particularly: -

Dr. J S Bedi: Chairman

Dr. Aneet Bedi: Director

We express our thanks to the following:

Prof. Gurdeepak Singh: Director International Studies

Assistant Prof.Sh. Sanjay Gupta

Assistant Prof.Sh. Vivek Sharma

& Electrical staff without whose constant support, we could not have carried out this audit.

ER. R.K. Sharma MIE, FIV

BEE's Energy Auditor (EA-10080) MoP, GoI

ABBREVIATIONS

A	Ampere
AC	Alternating Current
APFC	Automatic Power factor Controller
Avg.	Average
BEE	Bureau of Energy Efficiency
CEA	Certified Energy Auditor
CFL	Compact florescent lamp
EER	Energy Efficiency Ratio
FTL	Florescent Tube Light
Kcal	Kilo Calories
Kg.	Kilogram
KL	Kilo Liter
KV	Kilo Volt
kVA	Kilo Volt Ampere
KVAr	Kilo Volt Ampere Reactive
kW	Kilo Watts
kWh	Kilo Watt Hour
M or m	Meter
Mm	Millimeters
Max.	Maximum
Min.	Minimum
MT	Metric Ton
No.	Number
PF	Power Factor
TR	Tons of Refrigeration
V	Voltage
W	Wattage (watt)

EXECUTIVE SUMMARY

The Institution's management is conscious with regard to its Energy Efficiency Levels and they have initiated several measures to reduce the energy consumption. During field studies, it was observed that the management was found to be progressive as it has done very well on energy conservation front by implementing several energy conservation initiatives such as good usage of day light in campus, installation of LED light fixtures at few locations etc. We acknowledge and appreciate the commitment of the **Gian Joyti Institute of Management & Technology, Mohali** management towards conservation of Energy.

However, energy conservation is a continuous process and there is always scope for further improvements.

The objective – The Energy Conservation Act (EC Act) was enacted in 2001 with the goal of reducing energy intensity of Indian economy. Bureau of Energy Efficiency (BEE) was set up as the statutory body on 1st March 2002 at the central level to facilitate the implementation of the EC Act. The Act provides regulatory mandate for: standards & labeling of equipment and appliances; energy conservation campus codes for commercial campus; and energy consumption norms for energy intensive industries.

India faces formidable challenge in meeting its energy needs and in providing adequate energy of desired quality in various forms in a sustainable manner and at competitive prices. Due to rising tariffs, everybody is making efforts to reduce specific energy consumption with the twin aim of reducing energy bills, fast depleting natural resources and pollution. With this aim in mind, the management got this study done to explore energy saving potential to reduce further energy consumption. This involved a detailed Energy:

- i) Establish a baseline of the present energy consumption pattern,
- ii) Identify Energy Efficiency Measures (EEM's) which can lead to sustained energy savings in the campus and
- iii) Prepare an action plan to implement the same.

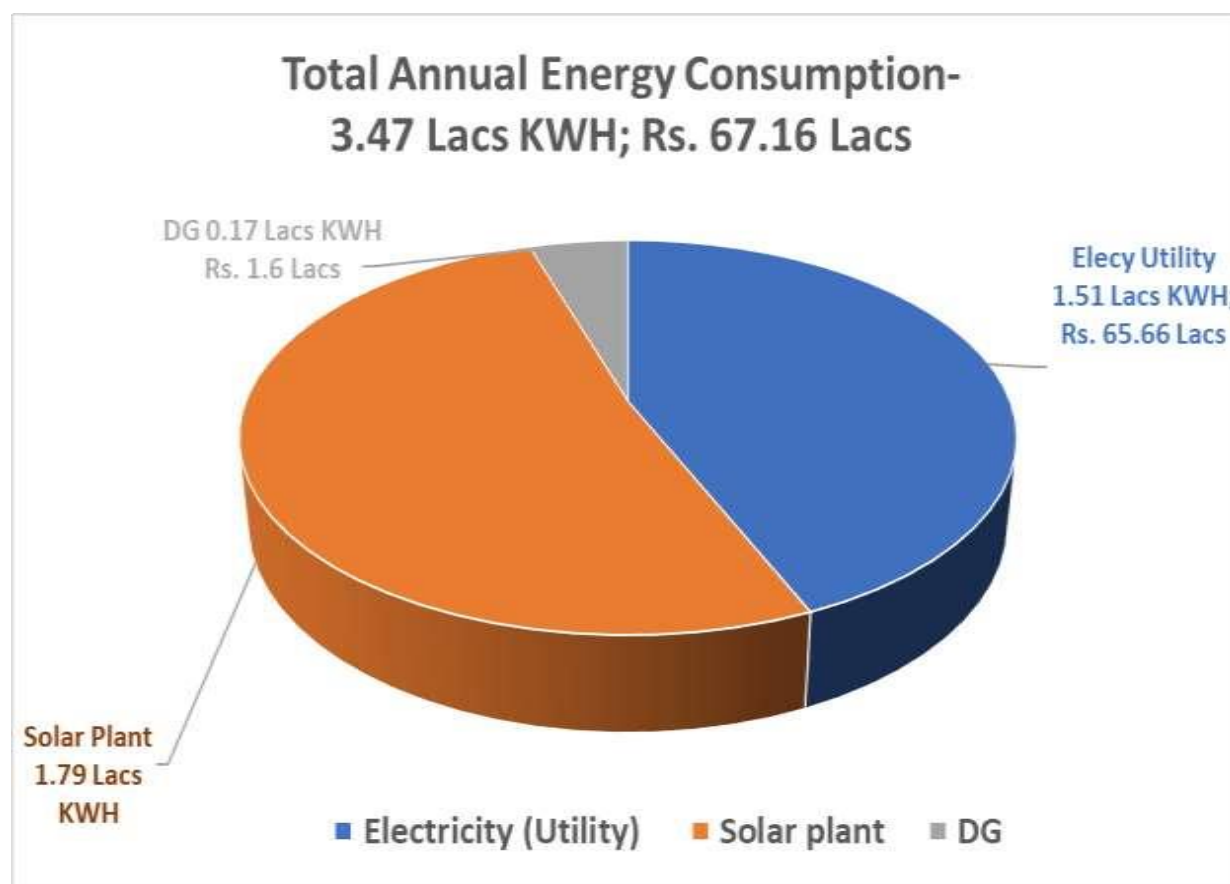
This report is an attempt to provide an overview of energy consumption, its variation and energy reduction potential of **Gian Joyti Institute of Management & Technology, Mohali** campus. The report also highlights the major energy saving opportunities available in the air conditioners, fans, lighting at the campus. A set of recommendations which will assist in improving energy efficiency has also been highlighted in this report.

Detail of Energy Consumption

Using the historical data, the total energy consumption of the building during the last 12 months was **4.14 Lacs KWH** with the annual energy cost amounting to Rs **61.20 Lacs**. Electricity, Solar and HSD are the sources of energy in the campus.

Annual Existing Energy Consumption

Energy Source	Annual Consumption- (Lacs KWH)	Energy cost (Rs. Lacs)
Electricity (Utility)	1.51	65.66
Solar plant	1.79	
DG	0.17	1.60
Total	3.47	67.16



SUMMARY OF GJIMT CAMPUS

Sr No.	Description	Details
1	Name of the campus	Gian Joyti Institute of Management & Technology, Mohali
2	Location/Address	Gian Joyti Institute of Management & Technology, Phase-2, Mohali
4	Ground covered area of the campus	37800 sq ft
5	Date of Energy Audit	19,22,&24 May 2023
6	Energy Audit report No.	RKS/EA-25/2023
7	Connected load/Contract demand of the campus	272.18 KW
8	No. Of Gen sets with capacity	250 KVA ,125 KVA & 30 KVA
9	Average annual consumption of the Diesel	2000Litres/yr. App.
10	Nature of the campus	Educational Institute
11	Storey	Ground, + 2 Floors
12	Hours of normal operation of the campus	8-9 hrs.
13	Percentage of air-conditioned floor area	More than 50%
14	a) Annual Electricity Consumption purchased from utility	1.51 Lakh kWh
	b) Annual Electricity Consumption through DG set	0.17 Lakh KWh
	c) Annual Electricity Consumption through Solar plant	1.79 KWh (58 % of total consumption)
	d) Total Lighting Load consumption	0.61 Lakh kWh (14.7 % of Total consumption)
	e) Total LED lights load	18% of Total lights load
	f) Total LED Light consumption	13.7% of Total lighting load
	g) Total annual existing Electricity consumption, Utility+ through DG+ Solar Plant	1.51+0.17+1.79=3.47 Lakh KWh
15	Energy Performance Index (EPI of the bdg.)	94.1kWh/Sqm/Annum
16	a) Annual Electricity Cost purchased from utility	Rs.65.66 Lakh
	b) Annual cost of electricity through DG Set	Rs.1.60 Lakh
	c) Total annual existing Electricity cost, (Utility+ DG)	Rs. 67.16 Lakh
17	Electricity rate/KWh as per Tariff – NRS more than 100 KW	Rs.6.55/KWh+11Paise / kWh as electricity duty=Rs.6.66/KWh
18	Proposed Annual Electricity Units saving	0.35 Lakh KWh
19	Proposed total annual monetary savings	3.13 Lakh
20	Proposed investment	1.95 Lakh
21	Payback	1Years

BRIEF PROPOSED SAVINGS SCOPE

Sr No	DESCRIPTION	VALUE
1	Proposed Annual Electricity Units saving	0.35 Lakh KWh
2	Proposed Annual Monetary Savings	Rs.3.13 Lakh
3	Proposed investment	Rs.1.95 Lakh
4	Payback	1 Years

RECOMMENDATIONS

1. Current Energy Audit Report Academic Year (2022-23):

Findings/Comments Recommendations contained in the current energy audit

i) Utility system:

a) Transformers: Checked Voltage, Current, harmonics and power factor profile of both the transformers installed in the electric substation and found well within the permissible limits.

b) Diesel Generator Sets: Checked the performance of DG Sets installed in the substation for power back up and found their efficiency excellent.

ii) Campus electric wiring: inspected campus electric wiring and found healthy with no defect.

iii) Campus lighting system: Checked Lux level of some rooms and found excellent. With the retrofitting of remaining conventional lighting with the LED lighting and LED fixtures, proposed average energy Savable is 13 % from total savings

iv) Renewable Energy Application (Solar power plant): Solar energy is one of the most widely used renewable source of energy one can use renewable energy technologies to convert solar energy in to electricity, it is very reliable source of energy and can significantly reduce the electricity bills, as such, institute's management has installed 200 KWp roof top grid interactive Solar plant and it is generating 700-800 units of electricity which is excellent. The expected annual saving in electricity shall be about 24000 units Which will be 13.2% of total savings

v) Switching off lights, when not required: Some postures & stickers installed at all important locations so that staff and students remain conscious about it.

vi) Awareness campaigns: Awareness campaigns made in the campus for energy conservations covering lighting and renewable source of energy in the campus like solar parking/street lighting.

vii) National Energy conservation day: Energy conservation day celebrated during December 2022 in the campus where various initiatives were taken by the management and students for promoting energy conservation.

SUMMARY OF ENERGY EFFICIENCY MEASURES

EEM (Energy Efficiency Measures)	Proposed Energy Efficiency Measures	Nos.	Annual energy consumption -Kwh	Annual energy consumption after replacement-Kwh	Annual energy saving -Kwh	Annual monetary saving-Rs.	Total investment including installations-Rs.	Simple pay back period (years)
EEM-1	Installation of additional 4 nos. small capacitors to reduce fluctuations & improvement in power factor.					77103	5000	0.06
EEM-2	Replacement of existing FTL 1x40 Watt 4' long with 1x18 Watt LED Tube light 4' long	308	34304	11226	23078	153699	92400	0.6
EEM-3	Replacement of existing round 2x10Watt CFL PL with round 7 Watt LED PL	90	4374	1276	3098	20633	15750	0.7
EEM-4	Replacement of Existing 2'X2' CFL PL 2X18 watt with LED PL 2X10 Watt.	81	7217	3280	3937	26220	28350	1
EEM-5	Maintenance and performance of water cooler installed in the campus	7	10463	9835	628	4181	3750	1

EEM-6	Replacement of existing Monoblock 1 phase 1hp conventional motor pump set with BEE star rated energy efficient 1 phase Monoblock pump set complete in all respects	2	4800	3600	1200	7992	20000	2.5
EEM (Energy Efficiency Measures)	Proposed Energy Efficiency Measures	Nos.	Annual energy consumption -Kwh	Annual energy consumption after replacement-Kwh	Annual energy saving -Kwh	Annual monetary saving-Rs.	Total investment including installations-Rs.	Simple pay back period (years)
EEM-7	Expected extra generation from existing Solar power plant by improving cleanliness of solar panels	1			3522	23455	30000	1.3
	TOTAL	489	61158	29217	35463	3,13,283	195250	1

NET SAVINGS

Units Savable: 0.35 Lakh KWH

Amount Savable: Rs. 3.13 Lakh

Investment: Rs. 1.95 Lacs

Simple Payback Period – 1 Years

For R.K. ELECTRICALS & ENERGY AUDIT SERVICES

INTRODUCTION

The Project

The Project was to prepare a DPR for energy efficiency improvements of the entire campus of Gian Joyti Institute of Management & Technology, Mohali with the advent of energy crisis and exponential hikes in the costs of different forms of energy, Energy Audit is manifesting its due importance in Commercial as well as Industrial Establishments. Energy Audit helps to understand more about the ways energy and fuels are used in any Establishments and helps in identifying areas where waste may occur and scope for improvement exists.

Energy Audit is the key to a systematic approach for decision-making in the area of energy management as it attempts to balance the total energy inputs with its use and serves to identify all the energy streams in a facility/ Establishment.

It was with this objective that **R.K Electricals and Energy Audit Services** was entrusted by the authorities of Gian Joyti Institute of Management & Technology, Mohali, for the study of their Institute. The basic objective of the Audit was to study the load distribution/ consumption pattern in the campus and also to study the operations of major energy intensive equipment/ systems to identify potential areas wherein energy savings are practically feasible.

Background of Gian Joyti Institute of Management & Technology, Mohali

Gian Jyoti Institute of Management & Technology (GJIMT) was established under the aegis of Gian Jyoti Educational Society (GJES) in the year 1998. GJIMT is an ISO 9001:2008 certified. approved by All India. Council of Technical Education (AICTE), New Delhi and affiliated to IKG Punjab Technical University (PTU), Kapurthala. Being Best Colleges in Mohali & North India's premier destination in the fields of management and computer applications, located in the heart of Mohali City, GJIMT has been setting milestones in academics and placements.

GJIMT imparts holistic management and technical education to nurture and develop human resources globally. standards, capable of serving the industry and society productively. Hence, a conscious effort made to give latest and practical exposure to its students of MBA, MCA, BBA, BCA & B.Com programs.

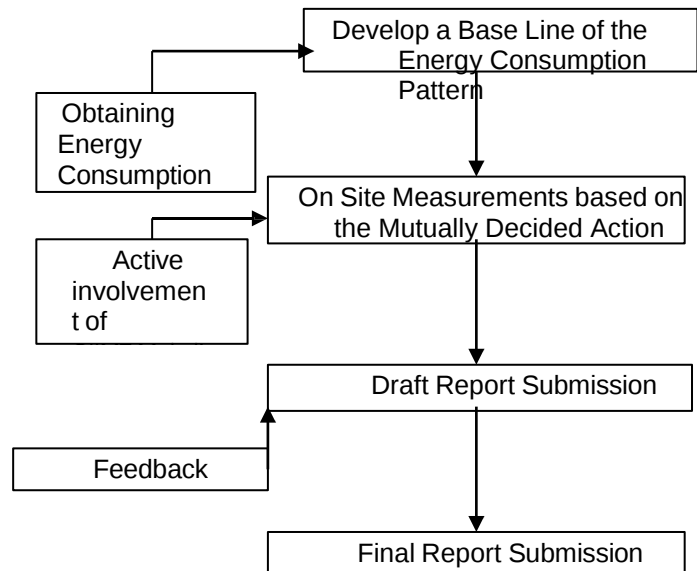
GJIMT has maintained the Top B-Schools of the country rankings for more than a decade now in surveys conducted by the various prestigious publications like Business Standard (2017), Outlook (2016) and Bureaucracy Today (2015). These surveys have been carried out on various parameters involving academics, pedagogy, infrastructure, training, and placement.

The Institute aims to make value addition to the professional skills of its students from day one by introducing the Employment Readiness Program (ERP). GJIMT maintains strong. industry connections that help students to get industry exposure before their final placements.

METHODOLOGY

Methodology adopted for achieving the desired objectives viz: Assessment of the Current operational status and Energy savings include the following:

- Discussions with the concerned officials for identification of major **areas of focus** and other related systems.
- A team of engineers visited the campus and had discussions with the concerned officials/ supervisors to collect data/ information on the operations and Load Distribution in the campus. The data was analyzed to arrive at a **base line energy consumption pattern**.
- Measurements and monitoring** with the help of appropriate instruments including continuous and/ or time lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- Computation and **in-depth analysis** of the collected data, including utilization of computerized analysis and other techniques as appropriate were done to draw inferences and to evolve suitable energy conservation measure/s for improvements/ reduction in specific energy consumption.



The entire recommendations have been backed up with techno-economic calculations including the estimated investments required for implementation of the suggested measures and payback period.

INSTRUMENT SUPPORT

Some of the instruments used for undertaking the audit include the following:

- Digital Pressure Meter
- Anemometer with Vane Type Probe & Hygrometer
- Three Phase Power Analyzer ALM-31 with appropriate CT's & PT's
- Single Phase Power Analyzer with appropriate CT's
- Digital Temperature Meter
- Ultrasonic Flow meter
- Infrared Temperature Meter
- Lux Meter and digital distance meter

Engineers Who Participated in Audit & Report Preparation

- | | |
|---|--|
| 1) Er Rakesh Kumar Sharma MIE, FIV | BEEs Energy Auditor (EA: 10080) |
| 2) Er Vibhor Aggarwal B Tech | BEEs Energy Manager (M-300062/21) |
| 3) Er Varun Sharma | Energy Engineer, B Tech, MBA, PGDC (Ind. Safety) |

CHAPTER- I. BASE LINE SCENARIO & REVIEW OF ENERGY CONSUMPTION

1.1 OVERVIEW OF THE BUILDING

1.2 Total area

Area of plot-2.5 Acre (108900 sq ft)

Covered area of the building-37800 sq ft

1.3. Area wise summary and detail of rooms:

The building has two blocks, Ground +3 floors

UG Block-Comprises of 18 rooms, GF, FF & 2nd floor

PG Block - comprises of about 18 rooms, GF, FF, Library, 2nd floor & top floor

MISC-Galleries, Labs & parking area etc.

1.4. PURCHASED POWER

Gian Joyti Institute of Management & Technology, Mohali draws power from PSPCL through dedicated feeder at 11 KV. The building has two transformers of 315 KVA each to step down the voltage from 11 KV to 433V. The connected/sanctioned load of the building is 272.18 Kw

1.5. SELF GENERATED POWER

The campus has 03 Nos. of DG Set 250,125 & 30 kVA installed in acoustic covers for in-house power generation. The operation of the DG set is limited to power cuts only.

1.6 REVIEW OF PRESENT ENERGY CONSUMPTION & BILLING: The details of electrical consumption copied from electricity bills for 2022-23 is shown below:

ANNUAL ENERGY DATA 2022-23

MONTH -->	SOLAR GENERATION	SOLAR EXPORT	UTILITY CONSUMPTION	NET UTILITY CONSUMPTION	NET SOLAR CONSUMPTION	TOTAL CONSUMPTION	AMOUNT
	KWH	KWH	KWH	KWH	KWH	KWH	RS
22.MAR-21.APR	24946	6556	14548	7992	18390	26382	480890
21.APR-19 MAY	18840	1963	22412	20449	16877	37326	636980
19.MAY-20.JUNE	26852	1300	33716	32416	25552	57968	735910
21.JUN-18. JUL	19736	3248	15640	12392	16488	28880	903350
18.JULY-22.AUG	25276	3232	29688	26456	22044	48500	1205530
22.AUG-30.SEPT	26024	2224	51292	49068	23800	72868	1722700
30.SEPT-21.OCT	15070	2436	15356	12920	12634	25554	649500
21.OCT-22.NOV	20108	11256	-2228	-13484	8852	-4632	41620
22.NOV-22.DEC	16756	9116	8380	-736	7640	6904	32210
22.DEC-21.JAN	11467	6124	10628	4504	5343	9847	59630
21.JAN-22.FEB	19913	8644	10248	1604	11269	12873	56630
22.FEB-22.MAR	20217	9708	7504	-2204	10509	8305	30760
TOTAL	245205	65807	217184	151377	179398	330775	6555710

Simplified-KWH

SOLAR GENERAT	SOLAR EXPORT	NET SOLAR CONSUMP	UTILITY CONSUM	UTILITY IMPORT	NET UTILITY CONSUMP	TOTAL CONSUMP	BILLING AMT-Rs.
245205	65807	179398	217184	65807	151377	330775	6555710

More Simplified-KWH

NET SOLAR CONSUMP-KWH	UTILITY IMPORT-KWH	TOTAL CONSUMP-KWH	BILLING AMT-Rs.
179398	151377	330775	6563660

Financial Year	22-23
Annual electricity consumption purchased from utility- Lacs kWh	1.51
Annual electricity consumption through solar system- Lacs kWh	1.79
Annual electricity consumption through (Utility+ Solar)- Lacs kWh	3.30
Annual electricity consumption through DG set -Lacs kWh	0.17
Total annual electricity consumption (Utility+ Solar+ DG) - Lacs kWh	3.47
Amount of utility billing+ amount of DG fuel billing (*65.56+1.60) – Rs lacs	67.16
Electricity tariff rate –Energy charges +electricity duty (6.55+0.11) -Rs / kWh	6.66

***The Billing amount of Rs.67.16 Lacs includes the fixed charges and pending arrears**

Thus, electrical energy of about **3.46 Lakh kWh** costing **Rs. 67.16 Lakh** is consumed annually

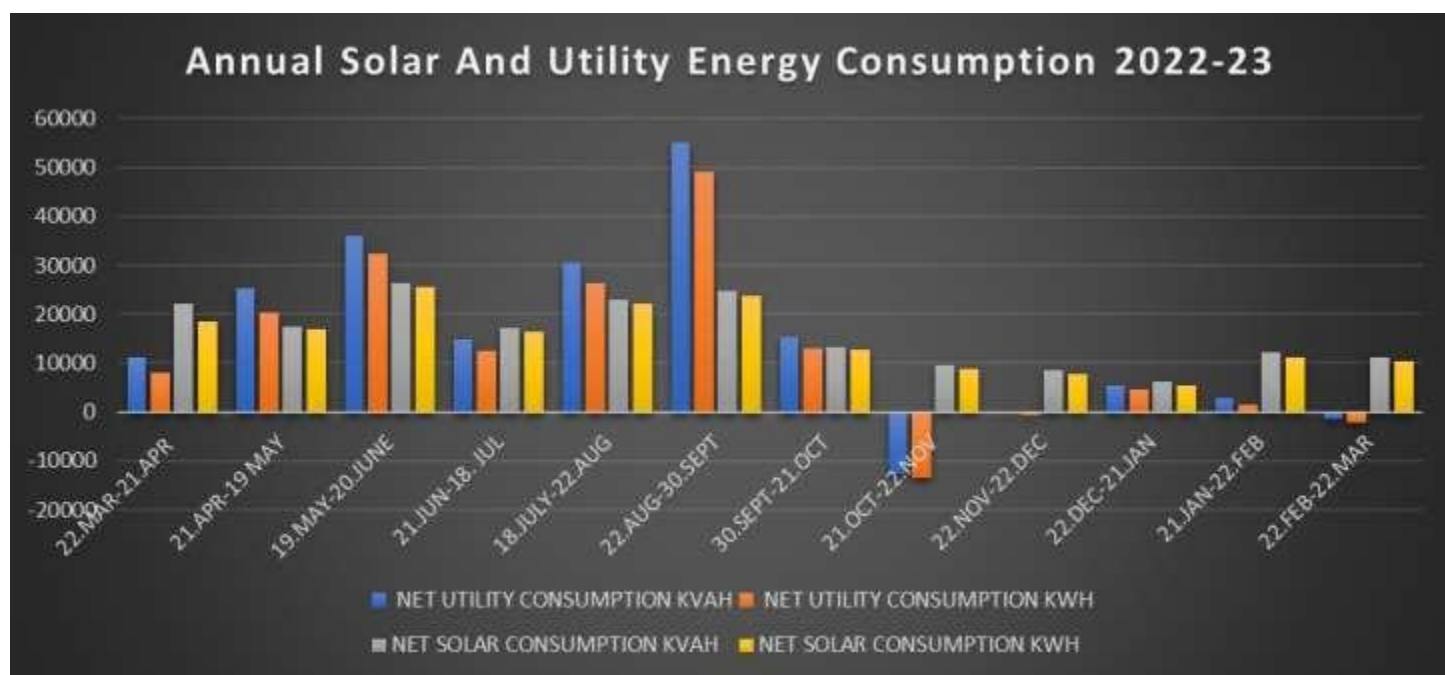
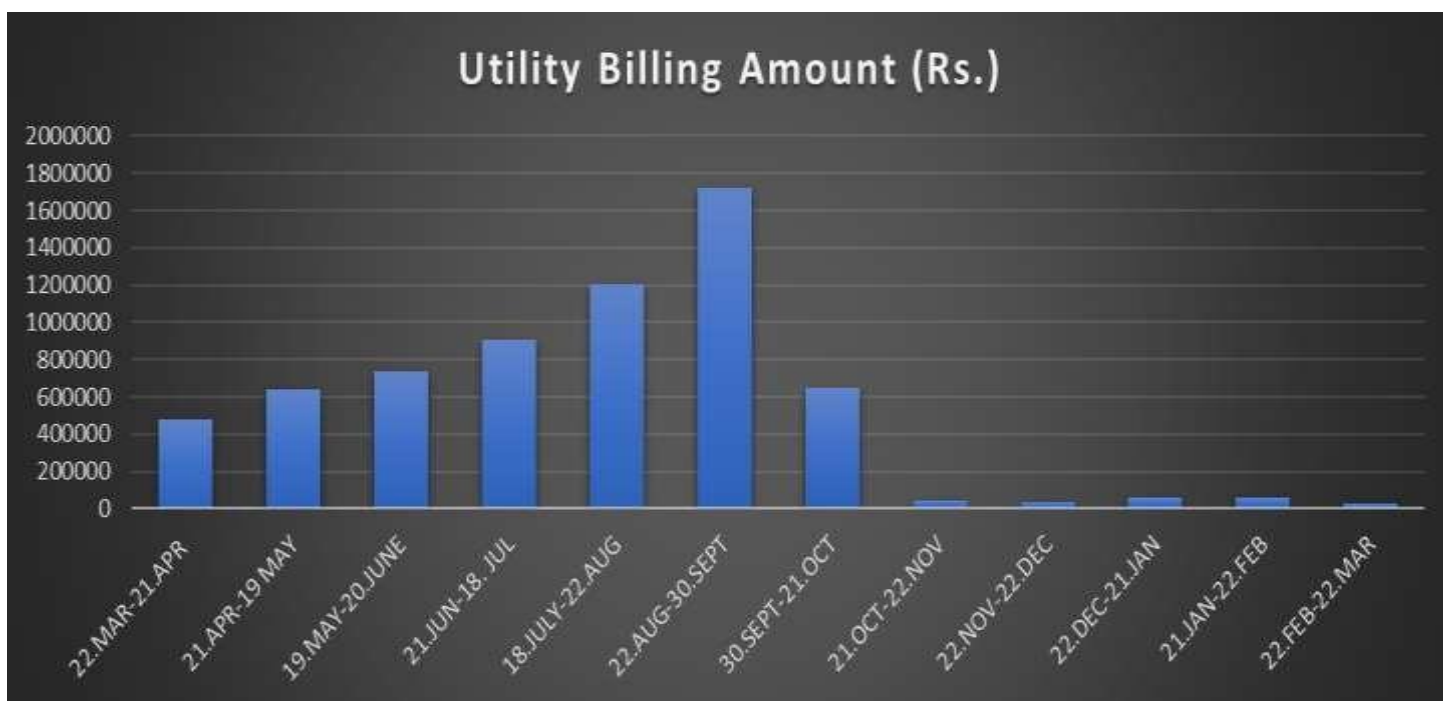


Figure 2 Energy Consumption Profile for FY 2022-2023 KWh Vs Month

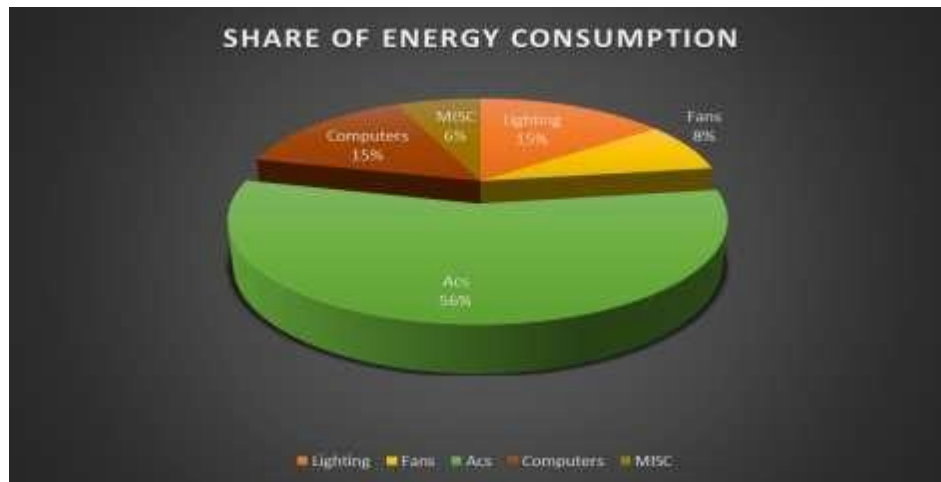


1.7. SHARE OF ENERGY CONSUMPTION IN DIFFERENT AREAS

The auditors tried to calculate energy consumption of various equipment. The energy consumption purchased from utility as well as self generated through DG Sets for the year 2022-23:

SHARE OF ENERGY CONSUMPTION

Item	KWH	%age
Lighting	50997.58	14.78
Fans	26622	7.66
Acs	218895	62.98
Computers	24300	6.99
MISC	26744.052	7.69
TOTAL	347559	100



Sharing of the Energy consumption within the boundary is shown graphically.

2.5. ENERGY PERFORMANCE OF THE CAMPUS (EPI): Energy performance index (EPI) is total energy consumed in a campus over a year divided by total built up area in kWh/sq m/year and is considered as the simplest and most relevant indicator for qualifying a campus as energy efficient or not

Benchmarking for EPI is tabulated as below

Climate zone Map Of India

Source: National Institute of Urban and Environmental Engineering (NIUEE), New Delhi, India

Legend:

- Warm & Humid
- Composite
- Hot & Dry
- Moderate
- Arid

Based on the data collected from different categories of commercial buildings, the following tables show the indicative EPI benchmarks.

EPI benchmarks for Office Buildings

Climate Zone	Less than 50% AC	More than 50% AC
EPI (kWh/m ² /yr)		
Warm & Humid	101	182
Composite	86	179
Hot & Dry	90	173
Moderate	94	179

EPI benchmarks for Shopping Malls

Climate Zone	EPI (kWh/m ² /yr)
Warm & Humid	428
Composite	327
Hot & Dry	273
Moderate	257

EPI benchmarks for Hospitals

Climate Zone	EPI (kWh/m ² /yr)
Warm & Humid	275
Composite	264
Hot & Dry	261
Moderate	247

EPI benchmarks for Hotels

Climate Zone	Upto 3 star	Above 3 star
EPI (kWh/m ² /yr)		
Warm & Humid	215	333
Composite	201	290
Hot & Dry	167	250
Moderate	107	313

EPI benchmarks for Institutes

Climate Zone	EPI (kWh/m ² /yr)
Warm & Humid	150
Composite	117
Hot & Dry	106
Moderate	129

EPI benchmarks for BPOs

Climate Zone	EPI (kWh/m ² /yr)
Warm & Humid	452
Composite	437
Hot & Dry	-
Moderate	433

Disclaimer : The EPI benchmarks should be considered as an indicative figure as it largely depends upon the operating hours, energy efficiency measures, sample size, climatic zone and lack of detailed information by building owners.

Energy benchmarks for Commercial Buildings

Bureau of Energy Efficiency
4th Floor, Sewa Bhawan, R.K. Puram,
New Delhi – 110066
Website : www.beenet.in

Calculation of EPI

Considering composite climate as Punjab falls under Composite climate zone

Annual energy consumption during the year 2022-23=330775KWh

Total built up area of the campus – 3511.73 sqm

$EPI = 330775 / 3511.73$

EPI=94.1/sqm/year

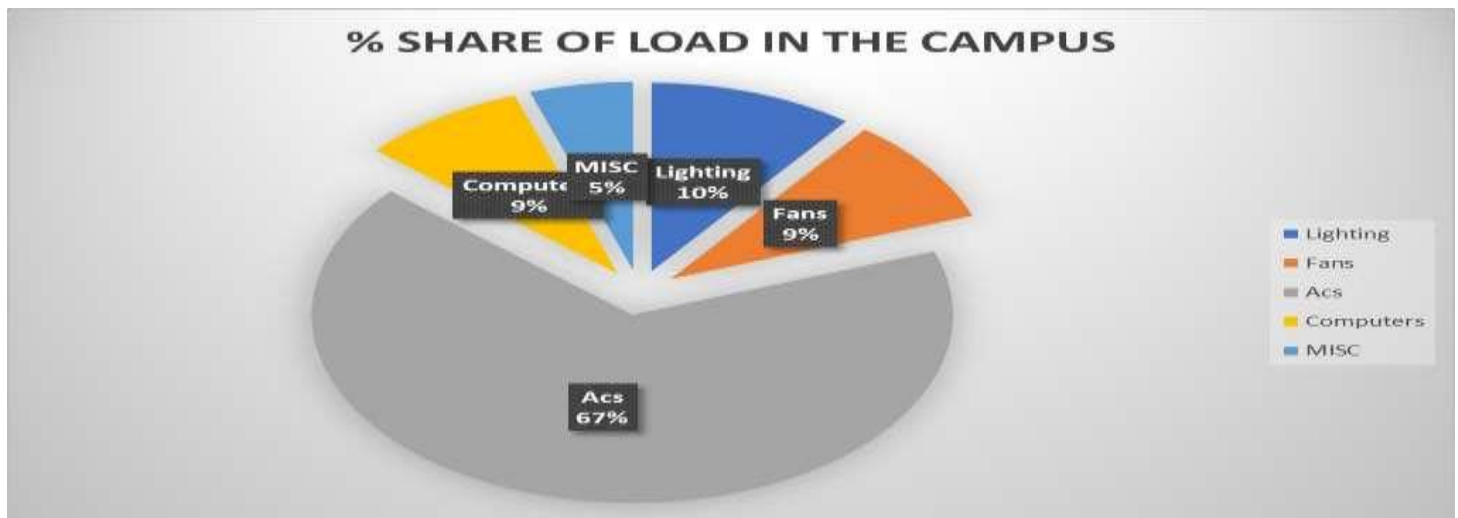
2.6 CAMPUS LOAD PROFILE

It was noticed during onsite assessment that two Transformers having capacity of 315 KVA each are installed for the entire premises. Inventory list of the Campus is shown below:

Connected / Sanctioned load: 272.18 KW

The auditors checked and calculated the electric load of the campus and the load detail is as under:

% SHARE OF LOAD IN THE CAMPUS		
Item	KW	% Share
Lighting	27.784	10.37
Fans	24.54	9.16
Acs	179.2	66.86
Computers	22.5	8.4
MISC	13.99	5.22
TOTAL	268	100



CHAPTER- II. ELECTRICAL DISTRIBUTION SYSTEM

- a) Review of present electrical distribution like Single Line Diagram (SLD), transformer loading, cable loading, normal & emergency loads, electricity distribution in various areas/floors etc.

2. TRANSFORMERS

2.1 The Campus has three distribution transformers, 2 nos. of 315 KVA each to step down the voltage from 11 KV to 433V.

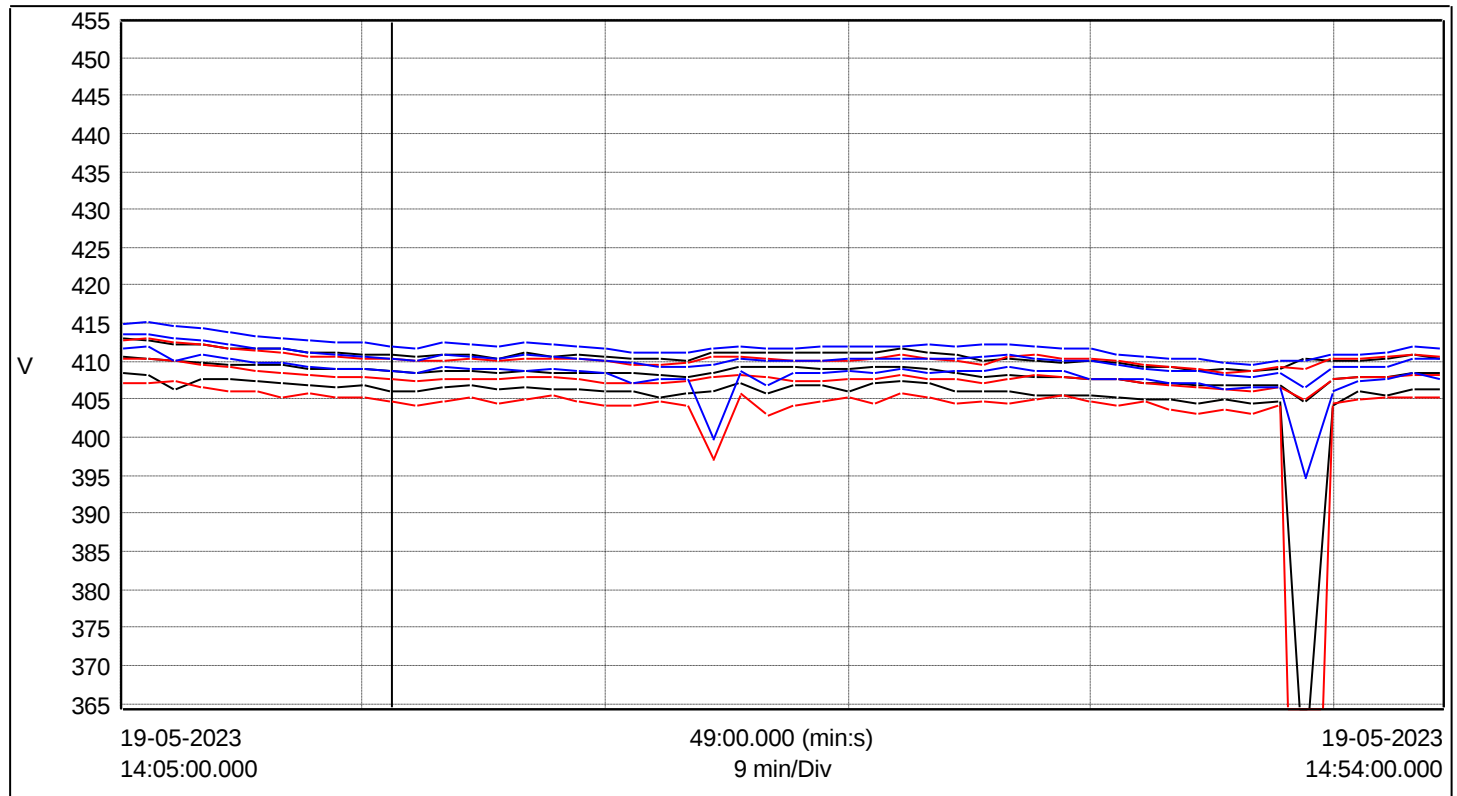
2.2. TRANSFORMER 1-315 KVA



2.2.1. VOLTAGE PROFILE – LT IN COMMERT/F 1

During the audit, quality of in-coming power is measured through 3 Phase Power Analyzer in order to measure the power quality parameters at incomer panel of T/F 1. Thus, various parameters were recorded which included Voltage, Current, Power Factor, Total Harmonic Distortion (THD), and Unbalancing of Load:

VOLTAGE PROFILE



Voltage profile of Transformer- 315 KVA

Urms	Urms	Urms	Average	%age
Line 1	Line 2	Line 3		im-balance
408.625	407.931	410.404	409.0	0.60

Imbalance voltage

IMBALANCE VOLTAGE

The unbalanced voltage is 0.60 % which is under the prescribed limit as per IEEE standards. An unbalance of 2% is acceptable as it doesn't affect the cable.

2.2.2. CURRENT PROFILE

Arms	Arms	Arms	Average	%age
Line 1	Line 2	Line 3		im-balance
186.8	155.9	169.8	170.9	18.11

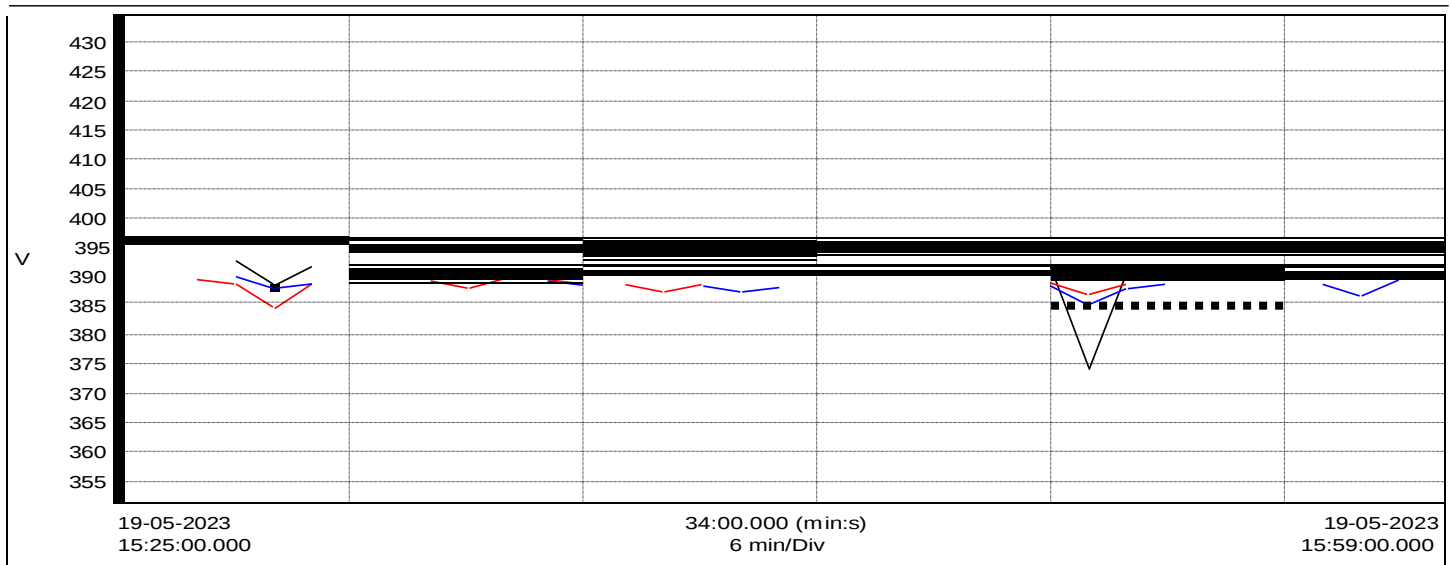
Imbalance current

IMBALANCE CURRENT

The unbalanced current was observed to be 18.11 %. and does not indicate any fault. Any large single-phase load, or a number of small loads connected to only one phase cause more current to flow from that particular phase causing voltage drop on line. All the single-phase loads should be distributed on the three-phase system such that they put equal load on three phases. The unbalanced current is not within the permissible limit of 2%.

2.3. TRANSFORMER 2-315 KVA

2.3.1. VOLTAGE PROFILE – LT IN COMMERCIAL 2- 315 KVA



Voltage profile of transformer 2-1600 KVA

Urms	Urms	Urms	Average	%age
Line 1	Line 2	Line 3		im-balance
394.106	390.977	391.495	392.2	0.13

Voltage imbalance in 315 kVA Transformer No. 2

IMBALANCE VOLTAGE

The unbalanced voltage is 0.13%, which is under the prescribed limit as per IEEE standards. An unbalance of 2% is acceptable as it doesn't affect the cable.

2.3.2. CURRENT PROFILE

Arms	Arms	Arms	Average	%age
Line 1	Line 2	Line 3		im-balance
44.656	51.281	49.579	48.5	13.66

Current imbalance in 315 kVA Transformer No. 2

IMBALANCE CURRENT

An unbalanced load occurs when there is significantly more power drawn. This can lead to the overheating of the electrical components and possibly overloading the panel.

The unbalance current was observed to be 13.66 %. and does not indicate any fault. Any large single-phase load, or a number of small loads connected to only one phase cause more current to flow from that particular phase causing voltage drop on line. All the single-phase loads should be distributed on the three-phase system such that they put equal load on three phases. The unbalance current is not within the permissible limit of 2%

HARMONIC

2.3.3. HARMONIC GENERATIONS

Equipment based on frequency conversion techniques generates harmonics. With the increased use of such equipment, harmonics related problems have enhanced which are leading to heating of cables, bus bars and transformers, overloading of electrical distribution system, frequent tripping of switchgears, frequent failure of costly mother boards and capacitors of equipment etc.

The harmonic currents generated by different types of loads, travel back to the source. While travelling back to the source, they generate harmonic voltages, following simple Ohm's Law. Harmonic voltages, which appear on the system bus, are harmful to other equipment connected to the same bus, in general sensitive electronic equipment connected to this bus, will be affected.

System Problem	Common Causes	Possible Effects	Solutions
Harmonics (non sinusoidal voltages and /or current wave forms)	Office – Electronics, UPSs, variable frequency drives, high intensity discharge lighting and electronic and core coil ballasts.	Over- heating of neutral conductors, motors. transformers, switch gear. Voltage drop, low power factors, reduced capacity.	Take care with equipment selection and isolate sensitive electronics from noisy circuits.

Common causes and solution of harmonics

OBSERVATIONS & RECOMMENDATIONS

During the assessment, the Audit team also measured the harmonics level of the transformers. Voltage harmonics are observed to be in range of average 2.1% - 2.5 % which is in the prescribed limit as per IEE standard of Voltage harmonics of 5%. Average current THD (%) observed to be in range of average 3.7% - 6.3 % which is in the prescribed limit of 12%

2.4. BALANCING THE LOAD ON TRANSFORMERS & REACTIVE LOAD MANAGEMENT

2.4.1. Transformer 1-315 KVA; Transformer 2-315 KVA

2.5. LOADING POSITION ON TRANSFORMERS

The auditors measured the Electrical parameters of the transformers for calculation of % load on the transformers

TRANSFORMER 1-315 KVA

MEASURED DATA OF T/F 1				
V	I	PF	KW	KVA
409.0	170.9	0.928	112.32	121.06
Load on T/F 1-315 KVA		38.43 %		

TRANSFORMER 2- 315 KVA

MEASURED DATA OF T/F-2				
V	I	PF	KW	KVA
425.8	173.7	0.991	126.92	125.08
Load on T/F 2 - 315 KVA		10.46%		

2.5.1. Load on transformers --The distribution transformers are designed for taking variation of load with optimum efficiency between 40 & 50% of load. But their maximum utilization is at their rated capacity. It is observed that average load on these transformers remains approximate 38.43% and 10.46% 2.6.2. Distribution of load on transformers-- For minimum copper losses, the load distribution on all the transformers should be equal. While exact distribution is not possible, efforts should be made to make them as equal as possible. It is apparent from all these above that distribution of load is not uniform.

The sample calculations of the loading and efficiency are given below:

Transformer capacity – kVa	No load loss- kW	Copper loss – kW	% load	Efficiency
1000	3.3	11.38	45%	98.77%
1000	3.3	11.38	50%	98.79%
1000	3.3	11.38	60%	98.78%
1000	3.3	11.38	70%	98.75%
1000	3.3	11.38	80%	98.69%
1000	3.3	11.38	80%	98.69%
Fall in efficiency between 50% & 80% load				0.09%

OBSERVATIONS AND RECOMMENDATIONS

General condition of substation: The substation and transformers are well maintained

- i) Working of all the transformers found ok
- ii) **Silica gel** of transformer 1 required to be replaced
- iii) **Silica gel**- Transformers do not need much maintenance. The only routine maintenance required is maintenance of its silica gel & oil in breather cup. Due to the increase & decrease of load, its temperature rises & falls. Then, due to atmospheric temperature variations also, temperature fluctuates. So, either silica gel inhales air or expels it. With inhalation, moisture in air is also sucked & it is detrimental first to oil & then winding. This should be checked daily. It takes hardly 10 seconds. The silica gel of transformer 1 needs to be re-conditioned. Similarly, oil needs to be filled in breather cup.
- iv) **Unbalance load on:**
- v) Transformer -315 KVA = 18%
- vi) Transformer 2-315 KVA = 13%
- vii) It is recommended to balance the load on all the transformers to save the losses due to unbalance loading where no investment is required

*In the electrical system, unbalanced load on the three-phase of transformer is often found. It is due to the load operational time which does not occur simultaneously. If the unbalanced load occurs continuously on the transformer, it will **decrease the transformer's performance**.*

*The unequal distribution of loads between the three phases of the system causes the flow of unbalanced currents in the system, that produce **unbalanced voltage drops on the electric lines**. This increase in neutral current which causes line losses.*

An unbalance of **1%** is acceptable as it doesn't affect the cable. But above 1% it increases linearly and at 4% the de-rating is 20%. This implies that- 20% of the current flowing in the cable will be unproductive and thus the copper losses in the cable will increase by 25% at 4% unbalance.

- Excessive power loss
- The imbalance of current will increase the I²R Losses

Balance the load of both the transformers

The details of capacitors installed: Very good APFC panels are installed. Still average power factor is 0.92 against desirable & possible 0.99

At present 95 KVAR capacitors installed on each APFC panel which are sufficient, 4 Nos. additional small 10 KVAR capacitors are recommended to install to reduce the fluctuations and improvement in power factor

EEM- 1 Installation of additional 4 nos. small capacitors to reduce fluctuations & improvement in power factor.

Energy consumption - KWH	330775
Average energy bill @ 6.66/ kWh	2202962
Existing power factor	0.92
Proposed power factor	0.99
Amount saveable; $0.5(0.99-0.92) \times 2202962$ -Rs	77103
Expenditure for installing additional 4 nos. small capacitors for improving and reducing the fluctuations in power factor	5000
Pay back period = Yr.	0.06

CHAPTER- III. LIGHTING SYSTEM

3.1. STUDY OF WIRING SYSTEM

The wiring laid in the campus is of proper sizes with no defect

3.2. COLLEGE LIGHTING SYSTEM

Adequate and proper lighting contributes both directly and indirectly towards productivity, safety and towards providing an improved atmosphere. Primary considerations to ensure energy efficiency in lighting systems are:

- Selection of the most efficient light source as far as possible in order to minimize power cost and energy consumption.
- Matching proper lamp type to the intended work task or aesthetic application, consistent with color, brightness control and other requirements.
- Establish adequate light levels to maintain productivity, improve security and improve safety.

3.2.1. LIGHTING INVENTORY

During the onsite assessment, Audit team has carried out the lighting survey for various locations in GJIMT Campus

The Total lighting details installed in the premises are given below

Type of Luminary	No.	Watt
FTL 4' long	308	40
Round P L CFL 2x10 W	90	20
2'X2' P L CFL 2X18 W	81	36
LED PL	50	10
LED 4' long T/L	106	20
LED Flood Light	44	50
LED Flood Light	3	100

3.2.2 Electricity consumption of existing lighting system of the campus

Type of Luminary	No.	Watt	Ballast Watt	Total-Watts	Hrs	Days	LF	Total KWH
FTL 4' long	308	40	15	55	9	240	0.75	34304
Round P L CFL 2x10 W	90	20	4	24	9	240	0.75	4374
2'X2' P L CFL 2X18 W	81	36	8	44	9	240	0.75	7217
LED PL	50	10		10	9	240	0.75	1013
LED 4' long T/L	106	20		20	9	240	0.75	4293
LED FL	44	50		50	11	365	1	8833
LED FL	3	100		100	11	365	1	1205
KWH								50998

3.3. LUX MEASUREMENT

A high-quality DIGITAL LUX METER was used to measure the illumination levels at various locations GJIMT, Mohali and the recommended level of lightning in these areas is given in the table

The recommended light level as per standard is shown below:

Location	Recommended LUX
Normal work station space, open or closed office	500
Conference Rooms	300
Training Rooms	500
Internal Corridors	200
Auditorium	150-200
Entrance Lobbies, Atria`	200
Stairwells	200
Toilets	200
Dining Areas	150-200

Recommended Standard Light Level Details

3.4. STUDY FINDING OF LIGHTING

The college authorities provided the details of luminaries installed within their Campus premises. The auditors surveyed area and compared type of fittings, their height, and type of reflectors. Based upon this survey and data obtained from the authorities, hours and days of running, the energy consumption is calculated as follows

Assessment of the Lighting

Sr. No	LOCATION	Measured Lux	REMARKS
1	UG Block, GF Room-B101, PA-Chairman	325	Excellent
2	UG Block, GF Room-B108	300	Satisfactory
3	UG Block, GF Room-B103	390	Excellent
4	FF-Lab 6	415	Excellent
5	FF-Lab 13	405	Excellent
6	TF Room-A 402, Lab 3	385	Excellent
7	A-210, Guest room	310	Satisfactory
8	SF-B 307, Lab 15	320	Satisfactory
9	SF-B 301, Lab 12	300	Satisfactory
10	Reception	450	Excellent
11	PG Block, A-201	375	Satisfactory
12	PG Block, A-202, Syndicate room	420	Excellent
13	PG Block, A-208	320	Satisfactory
14	Wash room	215	Satisfactory
15	Library	365	Satisfactory

OBSERVATIONS

- Lux level found to be **excellent**
- During Audit, It was observed that some fluorescent tubes are fitted with magnetic blasts on conventional 40W luminaries and some CFL PLs
- It was also observed during the audit that reflector/diffuser were provided for most of the fluorescent tubes and CF PLs to distribute the uniform lighting in the room.
- It is recommended for converting the remaining installation to use more efficient lighting equipment.

RECOMMENDATION

3.4.1 Installation of Energy Efficient Lights

EEM-2 Replacement of existing 308 nos. 1x4'x40W T-12 WITH 1x4'18 W LEDTUBE LIGHT

In the existing system 308 nos. 40 W, T-12 FTLs are being used to provide general illumination to part of the campus. The proposed scenario includes replacement of T- 12 type with 18 W LED 4' long Tube Light. The energy saving calculations is shown below.

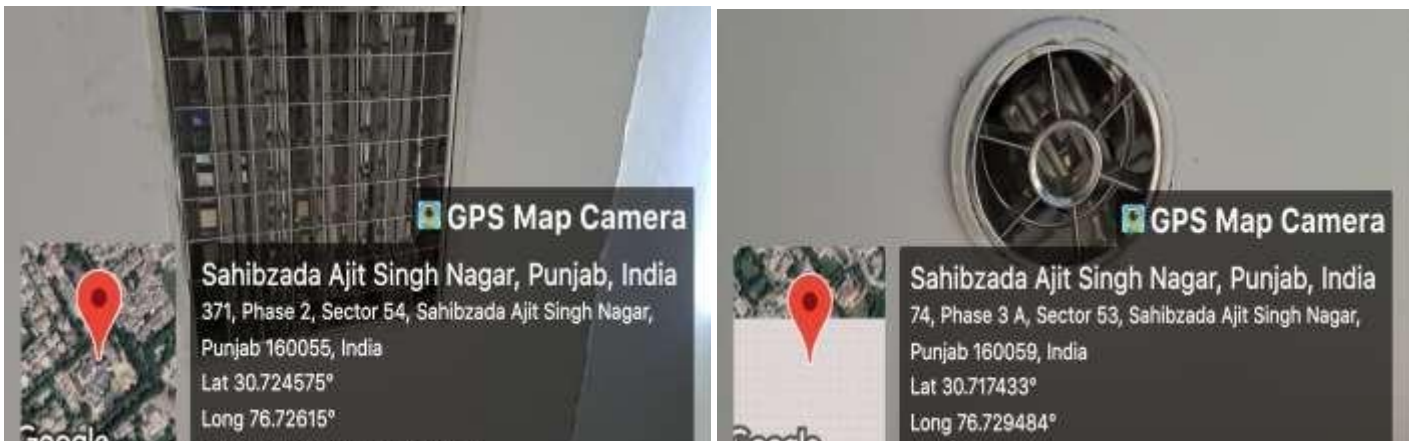
Energy Saving Calculation		Units	Value
Total Number of fittings	=	Nos.	308
Electricity Consumption of existing 1*40W FTL (including ballast) as per “above at Sr No.3.2.2. Electricity consumption of existing lighting system of college”	=	kWh	34304
Electricity Consumption of proposed 1x18W LED tube light, (308 no18wx9hrx300daysx0.75LF/1000=11226Kwh)	=	kWh	11226
Cost Benefit Analysis			
Annual Electricity Savings potential	=	kWh	23078
Per Unit cost	=	Rs.	6.66
Annual Monetary Savings	=	Rs.	153699
Investment/ fixture (including replacement cost)	=	Rs.	300
Total Investment	=	Rs.	92400
Simple Payback Period	=	Years	0.6

The payback period is calculated to be 0.6 years. Since the product life is much more than that, the move is economically beneficial and energy saving

EEM-3 Replacement of existing 90 No. Round CFL P L 2x10 W with Round LED PL 1X7 W

Energy Saving Calculation		Units	Value
Total Number of fittings	=	Nos.	90
Annual electricity Consumption of CFLPL2X10W (including ballast) as "above at Sr No 3.2.2 electricity consumption of existing lighting system"	=	kWh	4374
Annual electricity Consumption of proposed 5W direct fit LED lamp (90nos7wx9hrx300daysx0.75LF/1000=1276 KWH)	=	kWh	1276
Cost Benefit Analysis			
Proposed Annual electricity Savings potential	=	kWh	3098
Per Unit cost	=	Rs.	6.66
Proposed Annual Monetary Savings	=	Rs.	20633
Investment/ fixture (including replacement cost)	=	Rs.	175
Total Investment	=	Rs.	15750
Simple Payback Period	=	Years	0.76

The payback period is calculated to be 0.76 years. Since the product life is much more than that, the move is economically beneficial and energy saving.



EXISTING 2 X 2 AND ROUND CFL FITTINGS IN CAMPUS

EEM-4 Replacement of existing 81 nos. 2'X2'CFL P L 2X18 W with 2'X2'LED P L 2X10 Watt

Energy Saving Calculation		Units	Value
Total Number of fittings	=	Nos.	81
Annual electricity Consumption of 2'X2'CFL P L 2X18 W (including ballast) as "above at Sr No 3.2.2. electricity consumption of existing lighting system"	=	kWh	7217
Annual electricity Consumption of proposed 2'x2'LED PL 2x10 watt (81 nos 20wx9hrx300daysx0.75LF/1000=3280 KWH)	=	kWh	3280
Cost Benefit Analysis			
Proposed Annual Energy Savings potential	=	kWh	3937
Per Unit cost	=	Rs.	6.66
Proposed Annual Monetary Savings	=	Rs.	26220
Investment/ fixture (including replacement cost)	=	Rs.	350
Total Investment	=	Rs.	28350
Simple Payback Period	=	Years	1.0

The payback period is calculated to be 1 year. Since the product life is much more than that, the move is economically beneficial and energy saving.

3.4.2. Occupancy Sensors for existing Lighting System

Lighting is the biggest energy consuming area. The **Occupancy sensor, Passive infrared type (PIR)** detects presence of people in the target monitored area. They provide convenience by turning lights on automatically when someone enters a room, and save energy consumption by turning lights off room or reducing light output when a space is unoccupied.

The motion sensor responds to moving objects only. The difference between them is occupancy sensor produce signals whenever an object is stationary or not while motion sensor is sensitive to only moving objects. These types of sensors utilize some kind of a human body's property or body's actions. For instance, a sensor may be sensitive to body weight, heat, sounds, dielectric constant and so on. Occupancy sensors differ from motion sensors in that they don't require significant motion in order to work. Their purpose is not to detect motion, but to detect whether people are present, even if they're not moving around. Many occupancy sensors will use a combination of sensors and various technologies

Observations

It is observed that in many rooms the light, fans and AC units were running even when there was no occupant in the room. After office hours in a few rooms, the FCU fan supply was on lead to energy consumption irrespective of useful output.

Recommendation: It is recommended to install the occupancy sensor for individual rooms to switch off the running load when there is no occupant. Occupancy sensors are one kind of device used for detecting occupancy in space that automatically deactivates the light so that the energy can be conserved. This sensor may also activate the lights. This device can also activate the lights routinely by detecting the occurrence of people and provides security and convenience help. the calculated energy saving is as below:

Providing and fixing Occupancy Sensors (PIR) for existing lighting at various locations in the building.

Energy Saving Calculations:

Based on the laboratory like Lawrence Berkeley National, the strategies based on occupancy can generate 24% of normal savings of lighting energy Lighting load of the rooms, labs, washrooms and at some other locations is 28 KW

EEM-5(not accounted for) providing and fixing of Occupancy/motion Sensors for existing lighting

Energy Saving Calculations:

Description		Units	Value
Locations-Rooms and other connected area of the building.	=	Nos.	50
Annual existing electricity consumption of existing lighting load (28 KW x9 hrs. x300 days=86400 KWh)	=	KWh	75600
Proposed annual Saving in electricity Consumption after fixing the proposed occupancy (PIR) sensors with existing lightings @ 24%(75600x24%) =18144 KWh	=	KWH	18144
Cost Benefit Analysis			
Per Unit cost	=	Rs.	6.66
Annual Monetary Savings=6.66x18144	=	Rs.	120839
Investment/fixt. per sensor	=	Rs.	3000
Total Investment	=	Rs.	150000
Simple Payback Period	=	year	1.2

The payback period would be 1.2 years, which is viable. Since the product's life is much longer than that. Moving is economically beneficial and energy saving.

CHAPTER- IV. STUDY OF COMPUTER SYSTEM

This office has about 450 nos. of computers with LED monitors. The computers are generally for students

An equivalently sized LED monitor is upwards of 80% smaller in size and weight compared to a CRT/LCD. The larger the screen, the bigger the size difference. The other major drawback of LCD deals with the power consumption. The energy needed for the electron beam means that the monitors consume and generate a lot more heat than the LED monitors. On an average, CRT Monitors and LCD monitors consume more Watt while LED computers consume less power. Auditors found no savings in it.

CHAPTER- V. HEATING VENTILATION AND AIR-CONDITIONING SYSTEM

5. STUDY FINDING OF FANS

The Fan details installed in the premises are given below

Sr No	Specification Item	Total nos
1	Ceiling fan	225
3	Wall fan	11
4	Exhaust fan	16

5.1. CEILING FANS

The standard fans are installed in the premises. 100 W Ceiling fan should be replaced with BEE 5 star rated energy efficient BLDC fan comparatively with same air

Flow but reduced in their wattage.

Service Value= Minimum Air Delivery (m³/min) / Power Consumption (kWh)Star: Service Value ≥ 3.2 to <3.4

2 star: Service Value ≥ 3.4 to <3.6

Star: Service Value ≥ 3.6 to <3.8

Star: Service Value ≥ 3.8 to <4.5star: Service Value ≥ 4.0

OBSERVATIONS

- During Audit, Air delivery was not observed on their name plate

RECOMMENDATION

There are 225 nos. ceiling fans installed in the college area are taken for replacement with energy efficient BEE star rated 26watt BLDC Fans

5.2. Energy consumption of existing fans in the college

EEM-6(not accounted for) Replacement of 225 nos. existing old inefficient ceiling fans with 26 W Energy efficient/5 star rated BLDC ceiling fans in the colleges

Energy Saving Calculation		Units	Value
Total Number of ceiling fans	=	Nos.	225
Electricity Consumption of existing old inefficient 100 watt Ceiling fan , $225\text{no.} \times 100\text{w} \times 9\text{hr} \times 150\text{days} / 1000 = 30375$	=	Watt	30375
Electricity Consumption of proposed 26 W energy efficient fans $(225\text{no.} \times 26\text{w} \times 9\text{hr} \times 150\text{days} / 1000 = 78975)$	=	Watt	7897
Cost Benefit Analysis			
Annual Savings potential	=	kWh/year	22477
Per Unit cost	=	Rs.	6.66
Annual Monetary Savings	=	Rs.	149700
Investment-1200 mm sweep 26watt BLDC ceiling fan	=	Rs.	2800
Total Investment -Rs	=	Rs.	630000
Simple Payback Period	=	year	4.2

The payback period is calculated to be 4.2 year, which is high. Since the product life is much more than that, the move is economically beneficial and energy saving

5.4. Wall fans

Lower wattage wall fans are being used for air circulation and lowering the temperature of the rooms. It is generally seen that these are rarely used, thus, it is not viable to replace these.



5.4. EXHAUST FANS

Presently 16 no. old inefficient 85-100 W exhaust fans are being used to provide general ventilation to the washrooms/mess, labs on the campus and these may consume up to 100 watts. These are recommended to replace with 40watt energy efficient BEE star rated BLDC exhaust fans

5.5. Energy consumption of existing E/fans in the colleges

EEM-7(not accounted for) Replacement of 16 nos. of 100 W inefficient exhaust fan with 40 W Energy efficient BEE 5 Star rated BLDC exhaust fan

The energy saving calculation is shown below

Energy Saving Calculation		Units	Value
Total Number of Exhaust fans	=	Nos.	16
Electricity Consumption of existing old inefficient 80/85watt (16 no.x100wx9hrx150days/1000=2160 KWH)	=	kwh	2160
Electricity Consumption after replacement with 40 W energy efficient BEE 5 star rated BLDC E/fans (16 no.x40wx9hrx150days/1000=864 KWH)	=	kwh	864
Cost Benefit Analysis			
Annual Savings potential	=	kWh/year	1296
Per Unit cost	=	Rs.	6.66
Annual Monetary Savings	=	Rs.	8631
Investment/ fixture replacement	=	Rs./fixture	2350
Total Investment-Rs	=	Rs.	37600
Simple Payback Period	=	year	4.3

The payback period is calculated to be 4.3 years, which is high. Since the product life is much longer than that, the move is economically beneficial and energy saving.

5.6. AIR CONDITIONERS

The main purpose of an Air Conditioning (AC) system is to help maintain good indoor air quality through adequate ventilation with filtration and provide thermal comfort. AC systems are among the largest energy consumers in campus. The choice and design of the AC system can also affect many other high-performance goals, including water consumption (water-cooled air conditioning equipment) and acoustics.

5.6.1. DESCRIPTION OF AC SYSTEM

Campus has installed 59 Nos. of 1.5 and 2T Window /Split Air Conditioners make mostly Hitachi, carrier in various blocks of the campus. These are recommended to replace with energy efficient BEE 5 star rated air conditioners being very old and had served their life

5.6.2. POWER CONSUMPTION MEASUREMENT OF EXISTING AIR CONDITIONERS

The auditors measured the power consumption of some of air conditioners installed at PG block room no. and in the reception, area shown in shown below:

Measured data:

AC	Date	Volts	Amps	PF	KW
Window at RN-	10-06-2023	228	13.7	0.71	2.22
Split in the reception	10-06-2023	228.2	10.66	0.782	1.90

Power consumption of the Air Conditioners



5.6.3. PERFORMANCE OF AIR CONDITIONERS: The audit team has carried out the performance of some of the Air Conditioners by measuring the actual Tonnage (Cooling Capacity) using a hygrometer and anemometer. The performance of the Air conditioner is shown below:

Description	Window-AC in RN 107	Split Reception outside chairman's office
Tons	1.5	1.5
Make	Hitachi	Hitachi
Year		
Ambient air temp - Dry	22.7	28.5
Dry bulb temperature at inlet	15	14.1
Wet bulb temperature at inlet	14.1	12.2

Enthalpy of inlet air - K J / kg	39.72	38.5
Dry bulb temperature at outlet	13.9	11.8
Wet bulb temperature at out let	9.2	7.1
Enthalpy of outlet air - K J / kg	25.63	24.5
Heat shed at evaporator - KJ/kg	14.09	14
outlet duct area -square m	0.0419	0.1597
Air speed - m/second	5.33	1.30
Flow- Cubic meter/ hour	804.0	746.8
Flow - Kg/ hour at inlet temperature	989	926
Total enthalpy KJ/ hour	13938	12959
Total enthalpy KCal/ hour	3331	3097
Total tons/ hour	1.10	1.02
Power consumption - kw	2.22	1.90
Power consumption - kw/ ton	2.01	1.85
Heat shed at evaporator - kw	3.87	3.60
EER of AC	1.7	1.9

Performance analysis of Air Conditioner

OBSERVATIONS & RECOMMENDATIONS

The Performance assessment of units was done only for the purpose of comparison. .

The detailed analysis of the power consumption and performance of AC's were checked and shown above in the tabulated form.

1. The power consumption of ACs is 2.2 kw & 1.9 kw with low EER. The performance of these checked AC's is unsatisfactory. It is recommended to replace the window and split ACs with BEE 5star rated AC's which is a mandatory phase as per star rated plan of BEE.
4. Regular Maintenance of the A/C is required for proper refrigeration effect by attending the gas leakages present and cleaning of the filters.

5.6.4. Electricity consumption of existing ACs

Capacity	Type	Total	Hrs/ day	Days	kWh
1.5T	window	44	9	150	130680
1.5T	Split	15	9	150	38475

EEM-8 & 9 (Not accounted for) about 44/15 Nos. old inefficient window and split AC'S are proposed to be replaced with new BEE 5 star rated ACs installed in various rooms in the campus. The energy saving calculations is provided below:

Energy Saving Calculation	Units	1.5T/ window	1.5T/ split
Total Number of Air conditioners	Nos.	44	15
Electricity Consumption of existing old inefficient Air conditioners as per Para above “Existing consumption details” 6.5.	Kwh	130680	38475
Annual Savings potential after replacement with energy efficient 1.5 T W/S BEE star rated AC (1200x44X9X150=71280Kwh) & (1200x15X9X150=24300Kwh)	kWh/year	71280	24300
Cost Benefit Analysis			
Per Unit cost	Rs.	6.66	6.66
Annual Monetary Savings	Rs.	395604	94405
Investment/ fixture replacement	Rs. /fixt.	24000	31000
Total Investment	Rs.	1056000	465000
Simple Payback Period	year	2.6	4.9

The payback period would be 2.6, 4.9, years, which is viable. Since the product’s life is much longer than that. Move is economically beneficial and energy saving

5.7. DUCTABLE AIR CONDITIONING SYSTEM

5.7.1. Ductable air conditioning systems are basically large multi-split systems where a number of indoor units are connected to the outdoor unit. These air conditioning systems are generally used for larger applications where the alternative might be a central chilled water system or central ducted system. Unlike those other types of system these air conditioning would generally be comparable in capital cost but would be quicker to install and more energy efficient to run.

The main advantages of using ducted air conditioning Systems are as follows: -

- A ducted air conditioning system is one which functions by pumping cool air through a centrally located cooling unit. The unit comes equipped with ducts that through a series of ducts transfer the cool air to the living space.
- They provide temperature-controlled cooling and work fine in winters as well by supplying hot air into space.
- A Ductable air conditioner cools the entire area of the property as it comes with separate air-conditioned zones

These units have become very popular for all types of retail, office or commercial applications due to their high degree of flexibility.

The details of the existing Ductable AC system are as under:

Tower AC- 8 Nos.

VRV AC-4 Nos.

5.8. PERFORMANCE OF DUCTABLE AIR CONDITIONERS

5.8.1. RATED PARAMETERS

Description	Voltas/Tower	General/VRV
volts	380-420	380-420
current	12.5Amps	18.9A
Power	6500 watts	6.5 kw
Pressure	4.1Mpa	
A-410	14.3K	
Air flow	4480CFM	8400 m3/hr

5.8.2. Measured Power Data of Ductable AC

V	I	PF	KW	KVA
408.16	8.94	0.823	5.20	6.32



A



B

A & B → PERFORMANCE TESTING OF AIR CONDITIONERS

C → VRV OUTDOOR UNIT INSTALLED ON ROOFTOP



C

Parameters	1/ VRV	2/ Tower
Average Speed-m/sec	3.50	3.80
Inlet Area-sqm	0.16	0.11
Suction Air Flow -m3/hr	8288	1464
Dry bulb temperature-oC	29.5	28.4
Wet Bulb Temperature-oC	22	23.5
Enthalpy KJ/Kg	65	70
Density of air at 0°C	1.293	1.29
Density of air at inlet temperature	1.167	1.171
Flow in Kg/Hour	9671	1714
Dry bulb temperature--oC	24	23.8
Wet Bulb Temperature--oC	21.8	21.7
Enthalpy KJ/Kg	63.82	64
Heat shed by Air in Evaporator -Kcal	11412	10286
Heat shed by Air in Evaporator - Tons	3.77	3.40
Power - kW	6.1	5.2
kW/Ton	1.62	1.53
EER	2.18	2.30

OBSERVATIONS

The Performance assessment of units was done only for the purpose of comparison. .

1. The detailed analysis of the power consumption and performance of AC's were checked and shown above in the tabulated form. The performance of these checked units is satisfactory.
2. Filters required to be cleaned

RECOMMENDATION

Regular Maintenance of the A/C is required for proper refrigeration effect by attending the gas leakages present and cleaning of the filters on maintenance of the AC'

5.9. Water Coolers

5 Nos. of water coolers are installed in the building premises to enable the employees, students and visitors to get cool water. The water temperature is controlled with a thermostat. Normally it is kept at tap no. 4. Refrigerant R-22 is used in these coolers. No pressure gauges are installed on the refrigerant circuit.

5.9.1. Energy consumption of existing water coolers

Nos	Watts	Hrs.	Days	kWh
5	1550	9.0	150	10463
			Total	10463

Measured parameters of water cooler

Measured the parameters of the cooler installed near reception office and the Performance is as below:

5.9.2. Performance of water coolers

EEM-5

water cooler	Units	Value
Normal water temperature	°C	24
Reasonable chilled water temperature	°C	14
Water Temperature measured	°C	12
Difference in temperature	°C	2
Excess energy consumption @ 3%/ °C rise in temperature	%	6
Energy consumption in water cooler as per above Para 6.4.1.	=	10463
Energy saving potential @ 6% ,10463x0.06=933 kwh	=	628
Amount savable @ Rs.6.66/ kWh	=	4181
Expenditure for maintenance of all evaporator coils-Rs750/WC	=	3750
Payback period		1

The payback period would be 1 year which is viable. Since the product life is much more than that

CHAPTER- VI DIESEL GENERATOR SETS

6.1. SELF GENERATED POWER

GJIMT campus has 3 Nos. DG Set of 250 KVA, 125 & 30 KVA capacities installed in acoustic covers for in-house power generation. The operation of the DG set is limited to power cuts only.

HSD Consumption of DG Sets

Diesel Consumption Details	FY 22-23	Units Generated-KWh
Annual- Lts	2000	16460 and added in utility consumption
Rate Rs / lts	80	
Amount – Rs lacs	160000	

6.2 DG SET 1 of 250 KVA

6.2.1 Rated parameters of DG Sets

Description	Details
Make	KIRLOSKAR
Capacity-KVA	250
Volts	415
Amps	1405.1
Power factor	0.8 lag
Rpm	1503
Connection	Series
Rated Power-KW	808
Frequency-HZ	50

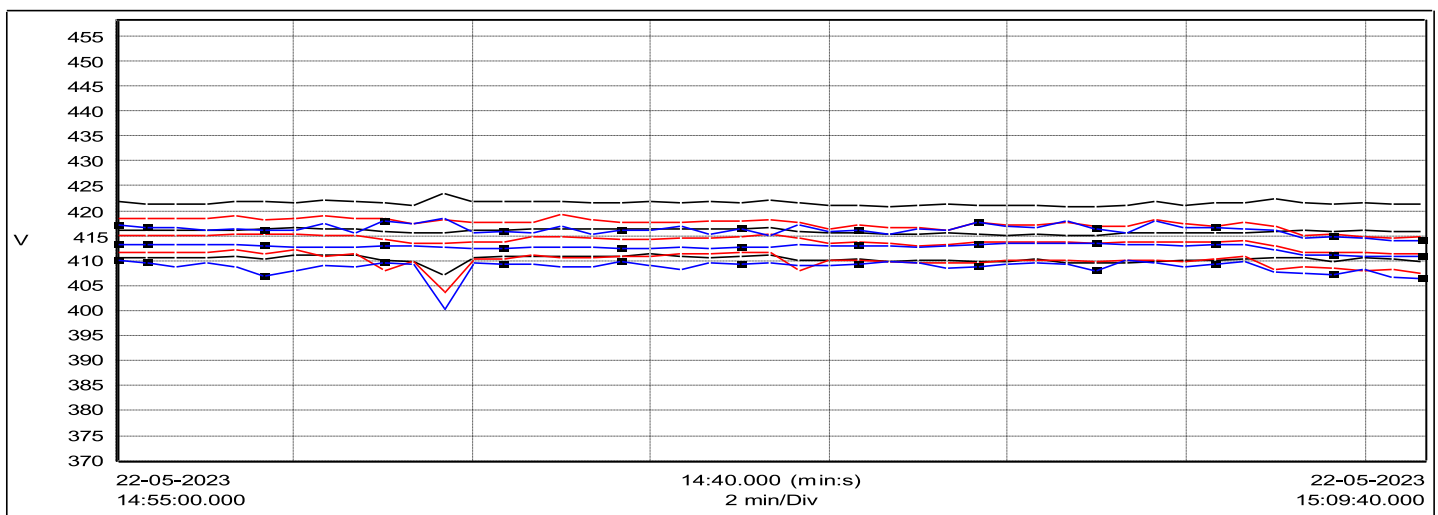
For analyzing DG of 250 KVA DG set was on 22.05.2023



Measuring Parameters of DG Set No. 1- 250 KVA installed at GJIMT Campus

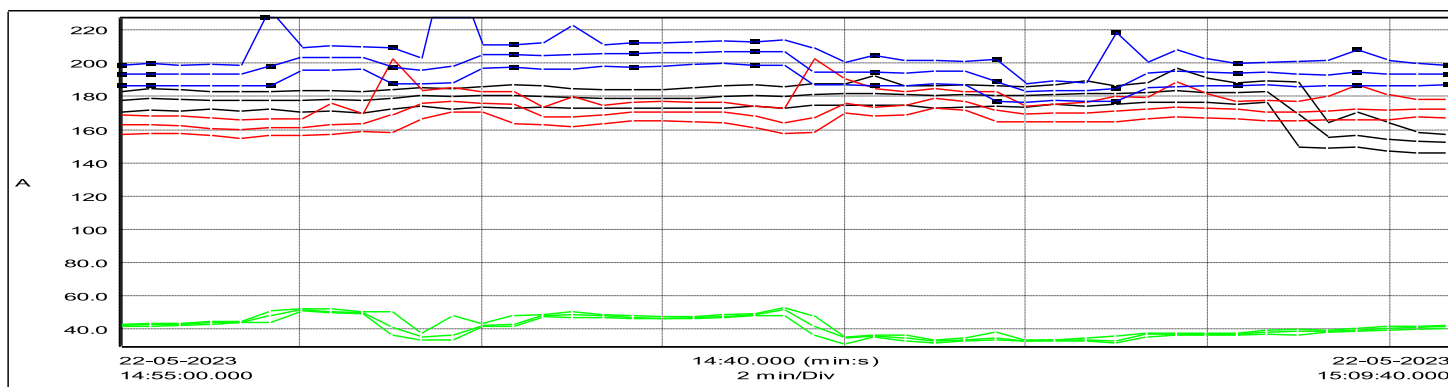
6.2.2. VOLTAGE PROFILE DG-1

Urms	Urms	Urms	Average
Line 1	Line 2	Line 3	
415.994	414.059	412.845	414.3



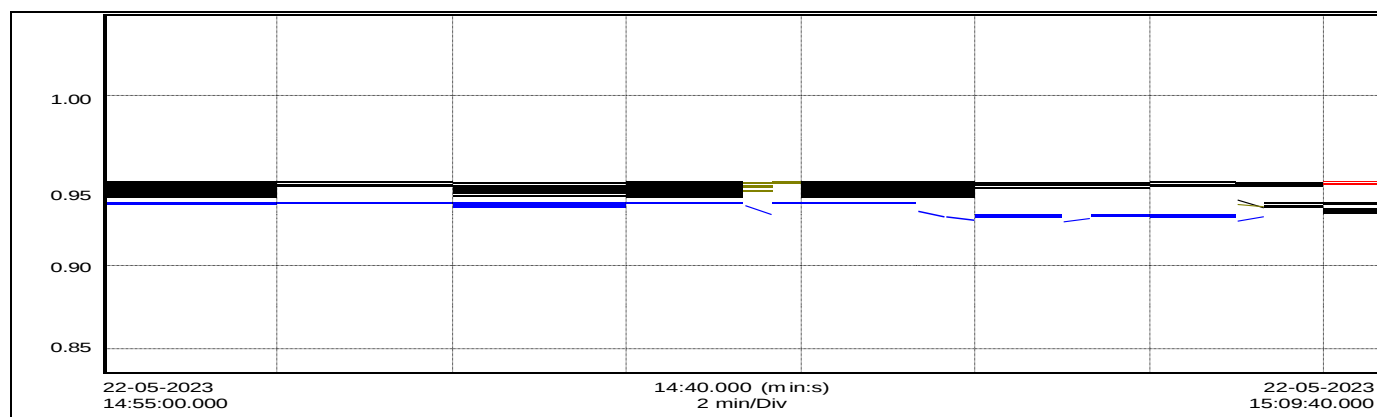
6.2.3. CURRENT PROFILE DG-1

Arms	Arms	Arms	Average
Line 1	Line 2	Line 3	
177.461	170.157	197.301	181.64



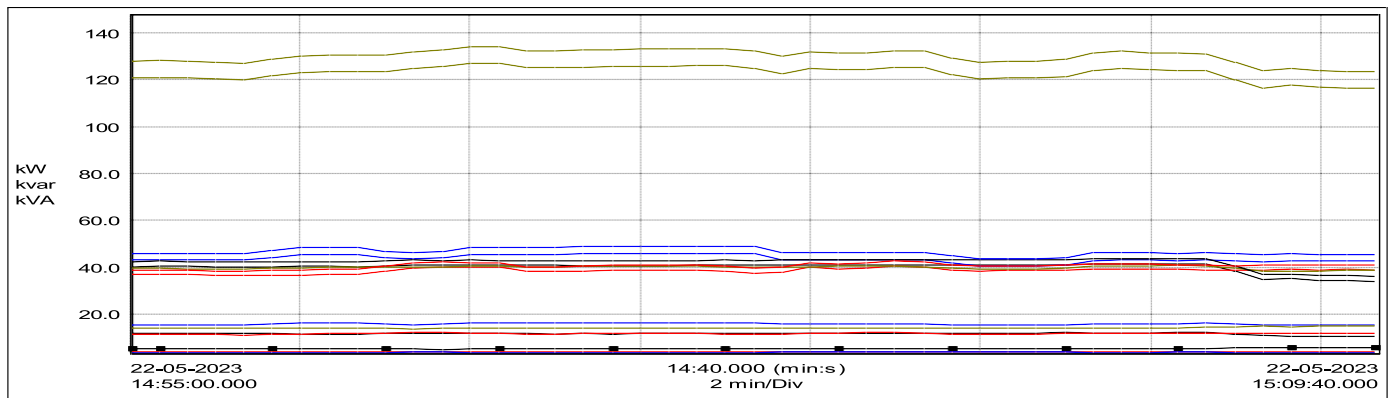
6.2.4. POWER FACTOR PROFILE DG-1

Item	Date	Av	Min	Max
PF1	22-05-2023	0.95	0.939	0.952
PF2	22-05-2023	0.949	0.946	0.953
PF3	22-05-2023	0.935	0.929	0.938
PFT	22-05-2023	0.944	0.941	0.947



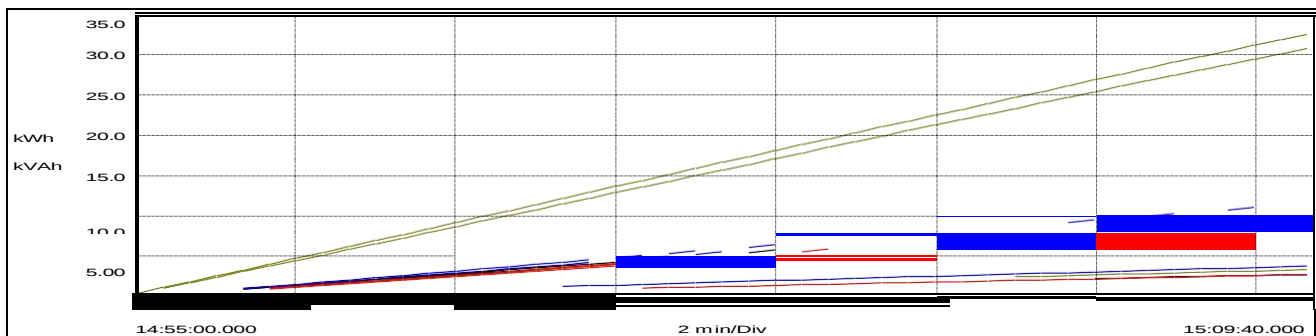
6.2.5. POWER GENERATION PROFILE DG-1

Item	Date	Av	Min	Max	Power
P1	22-05-2023	40.343	34.382	41.909	k W
P2	22-05-2023	38.829	36.651	40.819	k W
P3	22-05-2023	43.91	40.666	46.328	k W
PT	22-05-2023	123.082	116.427	127.361	k W



6.2.6. UNITS GENERATED PROFILE

Item	Date	kWh
Ep1	22-05-2023	10.086
Ep2	22-05-2023	9.707
Ep3	22-05-2023	10.978
EpT	22-05-2023	30.771



GRAPHS OF ENERGY GENERATED BY 250 KVA GENERATOR DURING TRIAL

6.2.7 DATA ANALYSIS OF DG SETs, OBSERVATIONS & RECOMMENDATIONS

All the measurement data is being analyzed

The following is supplemented in management's efforts to further bring down energy costs.

1. Specific energy consumption: -The most important thing is to know specific energy consumption. Log book is maintained for DG. At present only hours of operations are being monitored.
2. Effect of temperature & suction pressure - For every 3.5 °C increase in inlet air temperature, fuel consumption increases by 1%. The DG Sets is normally designed for ambient temperatures of 25 to 30 degree centigrade. Higher temperature & lower suction pressure decreases efficiency. The position of set is as below: -
 - A. Exhaust pipe- Not insulated. It be insulated
 - B. Expansion joint & bend- These are insulated.
 - C. Oil pressure: It varied from 3.72 bar. It was found satisfactory.
 - D. Water temperature: It remained 80 °C. It is found satisfactory.
 - E. With balanced load, it can be loaded up to normal 75%. With some control on power factor, it can be loaded up to 85%
 - F. Supply voltage: Average voltage of DG- is 414.3
 - G. Supply Current: Average supply current of DG-1 is 181.64
 - H. The load on the GEN SETs is very less.
 - I. Power factor: Power factor of DG-1 is 0.944 which is more than 0.8
 - J. The load power factor is entirely dependent on the load The AC generator is designed for the power factor of 0.8 lag as specified by standards
 - K. Power: Power generated by DG-1 is 123 KW
 - L. Energy: Energy generated by DG- 31 kwh during its trial
 - M. Efficiency of DG is satisfactory

Typically, a diesel generator will run at about 40 percent efficiency in its designed optimum operating range, usually up to 80 percent of total load capacity. That means for every 100 units of energy input, 40 units are delivered as output.

-It is recommended to use additive in lubrication oil in HSD for DG it will increase the average and efficiency and will reduce the carbon deposit on the burner nozzles in the DG Set. **The auditors found nil saving in it**

CHAPTER-7. MOTOR & PUMPING SYSTEM

The campus has made the provision for storage of 35000 lts of water per day in pvc tanks placed on the roof top of the campus for the facility of the staff and students in the campus by pumping with two mono block pumps of 1 HP each installed near stage area Each pump runs 7-8 hour a day

7.1.1. POWER CONSUMPTION OF PUMPSET

During the audit power consumption of 2 X 1 hp Monoblock water pump installed behind reception area was measured The auditors measured the power consumption of the motor pump and measured details are shown below:-

7.1.2. PUMP-1HP Power consumption of one of the Pump-motor was measured

Measured Data

V	I	PF	KW
234	9.5	0.924	2.05

OBSERVATIONS AND RECOMMENDATIONS

Power consumption of the pump found high; it is recommended to replace with Energy efficient BEE star rated pump set of same capacity

EEM-6 Replacement of existing inefficient water pump set with energy efficient BEE 5star rated pump set

ENERGY SAVING CALCULATIONS

Energy Saving Calculation		Units	Pump Set
Floor mounted pump set of 1 HP	=	Nos.	2
Annual Electricity consumption of pump set for water pumping $2 \times 2 \times 4 \times 300 = 4800$ kwh	=	kWh	4800
Saving Potential after replacing existing motor pump sets with BEE star rated energy efficient pump set of single phase 1hp @ 25 %	=	KWh	1200

Cost Benefit Analysis			
Per Unit cost		Rs.	6.66
Annual Monetary Savings	=	Rs.	7992
Investment for replacing with BEE star rated energy efficient, 1 phase 1hp with flow 900-2500 l/hr. motor pump sets complete in all respect@Rs.10000/-	=	Rs.	20000
Simple payback period	=	Years	2.5

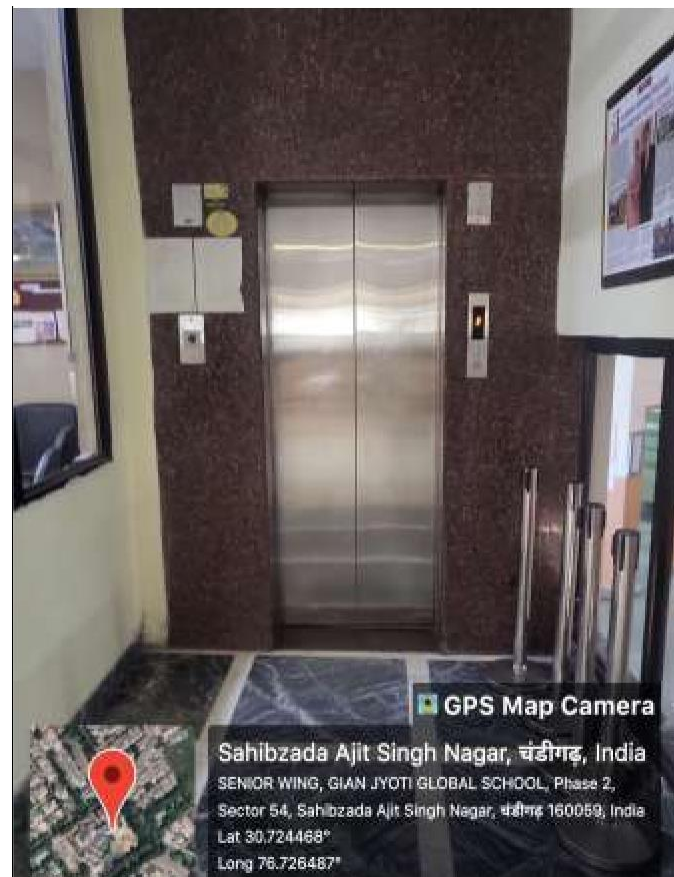
The payback period is calculated to be 2.5 year. Since the product life is much more than that, the move is economically beneficial and energy saving

7.2. LIFT SYSTEM

1no Passenger lift have been provided for comfort of students and staff of KONE make **7.2.1. RATED**

7.2.1. RATED PARAMETERS

Make	KONE
Motor	3 phase squirrel cage induction
Motor voltage	380 V $\pm 5\%$
Motor current	10A
Motor capacity	5.5KW
Car speed	2 m/s



KONE LIFT & MOTOR

7.2.2. Main observations:

Main observations are as follows:

1 Occupancy level: Since presently occupancy level is much more in this building being one lift, actual operation is also being controlled very effectively on account of in-built technology

2 Latest technologies: The lift is as per latest technology.

7.2.3. POWER MEASUREMENT DATA

We measured power in three conditions:

- a) Lift moving upward
- b) Lift moving downward
- c) Lift at no load

Summary of all the measurement data is as below:

V	A	PF	KW	REMARKS
428.7	3.1	0.785	1.77	lift on load moving downward
429	2.9	0.768	1.6	lift on load moving upward
429.5	0.32	0.712	0.16	lift on no load

Power measurement of lift:

Power consumption is at the low level.

No load power consumption is less than 0.16KW

CONCLUSION:

The lift is operating very efficiently. The auditors do not find any saving in it.

Therefore, Energy saving potential – Nil.

CHAPTER-VIII. SOLAR POWER PLANT

Detailed Report of 200 KWp Solar Roof Top Grid Interactive Power Plant

Solar energy is one of the most widely used renewable source of energy one can use renewable energy technologies to convert solar energy into electricity, it is very reliable source of energy and can significantly reduce the electricity bills

8.1. Installation of a 200 KWp roof top Solar Power Plant:

At present, power is sourced from the PSPCL at 11 kV, which is subsequently stepped down to 433 V using 2 nos. transformer of 315 KVA each Metering is done at the 11 kV level. Power is also generated using 3 DG sets of 250,125 & 30 kVA. The college has ample space i.e. Roof top area on campus. The average power generation from a 1 KWp SPV System is around 4-5 kWh per day. Since the proposed SPV system does not have a battery backup grid connection would be required to meet the power requirements during the night. Also, the SPV power generation varies with time of day, the balance power requirements are automatically met by the grid supply during this period.



One 200 kW solar plant for generating own electricity is installed on roof top. The electricity generated by unit installed for which 12 months data is available is as follows:

MONTH 2022-23	Apr	May	Jun	Jul	Aug	Sep
Solar Generation-KWH	24946	18840	26852	19736	25276	26024

Oct	Nov	Dec	Jan	Feb	Mar	Total
15070	20108	16756	11467	19913	20217	245205

8.2. The generation of electricity from above table is as follows:

Narration	Value
Total for 2022-23	245202
Average /day; $(245202/365=672)$ KWH	672
Energy /kw installed capacity ; $(672/200 \text{ KWp}=3.36)$ -KWh	3.36

The Solar panel is expected to generation an average over the year 4.6 kWh of electricity per day (considering 5.5 sunshine hours). If we consider 300 sunshine days, it comes to $4.6*200*300 = 276000$ KWH/annum for one 200 kW panel. We do not expect 4.6kwh/kw/day in this campus due to some deficiencies. Cleaning at roof top is difficult. The campus authorities have installed a water pipe connection at certain locations. But it is not sufficient. Water pipe with proper tee off & valves be laid all around & each panel washed with water & cleaned with cloth at least once a week instead of fortnightly as done now. Practices at some buildings are shown below:



In the first image, a locally made scrubber with water pipe connected is used. The water pipe is connected to the handle top & one person can do all the cleaning. Here, both manpower & water is saved but cleaning is not very perfect. In second method, one person sprays water & 2nd cleans it. It involves a lot of water. Secondly a good approach & safety be provided for person going up for cleaning so that he feels secure.

We expect extra generation

8.3. Expected saving potential & investment for it are as follows:

EEM-7

Energy Saving Calculations

Item	Value
Solar Generation capacity-taking 300 sunny days, $4.6 \times 200 \times 300 = 276000$ - KWH	276000
Total generation in 22-23-KWH	245205
Extra expected generation from solar power plant-KWH	30795
Total Energy salvable, assuming @10% from expected generation - kwh	3080
Amount salvable @ Rs 6.66/ kWh - Rs	20513
Appr investment for improving stairs, water piping, safety, extra lab chgs@2days/week	30000
Pa back period	1.4

The payback period is calculated to be 1.4 year. Since the product life is much more than that, the move is economically beneficial and energy saving

CHAPTER-IX. ENERGY MONITORING & ACCOUNTING SYSTEM

9.1. Detail review of present energy monitoring & accounting system terms of metering record keeping, data logging, periodic performance analysis etc.

9.2 Energy management monitoring system

Energy is costly & its consumption causes environmental degradation. So, without sacrificing production & growth, it is worthwhile saving it to the extent possible

Monitoring and targeting is an important management tool to control energy consumption. Monitoring gives existing energy consumption pattern and targeting is desirable/achievable energy consumption pattern. By proper monitoring & targeting, it is possible to save 2 to 5% energy. For its effectiveness, proper records of energy consumption and production needs to be maintained.

Somehow, the auditors feel that proper records are either confined to 1-2 persons or not maintained. It is necessary to maintain & monitor & record following things:

- i Electricity consumption, power factor & maximum demand
- ii Maximum, minimum voltage from grid. This will enable them to install Servo stabilizer at important locations.

9.3. For maintenance:

Transformer – 2 No. transformers of 315 KVA each for which routine maintenance schedule be adhered to.

Generator set- Some maintenance schedule should be prepared for DG Set. It can be as follows

L D System

9.3.1. Initially tightening of all connections. Later, once a month & after 1-2 months, once a year

Thermo graphic images: Be taken after tightening all connections.

There after once in 2 years.

9.3.2. Bench marking

Benchmarking of energy consumption is a powerful tool for performance assessment and logical evolution of avenues for improvement. Historical data, well documented, helps to bring out energy consumption and cost trends month-wise / daily. Trend analysis of energy consumption, cost, relevant production features, specific energy consumption, help to understand effects of capacity utilization on energy use efficiency and costs on a broader scale.

9.3.3. Suggestions to carry out this monitoring & bench marking: Presently, the campus building is being looking after by the competent technical staff provided by the Govt. & accounts staff of the college. But, monitoring, targeting etc. is itself professional work. The energy consumption in this campus is about 3.47 Lakh KWH. It can hire a professional energy manager to visit & guide their staff –initially once afterwards 1 visit once in 6 months.

CHAPTER-X. CHECKLISTS AND ENERGY SAVING TIPS

Below are some of the energy efficiency tips in electrical utilities

10.1. ELECTRICITY

- Optimize the tariff structure with utility supplier
- Schedule your operations to maintain a high load factor
- Shift loads to off-peak times if possible.
- Minimize maximum demand by tripping loads through a demand controller
- Stagger start-up times for equipment with large starting currents to minimize load peaking.
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.90 under rated load conditions.
- Relocate transformers close to main load.
- Set transformer taps to optimum settings.
- Disconnect primary power to transformers that do not serve any active loads
- Consider on-site electric generation or cogeneration.
- Export power to grid if you have any surplus in your captive generation
- Check utility electric meter with your own meter.
- Shut off unnecessary computers, printers, and copiers at night.

10.2. MOTORS

- Proper size to the load for optimum efficiency.
- (High efficiency motors offer of 4 - 5% higher efficiency than standard motors)
- Using energy-efficient motors was economical.
- Use synchronous motors to improve power factor.
- Check alignment.
- Provide proper ventilation
- (For every 10 oC increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)
- Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply.
- (An imbalanced voltage can reduce 3 - 5% in motor input power)
- Demand efficiency restoration after motor rewinding.

- (If rewinding is not done properly, the efficiency can be reduced by 5 - 8%)

10.3. PUMPS

- Operate pumping near the best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.
- Balance the system to minimize flows and reduce pump power requirements.
- Source: Bureau of Energy Efficiency, New Delhi 4
- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

FOR R.K. ELECTRICALS & ENERGY AUDIT SERVICES

(END OF THE REPORT)

10.4. ANNEXURES - LIST OF SOME VENDORS

FOR LIGHTING	SYSKA LED DELHI, D-, 108, Patpar Ganj Rd, South Ganesh Nagar, Block D, Ganesh Nagar 1, Ganesh Nagar, New Delhi, Delhi 110092 Phone: 099101 11242
	Philips Lighting India Limited, 9th Floor, DLF 9-B, DLF Cyber City DLF Phase-3, Gurgaon – 122002, India

FOR FANS	Havells Galaxy, SCO 19, Madhya Marg, Sector 7 C Chandigarh
	Orient Fans, Gupta Electronics, SCO 1117, Sector 22, Chandigarh M - 7947243304

FOR PUMPS	Grundfos Pumps India Pvt. Ltd. 301C, 3rd Floor, D21, Corporate Park, Dwarka Depot, Near Sector 8 Metro Station, Sector 21, Dwarka, New Delhi – 110075, India
	Kirloskar Brothers Limited, M-11, 3rd Floor, Middle Circle, Connaught Place, New Delhi - 110 001 Tel : 011 - 41501055

10.5. Annexures - Copies of electricity bill

(pgBillPay.aspx) **PSPCL** (pgBillPay.aspx)

Print Bill

PUNJAB STATE POWER CORPORATION LIMITED (Regd. Office P.S.E.B., Head Office, The Mall Patiala-147001, Ph. 1912), CIN: U40109PB2010SGC033813 E-mail: 1912@pspcl.in, Website: www.pspcl.in, GSTIN NO: 03AAFCP5120Q1ZC										Billing Category NRS RATE CATEGORY FOR NRS>100KVA DPC	
Sub Division SUB DIVISION TECHNICAL-1	Division MOHALI SPECIAL DIVIS	Circle MOHALI	Bill Cycle 03-2023	Bill Date 27-MAR-2023	Bill No. 50020798290						
A/C No.: 3909328913 Old A/C No.: Consumer Name: M/S GIAN JYOTI GLOBAL SCHOOL Address: PH 2 MOHALI-160055-INDIA GST No.: Connection Date: 01-04-2014 Mobile No.: 90XXXXX278		Load 272.18	Contract Demand	Tariff Type NRS RATE CATEGORY FOR NRS>100KVA DPC	Bill Status O	Due Date 06-Apr- 2023	Cash/Online DD/Cheque	Bill Amount Rs.30760/-			
Feeder Code FDC0000003961		Date of New Reading 22-MAR-2023	Date of Old Reading 22-FEB-2023	Bill Period 28	Meter Security 30010	Secure Cons. 296185	Security cons/Meter Security Interest				
Meter Reading											
Type	Old Reading	New Reading	Current Units	Meter Multiplier	Line CT Ratio	Meter CT Ratio	Overall Multiplier	MMTS Correction	Unit Consumed		
KWH				1.00	20/5	5/5	4.00				
KVAH				1.00	20/5	5/5	4.00				
MDI	19.88	14.54		1.00	20/5	5/5	4.00		58.16		
(A) Fixed Charges											
Contract Load / Contract Demand (L) KWH/KVA	Actual Load/Demand KWH/KVA (A)	80% of (L) KWH/KVA (B)	A or B whichever greater KWH/KVA (C)	Rate per KWH/KVA per month (R)	Billing Days (D)	A: Fixed Charges Amount =CxRxRx12/365					
	58.16	241.76	241.76	110.00	28	24482.00					
(B) Energy Charges			(C) Fuel Cost Adjustment Charges			(D) Additional Surcharge					
KWH/KVAH	Tariff Rate	B: Amount	KWH/KVAH Consumption	Rate of FCS/KWH- KVAH	C: Amount	Units	Tariff Rate	Amount	Total Energy Charges (Rs.) + FCA + Addl. Surcharge		
	8.55	0			0.00			0.00	0		
(D) Rental Charges					GST						
Meter Rent for PSPCL Meter	MCB, CT/PT Unit Rental	Rent for any other equipment	Total Rent	HSN Code	SGST	CGST	Total GST	D: Total Rent with Tax			
1257	0		1257		113.13	113.13	226.26	1483.26			
(E) Surcharges											
Voltage Surcharge			Demand Surcharge			ToD Surcharge					
Supply Voltage	Catered Voltage	Surcharge Rate	Voltage Surcharge Amount	Demand in excess	Rate of Demand Surcharge	Amount of Demand Surcharge	Peak Hours KWH/KVAH	Rate	Amount		
11.00	11.00			0.00	0.00	0.00	0.00		0.00		
(F) Rebates											
Voltage Rebates					ToD Rebates						
Units	HT/EHT Rebate	Amount	Non-Peak Hours KWH/KVAH	Rate	Amount	F: Total Rebates (Rs.)					
	0.00	0.00	0.00	1.25	0.00	0.00					
(G) Previous Adjustment/Outstanding Amount Notice No.: and Date:											

Units	Fixed Charges	Energy Charges	FCA	Rentals	Surcharges(+)	Rebates(-)	Taxes	Subsidy	Total	G: Net Previous Adjustment (Rs.)	
		/		/			/0		0/-100	0/-100	
(H) Sundry Charges/Allowances Notice No.: - and Date: -											
Late Payment Interest	Units	Fixed Charges	Energy Charges	FCA	Rentals	Surcharges(+)	Rebates(-)	Taxes	Subsidy	Total	H: Net Sundry Charges/Allowances (Rs.)
	/	/	/0	/0	/0	/	/0	/0	/	0	0
(I) Subsidy											
Subsidised KWH/KVAH		Rate for Subsidy			Amount			I: Net Subsidy (Rs.)			
		0.00			0.00			0.00			
(J) Taxation											
Electricity Duty	Municipal Tax	IDF	Cow Cess	Total Tax (J)	Net Energy Charges		TCS/TDS	Cum/Prev Rounding Amount	NET BILL AMOUNT		
3183.00	490.00	1224.00	0.00	4897			0.00		Rs.30760/-		
										Thirty Thousand Seven Hundred Sixty Rupees Only	
(K) Total Billed Amount											
Due Date by Cash/Online	Due Date by DD/Cheque	Net Amount Payable by due date		Late Payment Surcharge for LT consumer upto 15 days @2% of unpaid amount	Amount Payable by LT consumer upto 15 days after due date	Late Payment Surcharge for HT consumer upto 7 days after due date	Amount Payable by HT consumer upto 7 days after due date	Late Payment Surcharge for HT consumer upto 7 days @5% of unpaid amount	Amount Payable by HT consumer after 7 days & upto 15 days after due date		
06-Apr-2023	06-Apr-2023	30760		617		517		1543			
Interest @ 1.5% per month on gross unpaid amount including surcharge shall be levied after 15 days from due date of bill.											
(L) Previous Cycle's Consumption											
Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8	Cycle 9	Cycle 10	Cycle 11	Cycle 12
MONTH:MAR-22	APR-22	MAY-22	JUN-22	JUL-22	AUG-22	SEP-22	OCT-22	NOV-22	DEC-22	JAN-23	FEB-23
MDI:57	88	185	202	167	217	285	291	153	56	23	79
KWH:20904	23220	44536	63700	34184	56656	82164	31027	19650	17466	49	23638
KVAH:26308	23220	19336	27556	20364	26120	26936	15667	20974	17594	17708	20770
										12376	
Payment History: Last Payment Amount:Rs. 56630, Dated: 28-02-2023											
Message: 1. Payments exceeding Rs.20,000/- shall be accepted in digital mode only w.e.f. 01-07-2021. 2. In case the payment of billed amount is not made by the due date, the power supply shall be liable for disconnection after expiry of 15 days of the due date and this may be taken as notice under section 55 of the Electricity Act 2003 read with regulation 32 of the Supply Code, 2014. 3. SEE DETAILS OF METER/CONSUMPTION ON 2ND PAGE. 4. CHARGES HAS BEEN CHARGED AS ED @ 13% OF SOP, MT @ 2% OF SOP, IDF @ 5% OF SOP, COWCESS @ 1 OR 2 PAISA PER KWH/KVAH 5. - UNPAID DUES :- A) LATE PAYMENT SURCHARGES : 0 B) LATE PAYMENT INTEREST : 0 6. 7. 8. 9.											
Description (HSN Code)	Quantity	UQC	Non-Taxable Amount	Taxable Amount	CGST 9%		SGST 9%		Total		
Meter Rent (997319)	1	-	0	1257	113.13		113.13		1483.26		
MCB Rent (997319)	1	-	0	0	0		0		0		
Electrical Energy (271600)	0	UNT-Units	0	0	0		0		0		
PUNJAB STATE POWER CORPORATION LIMITED website:www.pspcl.in form RO 3-B											
Meter Reading				Overall Multiplier		Consumption					
New Status				Old Status							

Bi-Directional Meter	Import (From PSPCL)	KWH	140786	138910	4.00	7504
		KVAH	169430	167341	4.00	8356
		KVA	14.54	0	4.00	58.16
	Export (To PSPCL)	KWH	170376	167949	4.00	9708
		KVAH	170394	167966	4.00	9712
		KVA	26.82	0	4.00	107.28
	Net	KWH	29590	28039	4.00	2204
		KVAH	964	625	4.00	1356
		KVA	12.28	0	4.00	49.12
Solar Meter	Solar	KWH	325820	320766	4.00	20217
		KVAH	337876	332844	4.00	20927
		KVA	36.9631	0	4.00	147
Previous Carry Forward: 0	Net Consumption: 0	Net Cons. for Billing: -1356		Total Consumption: 18571		Current Carry Forward: 1356

Powered by O/o CE(IT) PSPCL

Print Date: 07-07-2023 10:09 AM

10. Credentials in r/o “R.K. Electricals and Energy Audit Services”

10.6. Certificate ISO 50001:2018(Energy Management Services)



CERTIFICATE

This is to Certify that the Management System of
R.K. ELECTRICALS & ENERGY AUDIT SERVICES
PROGRESSIVE SOCIETY, 1131, SECTOR 50 B, CHANDIGARH - 160047, INDIA.
 has been audited and found to comply with the requirements of:
ISO 50001:2018
(Energy Management System)
 For the Scope of activities described bellow:
DEALS IN ENERGY MANAGEMENT, ENERGY, ENVIRONMENT & GREEN AUDITS, THERMOGRAPHY OF ELECTRIC EQUIPMENT AND ELECTRIC INSTALLATIONS OF BUILDINGS & INSTITUTIONS AND INDUSTRIES.

Certificate No.: 279101

Date of initial registration	Date of this Certificate	Surv. audit on or before/ Certificate expiry	Recertification Due
16-07-2022	16-07-2022	15-06-2023	15-06-2025

Validity of this certificate is subject to successful completion of surveillance audit on or before due date, in case surveillance audit not conducted this certificate shall suspended/cancelled.




Director

For verification and updated information concerning this present certificate visit to www.lmscert.com
 This Certificate is the property of LMS Certification Limited and shall be returned immediately when demanded.

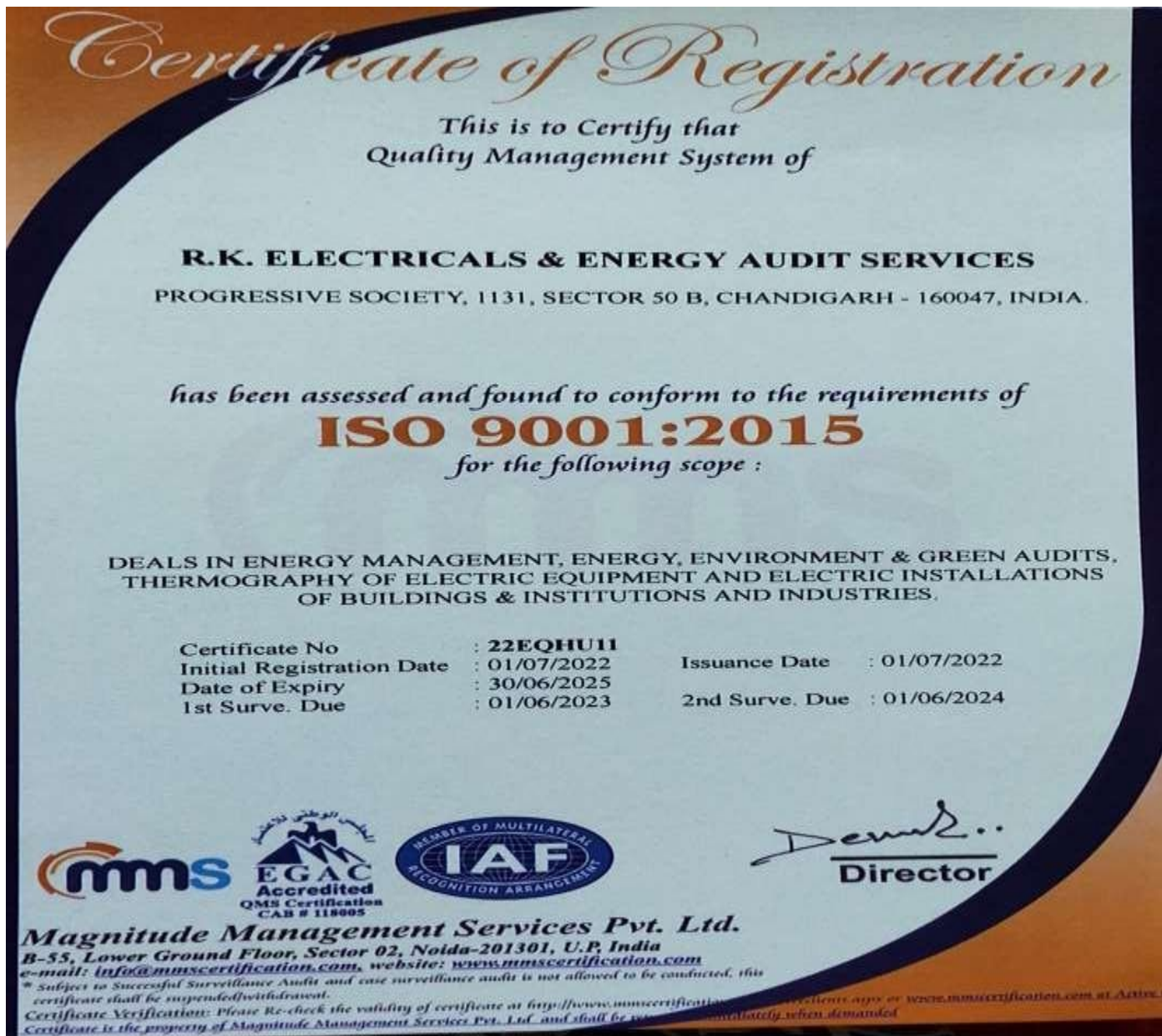
LMS Certification Limited
 Labrynth Business Centre, 43 Middle Hill Gate, Stockport,
 Great Manchester, England-SK1 3DG
 Phone :+44 208 935 5094
 Company No.: 11029176
 Visit : www.lmscert.com
 E-mail : info@lmscert.com


KAB-EN-06

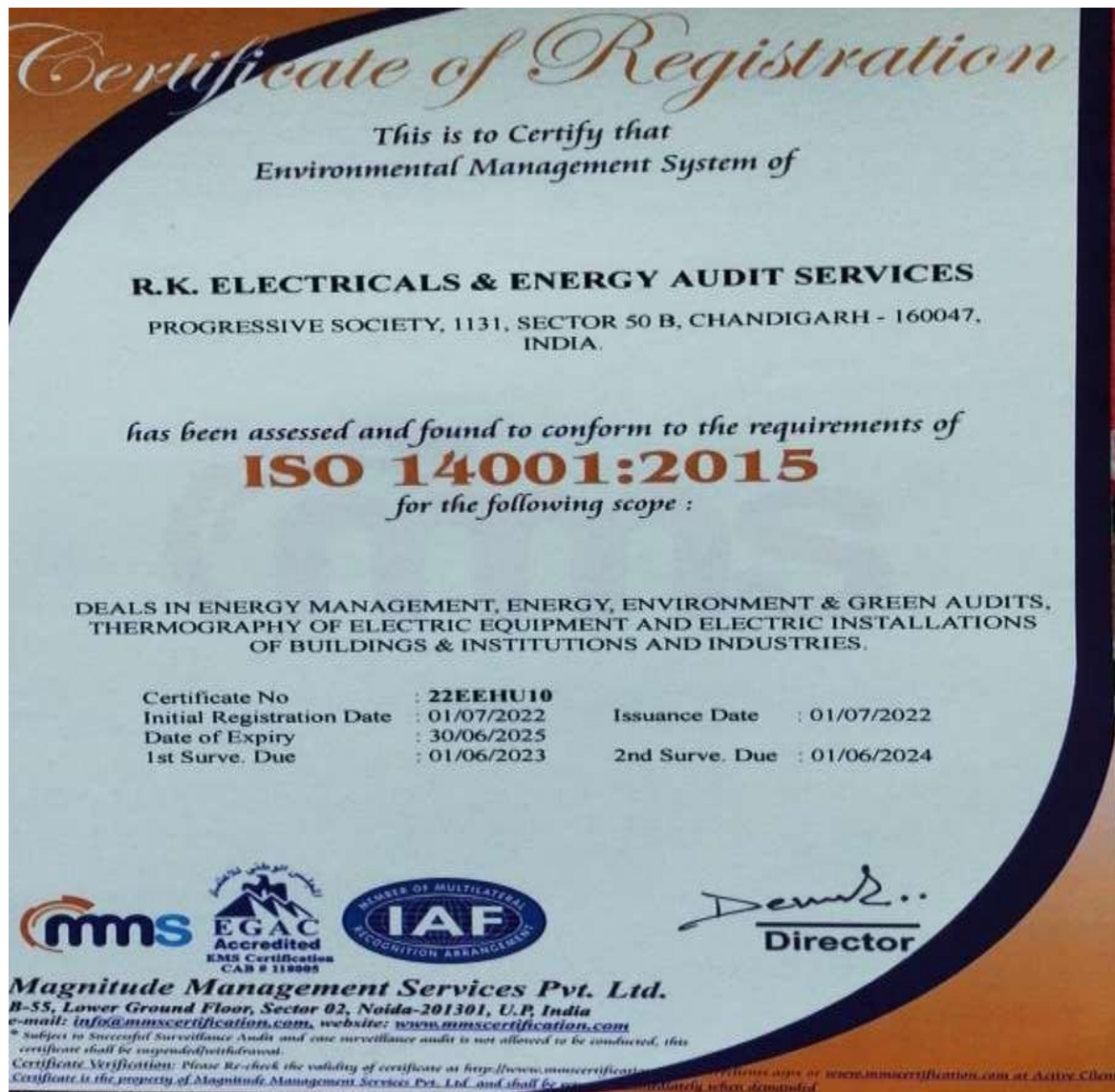


EN50001:2018

10.7. Certificate ISO 9001:2015 Quality Management



10.8. Certificate ISO 14001:2015 (Environmental Management System)



10.9. BEE Regn Certificate of Energy Auditor EA-10080 MoP Gol



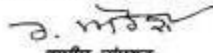
10.9.1. Certificate of IGBC Accredited Professional (IGBC India)



10.9.2 BEE Regn. Certificate of Er. Vibhor Aggarwal

 BUREAU OF ENERGY EFFICIENCY NEW DELHI CERTIFIED ENERGY MANAGER  Exam Reg. No. : EM-300062/21 Certificate Reg. No. : 17528/T Name : VIBHOR R AGGARWAL Son/Daughter of : RAJIT AGGARWAL Address : 174, H.I.G, Urban Estate, Phase -1, JALANDHAR - 144022. Signature of Certified Energy Manager : 	Date of Issue : 28.02.2022 Valid Upto : 27.02.2027 Digitally Signed: RAKESH KUMAR RAI Wed Feb 23 16:15:08 IST 2022 Secretary, BEE New Delhi Issuing Authority Name : R. K RAI Designation : Secretary (BEE) Office Address : 4th Floor SEWA Bhavan, R. K. Puram, New Delhi- 110066.
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10.9.3. Engineering Graduation Certificate of Er. Varun Sharma

ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ Punjab Technical University Jalandhar  Regn. cum Roll No. L-40405009	
BACHELOR OF TECHNOLOGY Mr./Ms. <u>Varun Sharma</u> son/daughter of <u>Sh. Rakesh Sharma</u> student of <u>Chandigarh Engineering College, Landran</u>, having completed the course of studies approved by the University and having passed the prescribed examination held in <u>Dec. 2007</u>, has been conferred the degree of Bachelor of Technology of this University in the discipline of <u>Electrical Engineering</u> in <u>First Division</u>. Given under the seal of the University	
 Registrar Jalandhar, 25/10/10	 Vice-Chancellor
 Chancellor	
