

# GREEN, ENERGY & ENVIRONMENTAL AUDIT REPORT | 2020

# GREEN AUDIT REPORT - 2020

is presented to

**M. S. Ramaiah University of Applied Sciences**

University House, New BEL Rd, M S R Nagar, Mathikere, Bengaluru, Karnataka

has successfully demonstrated knowledge on Energy conservation,  
Water conservation, Bio diversity, Waste management, Indoor  
Environmental quality, Carbon footprint.

05.01.2021

DATE

*Nischay N.*

**NISCHAY N**  
GREEN BUILDING CONSULTANT

*GL*  
Registrar  
M.S. Ramaiah University of Applied Sciences  
Bangalore - 560 054

# Green, Energy and Environment Audit Report 2020



PREPARED FOR

**M. S. Ramaiah University of Applied Sciences**

Bengaluru, Karnataka – 560054

PREPARED BY

**GREEN AURA**

No 692f 12th A cross BEL layout Bharath Nagar,

Bangalore, Karnataka,

India, 560091

Year -2020

  
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Bangalore - 560 054

## ACKNOWLEDGEMENT

**GREEN AURA, Bangalore, Karnataka** takes this opportunity to appreciate & thank the management **M. S. Ramaiah University of Applied Sciences, Bangalore** for giving us an opportunity to conduct energy audit for the university.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.

### **Audit Team**

The study team consisted of senior technical executives from Green Aura, and the audit spanned multiple visits from October to December 2020.

- ✦ **Mr. Nischay Gowda** [Director]
- ✦ **Mr. Sachin Kumawat** [Engineer]
- ✦ **Mr. Akash Kumar** [Jr.Engineer]

  
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# EXECUTIVE SUMMARY

The executive summary of the energy audit report furnished in this section briefly gives the identified energy conservation measures in the University.

## ENERGY INITIATIVE TAKEN BY UNIVERSITY MANAGEMENT

### ✚ SOLAR PHOTOVOLTAIC ROOFTOP PLANT INSTALLATION

University has total installed total 55 KWp grid connected solar roof top system. One is Ganaganagotri campus (20 KWp) and other one is Ramaiah technology campus (35 KWp)  
**It's Appreciable.**

## AREAS FOR IMPROVEMENT

### ✚ LIGHTING SYSTEM

Replacement of “conventional T-12 (40 Watt) and T-8 (36 Watt)” tube light by energy efficient LED lighting fixture was taken up phased manner.

### ✚ TIMER CONTROLLED STREET LIGHTS

Installation of “Timer control on high mast and street lighting” in College campus is recommended

### ✚ CEILING FAN

Replacement of “conventional ceiling fan (60 Watt to 80 Watt)” by energy efficient star rated fan or BLDC based energy efficient fan (20 to 25 Watt) in “admin building, class rooms, laboratories and faculties cabin” have great potential for energy saving

### ✚ IOT BASED ENERGY MONITORING SYSTEM IN PLACE OF SUB METER: -

Installation of “Cloud based (IoT based) energy monitoring system” including harmonic measurement (total voltage and current harmonic distortion %) in every buildings of GG Campus. It will be good initiative for energy monitoring by management.

### ✚ ENERGY MANAGEMENT WORKSHOP AND TRAINING

- Develop energy management policies for University. Establish a procurement policy that is energy saving and eco-friendly.
- Conduct awareness and training programs for faculty, student and non-teaching staffs. Conduct seminars, workshops and exhibitions on energy management education.

  
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## Green Auditing

The term "Green" signifies practices that are environmentally friendly and do not harm the natural environment. This concept can be encapsulated by the acronym "Global Readiness in Ensuring Ecological Neutrality" (GREEN). A "Green Audit" can be defined as the systematic process of identifying, quantifying, recording, reporting, and analyzing elements of ecological diversity, and expressing these findings in financial or social terms.

To effectively implement a Green Audit, it is essential to understand various key aspects, including the objectives, drivers, future potential, benefits, and advantages of such an assessment. The practical application of Green Auditing involves various measures such as energy conservation, the utilization of renewable energy sources, rainwater harvesting, efforts towards achieving carbon neutrality, and extensive plantation initiatives.

The concept of Green Auditing has gained significance in educational institutions and organizations alike, as it serves as a valuable management tool for evaluating and improving environmental standards. By embracing Green Auditing, institutions can contribute to sustainable development and enhance their overall environmental performance. Moreover, the reckless experimentation with nature, often disregarding natural laws and regulations, is a significant driver behind the growing importance of Green Auditing.



**M. S. Ramaiah University of Applied Sciences- Campus.**

## I. About University

M. S. Ramaiah University of Applied Sciences (MSRUAS) is a multidisciplinary, innovative, and collaborative Higher Education Institute established as a Private University by an Act of Karnataka State in 2013, with a vision to be student centric, emphasizing on applied research, while maintaining high academic and ethical standards. Initially, the University had Faculties of Engineering and Technology, Art and Design, Management and Commerce, Mathematical and Physical Sciences, Life and Allied Health Sciences, Pharmacy, Dental Sciences and Hospitality Management. The School of Social Sciences and School of Law were added in 2020. M S Ramaiah Medical College, M S Ramaiah Institute of Nursing Education and Research and M S Ramaiah University of Physiotherapy were brought under MSRUAS in 2022. MSRUAS offers Undergraduate, Postgraduate, Vocational and Ph.D. Programmes. The University has a student strength of around 7000+ and 740+ qualified faculty members well trained in pedagogy and constantly striving to impart quality education to address societal challenges. Through adoption of global best practices in curricular, research, co-curricular and extra-curricular activities, MSRUAS ensures all-round development of students. Directorates of Student Affairs, Training and Lifelong Learning, Transferable Skills and Leadership Development, Research, Internal Quality Assurance Cell, Techno-Centre, Entrepreneurship, International Collaborations and Partnership Management, support the academic activities and interaction with Academia, Research Organizations, Industry, and Communities, in India and Abroad. MSRUAS is equipped with modern infrastructure and laboratories including an Advanced Learning Center supporting initiatives in Research, Advanced Design, Simulation, Testing, Clinical Studies, and Health Care.



**M. S. Ramaiah University of Applied Sciences- Campus.**

  
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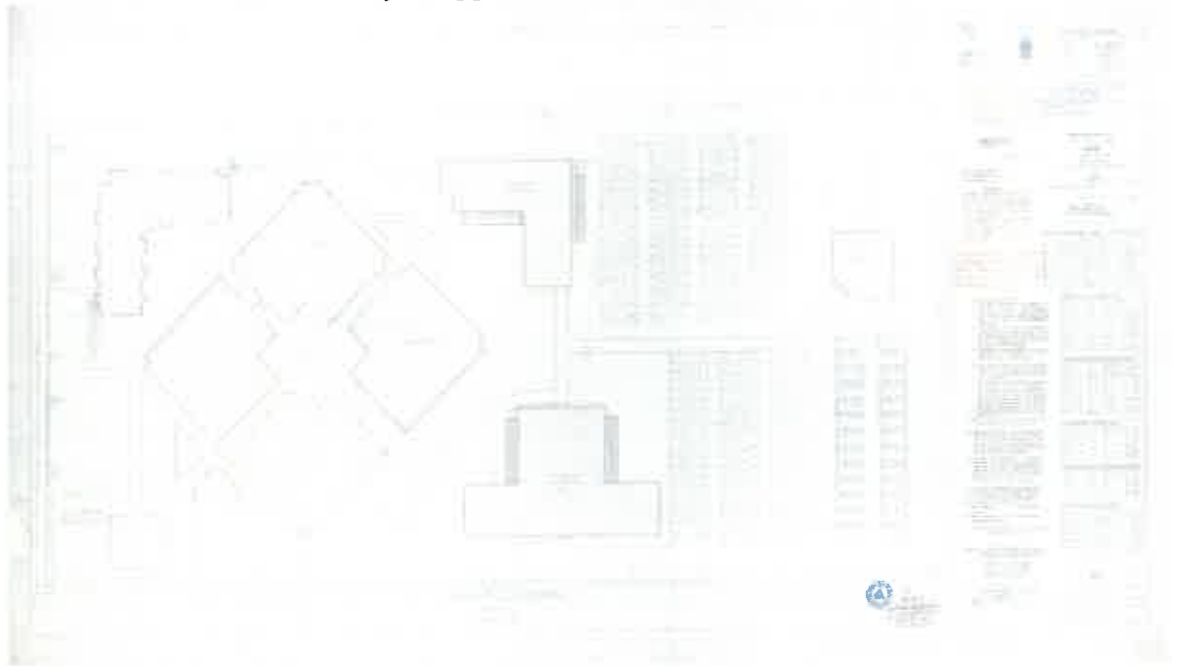


## II. Built Environment

### i. Layout plan - Gnanagangothri Campus



### M. S. Ramaiah University of Applied Sciences Gnanagangothri campus layout plan



### M. S. Ramaiah University of Applied Sciences, Ramaiah Technology Campus layout plan

  
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Pic : Google Map



**M. S. Ramaiah University of Applied Sciences, Ramaiah Technology Campus**

**Location of the campus.**

**Campus 1: Gnana Gangotri (GG) New BEL Road, M S R Nagar, Bangalore, Karnataka, INDIA\_560054**

**Campus 2:  
Peenya Campus**

**427, 12th Cross Rd, Ganapathy Nagar, Phase 3, Peenya, Bengaluru Karnataka 560058**

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## ii. Total built-up area of the University

Gnanagangothri Campus			
Sl. No.	Name of the Building	Floor	Area (Sft)
1	University House	Ground	12675
		First	20057
		Second	17900
2	Faculty of Dental Sciences	Basement	13,850
		Ground	30,374
		First	29,623
		Second	29,623
3	Faculty of Management & Commerce and Faculty of Life & Allied Health Sciences	Third	29,623
		Ground	24,500
		First	22,700
4	Faculty of Hospitality Management & Catering Technology	Second	22,700
		Third	22,700
		Basement	15,300
		Ground	15,300
5	Faculty of Pharmacy	First	15,300
		Second	15,900
		Third	15,900
		Ground	22,700
6	Heritage Block (School of Social Sciences and School of Law)	First	22,700
		Second	27,000
		Third	24,400
		Basement	6,675
7	Ramaiah Medical College	Ground	31,445
		First	28,000
		Second	28,853
		Third	28,000
		Lower Basement	65,250
8	Ramaiah Medical College Hospital	Upper Basement	52,780
		Ground	60,270
		First	59,880
		Second	56,590
		Third	58,230
9	Ramaiah Institute of Nursing Education and Research	Lower Basement 3 and Upper Basement 1	31,103
		Upper Basement 1	1,17,316
		Ground	1,17,144
		First	1,17,144
		Second	85,459
10	Triveni Girls Hostel and Nilgiris Boys Hostel	Third	24,074
		Ground	12,702
		First	12,702
		Second	12,702
11	Sapthagiri Hostel	Third	12,702
		Lower Basement	70,913
		Upper Basement	69,387
		Ground	42,338
12	Faculty Residence – Tulasi Staff Quarters	First	42,338
		Second	42,338
		Third	42,338
11	Sapthagiri Hostel	Ground	19,752
		First	19,752
12	Faculty Residence – Tulasi Staff Quarters	Second	19,752
		Stilt Floor	3,200
		Ground + 2 Typical	9,600

Ramaiah Technology Campus			
Sl. No.	Name of the Building	Floor	Area (Sft)
1	A Block (RTC)	Basement	10,600
		First	10,600
		Second	12,100
		Third	12,100
2	B Block (RTC)	Upper	10,600
		Ground	10,600
		First	10,600
		Second	10,600
3	C Block (RTC)	Third	10,600
		Lower	8,600
		Upper	10,200
		Ground	10,200
4	D Block (RTC)	First	10,200
		Second	10,200
		Third	10,200
		Upper	8,600

### iii. Total Population of the Institution.

Please provide the details in the below table format.

	Male	Female	Total
Teachers	226	170	396
Students	3359	2016	5375
Non-Teaching Staff	221	89	310
Sub Total	3806	3221	6081
Approximate no of visitors (per day)			200
What is the total number of working days in your campus in a year?			263

  
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<b>Total Actual Student Strength (Program(s) Offered by Institution)</b>			
<b>(All programs of all years)</b>	<b>No. of Male Students</b>	<b>No. of Female Students</b>	<b>Total Students</b>
UG [3 Years Program(s)]	296	203	499
UG [4 Years Program(s)]	2464	992	3456
UG [5 Years Program(s)]	60	235	295
PG [2 Year Program(s)]	440	398	838
PG [3 Year Program(s)]	23	84	107
PG [6 Year Program(s)]	76	104	180
<b>Total</b>	<b>3359</b>	<b>2016</b>	<b>5375</b>

<b>No of Male</b>	<b>3359</b>
<b>No of Female</b>	<b>2016</b>
<b>Total</b>	<b>5375</b>

**Gender Ratio**                      **26**

#### **iv. Facilities available in the campus.**

<b>Facilities</b>	<b>Present in the campus (yes/no)</b>	
	<b>GG Campus</b>	<b>Peenya Campus</b>
Garden Area	Yes	Yes
Play ground	Yes	Yes
Kitchen	Yes	Yes
Toilets (numbers)	103	245
Garbage or waste store yard	Yes	Yes
Laboratory (numbers)	70	46
Canteen	30 stalls (food street)	1 canteen+1(eatery)
Hostel Facility (numbers)	4	3
Guest house	No	No

  
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### III. Energy Audit

#### i. Introduction of Energy audit

An energy audit is a systematic process of evaluating and analyzing the energy consumption and efficiency of a building, facility, or organization to identify opportunities for energy savings and improved energy performance. The primary goal of an energy audit is to assess how energy is used, wasted, or potentially conserved within a given system or operation.

1. **Identify Energy Consumption:** - Determine how and where energy is being used within a facility or organization, including electricity, natural gas, heating oil, water, and other energy sources.
2. **Quantify Energy Efficiency:** - Assess the efficiency of energy-consuming systems and equipment, such as HVAC (heating, ventilation, and air conditioning) systems, lighting, appliances, and industrial processes.
3. **Identify Energy Conservation Measures (ECMs):**- Identify specific opportunities to reduce energy consumption and improve energy efficiency. This may involve upgrading equipment, optimizing operations, or implementing energy-efficient technologies
4. **Estimate Cost Savings:** - Calculate potential energy and cost savings associated with implementing recommended ECMs. This helps organizations prioritize energy-saving initiatives based on return on investment (ROI).
5. **Prioritize Recommendations:** - Present a list of recommendations, along with their associated costs and benefits, to help stakeholders make informed decisions about which energy-saving measures to pursue.
6. **Promote Sustainability:**-Energy audits can contribute to sustainability efforts by reducing greenhouse gas emissions and environmental impact, which is particularly important in the context of climate change mitigation

The GREEN AURA, Bangalore, Karnataka carried out the energy audit at the site to find loopholes in the energy consumption pattern for Ramaiah University of Applied Science . A technical report has been prepared as per the data basis & need of the requirement of the project.

  
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## ii. Objectives of Energy Auditing

The primary object of an energy audit is to assess and analyze the energy usage and efficiency of a building, facility, or process. Energy audits are conducted to achieve several specific goals and objectives, including

1. Identify Energy Efficiency Opportunities.
2. Fixing of energy saving potential targets for individual cost centers
3. To reduce operational costs.
4. To reduce energy consumption per unit product output.
5. Improve Energy Performance.
6. Relating energy inputs and production output
7. To find and apply effective planning for more effective use of energy throughout the industry works.
8. Identifying potential areas thermal and electrical energy efficiency.

## iii. Energy Audit Methodology

An energy audit is a systematic process of evaluating and analyzing energy usage in a facility or organization to identify opportunities for energy efficiency improvements. The goal of an energy audit is to reduce energy consumption, lower energy costs, and minimize environmental impacts. There are different levels of energy audits, ranging from a basic walkthrough audit to a comprehensive investment-grade audit.

### 1. Preparation and Planning

- Define the scope and objectives of the energy audit.
- Gather historical energy consumption data and utility bills.
- Assemble a team of auditors with expertise in energy systems, including HVAC, lighting, electrical, and building envelope.
- Obtain building plans, equipment manuals, and other relevant documentation.
- Schedule the audit and secure necessary permissions and access to facilities

### 2. Site Assessment

- Conduct a walkthrough of the facility to understand its layout, systems, and operations.
- Identify and document key energy-consuming equipment and systems.
- Collect data on operating hours, temperature settings, and occupancy patterns.
- Note any maintenance issues or equipment malfunctions that may affect energy efficiency.
- Perform basic energy benchmarking to compare the facility's energy performance with industry standards or similar facilities

### 3. Data Collection and Analysis

- Install energy monitoring equipment, such as data loggers, to track energy usage in real-time if necessary.
- Collect data on energy consumption for each identified system and equipment.
- Analyze energy bills to determine cost breakdown and seasonal variations.
- Calculate energy consumption and efficiency metrics (e.g., kWh, BTUs, Energy Use Intensity, etc.).
- Identify energy waste, anomalies, or deviations from expected performance.

#### **4. Data Collection and Analysis**

- Develop a list of energy-saving recommendations based on the audit findings.
- Prioritize recommendations based on cost-effectiveness, payback period, and potential energy savings.
- Provide detailed specifications for implementing each recommendation, including estimated costs and potential incentives or rebates.
- Consider both low-cost/no-cost measures (behavioral changes, maintenance improvements) and capital-intensive measures (equipment upgrades, retrofits)

#### **5. Reporting and Documentation**

- Compile the audit findings, recommendations, and supporting data into a comprehensive audit report.
- Include a summary of potential energy savings, estimated costs, and return on investment (ROI) for each recommendation.
- Present the report to key stakeholders, such as management, facility operators, and decision-makers.

#### **6. Monitoring and Verification**

- After implementing energy-saving measures, monitor energy consumption to verify actual savings.
- Adjust operations and maintenance practices as needed to maintain energy efficiency.
- Periodically review and update the energy management plan to ensure continuous improvement.

#### **7. Education and Training**

- Provide training to facility staff to ensure proper operation and maintenance of energy-efficient systems.
- Raise awareness among occupants about energy conservation practices

## POWER SUPPLY SYSTEM

### i. Transformer

There are one main electricity connection is 2151 KVA (The Register, M.S. Ramaiah Medical College Bangalore) and for each building they have sub meters for reading consumption details. This campus has one transformer details are below

Sr. No.	Items	Technical Details Transformer (TR)
1	Make	(KPRS) Kiran Power Rectification Services (P) Ltd.
2	Location	Gnanagangothri Campus
3	Year	2012
4	Rating (KVA)	1000
5	Voltage (HV/ LV)	11000/433
6	Current Rating (HV/ LV)	52.48/1333.33
7	Frequency (Hz)	50
8	Impedance at 75°C	5.12 %
9	Vector group	Dyn-11
10	Type of cooling	ONAN

### ii. DG SETS

The GG Campus has 02 Nos. DG sets one is 500 KVA and second is 320 KVA both for supply emergency power during the grid power failure.

Sr. No.	Parameter	Technical Specification DG Set-01	Technical Specification DG Set-01
1	Make	Cummins	Cummins
2	Model No	VTA28	1150G
3	Capacity (KVA)	500	320
4	Rated Voltage	415	415
5	ESN	25166387	25168243
6	Frequency	50	50
7	Phase	3	3

  
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**DG unit generation and fuel consumption details.**

<b>320 KV DG Sets</b>						
<b>Sr. No.</b>	<b>Month &amp; Year</b>	<b>Unit generated (kWh)</b>	<b>Diesel consumption (Litre)</b>	<b>DG run hour</b>	<b>Unit generated (kWh/litre)</b>	<b>consumption per hour (Litre)</b>
1	Jan-20	10	0.45	1.2	14.2	14.2
2	Feb-20	150	2.2	1.44	68	68
3	Mar-20	0	0	0	0	0
4	Apr-20	0	0	0	0	0
5	May-20	300	10.5	2.44	28.5	28.5
6	Jun-20	470	14.8	2.6	31.75	31.75
7	Jul-20	170	7.4	2.1	22.9	22.9
8	Aug-20	430	13.3	2.5	32	32
9	Sep-20	0	0	0	0	0
10	Oct-20	520	17.9	2.42	29.05	29.05
11	Nov-20	340	11.8	2.4	28.8	28.8
12	Dec-20	280	8.1	2.1	34	34
<b>Total</b>		<b>2670</b>	<b>86.45</b>	<b>19.2</b>	<b>289.2</b>	<b>289.2</b>

<b>500 KV DG Sets</b>						
<b>Sr. No.</b>	<b>Month &amp; Year</b>	<b>Unit generated (kWh)</b>	<b>Diesel consumption (Litre)</b>	<b>DG run hour</b>	<b>Unit generated (kWh/litre)</b>	<b>consumption per hour (Litre)</b>
1	Jan-20	768	330	7.7	2.3	42.8
2	Feb-20	1760	635	13	2.7	48
3	Mar-20	0	0	0	0	0
4	Apr-20	0	0	0	0	0
5	May-20	464	240	7.1	1.93	33.8
6	Jun-20	320	260	8.1	1.23	32.09
7	Jul-20	64	90	3	1.4	30
8	Aug-20	128	140	2.7	0.9	51
9	Sep-20	0	0	0	0	0
10	Oct-20	112	120	3.3	0.91	34.2
11	Nov-20	112	85	3.2	1.3	26.5
12	Dec-20	16	85	2.9	0.18	29
<b>Total</b>		<b>3744</b>	<b>1985</b>	<b>51</b>	<b>12.85</b>	<b>327.39</b>

**Observation:-**

- ✚ DG sets are used whenever grid power failure.
- ✚ Both DG sets kWh/litre is lower side. Which should be within range 3 to 4 kWh/litre.

  
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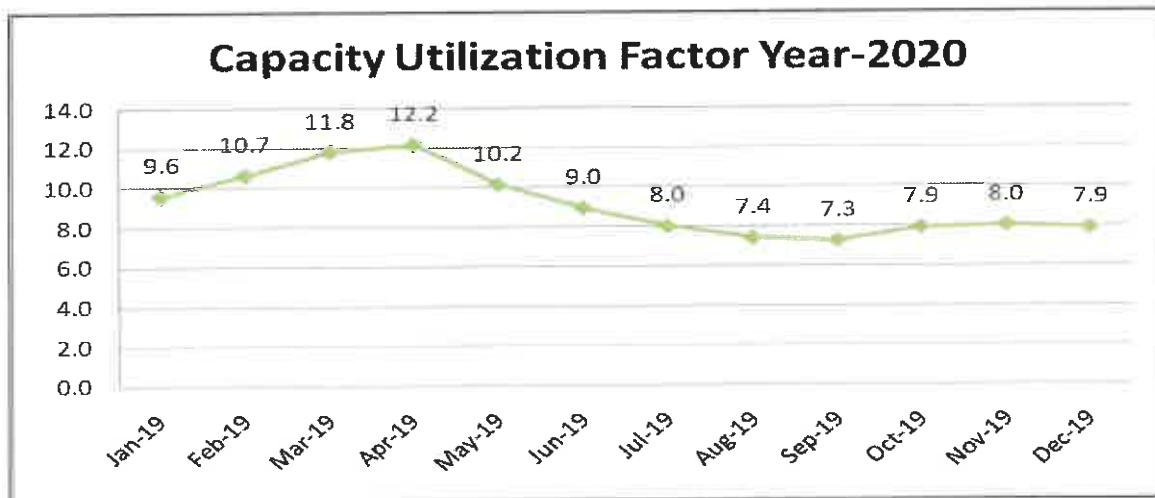


**iii. GRID CONNECTED SOLAR PHOTOVOLTAIC SYSTEM  
(20 KWp)**

Sr. No	Parameter	Technical Details
1	Make	Tata Power Solar System Ltd.
2	Solar Capacity	20 KWp
3	System Type	On Grid Type
4	No. of Solar Modules	88Nos.
5	Solar Modules Watts	250 Watts

**Solar unit generation Year-2020:- Monthly Solar unit generation Year-2020**

Sr. No.	Month & Year	Solar Unit Generation (KWp)	No of Days	Capacity Utilization Factor (CUF)%
1	Jan-19	2,498	31	9.6
2	Feb-19	2,507	28	10.7
3	Mar-19	3,073	31	11.8
4	Apr-19	3,073	30	12.2
5	May-19	2,644	31	10.2
6	Jun-19	2,259	30	9.0
7	Jul-19	2,088	31	8.0
8	Aug-19	1,932	31	7.4
9	Sep-19	1,834	30	7.3
10	Oct-19	2,068	31	7.9
11	Nov-19	2,028	30	8.0
12	Dec-19	2,061	31	7.9
<b>Total</b>		<b>28,065</b>	<b>365</b>	<b>9.2</b>



**Observation: -** Total unit generation from Jan-2020 to Dec -2020 is 28,065 (KWp) um

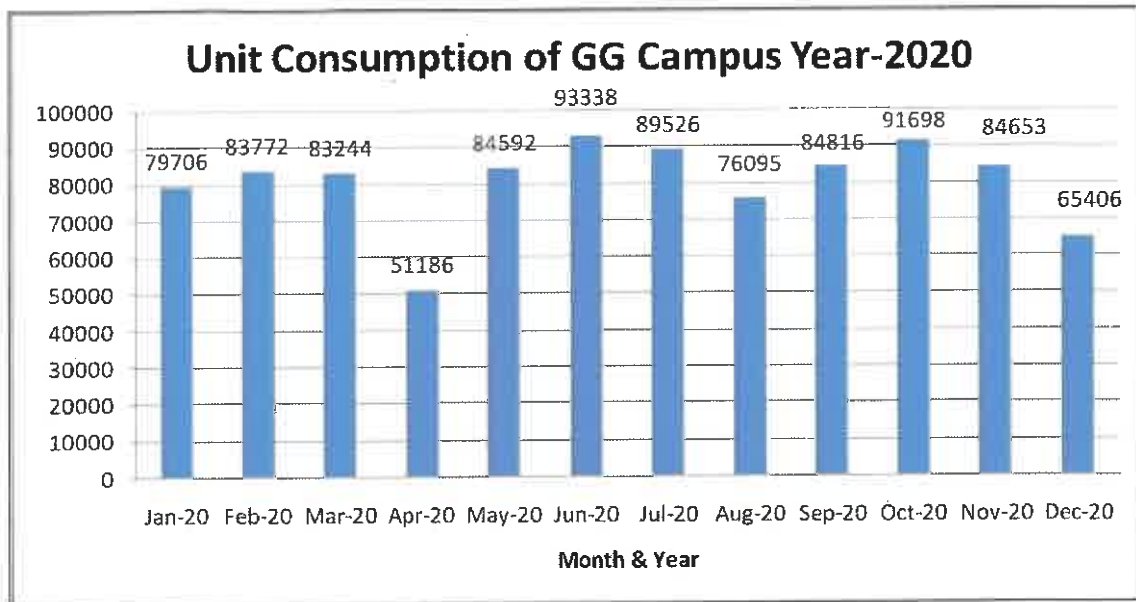
  
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## ENERGY CONSUMPTION ANALYSIS

Energy audit team was analysed Electricity bills of last one year- 2020(GG Campus)

Electricity Meter reading at GG Campus for Jan-2020 to Dec-2020									
Sr. No.	Month & Year	UAS	ALC	FDS	FMC	FHMCT	FPH	Street Light	Total(kWh)
1	Jan-20	2,402	37,390	19,336	7,674	7,546	4,063	1,295	79,706
2	Feb-20	3,051	37,600	22,094	7,373	8,346	4,182	1,126	83,772
3	Mar-20	3,269	41,192	17,970	6,757	8,812	3,911	1,333	83,244
4	Apr-20	1,004	16,730	21,394	3,580	5,702	2,223	553	51,186
5	May-20	3,510	28,633	35,480	4,590	8,527	3,326	526	84,592
6	Jun-20	4,020	30,366	42,128	5,233	7,692	3,096	803	93,338
7	Jul-20	2,548	29,364	42,365	5,142	6,331	2,422	1,354	89,526
8	Aug-20	1,857	23,732	35,731	5,173	5,690	2,734	1,178	76,095
9	Sep-20	2,182	24,970	42,410	5,420	5,751	2,681	1,402	84,816
10	Oct-20	2,073	28,332	46,021	5,877	5,264	2,695	1,436	91,698
11	Nov-20	1,789	24,922	42,216	5,609	5,710	3,014	1,393	84,653
12	Dec-20	1,620	2,468	45,013	6,410	4,985	3,446	1,464	65,406

  
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Graphical presentation of Energy consumption of GG campus.

**Observation**

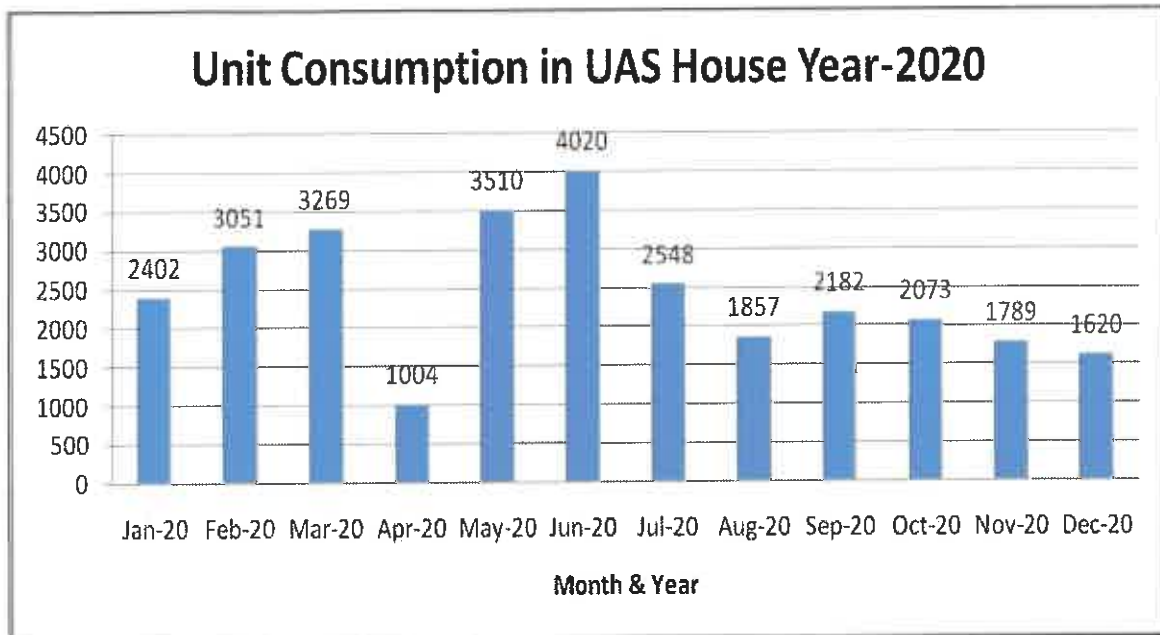
- ✚ Total energy consumption of the GG Campus is 9,68,032 units during period Jan-2020 to Dec-2020.
- ✚ University has a sub meter for every building in GG Campus

**Recommendation:-**

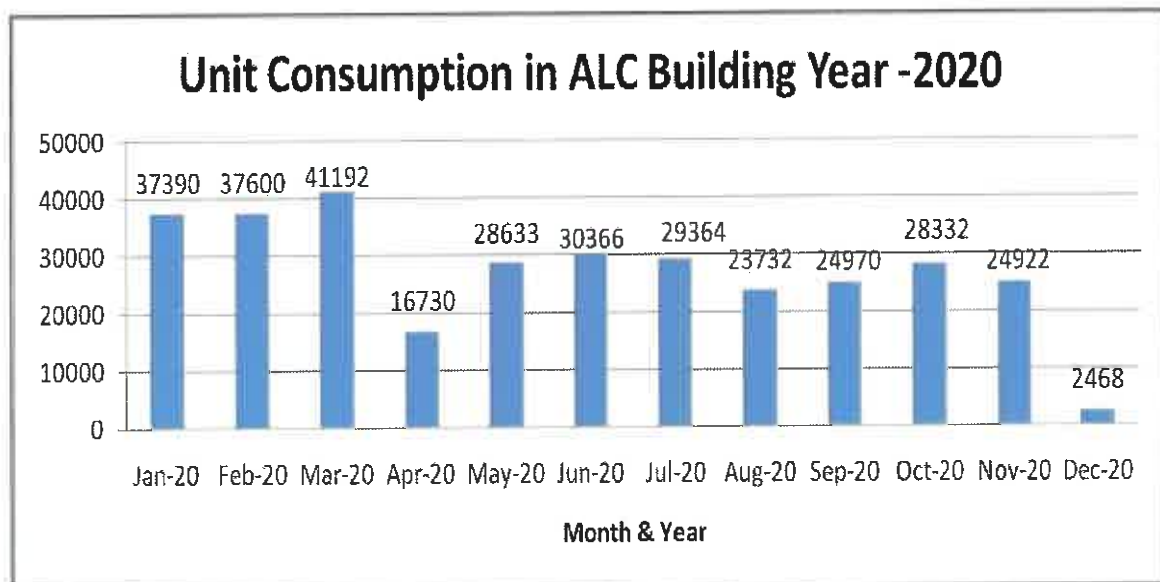
- ✚ Installation of “Cloud based (IoT based) energy monitoring system” including harmonic measurement (total voltage and current harmonic distortion %) every building. It will be good initiative for energy monitoring by university side.

  
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Graphical Presentation of all building unit consumptions is below



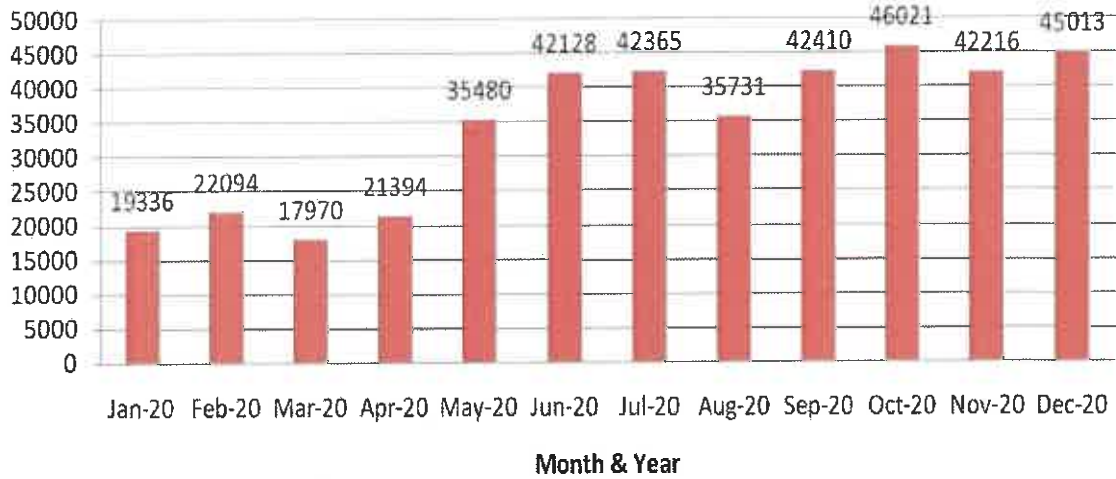
Graphical presentation of energy consumption UAS house year-2020



Graphical presentation of energy consumption ALC building year-2020

  
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### Unit Consumption in FDS Building Year -2020



Graphical presentation of energy consumption FDS building year-2020

### Unit Consumption FMC Building Year-2020

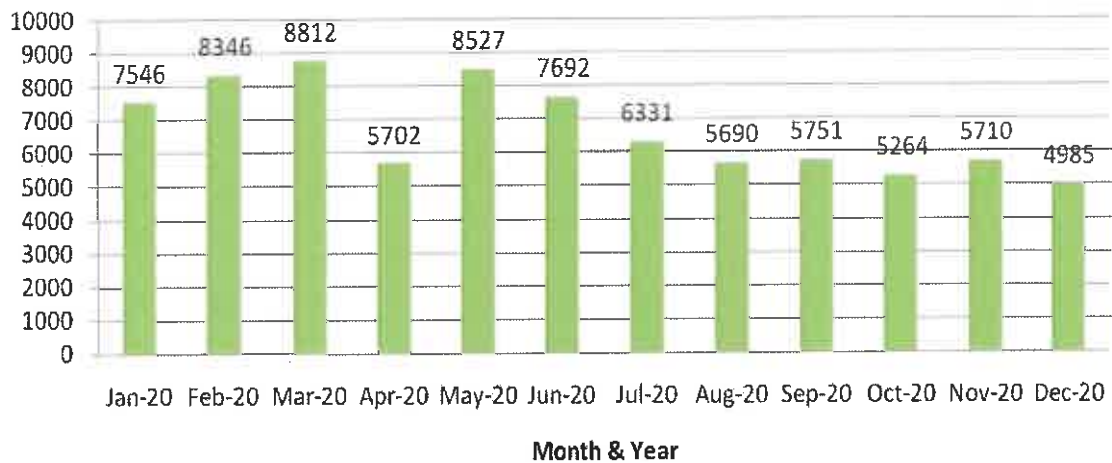


Graphical presentation of energy consumption FMC building year-2020

  
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### Unit Consumption FHMCT Buolding Year -2020



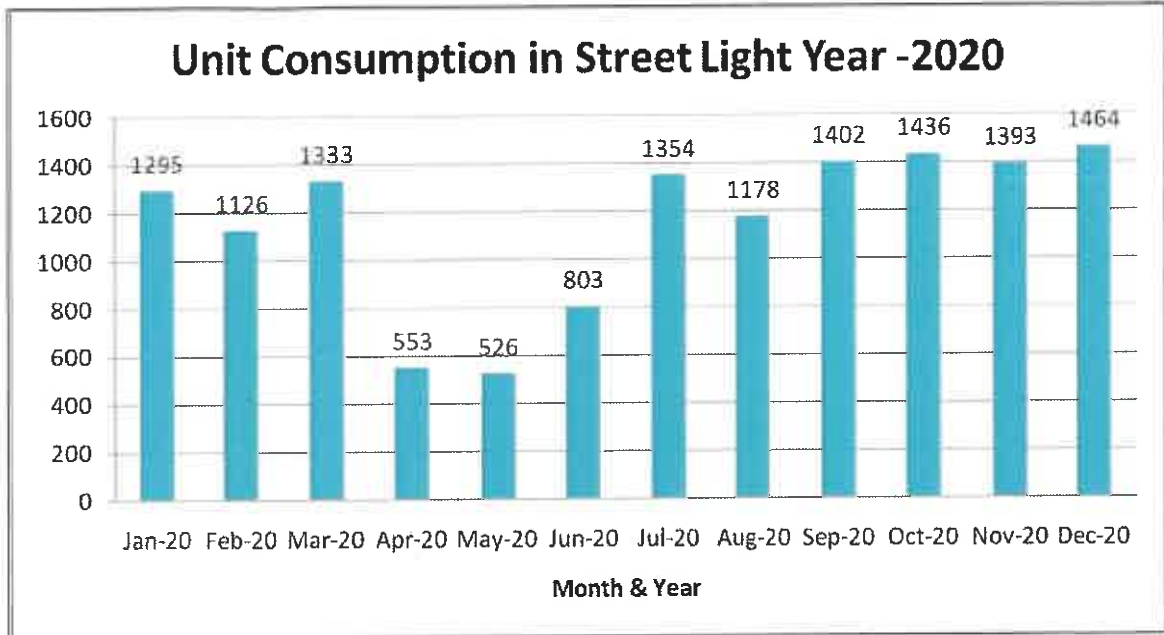
Graphical presentation of energy consumption FHMTTC building year-2020

### Unit Consumption in FPH Building Year -2020



Graphical presentation of energy consumption FPH building year-2020

  
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Graphical presentation of energy consumption of street light year-2020

  
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## CONNECTED LOAD SYSTEM

### 5.1 Lighting Details of the GG Campus are as below

UAS HOUSE													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Groun d floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED pannel light	0	0	0	0	36	0	57	13	83	0	0	153
2	4 Feet LED batten light	0	0	18	0	0	0	20	0	31	0	0	51
3	1' X 1' LED lights	0	0	0	0	0	0	0	0	0	0	0	0

FDS													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Groun d floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel light	0	0	0	0	36	0	84	68	65	0	0	217
2	4 Feet LED batten light	0	0	18	0	0	0	2	0	0	3	0	2
3	1' X 1' LED lights	0	0	0	20	0	0	13	3	1	10	0	27

Faculty of Pharmacy													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Groun d floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel light	0	0	0	0	0	0	0	0	0	0	0	0
2	4 Feet LED batten light	0	0	18	0	0	0	28	75	31	0	0	134
3	1' X 1' LED lights	0	0	0	0	0	0	0	0	0	0	0	0
4	LED lights	0	0	0	0	0	0	0	0	0	0	0	0
5	LED lights	0	0	0	0	0	0	0	0	0	0	0	0

  
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Faculty of Hospitality Management & Catering technology													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Basement	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel light	0	0	0	0	36 W	0	0	0	0	0	0	0
2	4 Feet LED batten light	0	0	18 W	0	0	20	13	13	4	0	0	30
3	1' X 1' LED lights	0	0	0	0	0	0	32	16	22	0	0	70
4	LED lights	0	0	0	0	0	0	0	0	0	0	0	0
5	LED lights	0	0	0	0	0	0	0	0	0	0	0	0

A/C Details of GG Campus are as below:-

FDS A/C DETAILS					
Sr.No	Description	Make	Qty	TR	LOCATION
1	2 TR SPLIT A/C	LG	2	2	CC Lab
2	2 TR SPLIT A/C	LG	1	2	Dr. Latha Cabin
3	2 TR Cassette A/C	Blue star	2	2	Board Room 3rd floor
4	1 TR SPLIT A/C	Carrier	1	1	Seminar room
5	2 TR Cassette A/C	Midea	2	2	Aesthetic Department
6	1 TR SPLIT A/C	Carrier	1	1	Dean Office
7	1 TR SPLIT A/C	LG	1	1	OBG
8	1.5 TR SPLIT A/C	Carrier	1	1.5	OBG
9	1 TR SPLIT A/C	Carrier	1	1	Administrative Registrar
Total No of AC			12		

Faculty of Pharmacy A/C DETAILS					
Sr. No	Description	Make	Qty	TR	LOCATION
1	2 TR Cassette A/C	Midea	1	2	G01 Class room
2	1 TR SPLIT A/C	LLOYD	1	1	FLAHS Dean room
3	2 TR SPLIT A/C	LG	1	2	Instrumentation lab
4	2 TR SPLIT A/C	Blue Star	2	2	BT Lab 2nd floor
Total No of AC			5		

  
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Faculty of Pharmacy A/C DETAILS					
Sr. No	Description	Make	Qty	TR	LOCATION
1	2 TR SPLIT A/C	Carrier	1	2	Dean Cabin
2	2 TR SPLIT A/C	LG	1	2	Bio- Technology Lab
3	2 TR SPLIT A/C	LG	1	2	Instrumentation lab
4	2 TR SPLIT A/C	Blue Star	2	2	Computer Lab
5	2 TR SPLIT A/C	LG	2	2	Seminar Hall
6	2 TR SPLIT A/C	LG	1	2	Instrument lab
7	2.5 TR SPLIT A/C	Blue Star	1	2.5	PG Computer lab
8	1.5 TR Window A/C	LG	2	2	Confrence Room (E Library)
9	2 TR SPLIT A/C	Blue Star	1	2	Bio- Technology Lab
	<b>Total No of AC</b>		<b>12</b>		

UAS HOUSE A/C DETAILS					
Sr. No	Description	Make	Qty	TR	LOCATION
1	1.5 TR SPLIT A/C	Carrier	1	2	Accounts department (GF)
2	1.5 TR SPLIT A/C	LLOYD	1	2	SPWCA department (GF)
3	2 TR Cassette A/C	LG	2	2	Vice Chancellor office
4	1.5 TR SPLIT A/C	Carrier	1	2	VC' office Dining area
5	2 TR SPLIT A/C	LG	1	2	VC' office Dining area
6	2 TR Cassette A/C	Midea	1	2	VC's Reception
7	2 TR Cassette A/C	Carrier	2	2	VC'S board room
8	2 TR Cassette A/C with 4 star invertors	LG	2	2	Registrar office
9	2 TR SPLIT A/C	LG	1	2	Chief Manager ICT
10	2 TR Cassette A/C	Carrier	2	2	Pro Vice Chancellor office (Research)
11	2 TR SPLIT A/C		1	2	Director Research
12	2 TR Cassette A/C	Carrier	2	2	Research Department
13	2 TR Cassette A/C	Carrier	2	2	Pro Vice Chancellor office (Health Sciences)
14	1.5 TR SPLIT A/C	Carrier	1	2	University Secretariat
15	2 TR SPLIT A/C	Blue Star	1	2	University Secretariat
16	2 TR Cassette A/C	Carrier	2	2	Meeting Hall
17	2 TR SPLIT A/C	Carrier	1	2	HR Manager
18	2 TR Cassette A/C	Carrier	1	2	Pro Vice Chancellor office (Social sciences)

19	8.5 TR Duct A/C	Blue Star	1	9	S18
20	5.5 TR Duct A/C	Blue Star	1	6	S18
21	2 TR Cassette A/C	Mitsubishi	4	2	Board Room S19
22	2 TR SPLIT A/C	Blue Star	1	2	Purchase office
23	2 TR SPLIT A/C	Blue Star	1	2	Ideology department
	<b>Total No of AC</b>		<b>33</b>		

<b>Faculty of Pharmacy A/C DETAILS</b>					
<b>Sr. No</b>	<b>Description</b>	<b>Make</b>	<b>Qty</b>	<b>TR</b>	<b>LOCATION</b>
1	1 TR SPLIT A/C	Blue Star	1	1	FBP Faculty room
	<b>Total No of AC</b>		<b>1</b>		

  
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ADVANCED LEARNING CENTER A/C DETAILS						
Sr No	Description	Qty	TR	M/C Serial No	LOCATION	USAGE PER WEEK
1	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180020 00	SIMULATION ROOM - ICU 24	3 DAYS
2	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	SEMINAR ROOM 20	3 DAYS
3	8.5 TR DUCATAB LE	1	8.5	5000967311180030 00	RESEARCH ROOM (CRC Staff room)	7 DAYS
4	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	SIMULATION ROOM	4 DAYS
5	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	DRY BONE LAB	3 DAYS
6	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	CADAVER WORK SHOP	3 DAYS
7	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	SKILLED LAB	5 DAYS
8	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	STORAGE – COLD	7 DAYS
9	8.5 TR DUCATAB LE SPLIT	1	8.5	5000967311180030 00	CADAVER WORK SHOP	3 DAYS
10	5.5 TR DUCTABL E	1	5.5	5001829391180020 00	MADICINE – CRC	7 DAYS
11	5.5 TR DUCTABL E	1	5.5	5001829391180020 00	TISSUE BANK	7 DAYS
12	5.5 TR DUCTABL E	1	5.5	5001829391180020 00	TISSUE BANK	7 DAYS
13	2.0 TR SPLIT A/C	1	2	5002111937118000 000	MINOR OT	2 DAYS
14	1.5 TR SPLIT A/C	1	1.5	5001709331180210 00	CONFERENCE	3 DAYS
15	1.5 TR SPLIT A/C	1	1.5	5001709331180210 00	CONFERENCE	3 DAYS

  
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Sr. No	Description	Qty	TR	M/C Serial No	LOCATION	USAGE PER WEEK
16	1.5 TR SPLIT A/C	1	1.5	500170933118021000	SERVER ROOM	7 DAYS
17	1.5 TR SPLIT A/C	1	1.5	500198114118008000	SIMULATION LAB-2 29	4 DAYS
18	1.0 TR SPLIT A/C	1	1	NOT VISIBLE	SHAKUNTALA CABIN	7 DAYS
19	1.0 TR SPLIT A/C	1	1	NOT VISIBLE	SHAKUNTALA CABIN SIDE	3 DAYS
20	2.0 TR CASSETE SPLIT	1	2	500150312118000000	SUNDRESH CABIN	-
21	2.0 TR CASSETE SPLIT	1	2	500150312118000000	SUNDRESH CABIN SIDE	1 OR 2 DAYS
	<b>Total</b>	<b>21</b>				

### Street light details of GG campus:-

There are total 25 Nos. of LED in the GG Campus Details are as Follow  
(100 W LED = 17 No's, 50W LED = 8 No's)

UAS HOUSE				
Sr. No	Item Description	100W	50W	Total
1	Street light LED	100W		8
	<b>Total</b>			<b>8</b>

FDS				
Sr. No	Item Description	100W	50W	Total
1	Street light LED	100W		3
2	Street light LED		50W	3
	<b>Total</b>			<b>6</b>

Faculty of Pharmacy				
Sr. No	Item Description	100W	50W	Total
1	Street light LED	100W		4
	<b>Total</b>			<b>4</b>

  
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DG Yard				
Sr. No	Item Description	100W	50W	Total
1	Street light LED		50W	5
	<b>Total</b>			<b>5</b>

Faculty of Hospitality Management & Catering technology				
Sr. No	Item Description	100W	50W	Total
1	Street light LED	100W		2
	<b>Total</b>			<b>2</b>

## Part-02 (Ramaiah Technology Campus)

### POWER SUPPLY SYSTEM

There are two main electricity connections one is 750 KVA (M/S MSR & SONS INVESTMENTS LTD.) and second is 200 KVA (M/S Brindavan Alloys Limited). This campus has one transformer details are below


Sr. No.	Items	Technical Details Transformer (TR)
1	Make	(KPRS) Kiran Power Rectification Services (P) Ltd.
2	Location	Ramaiah Technology Campus
3	Year	2010
4	Rating (KVA)	1000
5	Voltage (HV/ LV)	11000/433
6	Current Rating (HV/ LV)	52.24/1391.20
7	Frequency (Hz)	50
8	Impedance at 75°C	5.48 %
9	Vector group	Dyn-11
10	Type of cooling	ONAN

### DG Sets

The GG Campus has 03 Nos. DG sets one is 100 KVA for workshop block and 2 is 250 KVA respectively for main buildings to supply emergency power during the grid power failure.

### Grid Connected Solar Photovoltaic System (35 KWp)

There is a 35 KWp solar photovoltaic rooftop grid-connected system installed on various buildings. System details are given below:

  
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### *Solar plant detailed*

Sr. No	Parameter	Technical Details
1	Make	Tata Power Solar
2	Solar Capacity	35 KWp
3	Type	On Grid Type
4	Nos. of PV Modules	66Nos.
5	Solar Inverter	30 KWp (Goodwe)

### **UPS System**

Sr.No.	Location	KVA
1	Incubation Centre	40
2	A Block	160
3	B Block	120
4	C & D Block	80
5	Workshop Block	35
6	Techno Centre Block	20
	<b>Total</b>	<b>455</b>

  
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## ELECTRICITY BILL ANALYSIS BILL ANALYSIS OF 200 KVA CONNECTIONS.

Energy audit team was analysed Electricity bills of last one year- 2020 (Ramaiah Technology Campus).

Sr. No.	Month & Year	Contract Demand (KVA)	Fixed Demand (KVA)	Maximum Demand (KVA)
1	Jan-20	200	170	35
2	Feb-20	200	170	54
3	Mar-20	200	170	47
4	Apr-20	200	170	6
5	May-20	200	170	20
6	Jun-20	200	170	20
7	Jul-20	200	170	11
8	Aug-20	200	170	17
9	Sep-20	200	170	13
10	Oct-20	200	170	16
11	Nov-20	200	170	15
12	Dec-20	200	170	14
	<b>Minimum Demand (KVA)</b>			<b>6</b>
	<b>Maximum Demand (KVA)</b>			<b>54</b>
	<b>Average Demand (KVA)</b>			<b>22.33</b>

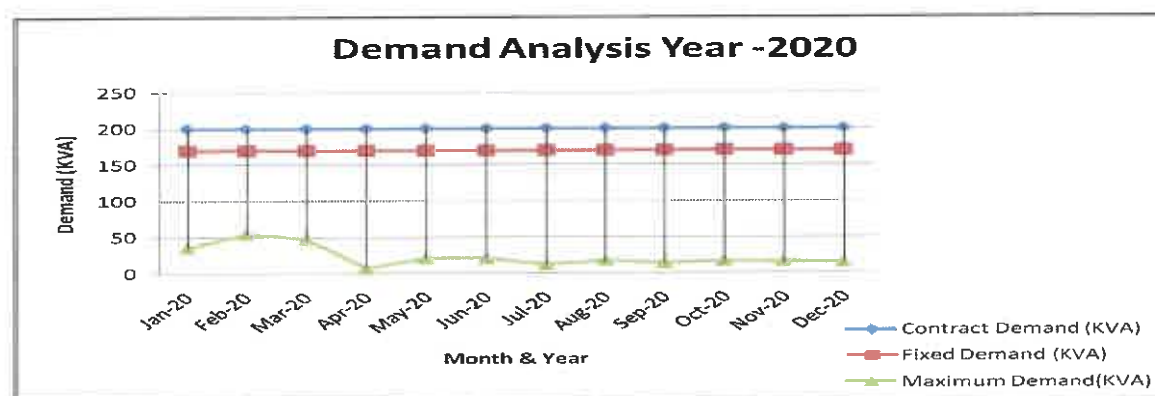


Figure: - Graphical Presentation of Demand analysis year-2020

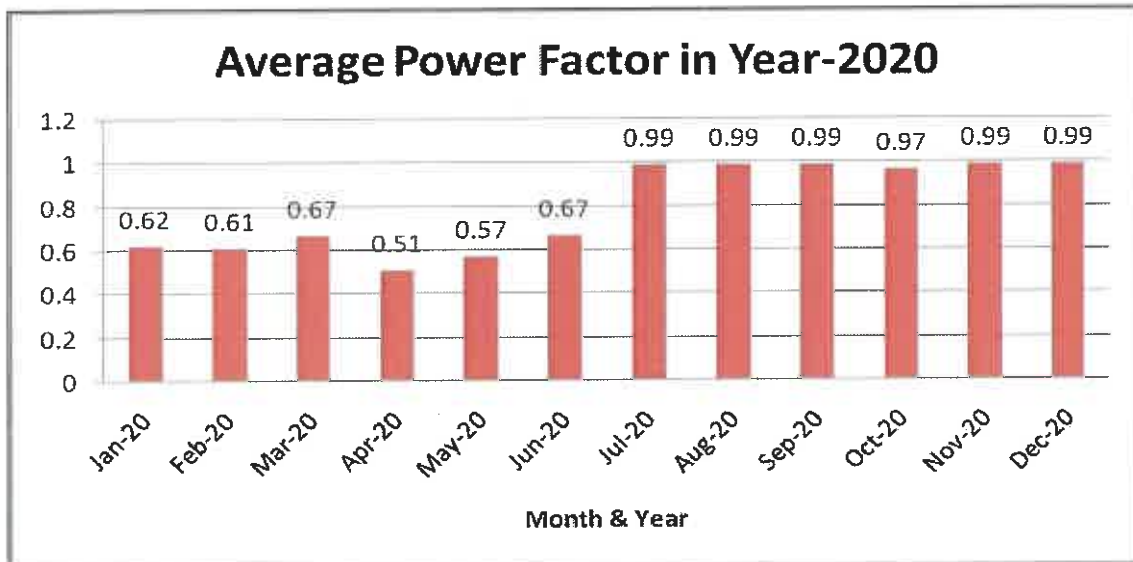
### Observation:

It was observed that the contract demand of the campus is 200 KVA. There is a variation in maximum demand. It is a maximum of 54 KVA in the Month of Feb -2020 and a minimum of 6 KVA in Apr – 2020

  
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Monthly Power factor analysis Year-2020

Sr. No.	Month & Year	Power Factor
1	Jan-20	0.62
2	Feb-20	0.61
3	Mar-20	0.67
4	Apr-20	0.51
5	May-20	0.57
6	Jun-20	0.67
7	Jul-20	0.99
8	Aug-20	0.99
9	Sep-20	0.99
10	Oct-20	0.97
11	Nov-20	0.99
12	Dec-20	0.99
<b>Total</b>		<b>0.80</b>



*Figure Graphical presentation of average power factor year 2020*

**Observation:**

The average power factor was 0.80 form Jan -2020 to Dec -2020. It is recommended to maintain power factor unity or 0.995

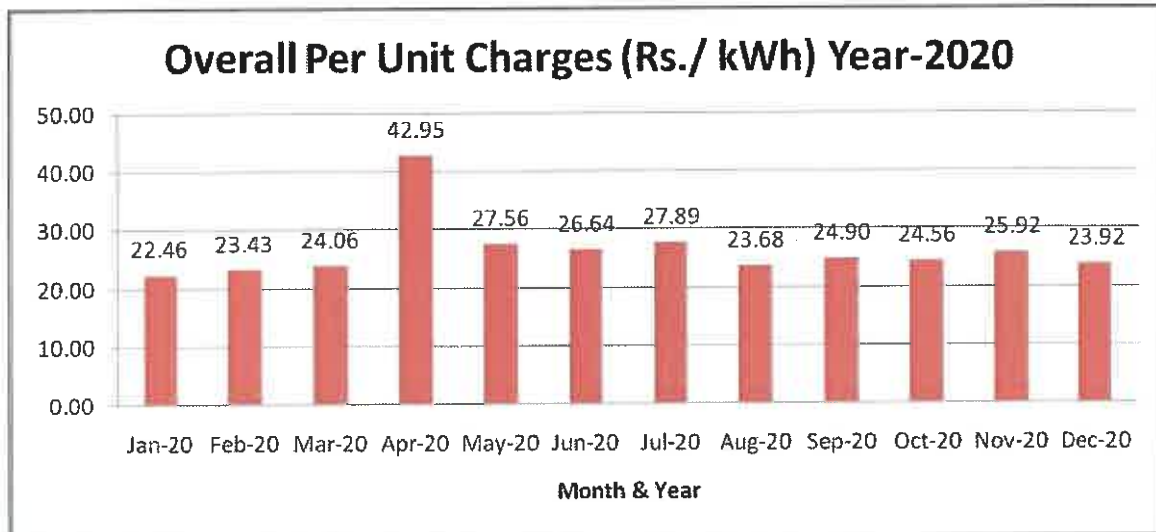
  
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## Monthly electrical energy consumption 2020

The monthly electrical consumption for the university is given in the table.

Sr. No.	Month & Year	Unit Consumption (kWh)	Amount (Rs.)	Overall per unit charges (Rs. / kWh)
1	Jan-20	3,500	78,603	22.46
2	Feb-20	3,250	76,133	23.43
3	Mar-20	3,170	76,280	24.06
4	Apr-20	1,300	55,831	42.95
5	May-20	2,410	66,430	27.56
6	Jun-20	2,540	67,667	26.64
7	Jul-20	2,290	63,877	27.89
8	Aug-20	2,980	70,575	23.68
9	Sep-20	2,750	68,485	24.90
10	Oct-20	2,810	69,017	24.56
11	Nov-20	2,690	69,716	25.92
12	Dec-20	3,090	73,916	23.92
<b>Total</b>		<b>32,780</b>	<b>8,36,530</b>	<b>26.50</b>



*Figure: - Graphical presentation of actual per-unit charges for the year -2020*

### Observation:

It was found that total energy consumption in the last one year was 32,780 units. The average annual energy charge is Rs 26.50 /kWh. It is higher side due to demand not utilized.

  
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**BILL ANALYSIS OF 750 KVA KVA CONNECTIONS.**

Energy audit team was analysed Electricity bills of last one year- 2020(Ramaiah Technology Campus).The details of sanctioned load 750 KVA are as below

Sr. No.	Month & Year	Contract Demand (KVA)	Fixed Demand (KVA)	Maximum Demand (KVA)
1	Jan-20	750	638	297
2	Feb-20	750	638	315
3	Mar-20	750	638	309
4	Apr-20	750	638	172
5	May-20	750	638	241
6	Jun-20	750	638	249
7	Jul-20	750	638	196
8	Aug-20	750	638	236
9	Sep-20	750	638	209
10	Oct-20	750	638	218
11	Nov-20	750	638	222
12	Dec-20	750	638	206
	<b>Minimum Demand (KVA)</b>			<b>172</b>
	<b>Maximum Demand (KVA)</b>			<b>315</b>
	<b>Average Demand (KVA)</b>			<b>239.17</b>

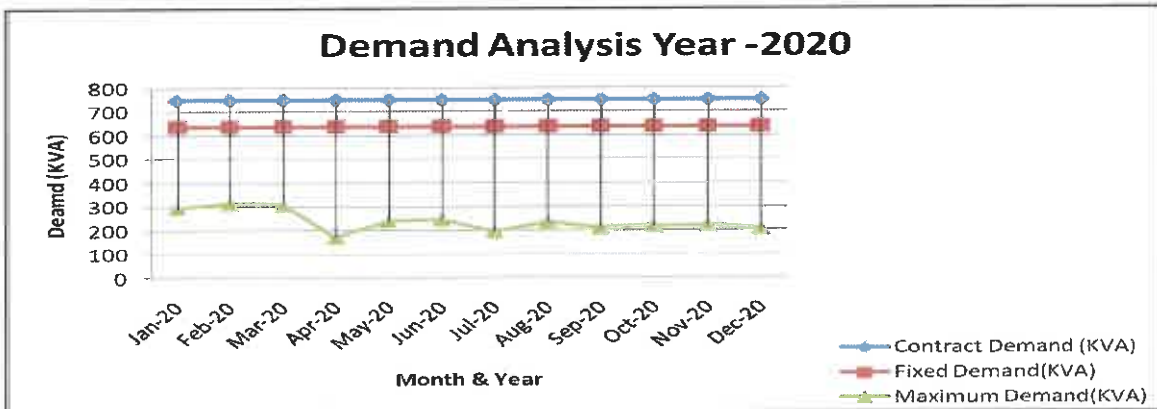


Figure: - Graphical Presentation of Demand analysis year-2020

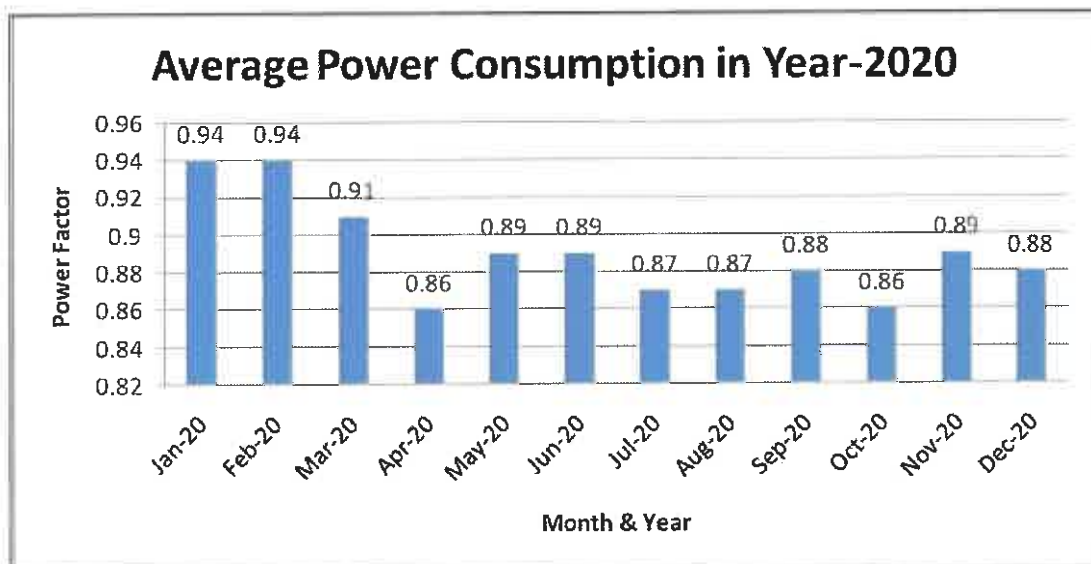
**Observation:**

It was observed that the contract demand of the campus is 750 KVA. There is a variation in maximum demand. It is a maximum of 315KVA in the Month of Feb -2020 and a minimum of 172 KVA Apr – 2020

  
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### Monthly Power factor analysis Year-2020

Sr. No.	Month & Year	Power Factor
1	Jan-20	0.94
2	Feb-20	0.94
3	Mar-20	0.91
4	Apr-20	0.86
5	May-20	0.89
6	Jun-20	0.89
7	Jul-20	0.87
8	Aug-20	0.87
9	Sep-20	0.88
10	Oct-20	0.86
11	Nov-20	0.89
12	Dec-20	0.88
<b>Total</b>		<b>0.89</b>



*Figure Graphical presentation of average power factor year 2020*

#### Observation:

The average power factor was 0.89 form Jan -2020 to Dec -2020. It is recommended to maintain power factor unity or 0.995

  
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## Monthly electrical energy consumption 2020

The monthly electrical consumption for the Campus is given in the table.

Sr. No.	Month & Year	Unit Consumption (kWh)	Amount (Rs.)	Overall per unit charges (Rs. / kWh)
1	Jan-20	91,920	10,80,502/-	11.75
2	Feb-20	94,720	11,00,712/-	11.62
3	Mar-20	93,890	10,98,902/-	11.70
4	Apr-20	41,360	5,66,030/-	13.69
5	May-20	50,720	6,47,588/-	12.77
6	Jun-20	62,240	7,73,176/-	12.42
7	Jul-20	51,360	6,69,040/-	13.03
8	Aug-20	54,230	6,95,982/-	12.83
9	Sep-20	54,120	6,97,097/-	12.88
10	Oct-20	55,328	6,87,210/-	12.42
11	Nov-20	56,000	7,20,378/-	12.86
12	Dec-20	59,000	7,50,773/-	12.72
<b>Total</b>		<b>7,64,888</b>	<b>94,87,390/-</b>	<b>12.56</b>

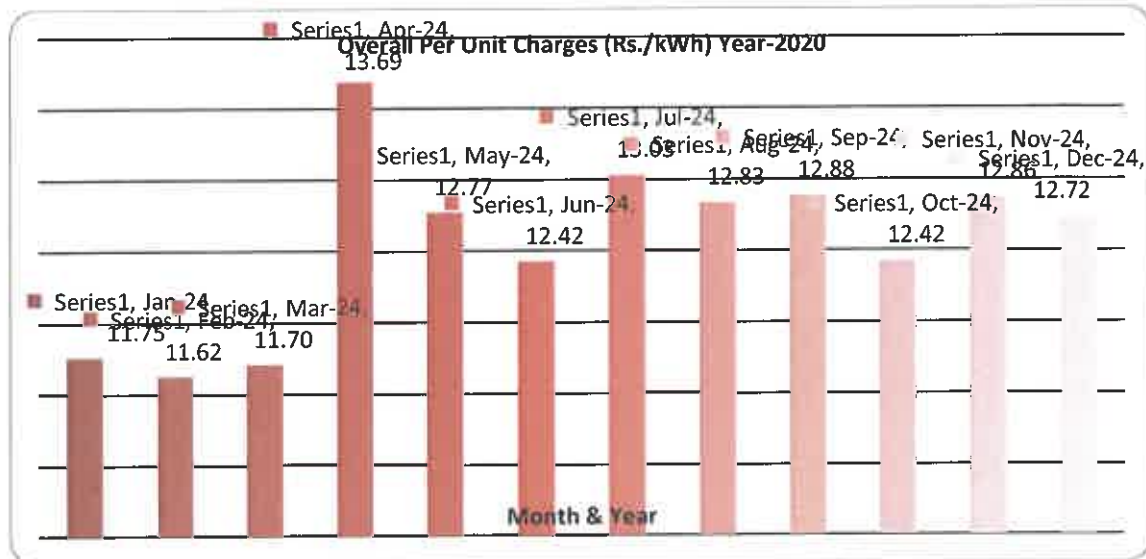


Figure: - Graphical presentation of actual per-unit charges for the year -2020

### Observation:

It was found that total energy consumption in the last one year months was 7,64,888 units. The average annual energy charge is Rs 12.56 /kWh. It is higher side due to demand not utilized.

  
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## IV. Water Audit

A water audit stands out as a crucial management tool, effectively minimizing losses, optimizing diverse uses, and promoting significant water conservation. The campus's unwavering commitment to efficient water usage and management is evident through various initiatives, ensuring satisfaction and eliminating unnecessary water wastage.

Throughout the survey, no instances of water wastage were observed. The expansive open grounds, adorned with abundant greenery, play a vital role in water percolation, eliminating barren areas. The campus is equipped with a functional rainwater harvesting unit that efficiently utilizes collected water for various campus needs. Additionally, all wastewater generated within the campus undergoes treatment in a fully operational Sewage Treatment Plant, and the treated water finds reuse for gardening purposes within the university. This comprehensive approach underscores the campus's dedication to responsible water management and sustainability.

### i. Water Conservation

<b>Control Objective</b>	<b>Control (s)</b>	<b>Compliances (Please answer Yes/No). If Yes please explain the process and procedure.</b>
To maximise the proportion of water that is stored and recycled and minimise the quantity of non-recyclable refuse	List the uses of water in your Institute	Gardening, Flushing, Washing hands and Utensils, Cleaning , Laboratories, Cooking, Drinking
To maximise the proportion of water that is stored and recycled and minimise the quantity of non-recyclable refuse	Water is stored in your Institute. Water saving techniques are followed in your Institute.	Tanks & Sumps, Urinal Sensors, Water level controller, Ball walls and sensors
To maximise the proportion of water that is stored and	Water wastage is prevented or stopped in the Institute.	1 Plumbers/ campus are appointed. They are available on Speed Dial. If any complaints on

recycled and minimise the quantity of non-recyclable refuse		leakage, blockage, and overflow is raised, they immediately attend to the complaint and maintain records. Automatic controller is employed to prevent over flooding of the water in the tank 2
To maximise the proportion of water that is stored and recycled and minimise the quantity of non-recyclable refuse	Locate the entry and exit point of water in your Institute.	<b>GG Campus:</b> Gate no. 5 -Entry Gate no.5 –Exit <b>Peenya Campus:</b> Gate no.2- Entry Gate no. 5: Exit
To maximise the proportion of water that is stored and recycled and minimise the quantity of non-recyclable refuse	List the ways that could reduce the amount of water used in the Institute.	The recycled water from STP is used for flushing of toilets and for Gardening purposes An aquarium with natural cleaning technology is proposed
To maximise the proportion of water that is stored and recycled and minimise the quantity of non-recyclable refuse	Is rain water harvesting carried out in the Institute.	Yes. 2 RWH points per campus Peenya: 1,50,000 litres capacity
To maximise the proportion of water that is stored and recycled and minimise the quantity of non-recyclable refuse	Is there a water recycling system in the Institute.	YES. STP- (450kld)- GG campus STP-(50kld)- Peenya STP unit of 40,000 litres per day capacity is used for treating the water and for re-use in the toilets flushing and for the gardening purpose.

  
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**ii. Water consumption record for the past 6 months.**

Please provide details in the below table format. Also, please provide water bills for past 6 months.

Month: JANUARY 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	165316	165342	26	26	
2	165342	165374	32	58	
3	165374	165397	23	81	
4	165397	165418	21	102	
5	165418	165441	23	125	
6	165441	165472	31	156	
7	165472	165497	25	181	
8	165497	165518	21	202	
9	165518	165540	22	224	
10	165540	165571	31	255	
11	165571	165594	23	278	
12	165594	165614	20	298	
13	165614	165640	26	324	
14	165640	165681	41	365	
15	165681	165699	18	383	
16	165699	165710	11	394	
17	165710	165734	24	418	
18	165734	165763	29	447	
19	165763	165795	32	479	
20	165795	165818	23	502	
21	165818	165836	18	520	
22	165836	165864	28	548	
23	165864	165891	27	575	
24	165891	165910	19	594	
25	165910	165931	21	615	
26	165931	165958	27	642	
27	165958	165987	29	671	
28	165987	166108	121	792	
29	166108	166133	25	817	
30	166133	166159	26	843	
31	166159	166180	21	864	

  
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Month: FEBRUARY 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	166180	166199	19	19	
2	166199	166220	21	40	
3	166220	166253	33	73	
4	166253	166282	29	102	
5	166282	166297	15	117	
6	166297	166314	17	134	
7	166314	166333	19	153	
8	166333	166371	38	191	
9	166371	166394	23	214	
10	166394	166411	17	231	
11	166411	166453	42	273	
12	166453	166484	31	304	
13	166484	166499	15	319	
14	166499	166513	14	333	
15	166513	166542	29	362	
16	166542	166584	42	404	
17	166584	166597	13	417	
18	166597	166614	17	434	
19	166614	166640	26	460	
20	166640	166677	37	497	
21	166677	166698	21	518	
22	166698	166711	13	531	
23	166711	166732	21	552	
24	166732	166760	28	580	
25	166760	166791	31	611	
26	166791	166811	20	631	
27	166811	166821	10	641	
28	166821	166852	31	672	

Month: MARCH 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	166852	166894	42	42	
2	166894	166920	26	68	
3	166920	166951	31	99	
4	166951	166982	31	130	
5	166982	166997	15	145	
6	166997	167104	107	252	

  
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7	167104	167119	15	267	
8	167119	167139	20	287	
9	167139	167164	25	312	
10	167164	167196	32	344	
11	167196	167217	21	365	
12	167217	167244	27	392	
13	167244	167276	32	424	
14	167276	167298	22	446	
15	167298	167315	17	463	
16	167315	167340	25	488	
17	167340	167377	37	525	
18	167377	167397	20	545	
19	167397	167417	20	565	
20	167417	167445	28	593	
21	167445	167472	27	620	
22	167472	167495	23	643	
23	167495	167517	22	665	
24	167517	167540	23	688	
25	167540	167581	41	729	
26	167581	167597	16	745	
27	167597	167620	23	768	
28	167620	167651	31	799	
29	167651	167684	33	832	
30	167684	167710	26	858	
31	167710	167734	24	882	

Month: APRIL 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	167734	167767	33	33	
2	167767	167794	27	60	
3	167794	167813	19	79	
4	167813	167840	27	106	
5	167840	167879	39	145	
6	167879	167894	15	160	
7	167894	167923	29	189	
8	167923	167950	27	216	
9	167950	167986	36	252	
10	167986	167993	7	259	
11	0		0		

12	0		0		
13	0		0		
14	0		0		
15	0		0	LOCKDOWN	
16	0		0		
17	0		0		
18	0		0		
19	0		0		
20	0		0		
21	0		0		
22	0		0		
23	0		0		
24	0		0		
25	0		0		
26	0		0		
27	0		0		
28	0		0		
29	0		0		
30	0		0		
31	0		0		

Month: MAY 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	0		0		
2	0		0		
3	0		0		
4	0		0		
5	0		0	LOCKDOWN	
6	0		0		
7	0		0		
8	0		0		
9	0		0		
10	0		0		
11	0		0		
12	0		0		
13	0		0		
14	0		0		
15	0		0		

16	0		0		
17	0		0		
18	0		0		
19	0		0		
20	0		0		
21	0		0		
22	0		0		
23	0		0		
24	0		0		
25	0		0		
26	0		0		
27	0		0		
28	0		0		
29	0		0		
30	0		0		
31	0		0		

Month: JUNE 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	0		0		
2	0		0		
3	0		0	LOCKDOWN	
4	0		0		
5	0		0		
6	0		0		
7	0		0		
8	0		0		
9	0		0		
10	0		0		
11	0		0		
12	0		0		
13	0		0		
14	0		0		
15	0		0		
16	0		0		
17	0		0		
18	0		0		
19	0		0		

20	0		0		
21	0		0		
22	0		0		
23	0		0		
24	0		0		
25	0		0		
26	0		0		
27	0		0		
28	0		0		
29	0		0		
30	0		0		
31	0		0		

Month: JULY 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	167993	168114	121	121	
2	168114	168126	12	133	
3	168126	168149	23	156	
4	168149	168166	17	173	
5	168166	168192	26	199	
6	168192	168217	25	224	
7	168217	168242	25	249	
8	168242	168271	29	278	
9	168271	168298	27	305	
10	168298	168314	16	321	
11	168314	168336	22	343	
12	168336	168364	28	371	
13	168364	168391	27	398	
14	168391	168417	26	424	
15	168417	168434	17	441	
16	168434	168469	35	476	
17	168469	168496	27	503	
18	168496	168517	21	524	
19	168517	168534	17	541	
20	168534	168560	26	567	
21	168560	168594	34	601	
22	168594	168622	28	629	
23	168622	168650	28	657	



24	168650	168681	31	688	
25	168681	168699	18	706	
26	168699	168724	25	731	
27	168724	168753	29	760	
28	168753	168787	34	794	
29	168787	168797	10	804	
30	168797	168817	20	824	
31	168817	168836	19	843	

Month: AUGUST 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	168836	168844	8	8	
2	168844	168860	16	24	
3	168860	168882	22	46	
4	168882	168895	13	59	
5	168895	168897	2	61	
6	168897	168900	3	64	
7	168900	168926	26	90	
8	168926	168950	24	114	
9	168950	168975	25	139	
10	168975	168996	21	160	
11	168996	169021	25	185	
12	169021	169050	29	214	
13	169050	169074	24	238	
14	169074	169098	24	262	
15	169098	169117	19	281	
16	169117	169136	19	300	
17	169136	169158	22	322	
18	169158	169177	19	341	
19	169177	169195	18	359	
20	169195	169218	23	382	
21	169218	169239	21	403	
22	169239	169256	17	420	
23	169256	169277	21	441	
24	169277	169295	18	459	
25	169295	169319	24	483	
26	169319	169331	12	495	
27	169331	169355	24	519	

28	169355	169377	22	541	
29	169377	169391	14	555	
30	169391	169414	23	578	
31	169414	169435	21	599	

Month: SEPTEMBER 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	169435	169452	17	17	
2	169452	169479	27	44	
3	169479	169497	18	62	
4	169497	169516	19	81	
5	169516	169539	23	104	
6	169539	169561	22	126	
7	169561	169584	23	149	
8	169584	169597	13	162	
9	169597	169611	14	176	
10	169611	169635	24	200	
11	169635	169655	20	220	
12	169655	169679	24	244	
13	169679	169694	15	259	
14	169694	169716	22	281	
15	169716	169740	24	305	
16	169740	169773	33	338	
17	169773	169798	25	363	
18	169798	169822	24	387	
19	169822	169847	25	412	
20	169847	169886	39	451	
21	169886	169907	21	472	
22	169907	169946	39	511	
23	169946	169991	45	556	
24	169991	170110	119	675	
25	170110	170152	42	717	
26	170152	170194	42	759	
27	170194	170219	25	784	
28	170219	170256	37	821	
29	170256	170290	34	855	
30	170290	170356	66	921	

Month: OCTOBER 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	170356	170392	36	36	
2	170392	170414	22	58	
3	170414	170446	32	90	
4	170446	170482	36	126	
5	170482	170516	34	160	
6	170516	170547	31	191	
7	170547	170584	37	228	
8	170584	170619	35	263	
9	170619	170638	19	282	
10	170638	170663	25	307	
11	170663	170694	31	338	
12	170694	170721	27	365	
13	170721	170750	29	394	
14	170750	170796	46	440	
15	170796	170824	28	468	
16	170824	170859	35	503	
17	170859	170896	37	540	
18	170896	170918	22	562	
19	170918	170947	29	591	
20	170947	170986	39	630	
21	170986	171009	23	653	
22	171009	171034	25	678	
23	171034	171068	34	712	
24	171068	171095	27	739	
25	171095	171127	32	771	
26	171127	171166	39	810	
27	171166	171197	31	841	
28	171197	171220	23	864	
29	171220	171253	33	897	
30	171253	171296	43	940	
31	171296	171321	25	965	
Month: NOVEMBER 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	171321	171362	41	41	
2	171362	171395	33	74	
3	171395	171422	27	101	
4	171422	171464	42	143	
5	171464	171497	33	176	

6	171497	171525	28	204	
7	171525	171556	31	235	
8	171556	171590	34	269	
9	171590	171622	32	301	
10	171622	171667	45	346	
11	171667	171690	23	369	
12	171690	171717	27	396	
13	171717	171746	29	425	
14	171746	171787	41	466	
15	171787	171859	72	538	
16	171859	171896	37	575	
17	171896	171924	28	603	
18	171924	171961	37	640	
19	171961	171994	33	673	
20	171994	172016	22	695	
21	172016	172044	28	723	
22	172044	172089	45	768	
23	172089	172106	17	785	
24	172106	172145	39	824	
25	172145	172190	45	869	
26	172190	172221	31	900	
27	172221	172254	33	933	
28	172254	172292	38	971	
29	172292	172317	25	996	
30	172317	172353	36	1032	

Month: DECEMBER 2020					
Date	Initial Reading	Final Reading	Difference	Cumulative	Remarks
1	172353	172387	34	34	
2	172387	172398	11	45	
3	172398	172416	18	63	
4	172416	172453	37	100	
5	172453	172489	36	136	
6	172489	172515	26	162	
7	172515	172542	27	189	
8	172542	172584	42	231	
9	172584	172609	25	256	
10	172609	172636	27	283	
11	172636	172669	33	316	

  
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12	172669	172694	25	341	
13	172694	172716	22	363	
14	172716	172748	32	395	
15	172748	172783	35	430	
16	172783	172805	22	452	
17	172805	172843	38	490	
18	172843	172890	47	537	
19	172890	172917	27	564	
20	172917	172950	33	597	
21	172950	172987	37	634	
22	172987	173019	32	666	
23	173019	173047	28	694	
24	173047	173090	43	737	
25	173090	173124	34	771	
26	173124	173156	32	803	
27	173156	173190	34	837	
28	173190	173224	34	871	
29	173224	173260	36	907	
30	173260	173295	35	942	
31	173295	173322	27	969	

### iii. Water Supply and Usage

The university fulfills its water requirements primarily through strategically positioned bore wells, totaling six across the campus. These bore wells play a crucial role as vital reservoirs, guaranteeing a steady water supply throughout the year. In a proactive measure to enhance groundwater sustainability, the university has introduced recharge structures for all bore wells. These structures facilitate the percolation of rainwater and surface runoff into the ground, actively contributing to the preservation of groundwater resources. This approach exemplifies the university's dedication to efficient water management and the conservation of valuable resources.

#### WATER CONSUMPTION & WATER SOURCES

As a primary data collected by survey, we found

Sr. No.	Particulars	Details
1	Students staying at Hostel	150
2	Students at College	1152

3	Teaching Staff	396
4	Non-Teaching Staff	315
5	Visitors	150
	Total	2163

Estimation of water requirement for drinking & domestic use as per (Source: NBC 2016, BIS)

Sr. No.	Particulars	Details	Water Consume limit	Total water in lit/day
1	Students staying at Hostel	150	135 lit/day	6750
2	Students at College	1152	45 lit/day	51840
3	Teaching Staff	396	45 lit/day	17820
4	Non-Teaching Staff	315	45 lit/day	14175
5	Visitors	150	15 lit/day	2250
	Total	2163		92835

Total expected Water consumption as per NBC 2016, BIS for MSRUAS is – 92.83 m<sup>3</sup>/day.

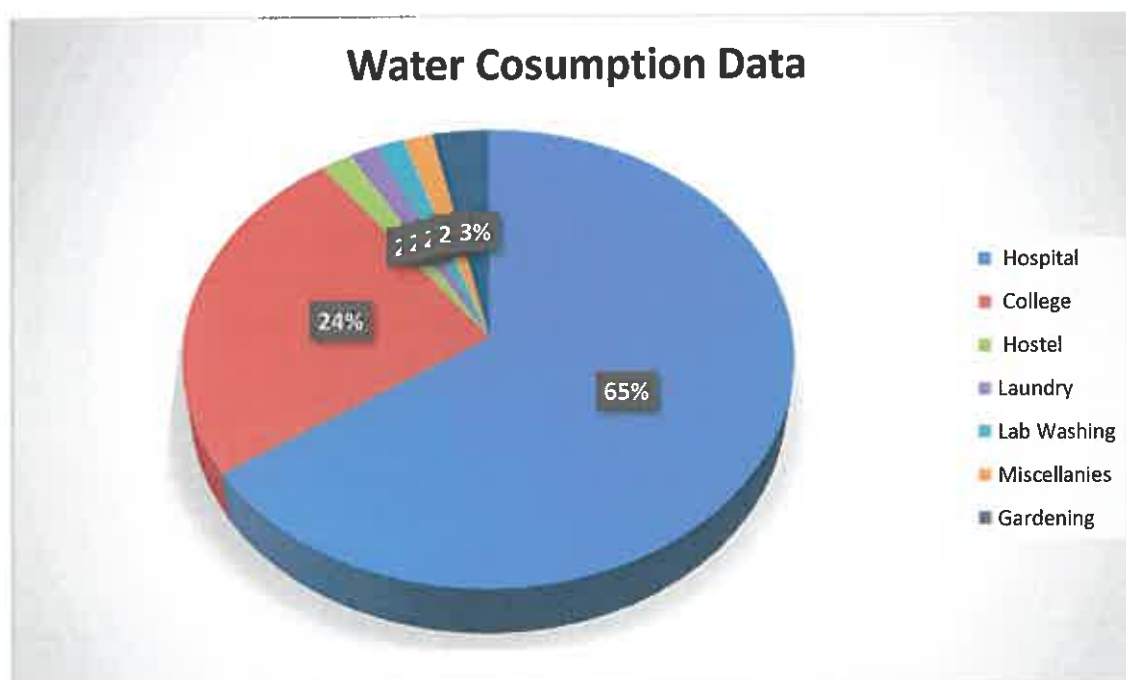
  
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### Actual Water Uses – (Both Campuses)

Sr. No.	Description	Water Consumption (m <sup>3</sup> /day)	Source/Remark
1	Domestic		1.BWSSB
	a) Hospital	400	2.Ground Water
	b) College	150	
	c) Hostel	10.7	
2	Laundry	20	
3	Lab Washing	10	
4	Miscellanies	10	Fresh Water
	Total	600	
5	Gardening	20	Treated/Recycle Water from STP Plant
6	Flushing	80	
		700	(Fresh Water & Treated Water From STP)

### Water Consumption Summary



#### iv. Water quality

The quality of the bore well water has been assessed and meets the standards for potable (drinkable) water. To ensure the continued safety and quality of the drinking water provided to staff and students, the campus has implemented a comprehensive water treatment system. This system includes UV (Ultraviolet) and RO (Reverse Osmosis) filtration systems installed on each floor of every block. These filtration systems effectively purify the water, making it safe for consumption, and contribute to the overall well-being of the University community by providing access to clean and potable drinking water.



**Rainwater Harvesting – Pit**



**Water filter for borewells**



**Water Station**



**Pipeline for Rainwater Harvesting**

## V. Waste Management Audit

M. S. Ramaiah University of Applied Sciences is committed to promoting environmentally responsible practices, and one key area where this commitment is evident is in its waste management strategies. By implementing a range of initiatives, the university aims to reduce its environmental impact, minimize landfill contributions, and foster a culture of sustainability among its students and staff.

Type	Present near the Institute (Yes/No)	
	If Yes, mention the distance from the campus in Km	
	GG campus	Peenya campus
Municipal Dump Yard	No	No
Garbage Heap	No	No
Sewer Line	No	No
Stagnant Water	No	No
Open Drainage	No	No
Industry (Mention the type)	Yes 3 km (BEL, HMT)	Yes within 1 km (manufacturing, aeronautical, garments, automobile industry)
Bus Station	Yes 0.5 km	Yes 0.5 km
Railway Station	Yes 2-3 kms	Yes 7kms
Public Convenience	Yes 1-2 kms	Yes 1-2 kms

### Waste Minimization and Recycling

Type of waste	Generated (Yes/no)
Solid Waste	Yes- eatables
Paper Waste	Yes-plates, printouts, files, books, manuals
Plastic Waste	Yes- bottles, carry bags, containers
Toiletry Waste	Yes- sanitary napkins, tissues
Horticulture Waste	Yes- leaves, dead plants, trimmed branches

### Waste Generated

Type of Waste Generated	Amount of waste generated (kg/month)	
	GG campus	Peenya campus
Bio-Degradable	N.A	350kg
Non-Biodegradable	50 Kgs	50kg
Hazardous	10 Kgs	10 litres/month of waste diesel
Others	05 Kgs sanitary pads	1kg/month sanitary pads

### Waste Management.

Waste Management Technique	Description	
	GG Campus	Peenya Campus
Composting		All the dry leaves shreds from the plants and trees are collected and wind row composting is done at the back yard of the campus
Recycling	STP	STP
Reusing	Single side printed sheets are reused for taking draft print outs and for internal circulation	Single side printed sheets are reused for taking draft print outs and for internal circulation
Others (Specify)	Nil	Nil

  
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### Recycling and Reusing.

Question	Answer (Yes/No)	Describe the process if yes
Is recycled paper used in your Institute?	No	
Is reused paper used in your Institute?	Yes	For packing One side printed papers are used for writing and personal reference printing by 70% of employees
Is the message of importance of recycling spread to others in your community? If yes, specify the initiatives taken.	Yes	Recycling process and awareness program details are posted in several places of the campus. Every employees email signature has a message 'Don't waste recycle' 'Print only if necessary'
Is it possible to achieve zero garbage in your institute? If yes, describe how.	No	

  
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## VI. Biodiversity Audit

A thorough scientific survey of the campus's plant and animal life was conducted throughout the rainy, winter, and summer seasons in 2022, constituting a comprehensive biodiversity audit. This examination revealed significant findings, including the identification of numerous tree species and a diverse array of mammals, birds (Aves), arthropods, and annelids. These findings highlight the remarkable diversity of flora and fauna flourishing on the campus.

Noteworthy among the discoveries is the seasonal influx of various bird species, contributing to the ecological significance of the campus. In a commendable initiative, the institution has taken steps to label trees and plants with their botanical names and assign unique numerical identifiers. This concerted effort aligns with the broader goal of preserving and celebrating the campus's rich biodiversity, aiming to foster a deeper appreciation for the natural world.

### Green Campus

Horticulture and plant as per the table format.

Question	Answer(Yes/No)	Description
Is there a horticulture department present in your campus?	Yes	A separate horticulture team is managing the garden area of the campus
How many staff is present in the Horticulture Department?	05	01-Asst. Facility Manager 01-Supervisor 03-Gardeners
Plant distribution program is organised for the students and community?	Yes	For 80% of the events/ programs Chief Guests and visitors are felicitated with a plant/ sapling instead of bouquet. Also the trainer/ faculty conducting workshops for Intra department / faculty is gifted with a sapling/ plantation as a token of gratitude
Is there a plant ownership program?	Yes	List is prepared



## VII. Best Practice/Initiative

### Best Practices/Initiatives

Some best practices/initiatives taken by the institution in the below table format.

<b>Sl No</b>	<b>Best Practice/Initiative</b>	<b>Description</b>
1	Renewable Energy	Solar panels have been installed in both campus, Bio gas plant has been installed in Peenya campus
2	Biodiversity Conservation	Both campus are surrounded with lush green beds. The trees are home for variety of birds like Crows Pigeon, Mynah, and Nightingale. Peacock also can be found near Peenya campus area. The species are not disturbed or hurt in any manner.
3	Tree Plantation Drives	NSS has participated in tree plantation drives. Two drives has been conducted. As a part of Service to Society every year students reach out to nearby streets, areas, towns and villages and plant trees.
4	Ground Water Recharge	Done in Peenya campus
5	Pollution Reduction	Car-pooling, Usage of battery operated vehicles and bicycles
6	E-Waste Management	Yes, unused and old electronic equipments are sold to authorised E-Waste scrap dealer
7	Solid Waste Management	Every faculty has separate bins for Dry, wet and hazardous. These are handed over to authorised dealers
8	Adoption of Village/Society	05 villages ( kaiwara, Rajgere, Mallur, Kannalli and Jakkanalli of Karnataka) across karnatka are adopted under Unnat Bharath Abhiyan Scheme to support for the technical development of the villages
9	Corporate Resource Center	No

  
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