

ENERGY AUDIT

REPORT | **2021**

ENERGY AUDIT REPORT 2021

CONSULTATION REPORT



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 -2021



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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.

Energy Audit Team

The study team consisted of senior technical executives from Green Aura, and the audit spanned multiple visits from October to December 2021.

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



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Mr Nischay N Gowda,
Director

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 Ganaganangotri 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 savi


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**CHAPTER-01
POWER SUPPLY SYSTEM**

Part-01 (Gnanagangothri Campus)

1.1 Transformer

There is 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



Figure: - 1000 KVA Transformer


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1.2 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-02
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



500 KVA DG Set


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DG unit generation and fuel consumption details.

320 KV DG Sets						
Sr. No.	Month & Year	Unit generated (kWh)	Diesel consumption (Litre)	DG run hour	Unit generated (kWh/litre)	consumption per hour (Litre)
1	Jan-21	576	260	8.7	2.2	29.8
2	Feb-21	552	215	6.6	2.5	32
3	Mar-21	696	300	10.3	2.32	29.12
4	Apr-21	840	405	14	2	28.92
5	May-21	324	180	7.6	0.55	23.68
6	Jun-21	444	160	7.1	2.77	22
7	Jul-21	228	245	8.1	0.93	30.24
8	Aug-21	684	290	10.5	2.35	27.6
9	Sep-21	240	180	5.45	1.33	31.5
10	Oct-21	168	125	4.6	1.34	27.17
11	Nov-21	324	155	6.4	2.09	24
12	Dec-21	384	195	6	1.96	32.5
Total		5460	2710	95.35	22.34	338.53

500 KV DG Sets						
Sr. No.	Month & Year	Unit generated (kWh)	Diesel consumption (Litre)	DG run hour	Unit generated (kWh/litre)	consumption per hour (Litre)
1	Jan-21	80	120	3.9	0.6	30.7
2	Feb-21	64	100	2.4	0.64	41
3	Mar-21	400	210	6.1	1.9	34
4	Apr-21	1488	560	12.1	2.65	46.2
5	May-21	16	90	3.1	0.17	29
6	Jun-21	16	90	3	0.1	30
7	Jul-21	800	340	8.4	2.3	40.4
8	Aug-21	576	320	94	1.8	35
9	Sep-21	288	190	5.5	1.5	32.75
10	Oct-21	176	110	4.2	1.6	26.19
11	Nov-21	432	215	6.7	2	32
12	Dec-21	240	185	4.3	1.29	42
Total		4576	2530	153.7	16.55	419.24

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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1.3 GRID CONNECTED SOLAR PHOTOVOLTAIC SYSTEM (20 KWp)

There is a 20 KWp solar photovoltaic rooftop grid-connected system installed on various buildings. System details are given below:

Solar plant detailed

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

Photographs of Solar Plant: -

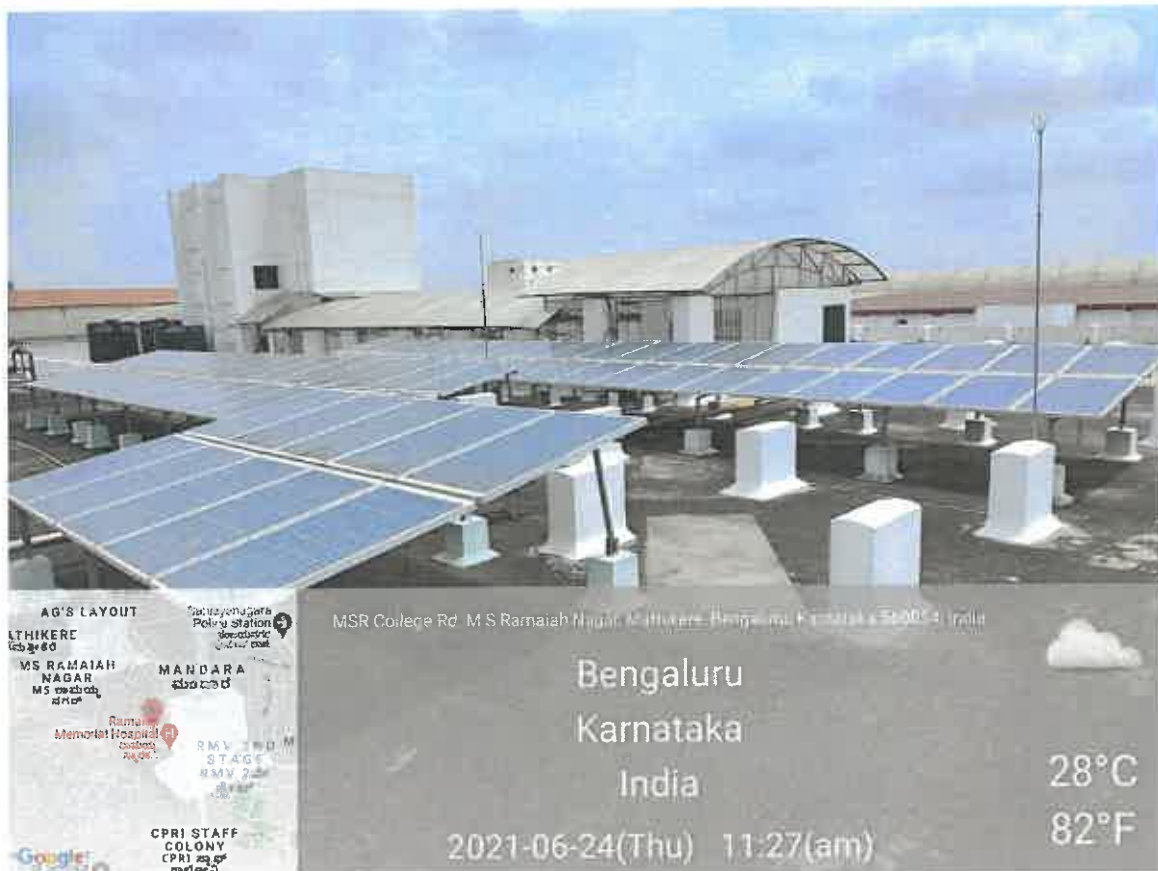
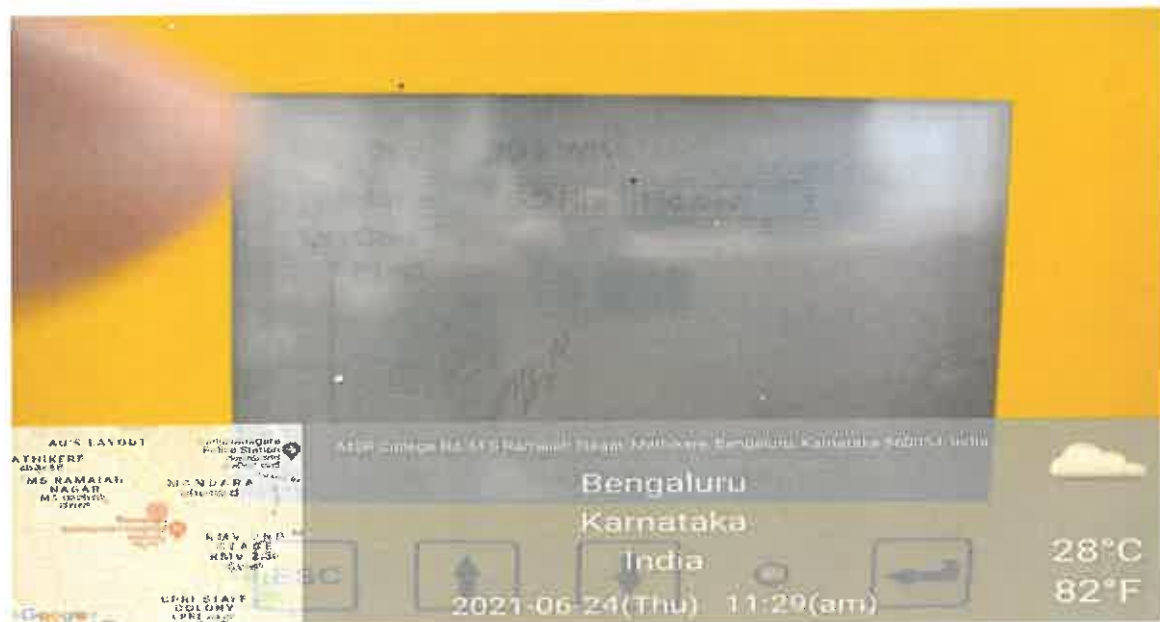
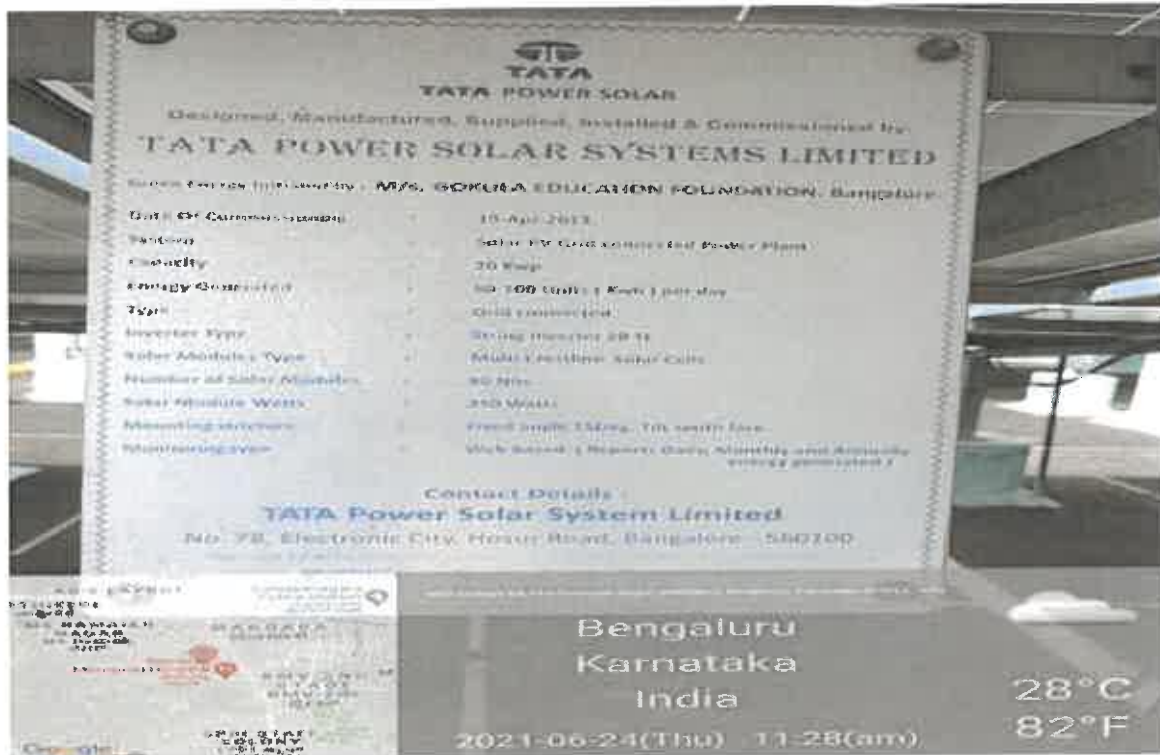


Figure: - 20 KWp solar System


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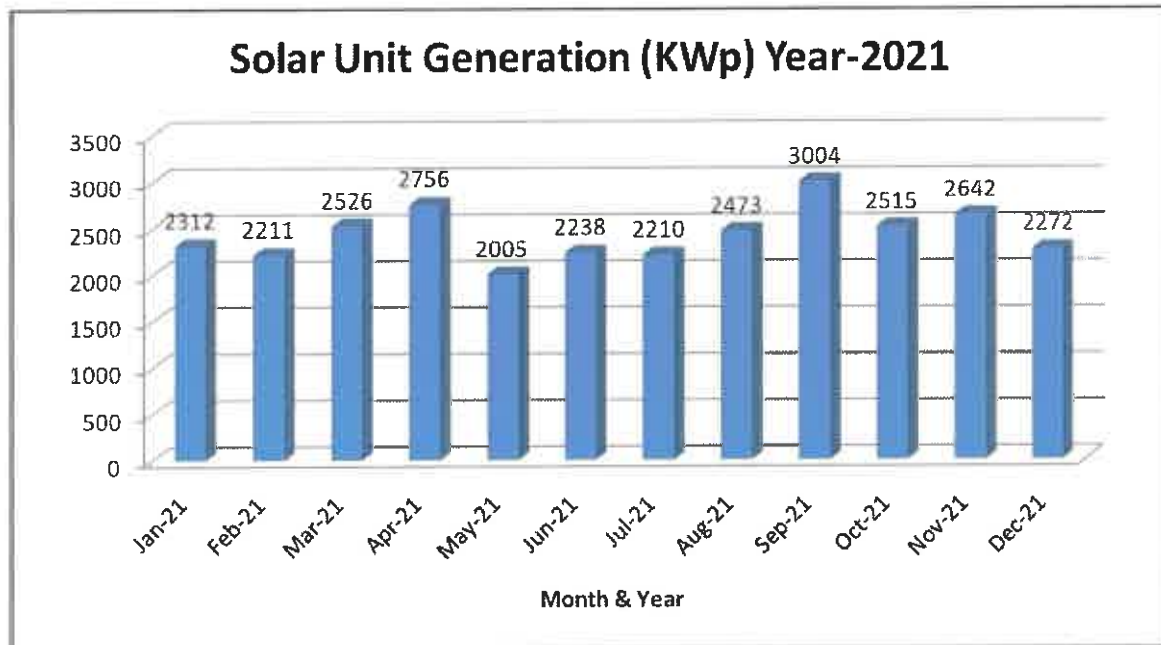


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Solar unit generation Year-2021: -

Monthly Solar unit generation Year-2021

Sr. No.	Month & Year	Solar Unit Generation (KWp) Year-2021
1	Jan-21	2,312
2	Feb-21	2,211
3	Mar-21	2,526
4	Apr-21	2,756
5	May-21	2,005
6	Jun-21	2,238
7	Jul-21	2,210
8	Aug-21	2,473
9	Sep-21	3,004
10	Oct-21	2,515
11	Nov-21	2,642
12	Dec-21	2,272
Total		29,164



Observation: -

Total unit generation from Jan-2021 to Dec -2021 is 29,164 (KWp) units


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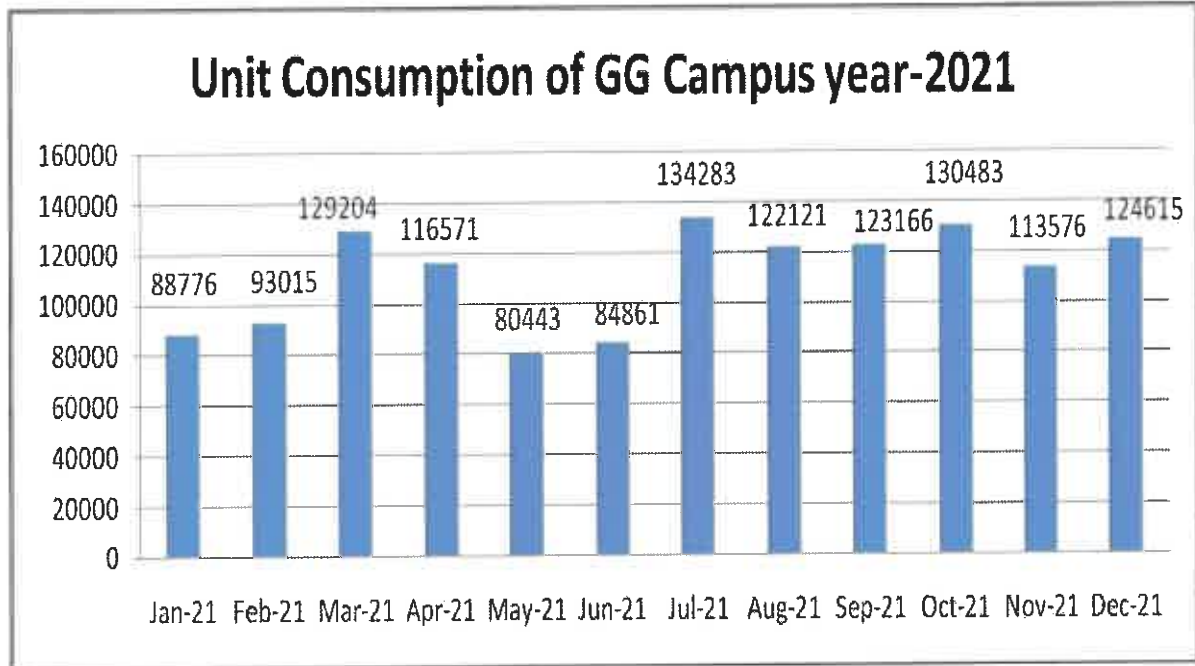
**CHAPTER-02
ENERGY CONSUMPTION ANALYSIS**

Energy audit team was analysed Electricity bills of last one year- 2021(GG Campus)

Electricity Meter reading at GG Campus for Jan-2021 to Dec-2021							
Sr. No	Month & Year	UAS	ALC	FDS	FMC	FHMCT	FPH
1	Jan-21	1503	24209	44659	7480	5760	3712
2	Feb-21	2085	25387	46371	7671	6381	3810
3	Mar-21	4156	37919	60910	10250	10422	4151
4	Apr-21	3817	34614	53627	8705	10922	3672
5	May-21	830	27451	36896	4941	8036	1038
6	Jun-21	1630	25360	40790	5380	8081	2161
7	Jul-21	2597	34782	24287	7406	8534	3891
8	Aug-21	2306	36417	22449	7071	7938	3971
9	Sep-21	2104	35592	22446	7196	8503	3107
10	Oct-21	2142	38153	21817	8672	8374	3368
11	Nov-21	1343	32487	23580	8588	8542	2982
12	Dec-21	1665	36721	23712	9439	7966	3926

Electricity Meter reading at GG Campus for Jan-2021 to Dec-2021							
Sr. No	Month & Year	SOL & SSS	RMC	Nursing	Physiotherapy	Street Light	Total(kWh)
1	Jan-21	0	0	0	0	1453	88,776
2	Feb-21	0	0	0	0	1310	93,015
3	Mar-21	0	0	0	0	1396	1,29,204
4	Apr-21	0	0	0	0	1214	1,16,571
5	May-21	0	0	0	0	1251	80,443
6	Jun-21	0	0	0	0	1459	84,861
7	Jul-21	12596	28744	3691	5898	1857	1,34,283
8	Aug-21	7888	25811	3686	2577	2007	1,22,121
9	Sep-21	10995	24630	4377	2316	1900	1,23,166
10	Oct-21	11579	20758	3472	10348	1800	1,30,483
11	Nov-21	10485	20602	3428	0	1539	1,13,576
12	Dec-21	11953	18225	2224	7054	1730	1,24,615


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Graphical presentation of Energy consumption of GG campus.

Observation

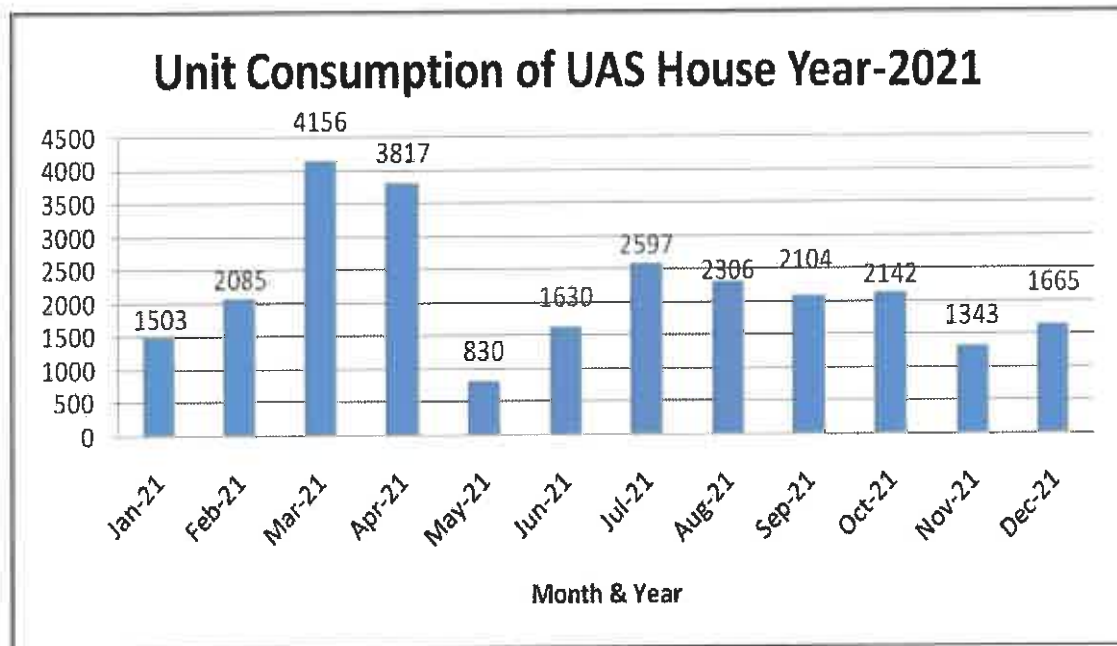
- ✦ Total energy consumption of the GG Campus is 13, 41,114 units during period Jan-2021 to Dec-2021.
- ✦ University has a sub meter for every building in GG Campus

Recommendation: -

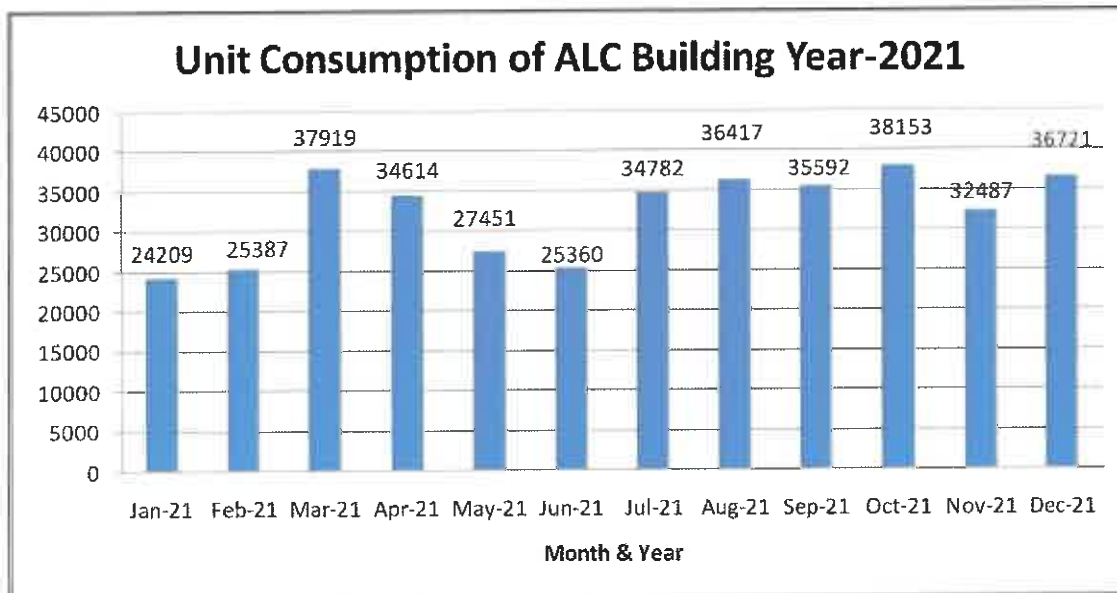
Installation of “Cloud based (IoT based) energy monitoring system” including harmonic measurement (total voltage and current harmonic distortion %) every building. It will be good initiative for energy monitoring by university side.


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Graphical Presentation of all building unit consumptions is below

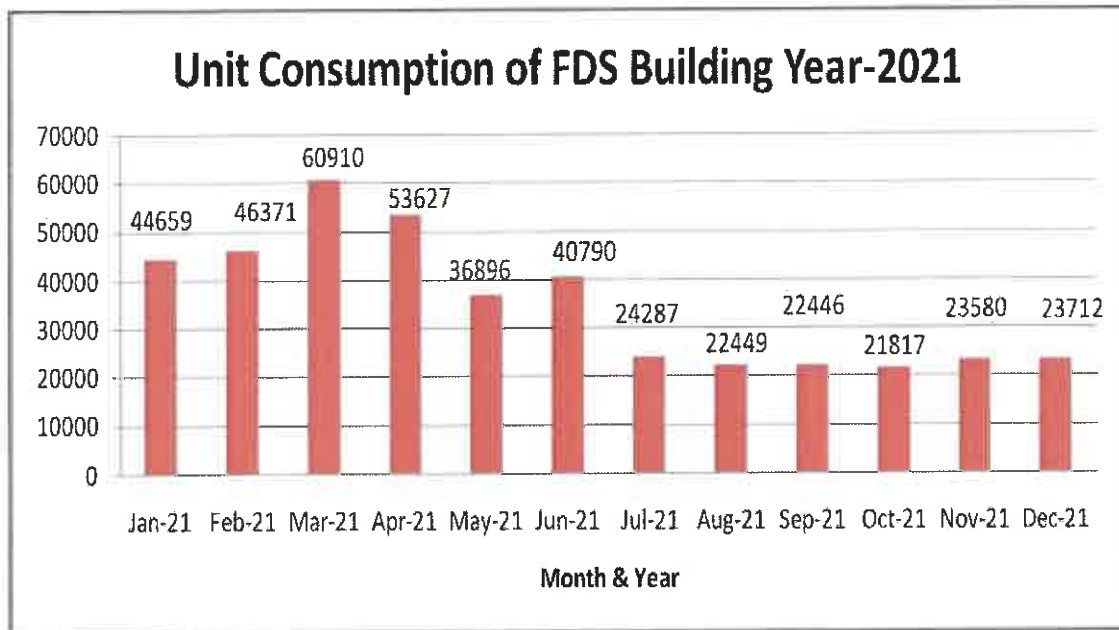


Graphical presentation of energy consumption UAS house year-2021

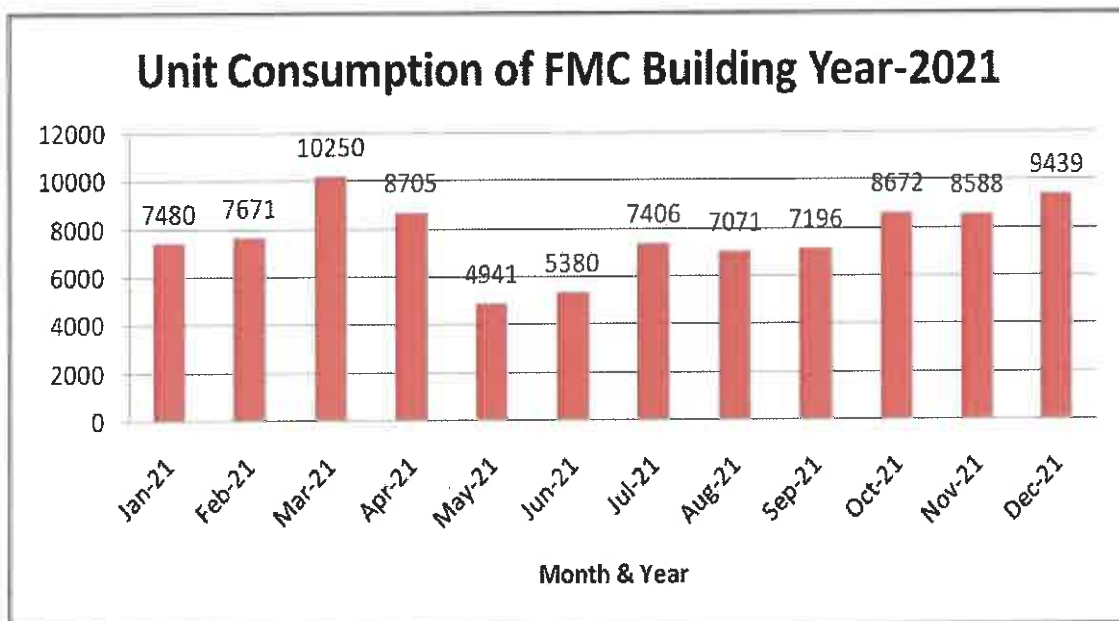


Graphical presentation of energy consumption ALC building year-2021

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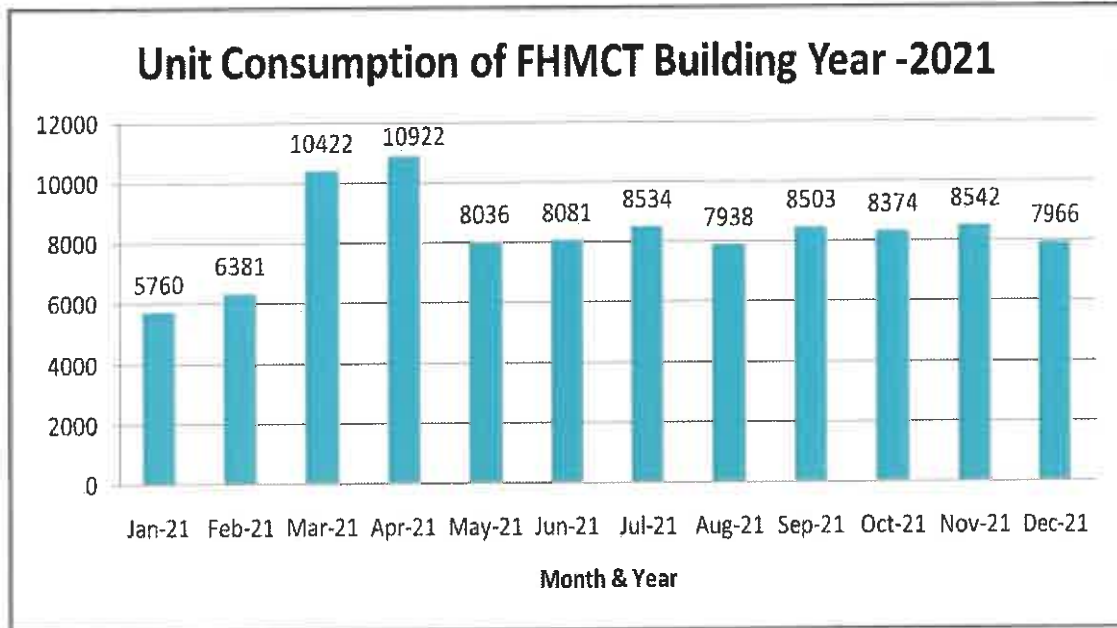


Graphical presentation of energy consumption FDS building year-2021

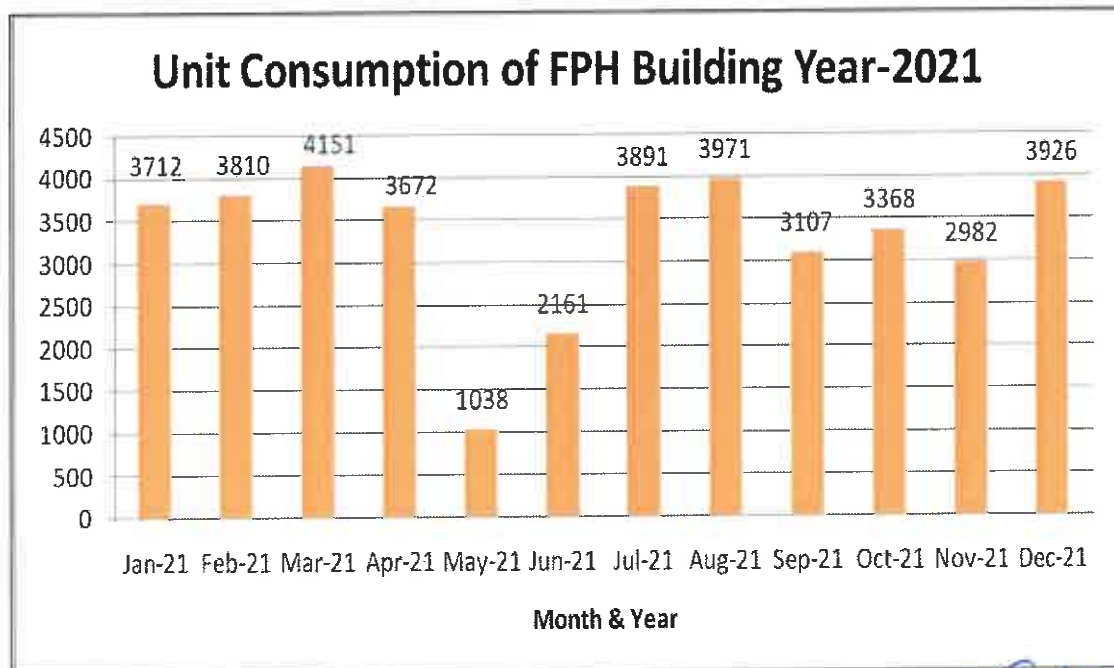


Graphical presentation of energy consumption FMC building year-2021


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Graphical presentation of energy consumption FHMTTC building year-2021



Graphical presentation of energy consumption FPH building year-2021

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Graphical presentation of energy consumption of street light year-2021


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CHAPTER-03
CONNECTED LOAD SYSTEM

3.1 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	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel 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	Ground 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 Management & commerce and FLAHS													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel light	0	0	0	0	36	0	47	44	5	150	0	246
2	4 Feet LED batten light	0	0	18	0	0	0	127	121	136	6	0	390
3	1' X 1' LED lights	0	0	0	0	0	0	0	0	0	0	0	0
4	LED lights	9	0	0	0	0	0	0	0	6	0	0	6
5	LED lights	0	15	0	0	0	0	0	0	36	0	0	36


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Faculty of Pharmacy													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Ground 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

Faculty of Hospitality Management & Catering technology													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel light	0	0	0	0	36	0	0	0	0	0	0	0
2	4 Feet LED batten light	0	0	18	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

Faculty of School of Law & Social sciences													
Sr. No	Item Description	9 W	15 W	18 W	20 W	36 W	Base ment	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Total
1	2' X 2' LED panel light	0	0	0	0	36	0	0	0	0	0	0	0
2	4 Feet LED batten light	0	0	18	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


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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		

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
Total No of AC			12		

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
	Total No of AC		33		

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

ADVANCED LEARNING CENTER A/C DETAILS						
Sr. No	Description	Qty	TR	M/C Serial No	LOCATION	USAGE PER WEEK
1	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 2000	SIMULATION ROOM - ICU 24	3 DAYS
2	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	SEMINAR ROOM 20	3 DAYS
3	8.5 TR DUCATABLE	1	8.5	50009673111800 3000	RESEARCH ROOM (CRC Staff room)	7 DAYS
4	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	SIMULATION ROOM	4 DAYS
5	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	DRY BONE LAB	3 DAYS
6	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	CADAVER WORK SHOP	3 DAYS
7	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	SKILLED LAB	5 DAYS
8	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	STORAGE – COLD	7 DAYS
9	8.5 TR DUCATABLE SPLIT	1	8.5	50009673111800 3000	CADAVER WORK SHOP	3 DAYS
10	5.5 TR DUCTABLE	1	5.5	50018293911800 2000	MADICINE – CRC	7 DAYS
11	5.5 TR DUCTABLE	1	5.5	50018293911800 2000	TISSUE BANK	7 DAYS
12	5.5 TR DUCTABLE	1	5.5	50018293911800 2000	TISSUE BANK	7 DAYS
13	2.0 TR SPLIT A/C	1	2	50021119371180 00000	MINOR OT	2 DAYS
14	1.5 TR SPLIT A/C	1	1.5	50017093311802 1000	CONFERENCE	3 DAYS
15	1.5 TR SPLIT A/C	1	1.5	50017093311802 1000	CONFERENCE	3 DAYS

Sr. No	Description	Qty	TR	M/C Serial No	LOCATION	USAGE PER WEEK
16	1.5 TR SPLIT A/C	1	1.5	5001709331180 21000	SERVER ROOM	7 DAYS
17	1.5 TR SPLIT A/C	1	1.5	5001981141180 08000	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	5001503121180 00000	SUNDRESH CABIN	-
21	2.0 TR CASSETE SPLIT	1	2	5001503121180 00000	SUNDRESH CABIN SIDE	1 OR 2 DAYS
	Total	21				


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3.2 Street light details of GG campus: -

There is 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
	Total			8

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

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

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

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


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**CHAPTER-04
POWER SUPPLY SYSTEM**

Part-02 (Ramaiah Technology Campus)

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



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4.1 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.

4.2 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:

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 Wp (Goodwe)

4.3 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
	Total	455


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**CHAPTER-05
ELECTRICITY BILL ANALYSIS**

5.1 BILL ANALYSIS OF 200 KVA CONNECTIONS.

Energy audit team was analysed Electricity bills of last one year- 2021 (Ramaiah Technology Campus).

Sr. No.	Month & Year	Contract Demand (KVA)	Fixed Demand (KVA)	Maximum Demand (KVA)	
1	Jan-21	200	170	18	
2	Feb-21	200	170	15	
3	Mar-21	200	170	32	
4	Apr-21	200	170	13	
5	May-21	200	170	7	
6	Jun-21	200	170	0	
7	Jul-21	200	170	23	
8	Aug-21	200	170	16	
9	Sep-21	200	170	23	
10	Oct-21	200	170	20	
11	Nov-21	200	170	23	
12	Dec-21	200	170	30	
		Minimum Demand (KVA)			0
		Maximum Demand (KVA)			32
		Average Demand (KVA)			18.33

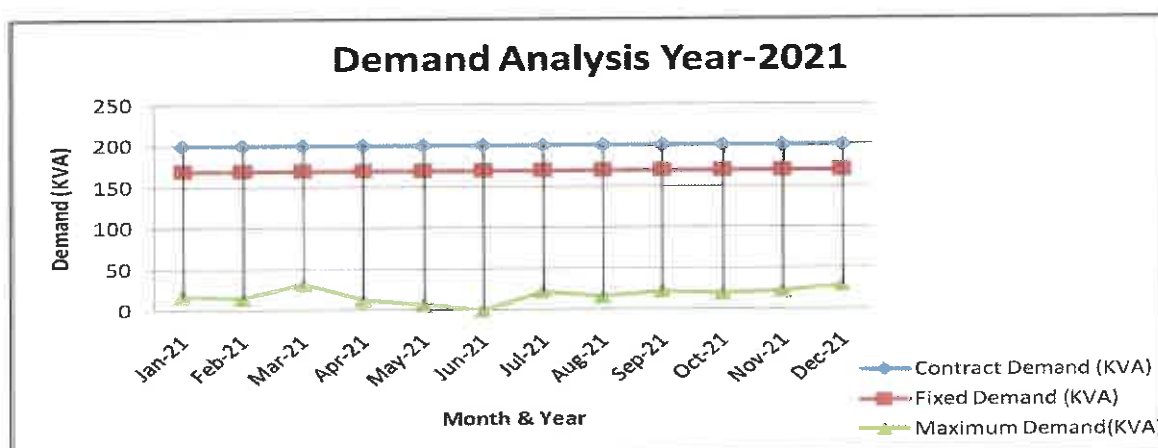


Figure: - Graphical Presentation of Demand analysis year-2021

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 32 KVA in the Month of Mar -2021 and a minimum of 0 KVA in Jun – 2021

5.2 Monthly Power factor analysis Year-2021

Sr. No.	Month & Year	Power Factor
1	Jan-21	0.98
2	Feb-21	0.99
3	Mar-21	0.99
4	Apr-21	0.99
5	May-21	1
6	Jun-21	0.99
7	Jul-21	1
8	Aug-21	1
9	Sep-21	1
10	Oct-21	0.9
11	Nov-21	1
12	Dec-21	0.99
Total		0.986

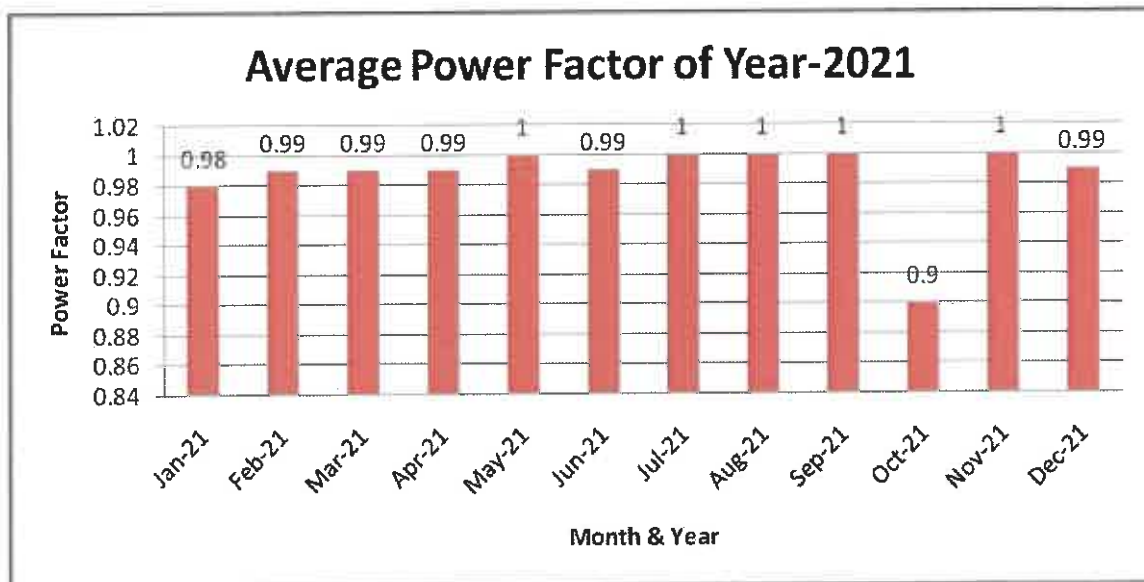


Figure Graphical presentation of average power factor year 2021

Observation:

The average power factor was 0.986 form Jan -2021 to Dec -2021. **Its appreciable**


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5.3 Monthly electrical energy consumption 2021

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-21	3,250	75,742/-	23.31
2	Feb-21	2,680	69,972/-	26.11
3	Mar-21	3,560	78,593/-	22.08
4	Apr-21	3,050	73,448/-	24.08
5	May-21	2,550	55,401/-	21.73
6	Jun-21	2,240	67,747/-	30.24
7	Jul-21	3,640	81,390/-	22.36
8	Aug-21	3,510	80,149/-	22.83
9	Sep-21	4,080	91,092/-	22.33
10	Oct-21	4,540	95,818/-	21.11
11	Nov-21	4,550	92,070/-	20.24
12	Dec-21	5,150	98,393/-	19.11
Total		42,800	9,59,815/-	22.96

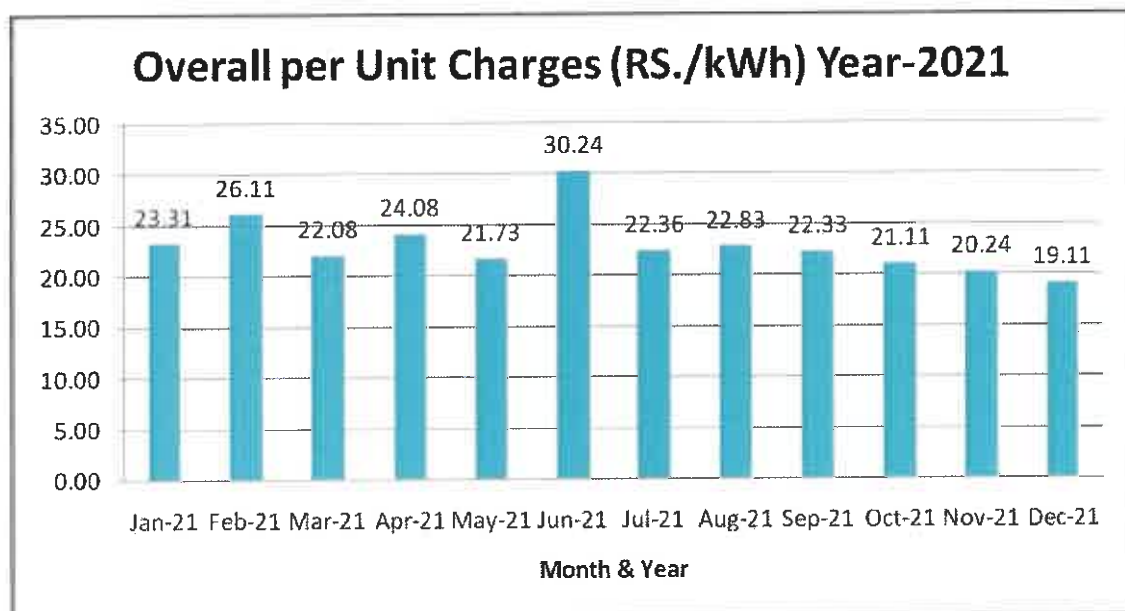


Figure: - Graphical presentation of actual per-unit charges for the year -2021

Observation:

It was found that total energy consumption in the last one year was 42,800 units. The average annual energy charge is Rs 22.96 /kWh. It is higher side due to demand not utilized.

5.4 BILL ANALYSIS OF 750 KVA KVA CONNECTIONS.

Energy audit team was analysed Electricity bills of last one year- 2021(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-21	750	638	0
2	Feb-21	750	638	237
3	Mar-21	750	638	295
4	Apr-21	750	638	325
5	May-21	750	638	126
6	Jun-21	750	638	158
7	Jul-21	750	638	196
8	Aug-21	750	638	194
9	Sep-21	750	638	220
10	Oct-21	750	638	295
11	Nov-21	750	638	293
12	Dec-21	750	638	256
	Minimum Demand (KVA)			0
	Maximum Demand (KVA)			325
	Average Demand (KVA)			216.25



Figure: - Graphical Presentation of Demand analysis year-2021

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 325 KVA in the Month of Apr -2021 and a minimum of 0 KVA Jan – 2021

5.5 Monthly Power factor analysis Year-2021

Sr. No.	Month & Year	Power Factor
1	Jan-21	0.91
2	Feb-21	0.92
3	Mar-21	0.93
4	Apr-21	0.92
5	May-21	0.93
6	Jun-21	0.87
7	Jul-21	0.9
8	Aug-21	0.91
9	Sep-21	0.93
10	Oct-21	0.9
11	Nov-21	0.94
12	Dec-21	0.94
Total		0.92

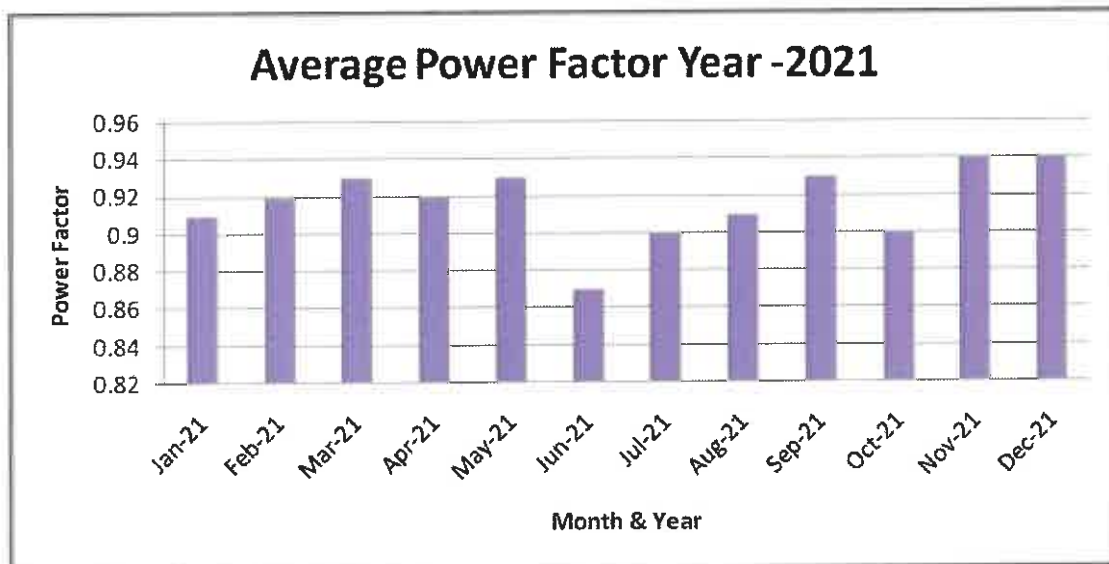


Figure Graphical presentation of average power factor year 2021

Observation:

The average power factor was 0.92 form Jan -2021 to Dec -2021. It is recommended to maintain power factor unity or 0.995

5.6 Monthly electrical energy consumption 2021

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-21	58,080	7,39,907/-	12.74
2	Feb-21	71,080	8,71,095/-	12.26
3	Mar-21	93,040	10,88,012/-	11.69
4	Apr-21	75,720	14,57,935/-	19.25
5	May-21	33,400	2,30,582/-	6.90
6	Jun-21	42,560	2,56,659/-	6.03
7	Jul-21	62,920	7,81,477/-	12.42
8	Aug-21	65,240	8,00,729/-	12.27
9	Sep-21	72,600	9,02,314/-	12.43
10	Oct-21	83,240	1,009,991/-	12.13
11	Nov-21	85,360	1,029,035/-	12.06
12	Dec-21	92,120	1,093,130/-	11.87
Total		8,35,360	1,02,60,866/-	11.84

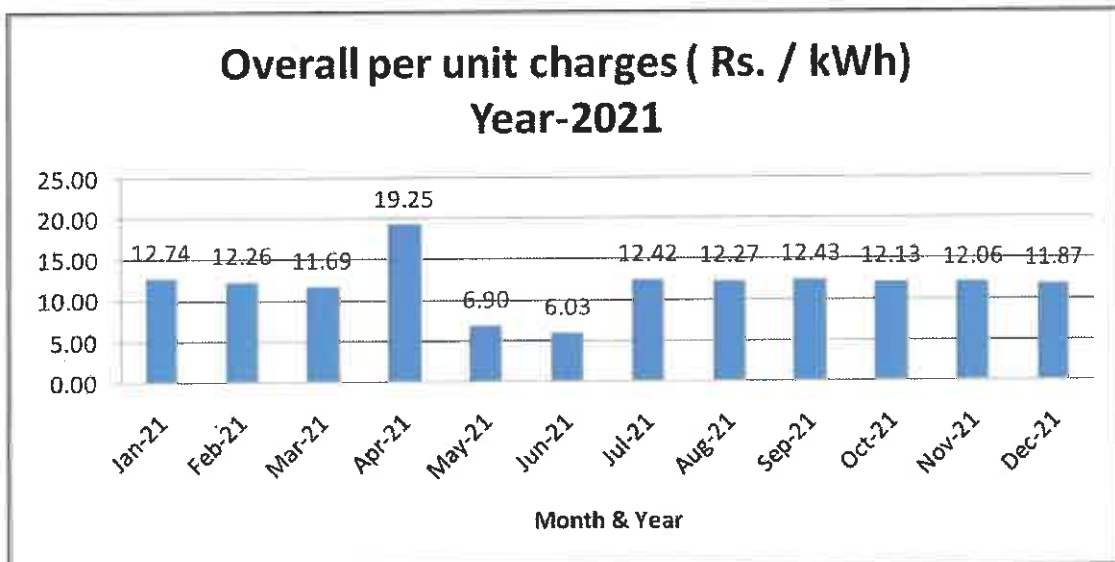


Figure: - Graphical presentation of actual per-unit charges for the year -2021

Observation:

It was found that total energy consumption in the last one-year months was 8,35,360 units.

The average annual energy charge is Rs 11.84 /kWh.


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