

ENERGY AUDIT

2019-20 & 2020-21

AUDIT REPORT

Studied for

Rama University

Rama City, G.T. Road Mandhana, Kanpur,
Uttar Pradesh, Pin- 209217

Analysed by



11 March 2022

Disclaimer

The Audit Team has prepared this report for the **Rama University** located at Rama City, GT Road Mandhana, Kanpur, Uttar Pradesh, Pin- 209217 based on input data submitted by the University analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and University. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who has completed audits of multiple Institutes including Technical, State University, Private University and Single Faculty Universities for a total of more than 50 lakhs+ sq. ft. of Built-up area audited till date Pan India as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

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Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

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Hereby presents

An Environment & Ecological friendly premise

Established as a State Private University at Kanpur
vide U.P. Act No. 1 of 2014 as passed by the State Legislature

The prestigious

Rama University

Rama City, G.T. Road Mandhana, Kanpur, Uttar Pradesh, Pin- 209217



Best features of the University as per our study



1. Solar generation
Installation of Solar panels



2. Waste water recycling
In-house system designed



3. Amenities
Provision for parking & E-vehicles



12. Residential facility
Provided for staff and students



4. Natural manure
Prepared in premise and used



11. Natural water is harvested
Borewell system



An Environment and Ecological friendly premise



5. Waste segregation
Practiced at the source



10. Community development
Adopted 5 villages in UBA



6. Pollution free environment
No smell or smoke



9. Mobility
90 buses free of cost for students



8. Universal design
Ramps, Universal toilet, 100% lifts



7. Clean and hygienic premise
Regular maintenance

1. Introduction

1.1 About Rama University

An educational institute is beyond than being just a building. It helps one in acquiring knowledge which is a gateway to being successful and a good human.

“A good education is the best gift you can give yourself or anyone else”

- Mahtab Narsimhan

Rama University is the one of the best private universities in the state of Uttar Pradesh, India; started in the year 2014 by the founder **Late Dr. Babu Singh Kushwah, a great visionary, a dentist, an educationist and the guiding force behind the Rama Group with a motto “Healthy people build healthy nation and education is an important tool in transforming the society”.**

Following the directions of the founder, Rama Group has evolved as a multi-activity and multi-industry group that actively participates in many major contributions to our society. It strongly believes in creating responsible citizens out of its students and hence works with a 360 degree approach towards the all-round development of the students. In this effort, the group provides adequate opportunities to its students to gain both the theoretical and the practical hands on knowledge by way of providing training and work exposure within the Group companies.

“There is no school equal to a decent home and no teacher equal to a virtuous parent.”

- Mahatma Gandhi

The University offers undergraduate, post-graduate courses, research programmes. It has full-fledged infrastructure, advanced academic programs and efficient administrative hierarchy. **It is one of the premier Educational University providing quality education with best state of the art facility and Infrastructure to the students.**

1.2 Vision and Mission Statement of University

1.2.1 Vision towards the future

To emerge as a Global Premier University in imparting education of international standards, to build superior professionals with strong work ethics and to empower the world with futuristic minds, through excellence in research and innovation.

1.2.2 Mission for achieving benchmarks

- To promote national and international collaboration for industry academia integration to achieve top most position in global hierarchy.
- To create a scientific, challenging, transparent and sustainable environment/curriculum ideal for research, innovation, entrepreneurship and consultancy.
- To nurture talent and creativity, committed to serve people, society and nation at large.
- To inculcate strong morals, values & ethics to build socially committed and spiritually inspired personalities.
- To empower and uplift each section of society through education and to contribute back to the environment by adapting and promoting eco-friendly practices.

1.2.3 Aim for community development through goals

University have set ten Broad Based Goals for 2015-19

1. Ensuring Educational Excellence
2. Ensuring Student Development including physical and emotional health and wellbeing.
3. Creating culture of excellence in Research, Scholarship, Innovation and Creativity for high impact.
4. Enhancement of quality of faculty and staff for outstanding performance.
5. Advancing internationalization.
6. Enhancing relations with industry, alumni and society.
7. Enhancing employability and promote entrepreneurial initiatives.

8. Committing to all aspects of social, economic and environmental sustainability.
9. Enhancement of supporting resources.
10. Ensuring excellence in Organizational Leadership and governance.

1.2.4 Objective defining the educational purpose

- The objectives of the University are to disseminate and advance knowledge by providing instructional, research and extension facilities in such branches of learning as it may deem fit.
- The University endeavours to provide students and teachers the conducive atmosphere and facilities and infrastructure for the promotion of :
 - a) *Innovations in education leading to restructuring of courses, new methods of teaching and learning and integral development of personality*
 - b) *Studies in established and new disciplines.*
 - c) *Inter-disciplinary studies*
 - d) *National integration, secularism, international understanding and ethics.*

1.3 Institutions in the premises

The aim of the University is to continuously enhance the teaching methods in order to provide students with an opportunity for their all-round development. In order to manage the programme offerings in a much better way, Rama University has **structured its offerings under 11 Major Sections** as follows:

1. **Faculty of Agricultural Sciences and Allied Industries**
2. **Faculty of Ayurveda**
3. **Faculty of Commerce and Management**
4. **Faculty of Dental Sciences**
5. **Faculty of Engineering and Technology**
6. **Faculty of Juridical Sciences**
7. **Faculty of Medical Sciences**
8. **Faculty of Nursing**

9. Faculty of Paramedical Sciences

10. Faculty of Pharmaceutical Sciences

11. Faculty of Professional Studies

Each of these Schools is headed by highly experienced and competent Director/Deans along with H.O.Ds checking on the right academic progress of each faculty/department in the University. The University strives for excellence in academics and makes an effort to induce passion for learning along with the inspiration for decisive thinking and assessment, thereby helping them to become the best professionals in their chosen careers.

1.4 Programs offered by the University

The University a wide range of courses for the students to upgrade their educational qualification. The details of each of these courses as per the School are as follows.

S. No.	School	Course offered
1.	Faculty of Medical Sciences	<u>1.1. MBBS</u> <u>1.2. MD(Anatomy)</u> <u>1.3. MD(Physiology)</u> <u>1.4. MD(Biochemistry)</u> <u>1.5. MD(Pathology)</u> <u>1.6. MD(Community Medicine)</u> <u>1.7. MD(Pharmacology)</u> <u>1.8. MD(Microbiology)</u> <u>1.9. MSc(Medical Microbiology)</u> <u>1.10. MSc(Medical Anatomy)</u> <u>1.11. MSc(Medical Physiology)</u> <u>1.12. MSc(Medical Pharmacology)</u> <u>1.13. MSc(Medical Biochemistry)</u> <u>1.14. PhD (Medical Anatomy)</u> <u>1.15. PhD (Medical Physiology)</u> <u>1.16. PhD (Biochemistry)</u> <u>1.17. PhD (Medical Pharmacology)</u> <u>1.18. PhD (Medical Microbiology)</u> <u>1.19. PhD (Medical Community Medicine)</u> <u>1.20. PhD (Forensic Medicine)</u> <u>1.21. PhD (Bio. Statistics)</u>
2.	Faculty of Dental Sciences	<u>2.1. BDS</u> <u>2.2. MDS(Oral Medicine and Radiology)</u> <u>2.3. MDS(Prosthodontics and Crown and Bridge)</u>

		<p><u>2.4. MDS(Orthodontics and Dentofacial Orthopedics)</u></p> <p><u>2.5. MDS(Oral and Maxillofacial Surgery)</u></p> <p><u>2.6. MDS(Periodontology)</u></p> <p><u>2.7. MDS(Pediatric and Preventive Dentistry)</u></p> <p><u>2.8. MDS(Conservative Dentistry and Endodontics)</u></p> <p><u>2.9. MDS(Public Health Dentistry)</u></p> <p><u>2.10. MDS(Oral Pathology and Microbiology)</u></p> <p><u>2.11. PhD (Oral Medicine and Radiology)</u></p> <p><u>2.12. PhD (Prosthodontics and Crown and Bridge)</u></p> <p><u>2.13. PhD (Oral and Maxillofacial Surgery)</u></p> <p><u>2.14. PhD (Periodontology)</u></p> <p><u>2.15. PhD (Conservative Dentistry and Endodontics)</u></p>
3.	Faculty of Nursing	<p><u>3.1. BSc Nursing</u></p> <p><u>3.2. BSc(Post Basic Nursing)</u></p> <p><u>3.3. MSc(Medical Surgical Nursing)</u></p> <p><u>3.4. MSc(Obstetrics and Gynecology Nursing)</u></p> <p><u>3.5. MSc(Psychiatric Nursing)</u></p> <p><u>3.6. MSc(Community Health Nursing)</u></p> <p><u>3.7. MSc(Child Health Nursing)</u></p>
4.	Faculty of Paramedical Science	<p><u>4.1. BPT</u></p> <p><u>4.2. BSc(Medical Lab Technology)</u></p> <p><u>4.3. BSc(Optomety)</u></p>
5.	Faculty of Engineering and Technology	<p><u>5.1. BTech(Mechanical Engineering)</u></p> <p><u>5.2. BTech(Electronics & Communication Engineering)</u></p> <p><u>5.3. BTech(Computer Science and Engineering)</u></p> <p><u>5.4. BTech(Civil Engineering)</u></p> <p><u>5.5. BTech(Biotechnology)</u></p> <p><u>5.6. BTech(Agricultural Engineering)</u></p> <p><u>5.7. Mtech(Electrical Engineering Power Electronics and Power System)</u></p> <p><u>5.8. Mtech(Mechanical Engineering CAD CAM)</u></p> <p><u>5.9. Mtech(Microelectronics and VLSI Design)</u></p> <p><u>5.10. Mtech(Computer Science and Engineering)</u></p> <p><u>5.11. Mtech(Civil Engineering Structure Engineering)</u></p> <p><u>5.12. Mtech(Biotechnology)</u></p> <p><u>5.13. PhD (Electrical Engineering)</u></p> <p><u>5.14. PhD (Electronics and Communication Engineering)</u></p> <p><u>5.15. PhD (Computer Science and Engineering)</u></p>

		<u>5.16. BCA</u> <u>5.17. PhD (Environmental Chemistry)</u> <u>5.18. PhD (Applied Physics)</u> <u>5.19. PhD (Applied Mathematics)</u> <u>5.20. BSc(Biotechnology)</u> <u>5.21. MSc(Biotechnology)</u> <u>5.22. PhD (Biotechnology)</u>
6.	Faculty of Commerce & Management	<u>6.1. BBA</u> <u>6.2. BCom</u> <u>6.3. MBA(Dual Specialisation)</u> <u>6.4. PhD (Commerce)</u> <u>6.5. PhD (Management)</u>
7.	Faculty of Professional Studies	<u>7.1. BA(Journalism and Mass Communication)</u> <u>7.2. MA(Journalism and Mass Communication)</u> <u>7.3. PG Diploma(Journalism and Mass Communication)</u> <u>7.4. PhD (Journalism and Mass Communication)</u>
8.	Faculty of Agricultural Sciences and Allied Industries	<u>8.1. BSc(Agriculture)</u> <u>8.2. MSc(Agriculture)(Agronomy)</u> <u>8.3. MSc(Agriculture)(Horticulture)</u> <u>8.4. MSc(Agriculture)(Genetics and Plant Breeding)</u> <u>8.5. MSc(Agriculture)(Plant Pathology)</u> <u>8.6. MSc(Agriculture)(Soil Science)</u> <u>8.7. PhD (Horticulture)</u> <u>8.8. PhD (Plant Pathology)</u> <u>8.9. PhD (Agriculture)</u> <u>8.10. PhD (Agronomy)</u>
9.	Faculty of Juridical Science	<u>9.1. LLB</u> <u>9.2. BA LLB</u> <u>9.3. BBA(LLB)</u> <u>9.4. PhD (Law)</u> <u>9.5. LLM(Criminal and Security Law)</u> <u>9.6. LLM(Constitutional and Administrative Law)</u> <u>9.7. LLM(Business and Corporate Law)</u>
10.	Faculty of Pharmaceutical Sciences	<u>10.1. BPharm</u>

Table 1: Details of the various courses offered by each faculty of Rama University, Uttar Pradesh

1.5 Assessment of the University

1.5.1 Establishment and Affiliation

Rama University, Uttar Pradesh, has been established as a State University at Kanpur vide U.P. Act No. 1 of 2014 as passed by the State Legislature and is empowered to give degrees as specified by UGC under section 22 of the UGC Act 1956 through its main campus with the approval of Statutory Councils, wherever required. (Reference No. : 1-2014-15(63)/2005 dated 24.01.2014)

1.5.2 Approvals

The University is approved University Grant Commission (UGC).

1.5.3 Accreditation

NAAC - Rama Dental College (presently, the Faculty of Dental Sciences of Rama University) has been accredited with NAAC on 05 May 2014. *The University as a single entity is due to enter its First cycle of NAAC soon.*

1.5.4 Recognitions

The University has achieved the following recognitions:

- **University Grant Commission (UGC)** - Rama University under section 2 (f) of the UGC Act, 1956 vide by University Grants Commission, New Delhi.
- **Dental Council of India (DCI)** - Rama Dental College has been established in year 1996 and recognized by Dental Council of India for BDS and MDS courses. (Reference No.: UG [V-12017/21/95-PMS (Vol.VII)] and PG [V-12017/44/2003-DE (Vol. VI)])
- **Indian Nursing Council (INC)** - Nursing Council of India, after visiting and inspecting the medical as well as academic infrastructure and facilities and reviewing the history of successfully releasing qualified batch of nursing students, has recognized the Nursing College and permitted the University to award degrees to Nursing students. (Reference No: 386/71-3-08-N-5/08 and Date of Approval: Jan 31, 2008)

- **Medical Council Of India (MCI)** - On recommendation of MCI, Rama Medical College Kanpur, has been recognized by MOHFW, Govt. of India under the notification no. MCI-34(41)/2013-Med./19815
- **BAR Council Of India (BCI)** - The University has also been recognized by Bar Council of India to offer LLB (3 Years), BA LLB (Five Years) & BBA LLB (Five Years) courses since 2015 vide notification no. BCI: D: 2162/ 2015 (LE) dated 2.11.15.
- **DSIR-SIRO** – The University has been recognised as a Scientific and Industrial Research Organisation (SIRO) by the Dept. of Scientific and Industrial Research under the scheme on recognition of Scientific and Industrial Research Organisation (SIROs), 1988.
- **AICTE** - The University is approved by All India Council for Technical Education (AICTE), New Delhi.

1.5.5 Certification

ISO - The University received ISO 9001:2015 (QMS) Certification for providing Educational Services by M/s Accredium Certifications Pvt. Ltd. since 2018.

1.6 Achievements of the University

The University has a tremendous track record of excellence in Built form and educational services provided, below are some of the achievements of the prestigious Institute.

Year of Award	Title of the innovation	Name of the Awardee	Name of the Awarding Agency
2015	Management of acute lymphoblastic leukemia in childhood	Dr. Nilam Nigam	CSJM university Kanpur
2017	Awarded second prize for Scientific paper presentation	Dr Vishal Mehrotra	Indian Academy of Oral Medicine and Radiology, VI National Triple O Symposium
2018	"Acclaimed Educator .	Dr Aftab Alam	MontanaUSA
2018	"BEST EDITOR" of	Dr. Rahul	International Society for Holistic Dentistry

	International Journal of Contemporary Medicine, Surgery And Radiology	Srivastava	(ISfHD) and International Society for Contemporary Medical Research (ISfCMR).
2018	Basics of medical education	Dr. Nilam Nigam	rama medical college hospital & research centre
2018	Best Postgraduate Student of the Year (Public Health Dentistry)	Dr. Devina Pradhan	International Dental Excellence Awards' Mumbai
2018	Best Professor Award in Services Marketing and Management	Dr Aftab Alam	ICBM Hyderabad
2018	Distinguished Academic Achievements in Dentistry	Dr. Janardhana Amaranath Bj	Bapuji Dental College and Hospital, Davengere, Rajiv Gandhi University of Health Sciences
2018	Distinguished Teacher in Management.	Dr Aftab Alam	MTC Global Bangalore
2018	International Exemplary Research and Performance Awards for "Best Editor"	Dr. Rahul Srivastava	International Society for Holistic Dentistry (ISfHD) and International Society for Contemporary Medical Research (ISfCMR).
2019	Best Model Polling Booth Award by National Election commission	Mis. Anjali Dixit	Loksabha Election Certificate
2019	Best Rural Dentist of the Year	Dr. Devina Pradhan	Indian Association of Dental Students
2019	Calcifying epithelial odontogenic tumor in a child patient a rare case report	Dr. Rahul Katyayan	International maxillofacial summit craniofacial surgery and oncology. Kanpur
2019	Dental website of the year. www.vivavoceoralmedicineradiology.com	Dr. Rahul Srivastava	International Society for Holistic Dentistry (ISfHD) and International Society for Contemporary Medical Research (ISfCMR).

2019	Drug induced parkinsonism	Dr. Nilam Nigam	Govt. Medical college kannauj
2019	Excellence in Oral Health/ Oral Hygiene Awareness	Dr. Devina Pradhan	International Society for Holistic Dentistry (ISfHD) and International Society for Contemporary Medical Research (ISfCMR).
2019	Excellence in Public Health Dentistry	Dr. Devina Pradhan	International Society for Holistic Dentistry (ISfHD) and International Society for Contemporary Medical Research (ISfCMR).
2019	MTC Global Award	Dr. Suraj Kushwah	MTC Global Award Global outstanding contribution to education award
2020	Academic Excellence Award	Dr. Devina Pradhan	International Accurate Certification
2020	Boived Best Teacher Award 2020	Dr. Aneeta Yadav	National conference organized by BRIATS, Allahabad & Rama University Kanpur
2020	Contribution to education community	Dr. Rahul Srivastava	Asian eduction awards
2020	Excellence in Dentistry	Dr. Karuna Sharma	Online Dentistry
2020	Rational use of antimicrobials	Dr. Nilam Nigam	Hamdard institute of medical sciences & research hamdard nagar new delhi
2020	Research excellence award	Dr. Rahul Srivastava	Institute of Scholars, Bangalore Institute of Scholars, Department of Awards, #1338, 2nd Cross, 7th Block Sir M V Layout, Muddhinapalya Bengaluru-560091, Karnataka, India
2020	Research excellence award 2020	Dr. Rahul Srivastava	Institute of Scholars, Bangalore Institute of Scholars, Department of Awards, #1338, 2nd Cross, 7th Block Sir M V Layout, Muddhinapalya Bengaluru560091, Karnataka, India
2020	Young Researcher in oral medicine and radiology	Dr. Rahul Srivastava	Global Outreach Medical & Health Association http://www.gomha.org/

2020	Young Researcher in Public Health Dentistry	Dr. Devina Pradhan	Global Outreach Medical & Health Association
2020	Young Researcher in Public Health Dentistry	Dr. Rahul Srivastava	Global Outreach Medical & Health Association http://www.gomha.org/
2020	Bioved Ratan	Dr. Suraj Kushwah	Bioved Ratan Awarded From Bioved Research Institute Of Agriculture Technology Of Science. Prayagraj
2017	Awarded second prize for Scientific paper presentation	Dr Vishal Mehrotra	Indian Academy of Oral Medicine and Radiology, VI National Triple O Symposium

Table 2: Details of the awards

1.7 MoU's and Collaborations

The University has teamed up with the following Organizations for a smooth and efficient functioning.

- Regional Food Research and Analysis Center, Lucknow, Ministry of Horticulture and food Processing Govt. of U. P.
- Tribhuvan University
- VNurt Technology Solution Pvt. Ltd.
- Favoriot
- International Institute of Goat Management
- Red Hat India Private, Mumbai
- GLA University Mathura
- ICAR-CSSRI, Karnal/RSS, Lucknow
- National Institute of Informatics, Tokyo, Japan
- Foundation for Innovation & Research in Science & Technology, IIT Kanpur
- ICAR-Central Institute for Subtropical Horticulture, Lucknow
- ICAR-Indian Institute of Pulses Research, Kanpur
- National AIDS Control Organization, Government of India

- Paliwal Diagnostics Private Limited
- Gian Life Care Ltd.
- Willworld Environmental
- Computer Society of India
- Center for Research and Development
- Vraddhi Organic Agro India Private Limited Vrindavan Mathura
- Alloix Technical Education LLP, Kanpur
- ICTC-UP SACS
- Saraswati Medical College

2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the University) shows there were a total of **2,363 Boys and 1,866 Girls** students thus **a total of 4,584 students** in the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	180	80	260
Teaching Staff	313	206	519
Non-Teaching Staff	890	145	1,035
Total Staff Members	1,383	431	1,814

Table 3: Staff data of the Institution for 2019-20

The staff data shows the premises had a total of **1,814** Staff Members.

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the University) shows there were a total of **2,752 Boys and 1,866 Girls** students thus **a total of 4,618 students** in the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	180	84	264
Teaching Staff	320	212	532
Non-Teaching Staff	895	150	1,045
Total Staff Members	1,395	446	1,841

Table 4: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **1,841** Staff Members.

2.3 Total University Area & Building Spread Area

The **total site area is 84.99 Acres** and the **total Built-up area of University is 3,26,523 sq. ft.** for a **total of 6,459 footfalls.**

2.4 University Infrastructure

The Buildings are made of Reinforced Cement Concrete (RCC) framework. These are equipped with modern amenities. It facilitates the students with a good environment for studies and stays true to its aim of providing Holistic development. The Residential and Academic buildings amalgamate smoothly with the open space in order to stand out as one of the most premier Institutes in the country.

Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers most of the requirements for a Green Habitat. It continues to upgrade itself in terms of the facilities and makes sure that there is no compromise on the quality of services towards Building requirements. The cooperative teamwork and the leadership of the Hon'ble dignitaries are one of the main reasons for achieving success in providing quality education with an advanced and up-to date premises.

2.4.1 Spatial Organisation

2.4.1.1 Architectural Design

The overall ambience of the University is warm and inviting. The courtyards, educational spaces, learning spaces, residential spaces and recreational spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the buildings are quite well designed. The colour palette not just helps the buildings to stand out as per respective typology of the Building be it Educational or Residential but also provides an Institutional arena. There are provisions for lifts, CCTV, Fire extinguishers, first aid box and much more.

2.4.1.2 Landscape design

The built-form balances with the local architecture and amalgamates very well with the natural landscapes in form of open ground, designed landscape spaces, streetscape

elements such grounds, designed gardens, greenhouse, botanical gardens and huge trees all around. There are provisions for ramps, open ground, courtyards, designated landscape areas, signages, Utility Boxes, Parking, Sidewalk Furniture and Utility Poles.

2.4.2 Building and Block wise details

The Building & Block wise details on the Rama University premises are mentioned below:

S. No.	Branch name	Floor
1	Faculty of pharmaceutical sciences	G+4
2	Faculty of Agricultural Sciences & Allied Industries	G+3
3	Vice Chancellor Building	G+3
4	Faculty of Ayurvedic Medical Sciences	G+2
5	Faculty of Nursing	B+G+3
6	Rama Hospital	B+G+3
7	Faculty of Medical Sciences	G+3
8	Faculty of Engineering & Technology	B+G+3
9	Raman House	G+3
10	Kalpana House	G+3
11	MBBS Boys Hostel	G+3
12	MBBS Girls Hostel	G+4
13		G+3
14	Nursing Girls Hostel	B+G+3
15	Nursing Boys Hostel	B+G+3
16	Resident Hostel	G+5
17	Staff Accommodation I	G+5
18	Staff Accommodation II	G+5

Table 5: Block and department wise details of the University premises

2.4.3 Salient features

The University had the best State of the art Infrastructure in the Country. Some of the best features available are as follows:

1. ERP System for monitoring administration /academics
2. Wi-Fi enabled premises
3. Modern infrastructure with well-equipped laboratories
4. Guest Lectures by Eminent Scholars
5. Ragging free environment
6. Hostels for Girls and Boys
7. 24 x 7 Power and RO water supply
8. State of art Library
9. Canteen Facility
10. Medical Facility (Health Centre)
11. Auditorium with all ultra-modern facilities.
12. Multipurpose Hall
13. Landscaped Gardens
14. On premises Residential Facilities for faculties and employees.
15. Community development programs
16. Arrangement for physically Challenged persons/students.

The University endeavours at training young women to be competent, committed and compassionate and lead in all walks of life.

2.4.5 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarized in the table. The Institutions are open Monday to Friday for full day. Saturday, Sunday is an off for all. Below mentioned in the table are the average working hours. The detail wise timing for each is mentioned below the table.

S. No.	Section	Spaces	Time	Hours / day	Days in a year
1	Main Institutional University	Student areas and Teaching faculty	09:00 a.m. to 4:30 p.m.	7.5	280
2	General areas	Admin areas and library, Passage, staircase, toilet	8:00 a.m. to 5:00 p.m.	9	300

Table 6: Schedule of the timings of the premises

On-site investigation and physical verification
The Beautiful and Eminent Institution Building and premises



Auditorium



Faculty of Agricultural Sciences & Allied Industries



Faculty of Ayurveda Sciences



Faculty of Commerce and Management



Faculty of Engineering and Technology



Faculty of Juridical Sciences



Faculty of Medical Sciences



Faculty of Nursing

On-site investigation and physical verification
The Beautiful and Eminent Institution Building and premises



Faculty of Pharmaceutical Sciences



Kalpana House



MBBS and Nursing Girls Hostel



MBBS Boys Hostel



Rama Hospital and Research Centre



Raman House



Staff Accommodation First And Resident Hostel



Vice Chancellor's Secretariat

3. Green Building Audit Study

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution a sustainable and healthy premises for its inhabitants.

3.2 Analysis for the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of premises; Scope to include Rain water harvesting and Waste water treatment in premises
- Waste Audit - Current waste produced, its segregation and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of premises
- Analysis of the flora and fauna of campus
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collected and preparation of the Report.

3.4 Timeline of the activities for Green Building Study Audit

- 28 December 2021 – Discussion with the University
- 13 January 2022 – Allotment and Initiation by the University
- 20 January 2022 – Induction meeting
- 25 January 2022 – Survey of the Student and staff submitted
- 7 to 9 March 2022 – Data submitted by University
- 11 March 2022 – Submission of the Report

4. Energy Audit

4.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

4.1.1 Primary sources

1. **Electrical (Metered)** – Light, Fans, AC, Equipments, Pumps consume approximately 1,67,286 units per month for Rs. 19,92,899/- per month (average).
2. **Renewable energy** – There are solar panels and solar hot water heaters available in premise.

4.1.2 Secondary sources

1. **UPS** – There are 80 UPS in the premises.
2. **Gas cylinders** – There are 22 gas cylinders in the premises and around Rs. 6,18,880/- is spent per month towards the same.
3. **Diesel generators** – There are 3 diesel generators in the premises and around Rs. 89,95,560/- was spent towards the same.

4.2 Site investigation analysis

The Site investigation observations and interviews with the Maintenance staff, Electrical department in charge are summarised below:

- The **switch-off drills are practised at present**, the maintenance staff and Lab Attendants put off switches of all equipments regularly.
- All the **computers are shut-off after use** and also put on power saving mode.
- There are **display boards encouraging staff and students to save energy are put up in the classrooms and laboratories**.
- There are **no Ultra-violet lights and any other harmful lights used** in the premise.

4.3 Actual Electrical Consumption as per Bills

The admin department had shared the bills for Meter which is connected to all Buildings and is main source of energy supply. The supplier is Dakshinanchal Vidyot Vitran Nigam Ltd. The type of supply is **HT – High Tension**. The analysis of actual electrical energy consumption is summarised below. The solar panels were installed in recently post which the cost of electricity has been reduced. The details of unit consumption meter wise is as follows.

S. No.	Month	Year	Meter 1 University		Meter 2 Education Society	
			Units	Amount	Units	Amount
1	April	2020	2,636	7,64,418	72,025	5,95,624
2	May	2020	430	1,48,484	86,545	11,88,518
3	June	2020	1,276	2,49,634	1,45,360	17,03,549
4	July	2020			2,04,840	21,67,393
5	August	2020	31,666	3,98,514	1,66,595	18,13,849
6	September	2020	40,192	4,73,623	2,01,915	21,87,431
7	October	2020	25,496	3,37,770	1,46,280	16,26,053
8	November	2020	21,032	2,99,289	68,935	7,03,492
9	December	2020	35,246	4,31,478	1,53,195	16,89,977
10	January	2021	57,268	6,31,478	32,319	22,86,836
11	February	2021	33,698	4,13,591	1,12,085	13,17,309
12	March	2021	35,852	4,33,521	1,50,690	16,75,886
13	April	2021	36,116	4,35,945	2,02,450	21,90,729
14	May	2021	24,586	3,29,356	40,509	21,90,424
15	June	2021	32,862	4,05,863	2,25,380	23,22,015
16	July	2021	62,262	6,78,138	3,33,575	35,58,242
17	August	2021	44,360	5,12,152	3,30,275	35,90,809
18	September	2021	38,802	4,60,774	2,85,630	31,07,939

19	October	2021	40,796	4,79,206	2,25,370	24,74,763
20	November	2021	35,818	4,33,190	87,315	10,82,060
21	December	2021	35,736	4,32,431	1,72,870	18,73,746
22	January	2022	53,548	5,97,089	2,36,135	24,97,126
23	April	2020	2,636	7,64,418	72,025	5,95,624
24	May	2020	430	1,48,484	86,545	11,88,518
Total			6,89,678	93,45,944	36,80,293	4,38,43,769

Table 7: Study of the electricity consumption of the meters in premise

The summary of the above study shows the average consumption varies for each month.

4.4 Survey

4.4.1 Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in University, following is the result received.

Participation

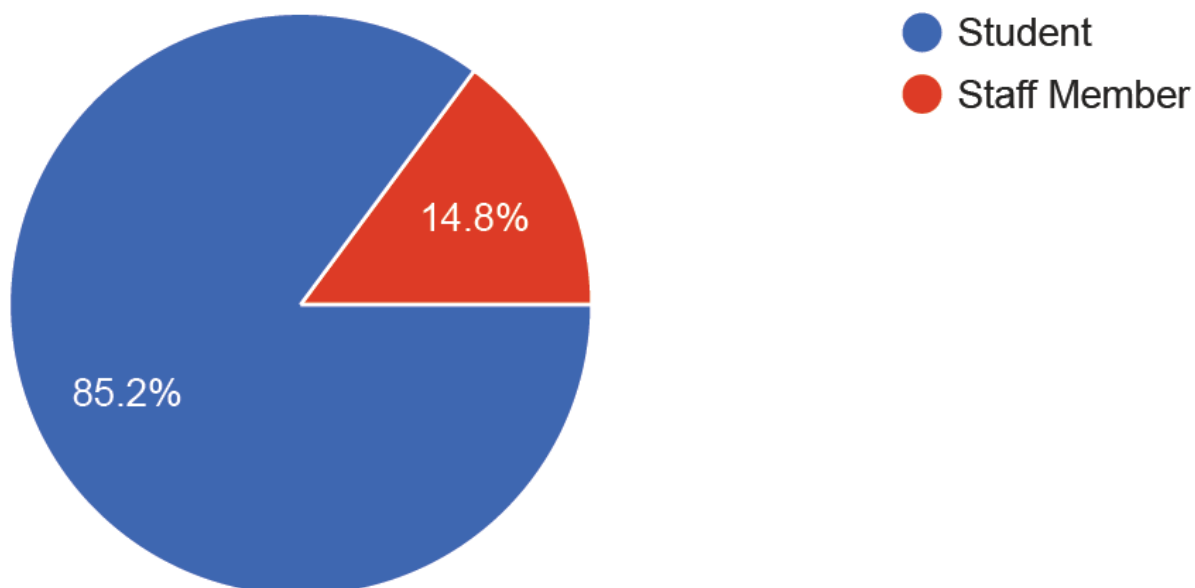


Figure 1: Participation analysis in the survey

A total of **843 responses** were received out of which 85% were students.

4.42 Survey ratings

Review of the Energy management practices in the premises

Note: The Participants were asked to review the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

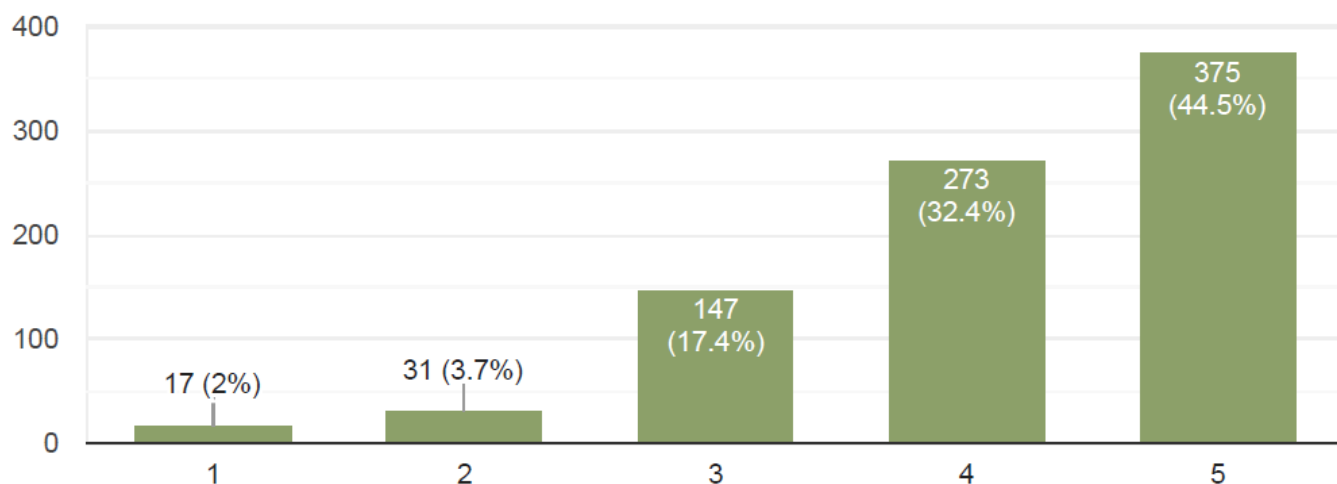


Figure 2: Energy Management practices in University

The students, staff (**almost 45%**) of the responses found the practices to be excellent.

4.4.3 Survey review

Some of the key responses are noted below as a result of Online survey.

What is the best environmental feature you find about the Institute site?

1. University used renewable energy sources as solar guesser in hostel
2. There is no unnecessary lights left opened and many other things are done in order to conserve energy.
3. Unplugging appliances when they're not in use
4. Replace of light bulbs. Use energy efficient appliances.
5. In my observation when we leave the room put off the switch of light, air conditioners, fans and penalty charges applied who those are responsible
6. Replaced hand dryers with paper towel dispensers to cut down in energy costs.
7. As we all know that we are moving towards the green energy day by day so our university is so much favorable for making green energy from sun light by converting sunlight in to energy.

4.5 Calculated Electrical Consumption as per inventory

The electricity bills provide actual consumption data. The following is the calculated consumption. It is done to understand the percentage of energy usage in the premises by various applications. It is based on the inventory collected and interviews with the staff. The additional data such as wattage is taken from market research. In terms of electrical consumption, the main sources are lights, fans, air conditioners, equipment. The inventory and data collection for sources of energy consumed in the premise is summarised in the following sections.

Note: The following analysis is combined for entire premise taking into considerations the duration before pandemic to understand the consumption pattern as post pandemic the premise is used only for a few hours.

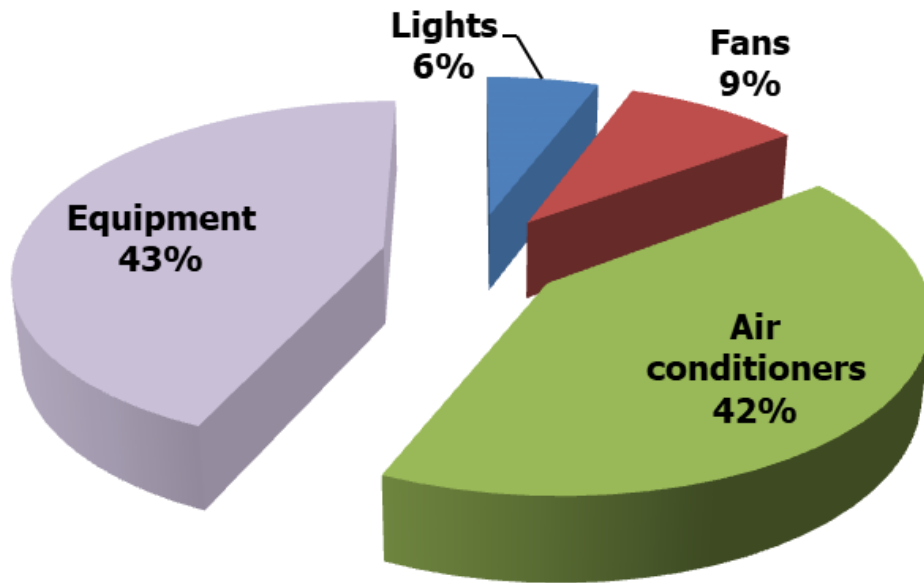


Figure 3: Summary of the Calculated Electrical Consumption as per data

The above graph shows that equipment consumes 43% followed by air conditioners at 42% the fans at 9% and lights at 6% of the total calculated electrical energy.

4.6 Lights

4.6.1 Sector wise allocation study

There are a **total of 4,436 lights** in the entire premises. For study purpose the entire premises was divided in **2 sectors – Residential and Educational**.

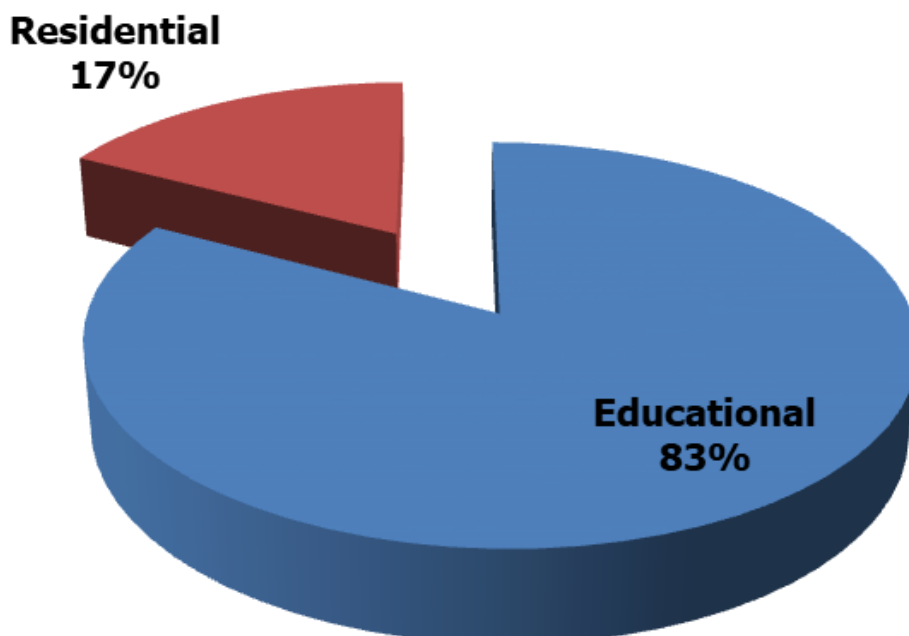


Figure 4: Energy consumed by Lights sector wise

As per our analysis **83% of the energy consumed by lights in the premises is through the lights in the Educational sector** which includes all the Educational, Admin buildings etc. and **17% of the energy consumed by lights in the premises is through the lights in the Residential sector** which comprises of the Boys and Girls hostel.

4.6.2 Residential Sector study

a) Types of lights as per the numbers

There are a total of **1,001 LED Lights in the Residential sector which consume 40,360 kWh**. The LED lights are present in both hostels.

b) Section-wise consumption analysis

As all the lights are LED and since the LED Lights are efficient and good practice, the section wise analysis is excluded for the LED Lights. These are present in the Staff Acco-1, Kalpna Hostel, Medical Girls Hostel, Nursing Boys Hostel, Residence boys Hostel, Nursing Girls Hostel.

4.6.3 Educational Sector study

a) Types of lights as per the numbers

There are a total of **3,435 Lights in the Educational sector**; the following table shows a consolidated study types of lights in the various buildings of Educational sector.

S. No.	Type	Nos.
1	LED	2,755
2	Non-LED	680
Total		3,435

Table 8: Summary of the types of lights in the educational sector

b) Types of lights as per their energy contribution

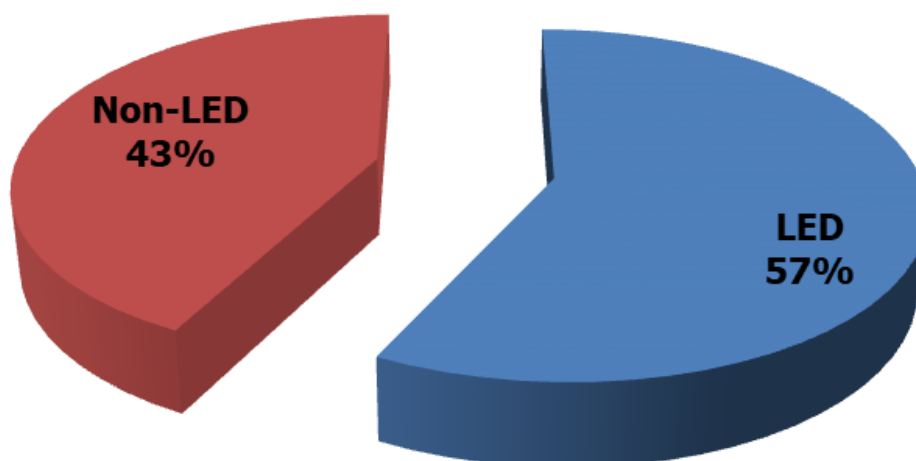


Figure 5: Energy consumed by types of lights in the educational sector based on the usage study

The analysis of the types of Lights in premises of Educational sector shows **LED lights form the majority and consume 57%** whereas the **Non-LED Lights consume 43%**

c) Section-wise consumption analysis (Non-LED Lights)

The energy consumption of Lights in Educational sector is **1,93,334 kWh with Non-LED Lights consuming the majority of the power**; the following graph shows the section wise consumption of only Non-LED Lights.

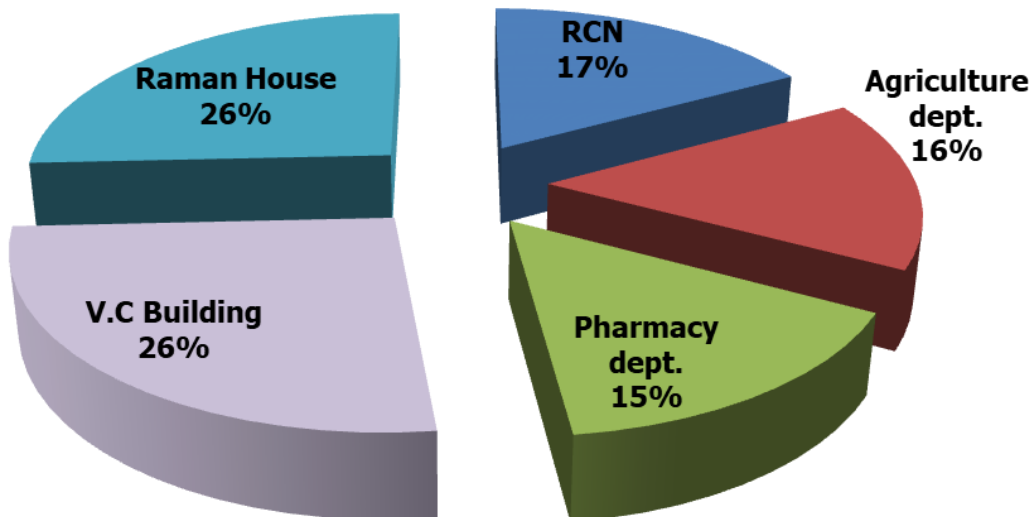


Figure 6: Energy consumed by lights section wise pertaining to the educational sector

The above analysis shows of the total power contribution by Non-LED lights in the Educational sector:

- Major consumption of lights is in the V.C. Building and Raman house at 26%
- The second highest contributors are RCN Block at 17% and the Pharmacy dept. at 15% and the lowest consumptions is by the Agriculture dept.

d) Section-wise consumption analysis (LED Lights)

As the LED Lights are efficient and good practice, the section wise analysis is excluded for the LED Lights. These are present in 2,755 numbers unevenly among the Hospital, Rama University Campus, Pharmacy dept., V.C Building, Raman House, RCN, Agriculture dept., FET and Medical college.

4.6.4 Power analysis study of energy

(Based on the requirement of NAAC)

4.6.4.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are solar panels available in premise at present. As per the statistics of 2021 Solar power generation total power generation capacity (Approximately) is 190 kWp.

100% of the power requirement is met by renewable energy in the premises.

The energy is not given back to the grid.

4.6.4.2 Percentage of lighting power requirement met through LED bulbs

The premise has LED Lights (Combined study for Residential and Educational areas) contribute to 62% in terms of number and **47.53% of the power requirement** is met through the same. As per our study we could conclude that both of these are highest contributions among all the types of lights.

4.6.5 Site investigation observations

Some of the points noticed are as follows:

1. All lights are in working conditions
2. Daily monitoring and check is done by the maintenance staff.
3. There was no fuse defect observed.

4.7 Fans

4.7.1 Sector wise allocation study

There are a **total of 3,403 fans** in the entire premises. For study purpose the entire premises was divided in **2 sectors – Residential and Educational**.

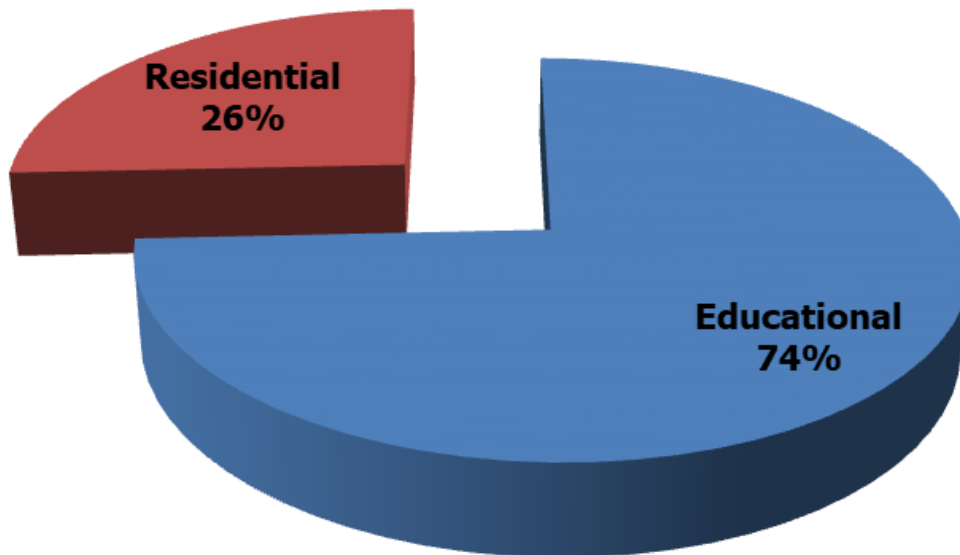


Figure 7: Energy consumed by fans sector wise

As per our analysis **74% of the energy consumed by fans in the premises is through the fans in the Educational sector** which includes all the Educational, Admin buildings etc. and **26% of the energy consumed by fans in the premises is through the fans in the Residential sector** which comprises of the Boys and Girls hostel.

4.7.2 Residential Sector study

a) Types of fans as per the numbers

There are a total of **877 ceiling fans in the Residential sector**; the fans are present in Kalpna Hostel, Medical Girls Hostel, Nursing Boys Hostel, Residence boys Hostel and Nursing Girls Hostel in an uneven manner in terms of numbers. (Not restricted to any particular type of fan present only in one location as compared to lights)

b) Section-wise consumption analysis

The energy consumption of fans in Residential sector is **18,792 kWh**; the following graph shows the section wise consumption.

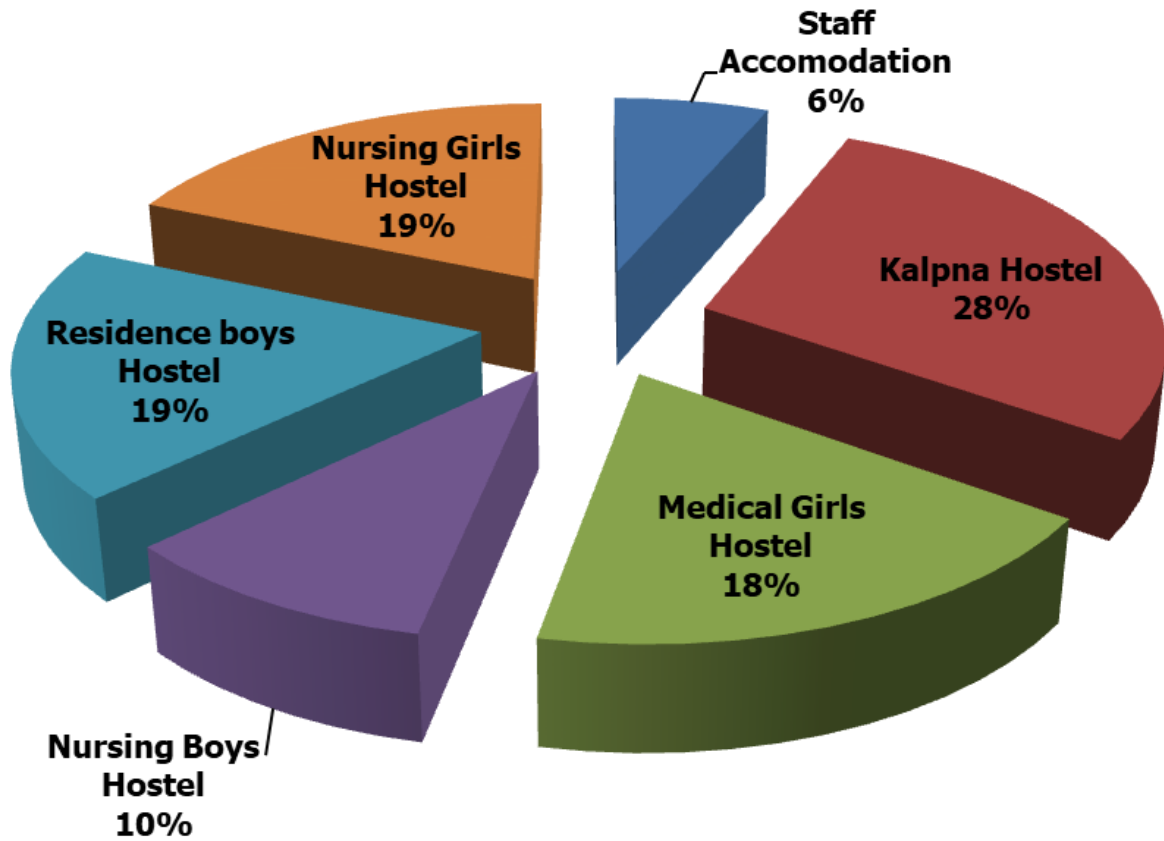


Figure 8: Energy consumed by fans section wise pertaining to the residential sector

The above analysis shows the fans in the **Kalpna hostel consumes 28%**, **Nursing Girls Hostel and Residence boys hostel at 19%**, **Medical Girls Hostel 18%**, **Nursing boys hostel at 10%** and the **Staff accommodation at 6%**

4.7.3 Educational Sector study

a) Types of fans as per the numbers

There are a total of **2,526 fans in the Educational sector**; the following table shows a consolidated study types of fans in the various buildings of Educational sector.

S. No.	Type	Nos.
1	Wall Mounted fans	11
2	Ceiling fans	2,515
Total		2,526

Table 9: Summary of the types of fans in the educational sector

The maximum numbers of fans are of the type – Ceiling fans in the entire premises.

b) Types of fans as per their energy contribution

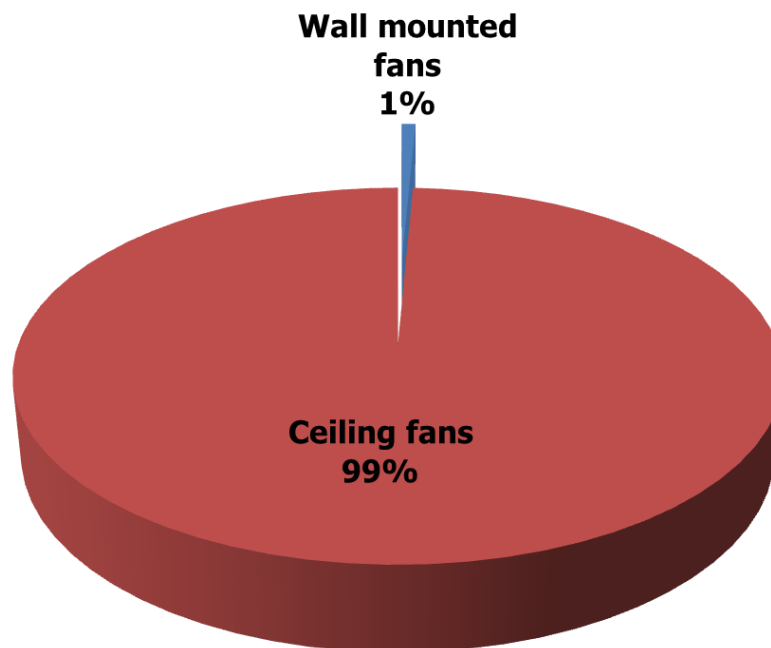


Figure 9: Energy consumed by types of fans in the educational sector based on the usage study

The analysis of the types of fans in premises of Educational sector shows **Ceiling fans consume 99% and the wall mounted fans consume 1%**

c) Section-wise consumption analysis (Ceiling fans)

The ceiling fans are present in **Medical College, FET, RCN, Agriculture dept., Pharmacy dept., V.C Building, Raman House and Hospital in major numbers**. As far as energy is concerned the Hospital and Medical college are the major contributors.

d) Section-wise consumption analysis (Wall mounted fans)

The Wall mounted fans are present in the Medical College, FET and Hospital. As far as energy is concerned the FET is the major contributors.

4.7.4 Site investigation observations

Some of the points noticed are as follows:

1. All fans are in working conditions
2. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.

4.8 AC

4.8.1 Types of AC

There are **539 air conditioners** in the entire premise. The number of air conditioners are summarised as per their block/ building wise location below. Since the number of air conditioners is comparatively less than other electromechanical systems there is a different study used.

Sr. No	Room name	Building/ Block	Floor	AC Nos.
1	General Section	Medical College	Basement	8
2	Library	Medical College	Basement	5
3	Central Store	Medical College	Basement	1
4	LT 2	Medical College	Ground Floor	4
5	LT1	Medical College	Ground Floor	6
6	Establishment	Medical College	Ground Floor	2
7	Dissection Room	Medical College	Ground Floor	6
8	Principal Office	Medical College	Ground Floor	2
9	Central Research Lab	Medical College	First Floor	4
10	Admission 2068	Medical College	First Floor	2
11	M.D Office	Medical College	First Floor	2
12	College Council Room	Medical College	First Floor	3
13	LT-3	Medical College	First Floor	4
14	LT-4	Medical College	First Floor	4
15	Hall & Corridor	Medical College	First Floor	1
16	2118	Medical College	Second Floor	1
17	2119	Medical College	Second Floor	1
18	2121	Medical College	Second Floor	1
19	2123	Medical College	Second Floor	1
20	2124	Medical College	Second Floor	1
21	2125	Medical College	Second Floor	1
22	Bio. Chemistry Lab	Medical College	Second Floor	1
23	Lib. Micro Biology 2134	Medical College	Second Floor	3

24	Library Pathology	Medical College	Second Floor	1
25	2179	Medical College	Third Floor	1
26	2181	Medical College	Third Floor	1
27	2182	Medical College	Third Floor	1
28	2165	Medical College	Third Floor	1
29	2163	Medical College	Third Floor	1
30	2162	Medical College	Third Floor	1
31	2161	Medical College	Third Floor	1
32	2154	Medical College	Third Floor	1
33	2156	Medical College	Third Floor	1
34	2159	Medical College	Third Floor	1
35	2158	Medical College	Third Floor	1
36	T&P Cell	FET	Ground Floor	1
37	Director Office 3014	FET	Ground Floor	1
38	Director Office 3016	FET	Ground Floor	1
39	Surveillance Room 3018	FET	Ground Floor	1
40	R&D Cell 3019	FET	Ground Floor	2
41	Library	FET	Ground Floor	1
42	Server Room	FET	Ground Floor	1
43	Computer Centre 3026	FET	Ground Floor	1
44	Admin Office 3028	FET	Ground Floor	1
45	Software Room 3032	FET	First Floor	1
46	CS Dept3034	FET	First Floor	2
47	EE Dept. 3048	FET	First Floor	1
48	Conference room 3049	FET	First Floor	1
49	EC Dept. 3050	FET	Second Floor	2
50	Appl. Sci. Dept. 3067	FET	Third Floor	1
51	ME & CE Dept. 3070	FET	Third Floor	2
52	Seminar Hall 3085	FET	Third Floor	2
53		FET	Third Floor	2

54	Examination Room 4020	RCN	First Floor	1
55		RCN	First Floor	1
56	Computer Lab	Agriculture	First Floor	1
57	Appl. Chemistry lab	Agriculture	First Floor	1
58	Faculty Room	Agriculture	Second Floor	1
59	Admin Office 302	Agriculture	Third Floor	1
60	Office	Pharmacy	Ground Floor	1
61	On AIR Room	Pharmacy	Second Floor	4
62	Cabin	Pharmacy	Second Floor	1
63	Account office	V.C Building	Ground Floor	1
64	Academic Office	V.C Building	Ground Floor	2
65	Admission Cell	V.C Building	Ground Floor	4
66	Reception	V.C Building	Ground Floor	2
67	Conference Hall	V.C Building	Ground Floor	3
68	Registrar office	V.C Building	Ground Floor	1
69	Examination Section	V.C Building	Ground Floor	3
70	Confidential Room	V.C Building	Ground Floor	1
71	Dy. Registrar Office	V.C Building	Ground Floor	1
72	Vice Chancellor Office	V.C Building	Ground Floor	2
73	Faculty Room	V.C Building	First Floor	2
74	Seminar Hall	V.C Building	First Floor	4
75	HOD Room	V.C Building	First Floor	1
76	Library	V.C Building	First Floor	1
77	Library	V.C Building	Second Floor	1
78	Computer Lab	V.C Building	Second Floor	2
79	Dean Office	V.C Building	Second Floor	1
80	Faculty Room	V.C Building	Third Floor	1
81	Supply Dept.	Hospital	Ground Floor	2
82	Gynaec OT complex	Hospital	Ground Floor	6
83	Gynaec Hall	Hospital	Ground Floor	3

84	Chyretix Office	Hospital	Ground Floor	2
85	General OPD	Hospital	Ground Floor	1
86	Gen surgery	Hospital	Ground Floor	2
87	OPD Hall	Hospital	Ground Floor	4
88	Ayushman Office	Hospital	Ground Floor	1
89	Sample Collection	Hospital	Ground Floor	1
90	Ortho OPD	Hospital	Ground Floor	4
91	General Medicine	Hospital	Ground Floor	2
92	Pharmacy	Hospital	Ground Floor	1
93	Pharmacy Hall	Hospital	Ground Floor	1
94	Billing Manager	Hospital	Ground Floor	1
95	Emergency	Hospital	Ground Floor	1
96	NS Office	Hospital	Ground Floor	2
97	Admin Office	Hospital	Ground Floor	4
98	HDU	Hospital	Ground Floor	1
99	Conference Hall	Hospital	Ground Floor	1
100	Admin Old Office	Hospital	Ground Floor	5
101	M.D Office	Hospital	Ground Floor	4
102	Server Room	Hospital	Ground Floor	5
103	Pathology	Hospital	Ground Floor	8
104	Doctor Office	Hospital	Ground Floor	1
105	Casualty Corridor	Hospital	Ground Floor	1
106	OT Office	Hospital	First Floor	12
107	CT Office	Hospital	First Floor	3
108	Post OT	Hospital	First Floor	2
109	Post OT 2	Hospital	First Floor	3
110	Anaesthesia	Hospital	First Floor	1
111	Darma Office	Hospital	First Floor	1
112	NICU	Hospital	First Floor	5
113	ICU	Hospital	First Floor	14

114	NICU Washroom	Hospital	First Floor	1
115	Darma ward	Hospital	First Floor	3
116	Surgery (4)	Hospital	Second Floor	2
117	Surgery Office	Hospital	Second Floor	1
118	Paediatrics Unit B	Hospital	Second Floor	3
119	Paediatrics Unit A	Hospital	Second Floor	2
120	T,B Chest	Hospital	Second Floor	1
121	Private Room	Hospital	Second Floor	19
122	MRD Office	Hospital	Second Floor	2
123	Corridor	Hospital	Third Floor	1
124	Medicine 1	Hospital	Third Floor	2
125	Medicine Office	Hospital	Third Floor	1
126	Staff Acco-1	Rama University Campus	Ground Floor	10
127	Staff Acco-1	Rama University Campus	First Floor	10
128	Staff Acco-1	Rama University Campus	Second Floor	10
129	Staff Acco-1	Rama University Campus	Third Floor	10
130	Staff Acco-1	Rama University Campus	Fourth Floor	10
131	Staff Acco-1	Rama University Campus	Fifth Floor	10
132	Medical Girls Hostel	Rama University Campus	Basement	5
133	Medical Girls Hostel	Rama University Campus	Ground Floor	13
134	Medical Girls Hostel	Rama University Campus	First Floor	31
135	Medical Girls Hostel	Rama University Campus	Second Floor	31
136	Medical Girls Hostel	Rama University Campus	Third Floor	31
137	Residence boys Hostel	Rama University Campus	Ground Floor	10
138	Residence boys Hostel	Rama University Campus	First Floor	14
139	Residence boys Hostel	Rama University Campus	Second Floor	14
140	Residence boys Hostel	Rama University Campus	Third Floor	14
141	Residence boys Hostel	Rama University Campus	Fourth Floor	14
142	Residence boys Hostel	Rama University Campus	Fifth Floor	14

Table 10: Details of the air-conditioner in the premises

4.8.2 Section wise consumption analysis

The energy consumption of air conditioners is **16,88,310 kWh** of energy; the following graph shows the section wise consumption. The building block are categorised under two sections Residential and Educational.

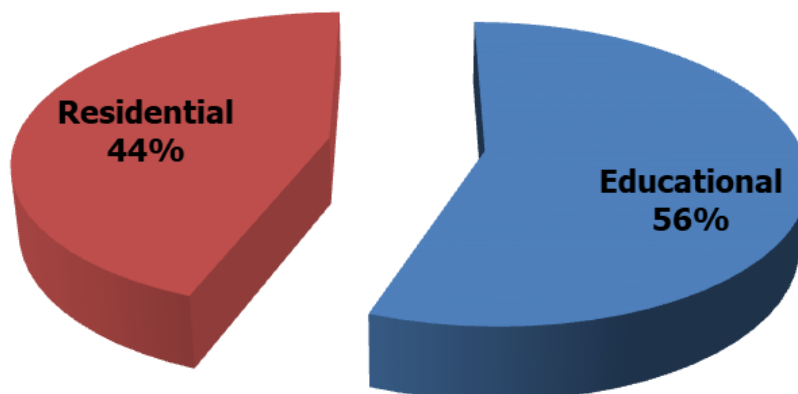


Figure 10: Energy consumed by air conditioners sector wise

As per our analysis **56% of the energy consumed by air conditioners in the premises is through the air conditioners in the Educational sector** which includes all the Educational, Admin buildings etc. and **44% of the energy consumed by air conditioners in the premises is through the air conditioners in the Residential sector** which comprises of the Boys and Girls hostel.

4.8.3 Residential Sector study

The energy consumption of air conditioners in Residential sector is **7,48,440 kWh**; the following graph shows the section wise consumption.

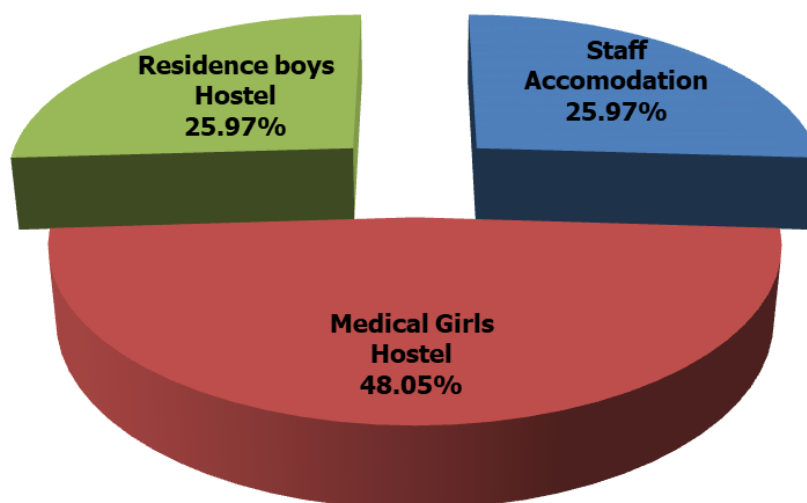


Figure 11: Energy consumed by air conditioners section wise pertaining to the residential sector

The above analysis shows the air conditioners in the **Medical Girls hostel consumes 48.05%**, the **Staff accommodation and Residence boys hostel consume 25.97% each**

4.8.4 Educational Sector study

The energy consumption of air conditioners in Educational sector is **9,39,870 kWh**; the following graph shows the section wise consumption.

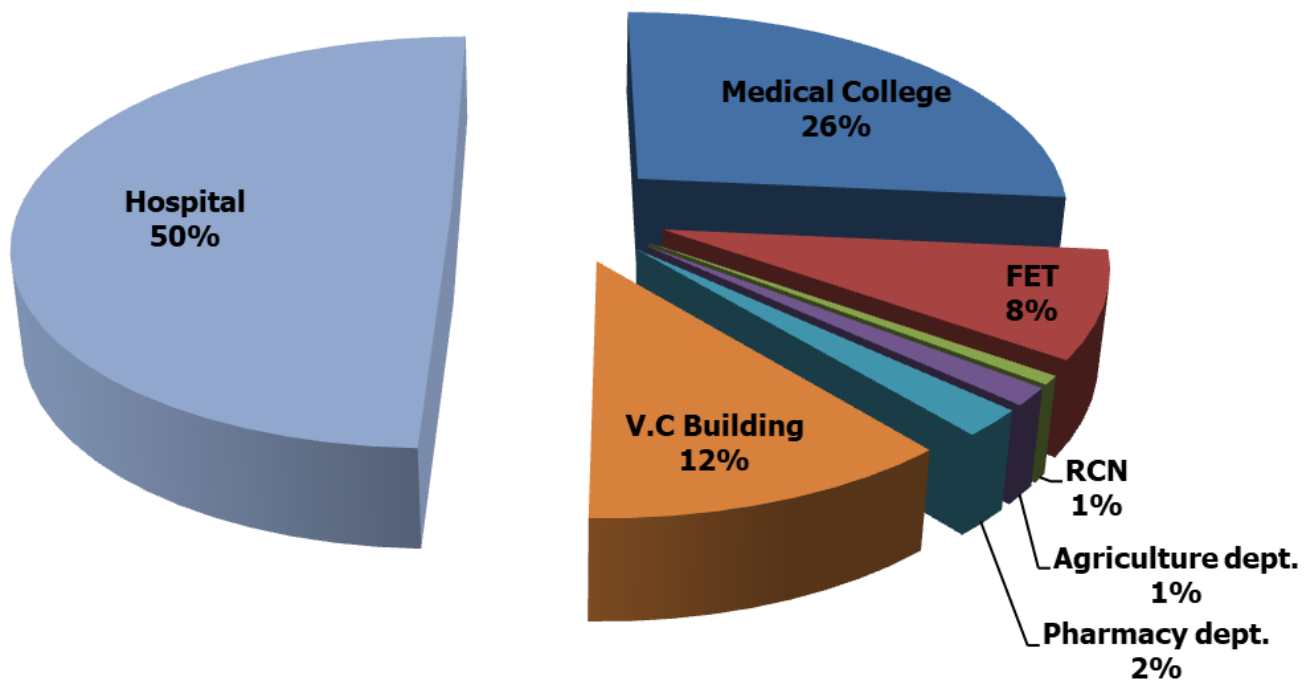


Figure 12: Energy consumed by air conditioners section wise pertaining to the Educational sector

The above analysis shows the air conditioners in the **Hospital consumes 50%** followed by **Medical college at 26%**, the **V.C. Building at 12%**, the **FET at 8%**, the **Pharmacy dept. at 2%** and **RCN and Agriculture dept. at 1% each**.

4.8.5 Site investigation observations

Some of the points noticed are as follows:

1. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. The outdoor units are properly cleaned and maintained well.
3. The outdoor units do not have any dust collection problem.

4.9 Equipment

4.9.1 Sector wise allocation study

There are a **total of 1,663 equipment** in the entire premises. For study purpose the entire premises was divided in **2 sectors – Residential and Educational.**

4.9.2 Residential Sector study

The equipment comprises of Mixer Grinder, TV, Wifi Router, Chimney, Desktop Computer, Aatamixer, CCTV, Water Plant with 2 Motors, Geysers, water pumps, Refrigerator and Water Cooler.

4.9.3 Educational Sector study

The educational sector was briefly subdivided into for major subsectors depending on their usage these are listed as follows along with the type of equipment which fall under this category.

- **Infrastructure mandatory usage** – Water pumps, submersible pumps, motors.
- **Scientific usage** – All the equipment used in various laboratories.
- **Administrative and regular usage** - Scanner, Bio Metric, Telephone, Wifi Router, Water Dispensers, Laptop, DVR, Water Purifier, Xerox Machine, Water Cooler, Intercom, Internet Hub, PA Systems, Refrigerator, CCTV, Desktop Computer, Printer
- **Occasional usage** - Amplifier, LED TV, Computer Home Theatre, Washing Machine, TV, Heater, Projector, Microwave Ovens, Mixer Grinder, Tread Mills, NVR

a) Types of equipment as per the usage

There are a total of **1,663 equipment**; the following table shows a consolidated study.

S. No.	Type	Nos.
1	Telephone	425
2	CCTV	342
3	Wifi	89
4	Biometric	10

5	Computer	766
6	Refrigerator	20
7	Lift pump	5
8	Water pumps	6

Table 11: Summary of the types of equipment in the premises

b) Types of equipment as per their energy contribution

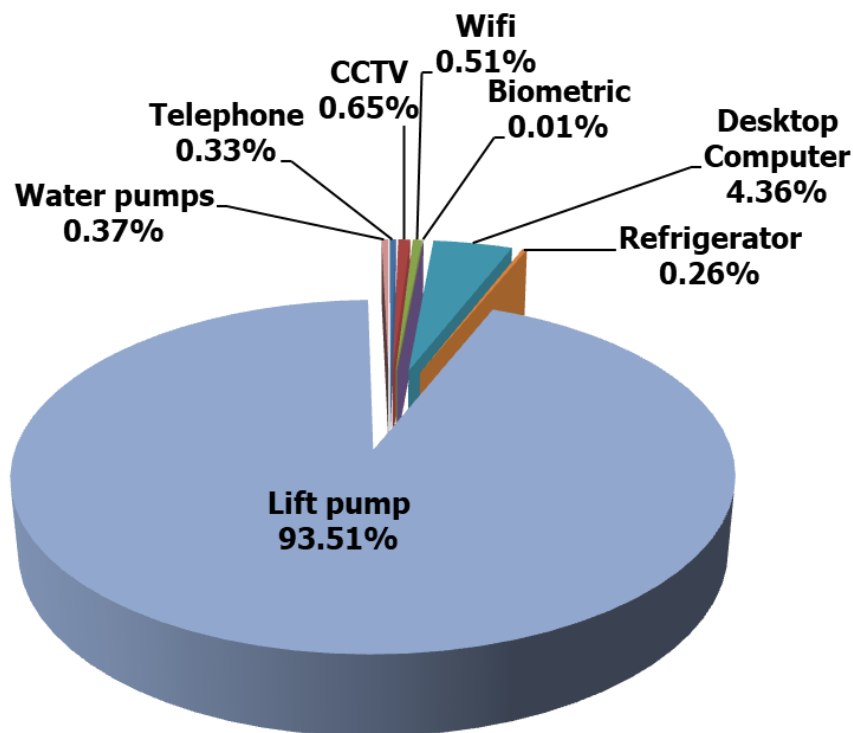


Figure 13: Energy consumed by types of equipment in the educational sector based on the usage study

The analysis of the types of equipment in premises shows **Lift pump consume the highest power at 93.51% followed by Desktop computers at 4.36%. The other types of equipment have been excluded in this study as it emphasis on the major equipment of daily use.**

4.9.4 Site investigation observations

Some of the points noticed are as follows:

1. All equipments are in working conditions and daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. No defect was found in any equipment of electrical consumption.

4.10 Positive aspect of Energy Efficiency Management

(Based on the Green Building system requirements for Electro mechanical Systems)

A. Electrical & lighting - Solarisation of the premises

- Availability of Solar hot heaters in Residential sections (Hostels)
- Provision of a 190 kWp solar plant in the Residential and Educational sections.

B. Water management

- Suitable ground water recharge through rainwater harvesting
- Sewage treatment plant

C. Waste management

- Sustainable integrated waste management practices through anaerobic process.

4.11 Recommendations for a Sustainable Habitat

Over the time energy efficient appliances have been a boon not only to the energy saving parameters they adhere to but also the eco-friendly habits it helps to inculcate. The Institution such as Schools and Universitys are the best way to implement these initiatives. It creates awareness among the students at a young age. The Institutions also act as a symbol and representative of being an energy efficient premise. Following the analysis we found are some of the suggestions which can be implemented for an energy efficient Institution. This would help in reduction of the current electrical consumption by a major percentage.

4.11.1 Electromechanical systems - Electrical and Lighting

Section 1 - Lights

The current light analysis shows that Non-LED Tubelights lights consume anywhere between 24W, 36W and 40W when in use and these should be replaced with LED lights which consume on an average 16-20W when in use.

a) Educational Sector - Non-LED Tubelights

The following graph shows a comparison of the current consumption and consumption of all **Non-LED Tubelights in all Buildings** if replaced with LED lights.

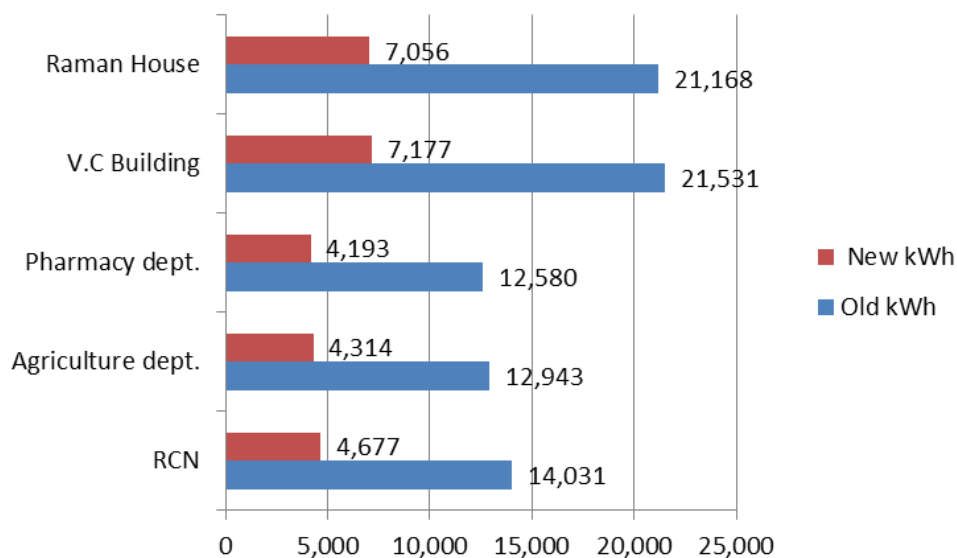


Figure 14: Analysis of current Non-LED and new LED lights in all the blocks of educational sector

The above analysis shows reduction of average of **67% reduction** in energy consumption if replaced with energy efficient appliance.

b) About the replacement of the lights

It will be suggested to either replace these now if University can have certain plans else the replacement can be done when fans get damaged or are not in working condition.

Section 2 - Fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 60W when in use. These should be replaced with energy efficient fans consuming 32W when in use. The following graph shows a comparison of the current consumption and consumption of all **ceiling fans in all Buildings** if replaced with star rated appliance results in a reduction of average of **47% reduction** in energy consumption if replaced with energy efficient appliance. It will be suggested to either replace these now if University can have certain plans else the replacement can be done when fans get damaged or are not in working condition.

Section 3 – Air conditioners

A few Air conditioners look old. Most of these are not star rated and are consuming more energy. These should be replaced with energy efficient and star rated air conditioners wherein 1 ton consumes only 900W, the 2 ton consumes 2000W and 1.5 ton consumes 1495W.

The following graph shows a comparison of the current consumption and consumption of the **air conditioners** if replaced with star rated appliance.

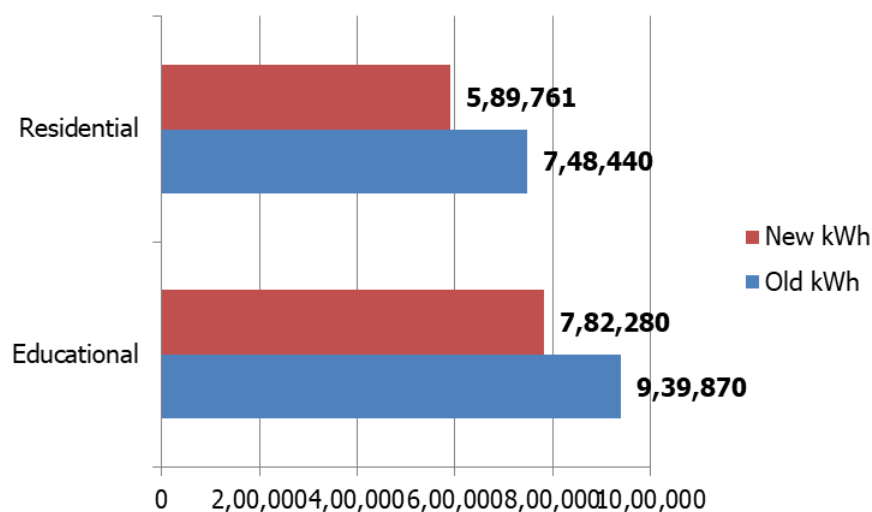


Figure 15: Analysis of current computers and air conditioners

The above analysis shows reduction of average of **19% reduction** in energy consumption if replaced with energy efficient appliance.

It will be suggested to either replace these now if University can have certain plans else the replacement can be done when air conditioners gets damaged or is not in working condition.

Section 4 - Equipment

Desktop computers to laptops

Among all equipment it suggested to replace the desktop computers with laptops as this would be energy efficient. A normal desktop computer consumes on an average 250W and it is to be connected all time when it has to be used. On the contrary a laptop consumes 40W and has a battery backup which lasts up to 4 hours.

There is **an average 84% reduction** in energy consumption if replaced with energy efficient appliance which is a laptop in all the areas of Educational and Residential areas.

This replacement is however is dependent on a variety of factors as follows.

- Some of the senior staff members may be more convenient with computers, replacement with laptop might result in a change of the working patterns and hours which may affect the productivity.
- Laptops – in case are not handled with care such as if dropped unintentionally might result in data imbalance.
- Students who are not day scholars can use laptop as per their own convenience, whereas in common areas there can a monitoring about the usage hours hence computers may be a preferable option then laptop in certain spaces.
- Similarly depending on the pandemic situation in case it might be possible due to irregular usage the device might have issues while functioning.

Thus the University should analyse the above points and then devise a strategy about the replacement, essentially when the devices get damaged or are not in working condition they can surely be replaced.

As well as once they are not in working condition the proposed strategy should be linked towards e-waste management as well.

4.11.2 Building management systems

The University has extreme potential to become 100% energy efficient premises. In addition to provisions in the electromechanical system some facilities can be introduced towards building management systems as well. These can be undertaken equally for educational and residential sections.

- Set the BMS time of day schedules to suit the minimum occupancy periods of the areas served and implement optimum start stop incorporating a night purge cycle, session and holiday scheduling.
- Space temperature Setback - A temperature setback is a simple strategy to help save utility cost by reducing how often your heating or cooling system operates. *(morriseyengineering)*
- Timer control of air conditioners.
- Timer control of personal heaters - Install push button timer control of personal heaters in Residential areas.

4.11.3 Facility management systems and controls

(Includes electromechanical systems – Electrical, Water)

a) Common facilities for Residential and Educational areas

- Install PIR control of the lighting in the toilet areas.
- Install low flow taps with automatic shut off in the toilets.
- Install push button timer control in all rooms lighting and ceiling fans.

b) Specific facilities for Residential areas

- Additional security lighting in Residential areas.
- Install PIR control of the lighting in the shower area.
- Install time of day control on the domestic hot water circulating pump

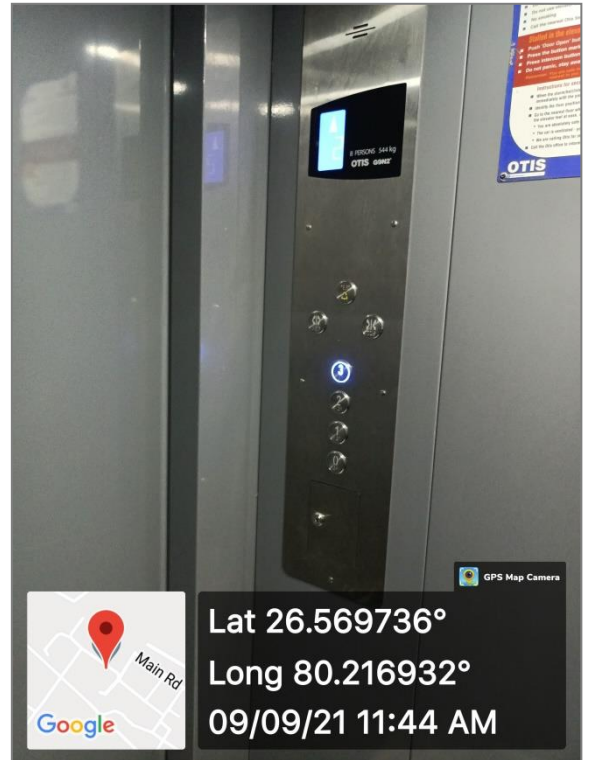
c) Specific facilities for Educational areas

- Install audible alarms on the laboratory doors to ensure doors remain closed at all times.
- Install Power Electronics control of the Foyer notice board lighting.

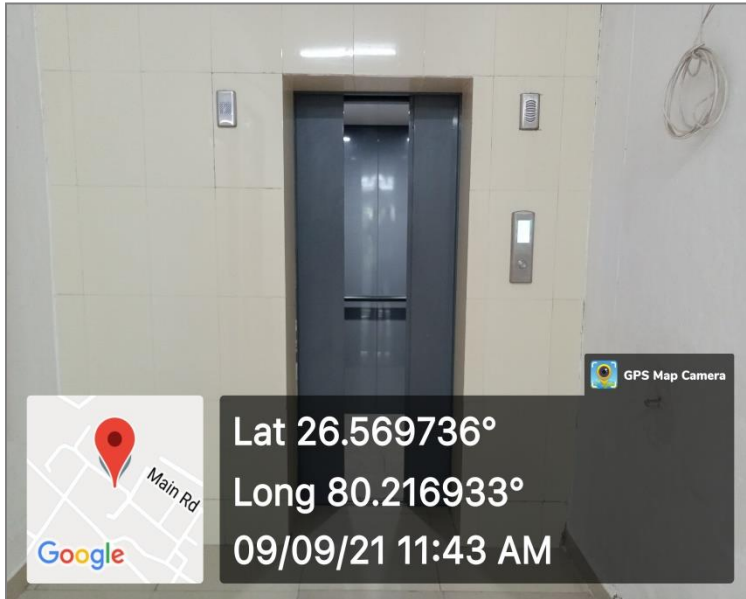
- Install reduced voltage control of the high bay lights.
- Install access lighting laboratories and Engineering Blocks and operate the high bay lighting only when required.

On-site investigation and physical verification

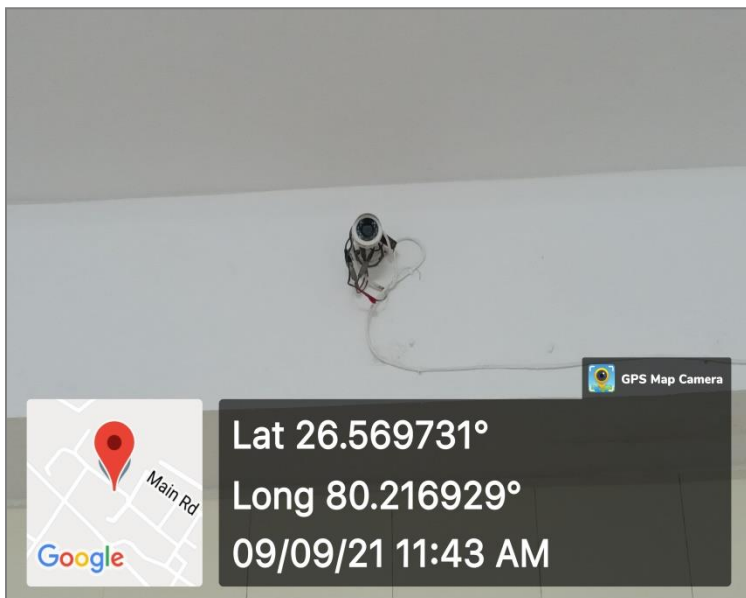
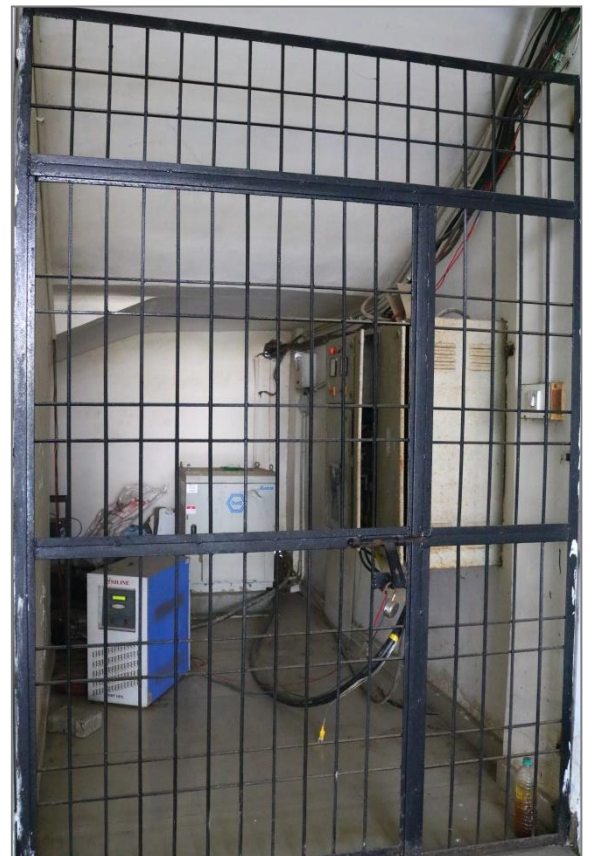
Energy consuming appliances and spaces in the premises



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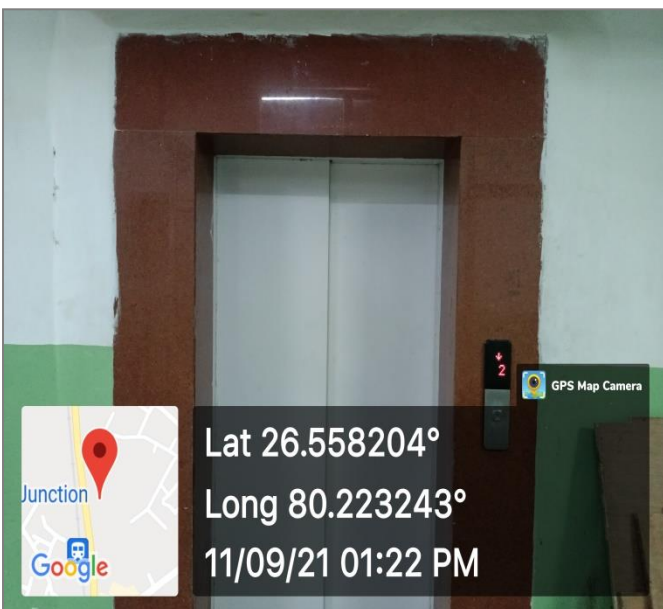
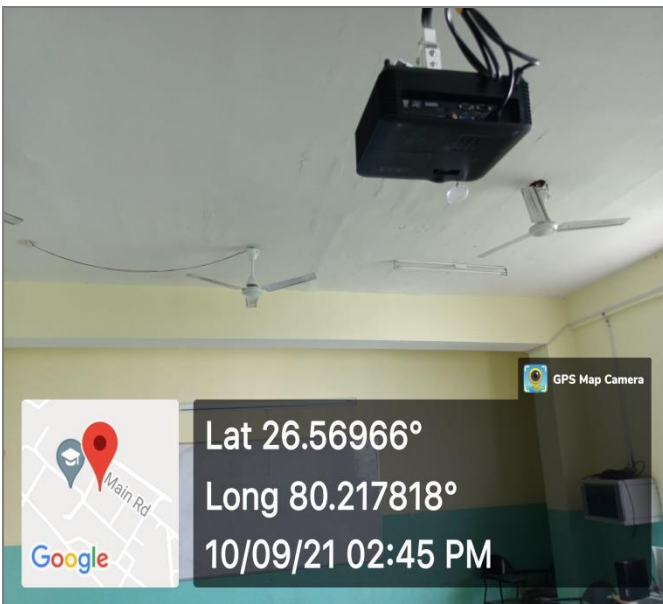
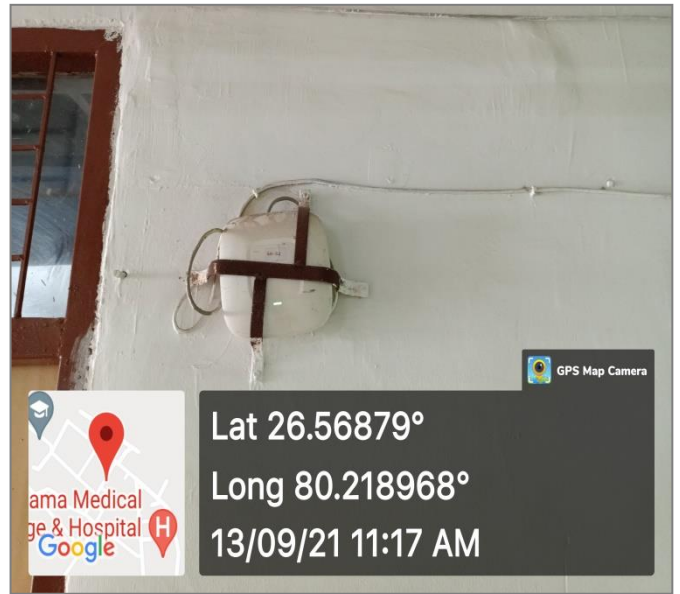
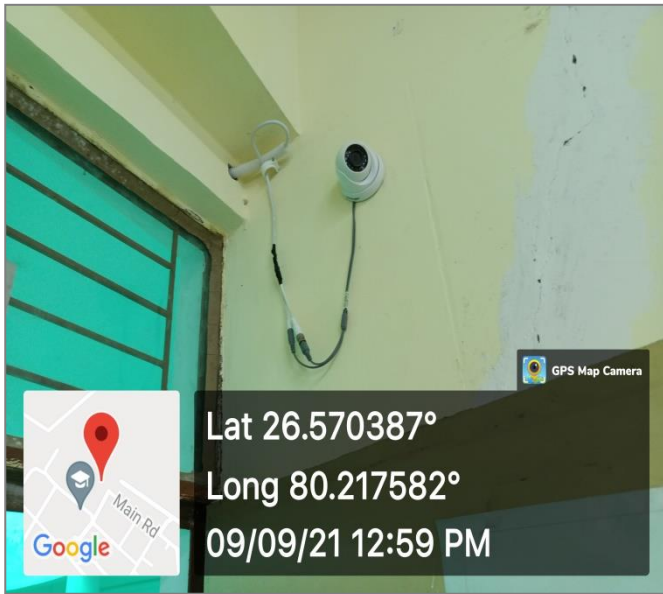
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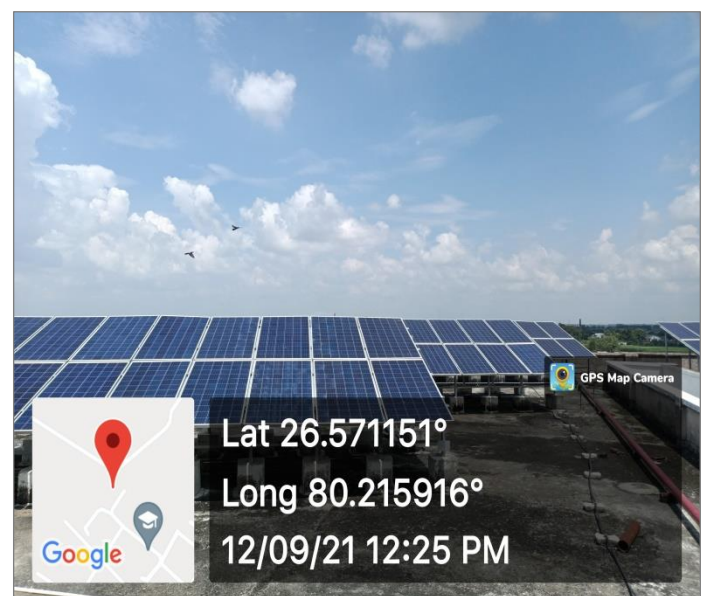
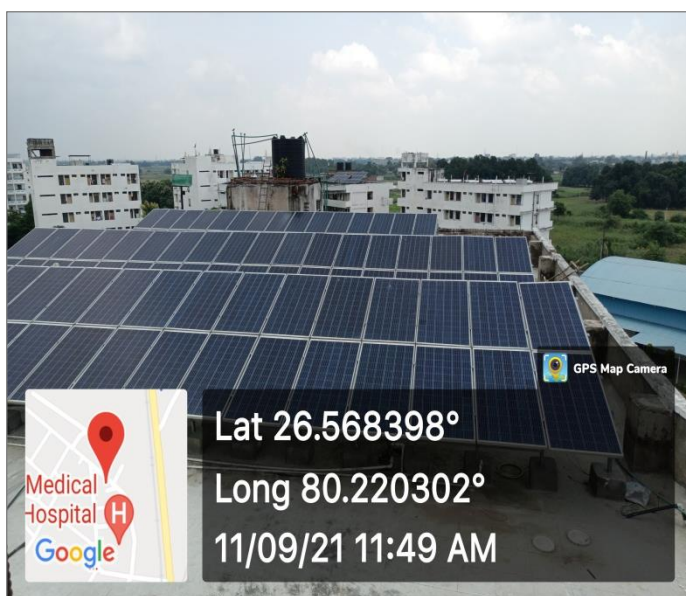
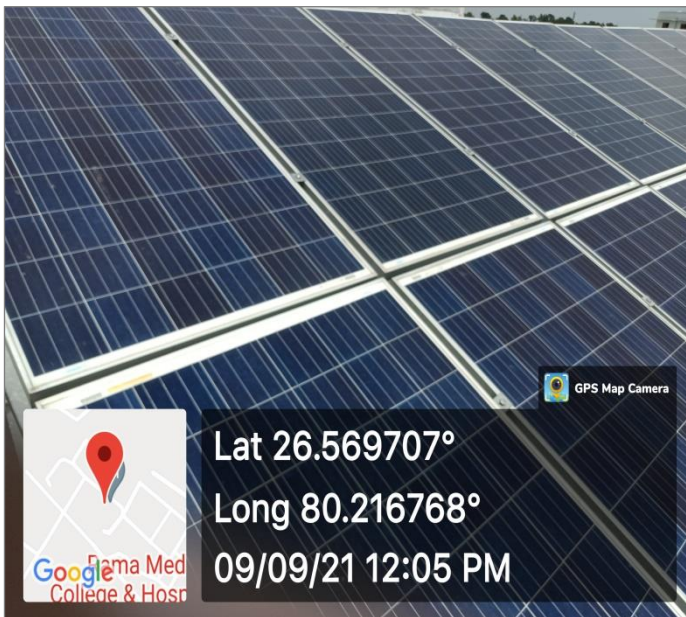
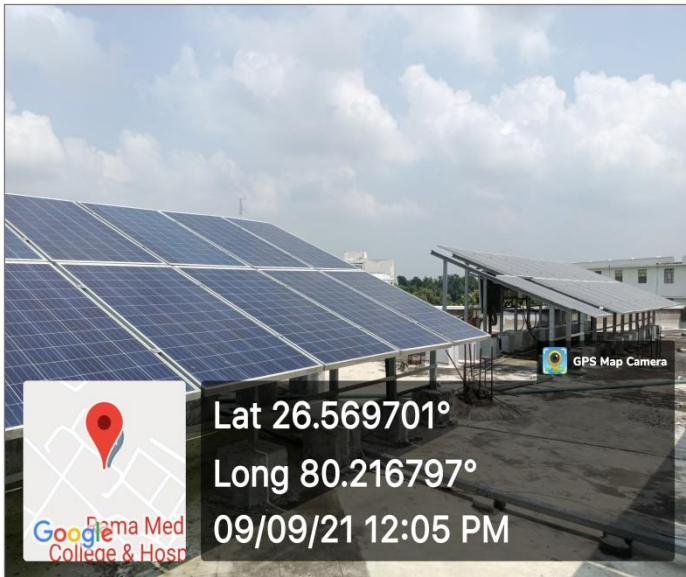
On-site investigation and physical verification

Energy consuming appliances and spaces in the premises



On-site investigation and physical verification

Source of energy in the premises



5. Towards a Healthy & Sustainable Institution

5.1 Inputs by Greenvio Solutions

Based on the analysis of the study of premises in addition to the recommendations provided in each section of Ecological, Water, Waste and Energy Audit the University can adopt the following strategies towards a Healthy and Sustainable Institution practices.

- a) Kitchen garden** - There can be provision of kitchen garden practices in a designated area of the open space this would enhance the biodiversity and be useful in training students and staff about the healthy practices and vegetables grown which would be used in Canteen/ Mess. It helps in capacity building. The smaller steps taken have huge impacts when each student would adopt these practices in their homes or societies and grow kitchen garden, terrace garden there will be a long term benefit for the environment as a whole.
- b) Cutlery in the Canteen** – The regular plastic and steel plates, spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straw, disposable plates, edible spoons and tables made out of sugarcane waste or bamboo. This will be first of its kind initiative to be adopted and practiced thus also inculcating the healthy practices in students.
- c) Signages** – In addition to the signages being in regular language there can be additional signages in braille language for the specially abled students.
- d) Waste vio** – Stepping up a little further an initiative can be undertaken wherein University can tie up with an organisation and students can be encouraged to collect dry waste and electronic waste such as newspapers, old computers and others and hand over to organisation on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, eco-friendly habits in becoming a responsible citizen.
- e) Eco clubs** – In addition to the NSS there can be an eco-club with school and college students operating together which will help the collaboration to yield results right from micro level.

5.2 Survey Results

An online survey was conducted to analyse the student and staff views about what changes according to you can be undertaken for Green audit improvement in University premises and activity, some of the key responses are listed below. Whereas many responses **stated there were no changes requires because the present practices are excellent.**

- No need for changes or activities
- Good surrounding

Some of the suggestions by the Students and staff are listed below:

- Tree plantation programme
- Unnecessary water uses should be reduced
- Donate bicycles ask facilities HOD or Dean to switch to cycle
- We should adopt fully paperless system.
- Plantation of different types of plant or new varieties of flower which make university environment green, fragrance and also attractive.
- Waste management could be improved by keeping different bins for biodegradable and non-biodegradable wastes. These biodegradable wastes can be used to make compost for gardens. Students active participation is also required, thus conducting seminars for waste management and air and water pollution management and its effect on climate change, should be conducted more.
- Student awareness program for growing more trees and respecting the trees and plants, caring of them and knowledge about how to grow them.
- Minimising the use of plastics
- Use of e-vehicles in the premise and not allowing of fuel vehicles to run in the premises.
- Cleaning of university

However, it should be noted that the University has taken up multiple initiatives and because of Pandemic the students have not practically visited the campus so many of these points are not mandatory at the moment.

6. References

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5. Climate data <https://en.climate-data.org/asia/india/uttar-pradesh/kanpur-5844/>
6. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.

