



Final Draft Energy Audit Report

(Aug 2022)

King George's Medical University

Uttar Pradesh, Lucknow

(The Reference Contract No. GEMC-51168777294462 dated 03rd Aug 2022.)



Conducted by

Bhagwat Technologies and Energy Conservation Pvt Ltd

New Delhi

Aradhana
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



Contents

Acknowledgement.....	5
Introduction.....	6
KGMU Energy & Environment Consciousness.....	8
Executive Summary	10
Summary of Key Savings Potential	11
Study of Air Handling Units (AHUs)	12
Scope of Work as per RfP	13
Approach & Methodology	14
Basic Data	15
Grid based Electrical Energy and Key Observations	15
Purchased Annual Electricity Cost Comparison of last 03 years.....	15
Evaluation of Unit Cost for Last 03 Years	15
Details of Connection	16
Existing Solar PV Plants	17
LPG Consumption	20
Diesel Gen Sets and Diesel Consumption	21
Solar Concentrator	22
Electricity Bill Analysis Connection wise	24
NEW MORTUARY DEPARTMENT A/C NO:- 3747481000	24
Account No. 9747481000; C.T.V.S Department; 700218 Registrar, KGMU	26
Account No. 8547481000; Hospital Substation; 71595 Registrar , KGMU	28
Account No. 5134370261; New Dental Extension Block ; 703688 Registrar , KGMU.....	30
Account No. 9547481000; Cobalt substation; 613917 Registrar, KGMU	32
Account No. 1747481000; Psychiatric department ; 00434 Registrar , KGMU	35
Account No. 7547481000; Queen marry Hospital; 30339 Registrar , KGMU	37
Account No. 4540285915; QMH(New 100 Bedded hospital); 4540285915 Registrar , KGMU	39
Account No. 5747481000; Trauma Center; 689414 Registrar , KGMU	41
Account No. 7747481000; Old Mortuary substation; 005699 Registrar , KGMU	43
Account No. 9753334424; Teaching Block(Kalam Center; 703712 Registrar , KGMU.....	45
Account No. 1214770000; Old Dental building(Dental Science University Building , PHI); 678537 Registrar, KGMU	47
Account No. 4697779403; New OPD Block.; 703687 Registrar, KGMU.....	49
Account No. 4747481000; Cancer unit; 678442 Registrar . KGMU	51
.....	52

Arunima
Registrar
King George Medical University
Lucknow



Type-5 Faculty building(J.N Road); 7200191928 Registrar , KGMU	53
Account No. 6747481000; Old Dental Building ; 566149 Registrar , KGMU	55
Account No. 1133332000; Gautam Buddha Hostel. ; 678569 Registrar , KGMU	57
Account No. 1647481000; Shatabdi Hospital; 678594 Registrar, KGMU	59
Account No. 2747481000; Cardiology Department; 577925 Registrar, KGMU	61
Account No. 7077481000; T.G. Hostel; 9202 Registrar , KGMU	63
Account No. 6357245033; T.G. Hostel Residential Type -2; 100057 Registrar , KGMU	65
Account No. 2157481000; RALC Building (Artificial Limb Centre); 86966 Registrar , KGMU	67
Account No. 4042748045; Employees Quarter Type-1; 4042748045 Registrar , KGMU.....	70
Seasonal Variation	72
Percentage Contribution of different Buildings in the total Electricity Consumption during April 2021 to March 2022	75
DG Sets Performance Analysis.....	77
Power Factor Analysis	83
Connection wise Power Factor.....	83
Performance of APFC Installed at Various Locations.....	84
Recommendations for Power Factor Improvement.....	86
Maximum Demand Analysis	97
Transformers Study	98
Pumps.....	109
Recommendations for Pumps replacement with EE Pumps	112
Energy Management System.....	113
Air Conditioning Systems.....	114
List of available Window and Split ACs are as below:	115
Energy Savings Possibilities in Windows and Split ACs.....	117
Other Air-Conditioned Plant Details	119
Chillers Performance Study	120
Shatabdi Phase I Hospital	120
New OPD	121
New Dental.....	122
Kalam Center	123
CTVS.....	123
Chilled Water Condenser Pumps Study.....	125
Cooling Towers Study	135
Study of Air Handling Units (AHUs)	140

Aradhana
Registrar
King George Medical University
Lucknow



AHU of New Dental	142
AHUs of New OPD	143
IoT Based Building Management System for Energy Savings	148
Thermographic Study	149
Concentrated Solar Systems Performance	166
Present Applications.....	166
Key Observations.....	166
Performance of Concentrated Solar Thermal (CST).....	167
Suggested Applications.....	169
Solar PV Power Plants Potential (Grid Connected).....	170
Importance of Solar PV Energy in Healthcare Sectors.....	170
Potential of Further Solar Plants	171
Application of Heat Reflective Coating	172
Heat Reflective Paints – Importance	172
How does a reflective coat helps?.....	172
Application Potential in KGMU Buildings	172
A list of such potential buildings	173
Induction Cooking in the Cooking Areas.....	174
District Cooling System.....	176
Carbon Footprint and Sustainability Practices of the KGMU.....	178
Standard operating practices for efficient use of energy at KGMU.	179

Arunima
Registrar
King George Medical University
Lucknow

Acknowledgement



Image Source : <https://www.kgmu.org/>

Bhagwat Technologies and Energy Conservation Pvt Limited (BTECON) is sincerely thankful to the King George's Medical University (KGMU), Uttar Pradesh, Lucknow and Uttar Pradesh New & Renewable Energy Development (UPNEDA) for entrusting this prestigious assignment to undertake the Energy Audit of the KGMU campus.

BTECON is thankful to all the officials of KGMU and UPNEDA who were part of this study for their continuous support. The particular key officials of the Energy Audit team to mention here are as below :-

KGMU Team :-

1. Dr. Kirti Srivastava, Professor Department of Radiotherapy, Member Secretary Environment Committee and Head of the University Environment Department
2. Er.Virendra Kumar Yadav, JE, PWD, Energy Audit Project In-charge, KGMU
3. Er. Birendra Kumar Dubey, JE, PWD, Electrical
4. Er. Sunil Kumar Kushwaha, JE, PWD, Mechanical
5. Er.Satya Prakash Pandey, JE, PWD, Electrical- Outsource
6. Er.Umesh Chandra Yadav, JE, PWD, Mechanical
7. Er.Dinesh Kumar, JE, PWD, Electronics
8. Er.Babloo Singh, JE, PWD, Mechanical

UPNEDA Team :-

1. Sh. Ashok Kumar Srivastava, In charge UPSDA, UPNEDA, Uttar Pradesh
2. Sh. Girish Kumar, Senior Energy Consultant, BEE Cell, SDA, Uttar Pradesh

Arunima
Registrar
King George Medical University
Lucknow



Introduction

India at the 26th session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Glasgow, United Kingdom, expressed to intensify its climate action by presenting to the world five nectar elements (Panchamrit) of India's climate action. The Union Cabinet chaired by the Prime Minister Shri Narendra Modi, has approved India's updated Nationally Determined Contribution (NDC) to be communicated to the United Nations Framework Convention on Climate Change (UNFCCC). As per the updated NDC, India now stands committed to reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005 level and achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. This update to India's existing NDC translates the 'Panchamrit' announced at COP 26 into enhanced climate targets. The update is also a step towards achieving India's long term goal of reaching net-zero by 2070.

King George Medical University (KGMU) is already introduced a number of Energy Efficiency (EE) (which is also called the first fuel of savings energy) and Renewable Energy (RE) measures and committed to further introduce similar measures which will surely be a contribution towards meeting the state as well as nation's commitment towards Climate Change.

An Energy Audit of the KGMU campus has been envisaged through a tripartite agreement between the KGMU, Uttar Pradesh New & Renewable Energy Development Agency (UPNEDA) and Bhagwat Technologies & Energy Conservation Pvt Ltd (BTECON).

The Energy Conservation Act, 2001 defines Energy Audit as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

An energy audit is usually conducted to understand how energy is used and to find opportunities for improvement and energy saving through implementing possible EE and RE measures. With this key objective Energy Audit was planned in the KGMU. The Energy Audit will also comply the Criteria VII (Institutional Values & Best Practices) of National Assessment and Accreditation Council (NAAC).

King George Medical University (KGMU), Lucknow is more than 100 years old. The university campus is spread over an area of roughly 100,000 sq meters. Presently the total connected load of all the buildings including hostels etc. is 13060.77 KVA as per the Electricity Bills information.

Non-Conventional Energy Development Agency, U.P. (NEDA) was set up in 1983 as a registered society under the Department of Additional Sources of Energy, Govt. of U.P. The Agency has inter-Alia following functions:-

- Propagation of the concept of renewable sources of energy and energy conservation.
- Promoting the use of renewable energy systems and means of saving energy in various sectors.
- Research and development primarily of applied nature in the field of renewable sources of energy and energy conservation.

Arunima
Registrar
King George Medical University
Lucknow

The agency is working in the field of Solar Energy, Wind Energy, Bio Energy, Micro Hydel and Energy Conservation besides energy planning and other aspects of energy management.

Bhagwat Technologies & Energy Conservation Pvt. Ltd. (BTECON) has been entrusted to undertake the Energy Audit service in KGMU. The Company was incorporated in the year 2002 as a Private Limited Company with registered and principal offices in Delhi. It is Bureau of Energy Efficiency (BEE), Ministry of Power, Govt of India empanelled Energy Service Company (ESCO) working to undertake Energy, Environment & Renewable Energy Testing and Consulting services.

KGMU Energy & Environment Consciousness

The KGMU is highly conscious regarding the energy consumption within the campus. This is testimony to the fact that it has executed a number of energy efficiency as well as renewable energy projects to reduce the energy consumption as well as dependency on the fossil fuel based energy sources. The earlier energy audit study was executed in 2015.

Some of the energy conservation and renewable energy measures as were executed: -

- Replacement of 250 W sodium lights with 120 W LED lights. Around 600 such LED lights were installed for the indoor areas of the hospital, replacing the old 150 lights and addition of remaining 450 new lights. There was also replace 12 High-mast lights of 850 W with those of 250 W lights, in the outdoor areas.
- installation of APFC panels for Power Factor improvement and thereby KVAh Consumption reduction
- use of Concentrated Solar Thermal system to provide steam for the cooking in lieu of LPG

Concentrated Solar system is installed to provide steam for the cooking suitable for cooking 3000 meals per session. A Total 30 numbers Parabola are installed in the year 2017 on the rooftop of the Shatabdi Phase-II Buildings.



Fig. Part of the Solar Concentrator Thermal System

- installation of Rooftop Solar PV power plants of 1370 kW

A Total 400 kW capacity Grid Connected Solar PV Projects comprising of 08 (Eight) sites (Kalam Center , 70 kW; Urology Department, 40 kW; Padiatric Department, 50 kW; Respiratory Medicine Department, 50 kW; General Surgery Department, 50 kW; Neurology Department, 40 kW, PRO Office, 50 kW and Medicine Board, 50 kW) was installed with the help of UPNEDA along with 970 kW capacity of Solar PV Projects comprising of 15(Fifteen) sites (Manshik Department, 50 kW; Old Age Manshik Department, 100 kW; Pathology Department, 100 kW; Trauma Center, 100 kW; Library, 30 kW; Old OPD, 50 kW; Shatabdi Hospital, Phase-I, 80 kW; Private Board, 50 kW; Plastic Surgery, 100 kW; Netro(Eye) Department, 50 kW; Prashuti Ebong Shtree Rog Department, 50 kW; Rheumatology Department, 50 kW; Physiology & Biochemistry Department, 60 kW; Cardiology Department , 50 kW and Pediatric Oncology Department, 50 kW) with the help of U.P.R.N.N. Unit -10.



fig . Google Earth View of the Solar PV Panels Installed on various buildings within KGMU Campus

KGMU is also continuously looking for attaining further savings through taking energy efficiency and renewable energy measures

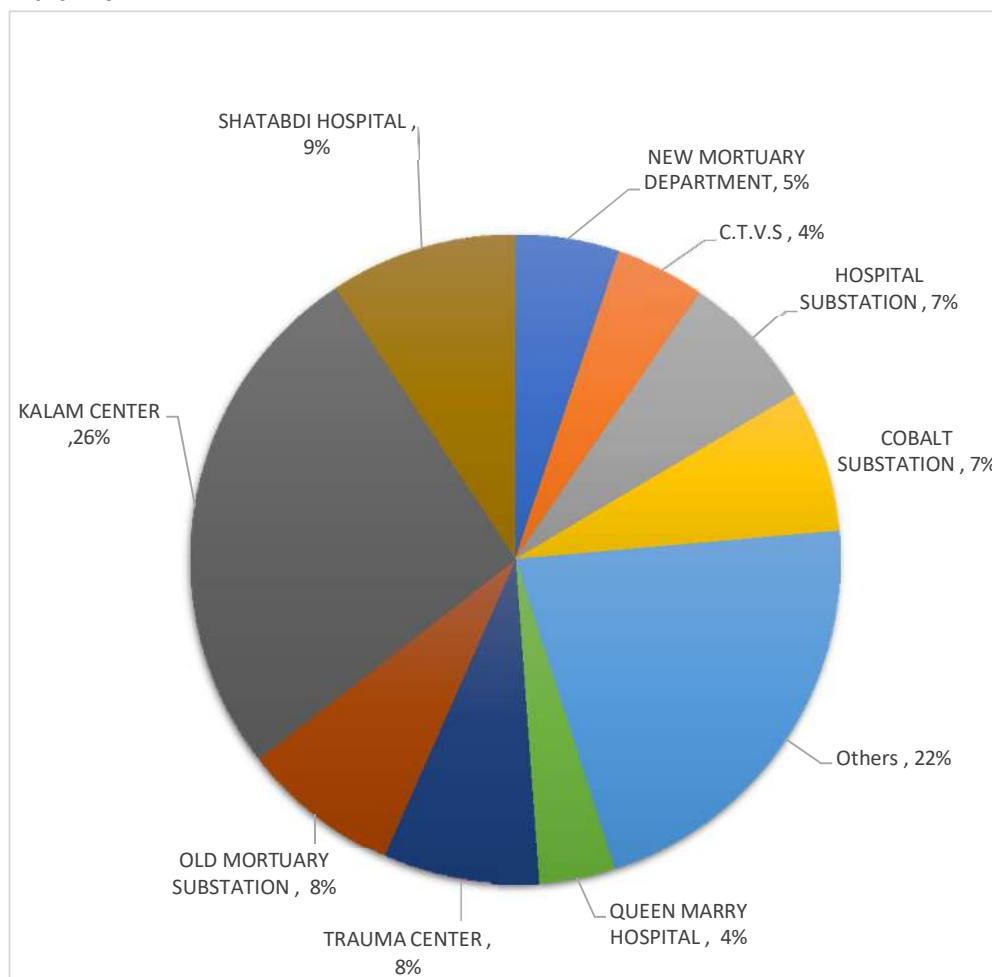


Fig. Solar Plants visited during the Energy Audit Study (Neurology Department in the Picture)

Archana
Registrar
King George Medical University
Lucknow

Executive Summary

1. KGMU is very much energy conscious and has already undertaken a number of energy efficient and renewable energy measures ; It uses Solar PV power plant and Solar Thermal Concentrator . It has also implemented energy efficient lights and APFC panels for energy conservation
2. The Hospital uses different form of conventional energy like electricity , LPG and Diesel
3. As a part of the study , Basic Data for various energy sources , carbon footprint, potential of white reflective coating , performance of the solar thermal concentrator system, potential of installing induction cooking , potential of solar PV system and analysis of the performance of the existing system, performance of HVAC systems , potential and feasibility for district cooling system , standard operating practices for efficient use of energy , etc. have been studied
4. An increasing trend of electricity consumption in the period 2021-22 in comparison to 2020-21 is observed
5. A total 23 meters connection are studied
6. Contribution of various buildings in the total electricity consumption during April 2021 to March 2022 :-



7. The Hospital carbon footprint (t CO₂-e) has been estimated 22952 which can be used as a benchmark for future energy conservation and sustainability strategy

Arunima
Registrar
 King George Medical University
 Lucknow



Summary of Key Savings Potential

S. No.	Proposal	Ref Chapter	Remarks
1	Broken Panel are to be replaced	Existing Solar PV Plants	Detailed Survey Recommended
2	Remote Monitoring to be Functional	Existing Solar PV Plants	For better performance of the Solar PV Plants
3	Smaller Capacity DG can be operated for oil savings	DG Sets Performance Analysis	Sample Study Recommendation
4	Power Factor Improvement Recommendations in Different Location	Recommendations for Power Factor Improvement	Energy Savings through better Power Factor
5	Penalty Avoidance by proper sanctioned load	Maximum Demand Analysis	Monetary Savings possible through the avoidance of penalty on MD
6	Right Transformers Loading	Transformers Study	There are observations of very less loading %
7	Pumps Replacement	Recommendations for Pumps replacement with EE Pumps	Less efficient and more running hours pumps have been recommended for replacements
	Energy Management System	Energy Management System	Energy Management System for better Energy Management
8	Chillers Performance	Chillers Performance Study	Specific Power Consumption & COP are analysed
9	Windows AC /Splits AC	Energy Savings Possibilities in Windows and Split ACs	Energy Savings by replacing with higher rating ACs . Also, Inverter technology can be considered

Archana
Registrar
King George Medical University
Lucknow



10	Chilled Water & Condenser pump	Chilled Water Condenser Pumps Study	The efficiency found more than 50% in general which is acceptable
	Cooling Towers Study	Cooling Towers Study	Cooling Towers Performances
11	AHU Motors	Study of Air Handling Units (AHUs)	Filter cleaning is recommended
12	Building Management System	IoT Based Building Management System for Energy Savings	IoT based Building Management Systems for Energy Savings
12	Solar Concentrate additional stream uses	Concentrated Solar Systems Performance	a part of the steam can be diverted to other applications like steam sterilizers.
13	Solar PV	Solar PV Power Plants Potential (Grid Connected)	2135 kW solar rooftop Grid connected projects potential
14	White reflective coating	Application of Heat Reflective Coating	A detailed list of building is mentioned.
15	Induction Cooking	Induction Cooking in the Cooking Areas	The commercial scale Induction cooking as well as Steam Cookers can be piloted in a particular cooking area which makes meals and the decision can be taken based on that experience.
16	A number of recommendations on maintaining system components, BLDC fans, building energy management systems, occupancies sensors, etc.	Standard operating practices for efficient use of energy at KGMU.	Other Energy Saving areas

Archana
Registrar
King George Medical University
Lucknow



Scope of Work as per RfP

- Collection of Basic Data for various energy sources being used in the university.
- Identification of Energy Consuming areas and Measurements & quantification
- Data analysis
- Identification of energy conservation & renewable energy potential
- Capital investments and payback period.
- Calculation of carbon footprint
- To check temperature of wiring and electric joints at key locations through thermographic imager.
- Measurement of the temperature of roof of top floors inside (inner surface of the roof) as well as outside (outer surface of the roof where sunshine is falling) & Identification of savings potential
- To check the performance of the Solar Thermal Concentrator system
- To identify feasibility and potential of installing induction cooking in the cooking areas
- Action plan formulation for implementing Energy efficiency Measures.
- To identify potential of solar PV system (Grid connected solar roof top plants) and analysing the performance of the existing system (check RfP)
- To check performance of HVAC systems
- To identify potential and feasibility for district cooling system covering all the buildings of KGMU.
- To prepare standard operating practices for efficient use of energy at KGMU.
- To create energy conservation awareness among the end users.
- Any other work deemed appropriate by the agency or advised by KGMU/UPNEDA during the study, which can add value to the assignment.

Arunima
Registrar
King George Medical University
Lucknow

Approach & Methodology

The Tender "Energy Audit of King George Medical University (KGMU), Lucknow" was issued by Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) with Uttar Pradesh State Designated Agency (UPSDA) in the GEM (Government e Marketplace) Portal.

The UPNEDA empaneled agencies were allowed to participate and Bhagwat Technologies and Energy Conservation Pvt Limited (BTECON) got selected and awarded the assignment.



Fig. Image : BTECON Team Measurements

The University campus is spread over an area of roughly 100,000 sq meters and the total connected load of all the buildings including hostels etc. is 13060.77 KVA. The Energy Audit was started with a kick-off meeting at the UPNEDA H.Q. in Lucknow, Uttar Pradesh on 08th Aug 2022 and tripartite contract in between UPNEDA, KGMU and Energy Audit Agency, BTECON was undertaken. The same day a Walkthrough Audit was organized for the Energy Audit Team and the meeting was organized amongst the key University Professors and representatives. The Energy Audit work on-site was started on 16th Aug 2022 following the below timeline as the same was submitted with the tender application by the Auditing agency: -

Sr.No.	Task	Time Duration							
		W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8
1	Kick-off Meeting with UPNEDA,SDA / Building Owner Representatives								
2	Sites visit and discussions with the Building Authorities								
3	Sites data collection and measurements								
4	Draft Energy Audit Report for Comments & Suggestions								
5	Final Energy Audit Report after incorporating the Suggestions								

Note : W stands for Week ; Total duration considered for the site study is 45 days; Draft report submission within 60 days and

The experienced team of the company got involved into the study to undertake the survey, measurements and discussion with the key officials. The instruments such as Ultrasonic Flow Meter, Three Phase Power Analyzers, Single Phase Power Analyzers, Data Loggers, Lux Meters, Thermal instruments, etc. duly calibrated were used for carrying out energy audits.

The on-site Energy Audit work as per the scope was started in parallel in 03 (Three) key areas such as Data Collection from various departments, various measurements and renewable energy related activities. In parallel to all these , the back office data entry as a part of the analysis for reporting was also started. The time was the essence of the project and that was the key reason for such an initiatives.

Mukhna
Registrar
 King George Medical University
 Lucknow

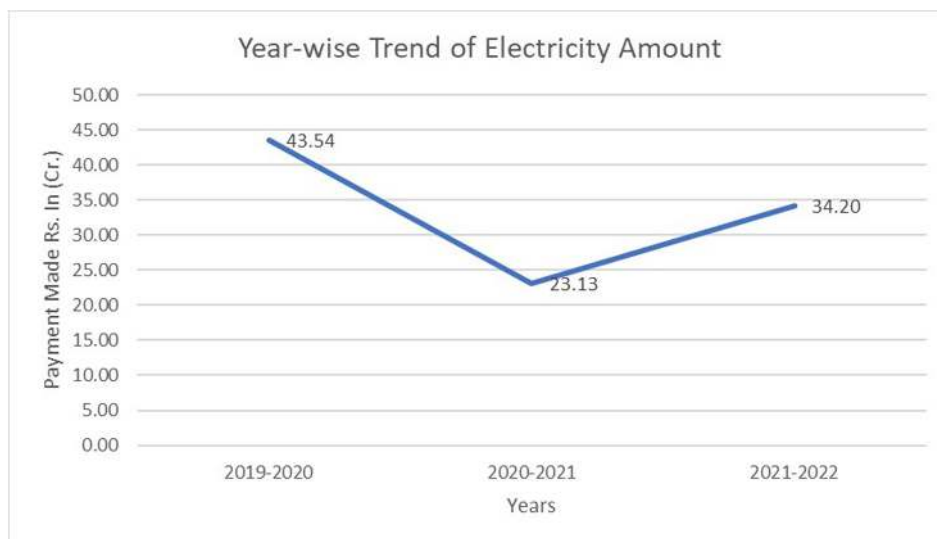


The Draft Energy Audit report was submitted within a month of the Zero date of the project and the recommendations were incorporated into the final report. Along with the Final report submission an awareness program was also initiated by the Auditing agency.

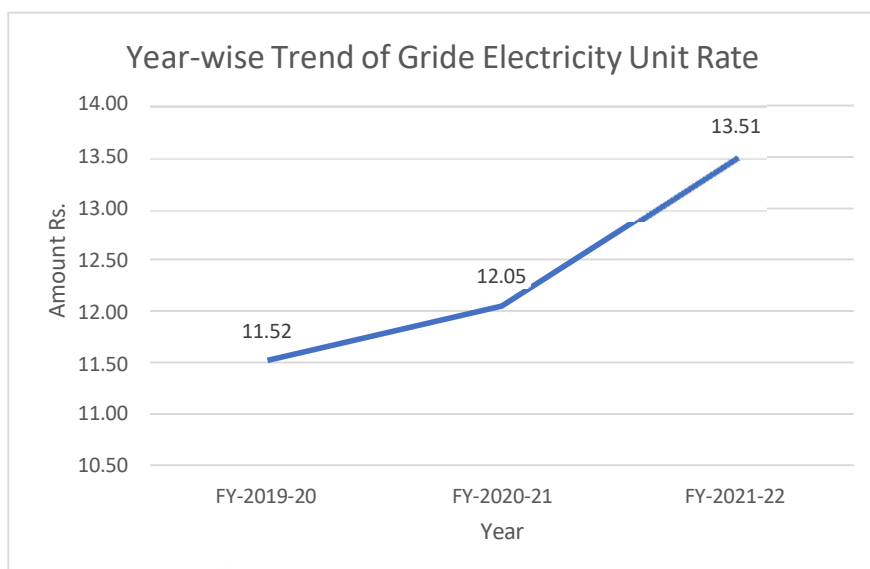
Basic Data

Grid based Electrical Energy and Key Observations

Purchased Annual Electricity Cost Comparison of last 03 years



Evaluation of Unit Cost for Last 03 Years



Archana
Registrar
King George Medical University
Lucknow



Details of Connection

The Details of Connection is mentioned below. The sanctioned load data as mentioned in the RfP has been compared with Electricity Bills and found variation in case of Cobalt Substation only

Sr.No.	Department/Place	Connection No./Name	Account No.	Date of Connection	Tariff Type	Connected Load , kVA, Bills	Name of the Buildings
1	New Mortuary substation	678528 Registrar , KGMU	3747481000	1/1/2001	HV-I	223	Sardar Patel Hostel/Resident Hostel, Physiology Department, Bio Chemistry department , SPM
2	C.T.V.S Department	700218 Registrar , KGMU	9747481000	8/4/2011	HV-I	445	Complete CTVS Department
3	Hospital Substation	71595 Registrar , KGMU	8547481000	1/1/2001	HV-I	1137	Radiotherapy department, Radio diagnosis department , Main hospital Building, Old OPD , Pharmacology Department , Old Neurology Building , Plastic surgery department , Medicine ward & M.R.I. , C.T Scan, Ophthalmic
4	New Dental Extension	703688 Registrar , KGMU	5134370261	28/11/2012	HV-I	737	Complete new dental Extension building
5	Cobalt substation	613917 Registrar , KGMU	9547481000	1/1/2001	HV-I	445	Medicine department , Plastic surgery department , surgery department , I.D.H. building , Old neurology , Pediatric department ,
6	Psychiatric department	00434 Registrar , KGMU	1747481000	1/1/2001	HV-I	158	Psychiatric department , Trauma emergency room , holding screening area & Geriatric mental
7	Queen marry Hospital	30339 Registrar , KGMU	7547481000	1/1/2001	HV-I	411	Complete Queen marry Hospital & Old LRH and NCR hostel.
8	QMH(New 100 Baded	4540285915 Registrar , KGMU	4540285915	27/04/2019	HV-I	333.33	Complete 100 Bedded Hospital (QMH)
9	Trauma Center	689414 Registrar , KGMU	5747481000	1/1/2004	HV-I	540	Trauma Center (Ground floor to 3rd Floor)
10	Old Mortuary substation	005699 Registrar , KGMU	7747481000	1/1/2001	HV-I	1087	Pathology department, Microbiology department , New old VL Girls Hostel, DK Hostel , VC Office ,
11	Teaching Block(Kalam	703712 Registrar , KGMU	9753334424	15/12/2014		2632	Complete Teaching Block, Hostel etc
12	Old Dental building(Dental Science University	678537 Registrar , KGMU	1214770000	15/07/2005	HV-I	45	Complete old dental faculty building
13	New OPD Block.	703687 Registrar , KGMU	4697779403	25/11/2012	HV-I	698	Complete New OPD building
14	Cancer unit	678442 Registrar . KGMU	4747481000	1/1/2001	HV-I	112	Complete Cancer Unit(QMH)
15	Type-5 Faculty building(J.N	7200191928 Registrar , KGMU	7200191928	16/02/2005	LMV-I	444.44	Complete Faculty building A Block & B Block
16	Old Dental Building	566149 Registrar , KGMU	6747481000	1/1/2003	HV-I	445	Complete Old dental faculty building
17	Gautam Budha	678569 Registrar , KGMU	1133332000	23/05/2008	HV-I	667	Complete Gautam budha Hostel block
18	Shatabdi Hospital.	678594 Registrar , KGMU	1647481000	29/04/2008	HV-I	1334	Shatabdi Hospital Phase-1 , New Rain Basera , V.C Residence
19	Cardiology Department	577925 Registrar , KGMU	2747481000	1/1/2001	HV-I	223	Complete Cardiology Department
20	T.G. Hostel	9202 Registrar , KGMU	7077481000	1/1/2001	HV-I	198	Faculty & employees Residence
21	T.G. Hostel Residential	100057 Registrar , KGMU	6357245033	15/12/2014	LMV-I	334	Nurses Hostel.
22	RALC Building (Artificial	86966 Registrar , KGMU	2157481000	1/1/2001	HV-I	334	Old Orthopedic, DPMR , Rheumatology(Proposed Covid-19
23	Employees Quarter Type-	4042748045 Registrar , KGMU	4042748045	16/02/2015	LMV-I	78	Type-1 Employees Quarter Near RALC
24	Employees Residence Amrapali	T/C No. 94/2015-16 Registrar , KGMU	not available	not available	not available	0	Employees Residence block-A & B
Total						13060.77	

Aradhana
Registrar
King George Medical University
Lucknow

Existing Solar PV Plants

The KGMU Hospital campus has a total 1370 kW capacity of Grid Connected Solar Rooftop Project.

A Total 400 kW capacity Grid Connected Solar PV Projects comprising of 08 (Eight) sites was installed with the help of UPNEDA: -

- I. Kalam Center, 70 kW
- II. Urology Department, 40 kW
- III. Padiatric Department, 50 kW
- IV. Respiratory Medicine Department, 50 kW
- V. General Surgery Department, 50 kW
- VI. Neurology Department, 40 kW,
- VII. PRO Office, 50 kW and
- VIII. Medicine Board, 50 kW



Another 970 kW capacity of Solar PV Projects comprising of 15(Fifteen) sites are installed with the help of U.P.R.N.N. Unit -10 :-

- I. Manshik Department, 50 kW
- II. Old Age Manshik Department, 100 kW
- III. Pathology Department, 100 kW
- IV. Trauma Center, 100 kW
- V. Library, 30 kW
- VI. Old OPD, 50 kW
- VII. Shatabdi Hospital, Phase-I, 80 kW;
- VIII. Private Board, 50 kW
- IX. Plastic Surgery, 100 kW
- X. Netro(Eye) Department, 50 kW;
- XI. Prashuti Ebong Shtree Rog Department, 50 kW;
- XII. Rheumatology Department, 50 kW;
- XIII. Physiology & Biochemistry Department, 60 kW;
- XIV. Cardiology Department, 50 kW and
- XV. Pediatric Oncology Department, 50 kW)

Key Notes :-

- I. The Solar PV Plants of total 1370 kW capacity is producing 5000 units electricity per day, consequently, the saving of Rupees 17 Lac per month (Ref. KGMU Data)
- II. The joint Survey of KGMU and UPNEDA is going on to find the suitable places to install more Solar power plants under the NEDA (Subah) Project (Ref. KGMU Data)
- III. No Net Metering is in practice at this moment ; the Solar PV Plants are only replacing the Grid Power based on its generation quantity .
- IV. Monkey Menace is existing
- V. Better Maintenance is a must for better generation and extended life of the systems
- VI. The Energy Audit team did physical survey of some sites and had the below observations:-

Aradhana
Registrar
King George Medical University
Lucknow

	Remote Monitoring Units are existing ; monitoring through online link on regular basis will help in better plants monitoring and performance
	Panels regular cleaning is necessary for better generation
	Loose cables touching ground; should have proper cable dressing through the conduits so that monkey menace is avoided. Also, it helps to avoid plants outages.

	Regular Inspection reduces the chances of having non-connected arrays and generation loss
	Damage Solar Panels are to be replaced for better generation and life of the Plant
	Damage Solar Panels are to be replaced for better generation and life of the Plant

Arunima
Registrar
 King George Medical University
 Lucknow

LPG Consumption

S. No.	Name of Fooding Facility	Landmark	Number of cylinders per day (Approx.)	Annul LPG Cylenders (Approx.)	Total kg's (Commercial cylinder @ 19kg)
1	M/S Mohini Caters Center	Near MRI	2	720	13680
2	C V Hall Mess	C.V. Hall	2	720	13680
3	Annapurna Kitchen	Power Grid Sadan-Rain Basera	1	365	6935
4	M/S Brijesh Singh	Shatabdi Phase-I	2	720	13680
5	Patient Diet Kitchen (Central Kitchen) of M/s Jaiswal Canteen	Shatabdi Phase- II	1.5	540	10260
6	Kitchen 1905	Trama Center Building	1.5	540	10260
7	Nitin Kapoor Cafeteria	Central Library Building	2	730	13870
8	Roti Making Facility	Above 1905 Kitchen	8	2880	54720
9	Rajendra Kumar	Registrar Office	0.5	180	3420
10	Shri Mohammed Nadeem	Canteen New OPD	1	360	6840
11	Shri Mohammed Amir	Canteen, Lari Cardiology	1	360	6840
12	M/s Chai Canteen	Queen Merry Hospital	0.6	216	4104
Total				8331	158289

Diesel Gen Sets and Diesel Consumption

Sr.N.	Location of DG sets	KVA	Make	Number of DG	Annual Diesel Consumption during April 2021 to March 2022(
1	RALC Campus, DPMR Dept., Orthopedic Dept., Rheumatology DG	250 KVA	Greaves	2	40610
		100 KVA	Kirloskar	1	
		500 KVA	Supernova	1	
2	Gandhi Ward	320 KVA	Cummins	2	
		60 KVA	Kirloskar	1	
3	PRO Office	500 KVA	Cummins	1	
		320 KVA	Cummins	3	
4	New Dental Dept. Old Dental Dept.	320 KVA	Cummins	1	
		125 KVA	Kirloskar	1	
		61 KVA	Kirloskar	2	
5	Geriatric Mental Dept., Mental Dept., Adolescent Psychic	100 KVA	Kirloskar	2	
		62.5 KVA	Cummins	1	
		125 KVA	Jackson	1	
6	Trauma Center	250 KVA	Cummins	3	
		125 KVA	Cummins	1	
7	CTVS Dept.	320 KVA	Kirloskar	1	
		125 KVA	Kirloskar	1	
8	Queen Mary Dept.	250 KVA	Greaves	1	
		250 KVA	Cummins	1	
		125 KVA	Kirloskar	2	
9	Microbiology, Virology TV Lab	250 KVA	Cummins	2	
		250 KVA	Kirloskar	1	
		125 KVA	Cummins	1	
10	Pathology Dept.	200 KVA	Greaves	1	
		45 KVA	Kirloskar	1	
11	PHI Bhawan	62.5 KVA	Kirloskar	1	
12	Library & Administrative Building, RH hostel, Marchery, New guest house, Nehru hostel.	200 KVA	Cummins	1	
		20 KVA	Kirloskar	1	
		50 KVA	Cummins	1	
		45 KVA	Kirloskar	1	
		7.5 KVA	Kirloskar	1	
13	TG Hostel	125 KVA	Kirloskar	1	
		125 KVA	Kirloskar	1	
14	Shatabdi Phase-1	500 KVA	Kirloskar	1	
		500 KVA	Cummins	1	
		10 KVA	Kirloskar	1	
15	Shatabdi Phase-2	500 KVA	Cummins	3	
16	Lary Cardiology	250 KVA	Greaves	2	
		125 KVA	Cummins	1	
17	New OPD	250 KVA	Cummins	2	
18	SPM Dept.	62.5 KVA	Kirloskar	1	
19	Faculty Accommodation	62.5 KVA	Greaves	2	
20	IT Cell	30 KVA	Kirloskar	1	
21	Kalam Center	320 KVA	Cummins	2	
22	Advance Research	45 KVA	Kirloskar	1	
		15 KVA	Kirloskar	1	
23	Burn Unit Plastic Surgery Dept.	250 KVA	Kirloskar	1	

Solar Concentrator

Solar Steam Cooking System for Steam Cooking Application

The Solar Steam Cooking System suitable for cooking 3000 meals per session was supplied, installed and Commissioned by M/S. Taylormade Renewables Ltd Ahmedabad and was handed over on 10/06/2017 with the support of UPNEDA and MNRE. The system is installed on the rooftop of the Shatabdi Phase-II Buildings with the below components: -



S.No .	Particulars/ Item Description	Quantity
1	Parabola / Dish - Area 16 sq. M. each	30 Nos
2	Receiver	30 Nos
3	Rotating Support	30 Nos
4	Stands	30 Nos
5	Foundation Cross	30 Nos
6	Bearing Plate	30 Nos
7	Steam Header	04 Nos
8	Solar Grade Mirrors	30 Nos
9	Valves & Fittings(steam side)	01 unit
10	Valves and Controls	01 unit
11	Tracking Mechanism , Gear box , wire rope & counter weight	04 Set
12	Control panel for Automatic Tracking of Sun	04 Nos
13	Cooking vessels - Indirect type - 350 litres	02 Nos
14	Cooking vessels - Direct type - 500 litres	04 Nos
15	PR V station	01 No
16	Sim based Data Logger for Online performance monitoring	01 No
17	Steam Flow Meter	01 No
18	Pressure Transmitter	01 No
19	Temperature Transmitter	03 Nos
20	Pressure Gauge	06 Nos
21	Insulated pipeline in meters	Up to Kitchen and Vessels

Designed Information

on the rooftop of the Shatabdi Phase-II Buildings with the below components:

1. Heat Required for Application in the form of steam 8.40 Lac k Cal per day
2. Required Temperature and Pressure of useful Heat : Temp 140 Deg C and 3 Bar Pressure
3. Present Fuel Consumption is 12 LPG Cylinders per day that is 4380 LPG cylinders per year
4. The system was installed at the KGMU, Lucknow Hospital for 3000 meals per session usages

Expected Outcome

5. Expected Outcome is Average Heat Delivery per day : 8.15 Lac kCal
6. Fuel Savings with prevailing fuel /LPG per day : 14.4 LPG Cylinders per day or 4032 LPG Cylinders per year @ 280 sunny days

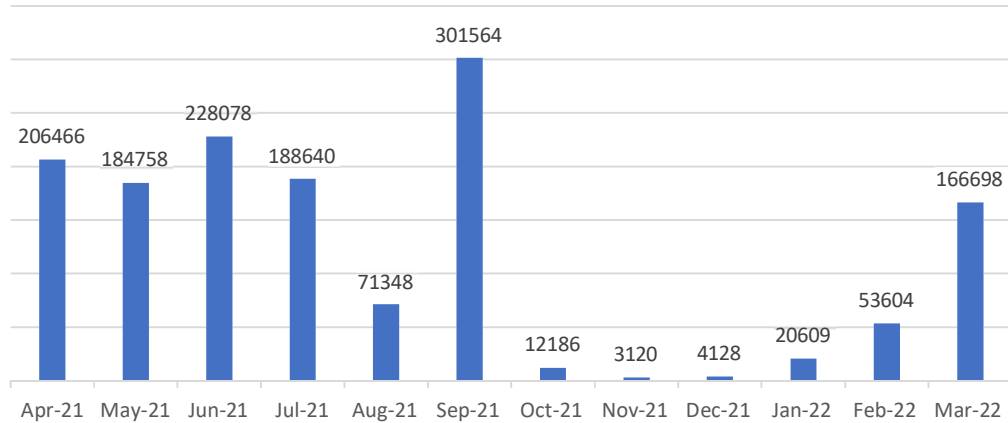
Aruna
Registrar
King George Medical University
Lucknow

Electricity Bill Analysis Connection wise

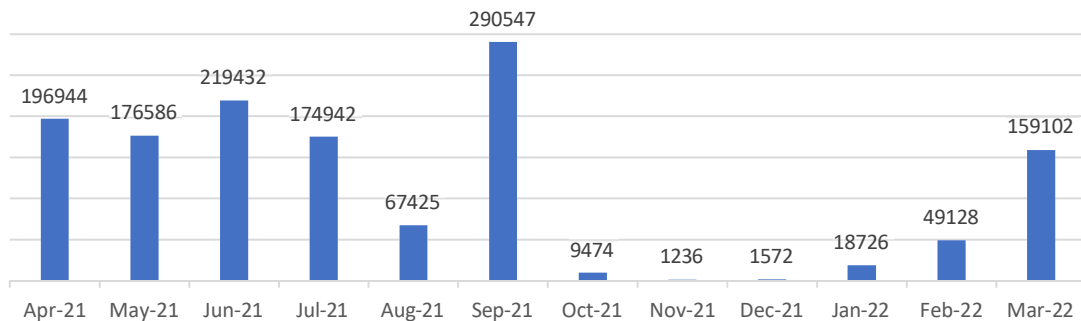
NEW MORTUARY DEPARTMENT A/C NO:- 3747481000

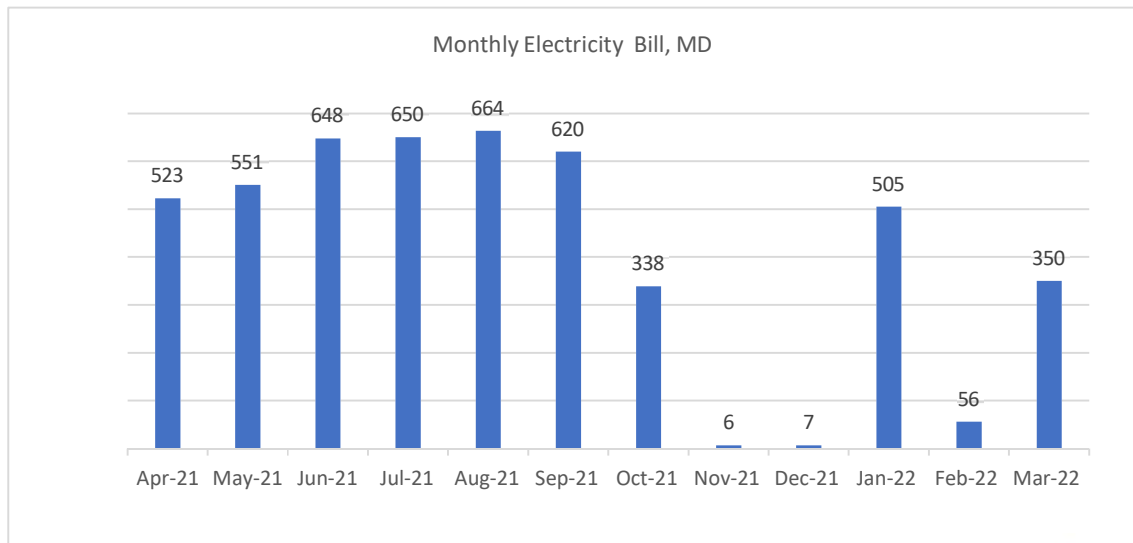
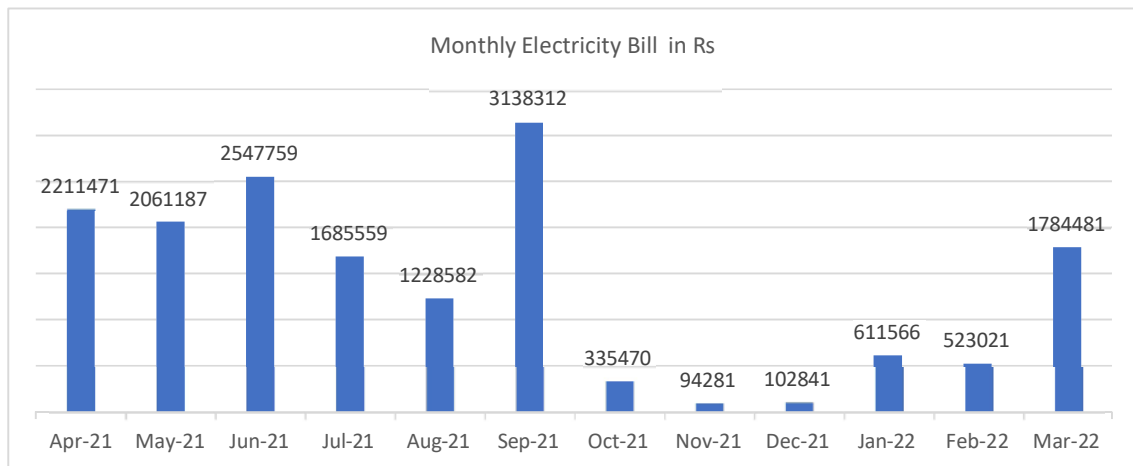
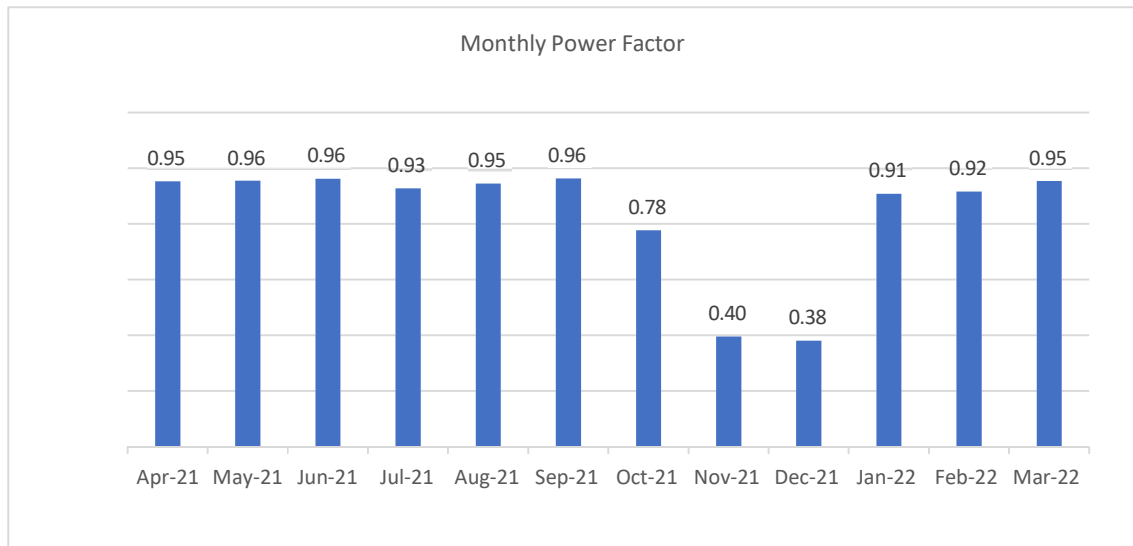
Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	223	523	206466	196944	0.95	1630581.40	198724.80	154295.69	227869.60	2211471	10.7
May-21	223	551	184758	176586	0.96	1459088.20	209258.40	143803.76	249036.80	2061187	11.16
Jun-21	223	648	228078	219432	0.96	1801316.20	246057.60	177750.00	322635.20	2547759	11.17
Jul-21	223	650	188640	174942	0.93	1506402.00	63555.00	115602.00	0.00	1685559	8.94
Aug-21	223	664	71348	67425	0.95	553147.62	252213.80	88273.13	334947.20	1228582	17.22
Sep-21	223	620	301564	290547	0.96	2381857.18	235660.80	218951.97	301841.60	3138312	10.41
Oct-21	223	338	12186	9474	0.78	95769.40	128592.00	23404.91	87704.00	335470	27.53
Nov-21	223	6	3120	1236	0.40	24148.00	63555.00	6577.73	0.00	94281	30.22
Dec-21	223	7	4128	1572	0.38	32111.20	63555.00	7174.97	0.00	102841	24.91
Jan-22	223	505	20609	18726	0.91	162314.26	192021.60	42667.43	214563.20	611566	29.67
Feb-22	223	56	53604	49128	0.92	422976.34	63555.00	36489.85	0.00	523021	9.76
Mar-22	223	350	166698	159102	0.95	1296948.00	176928.00	125829.00	184776.00	1784481	10.70

Monthly Electricity Consumption, kVAh

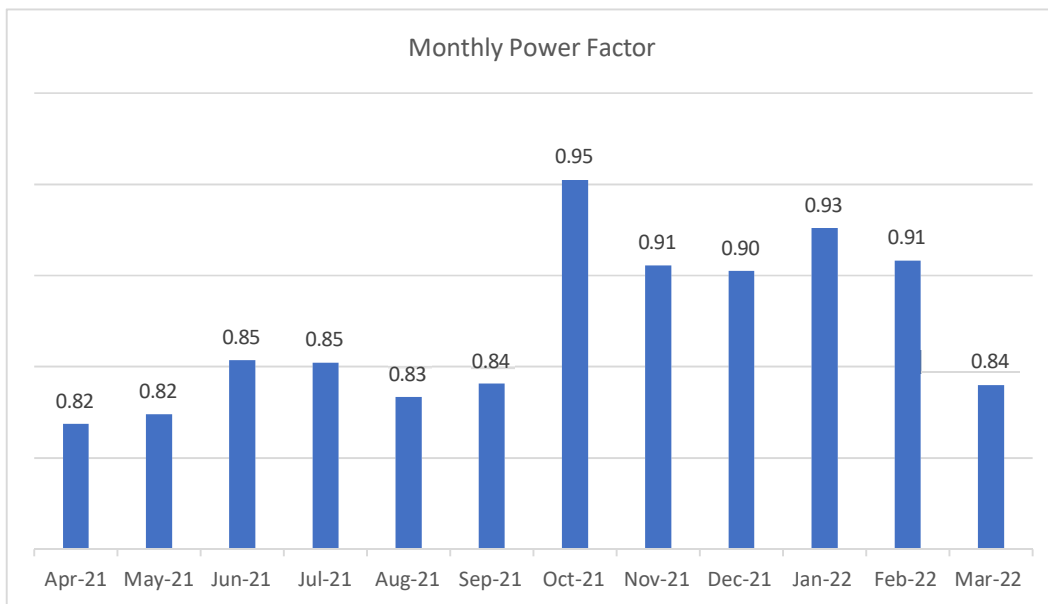
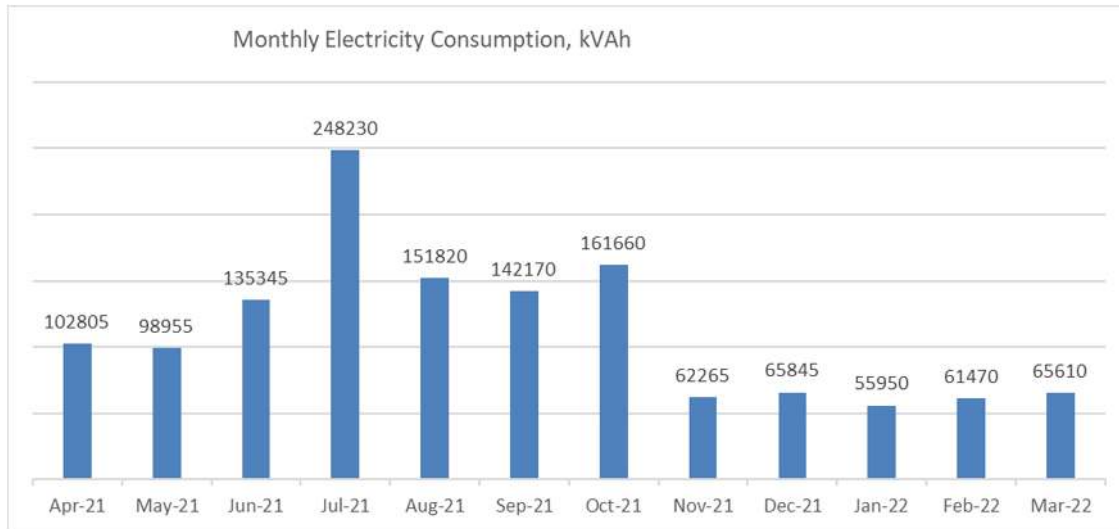


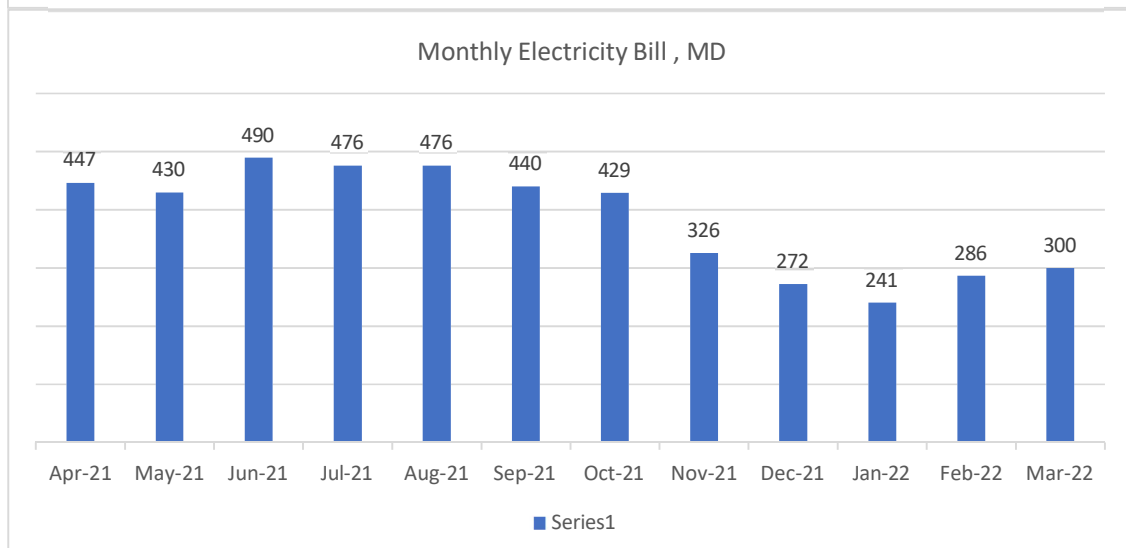
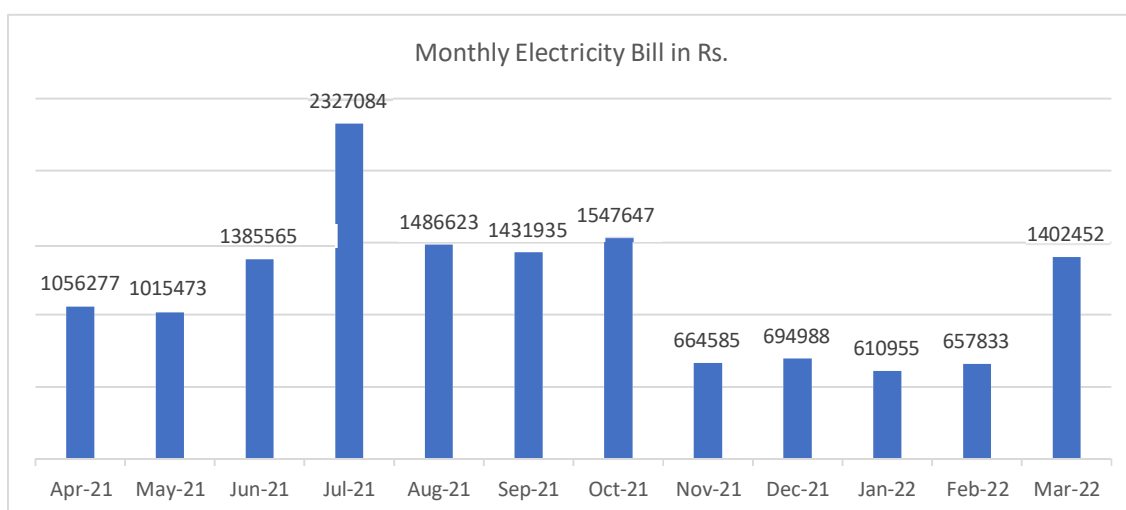
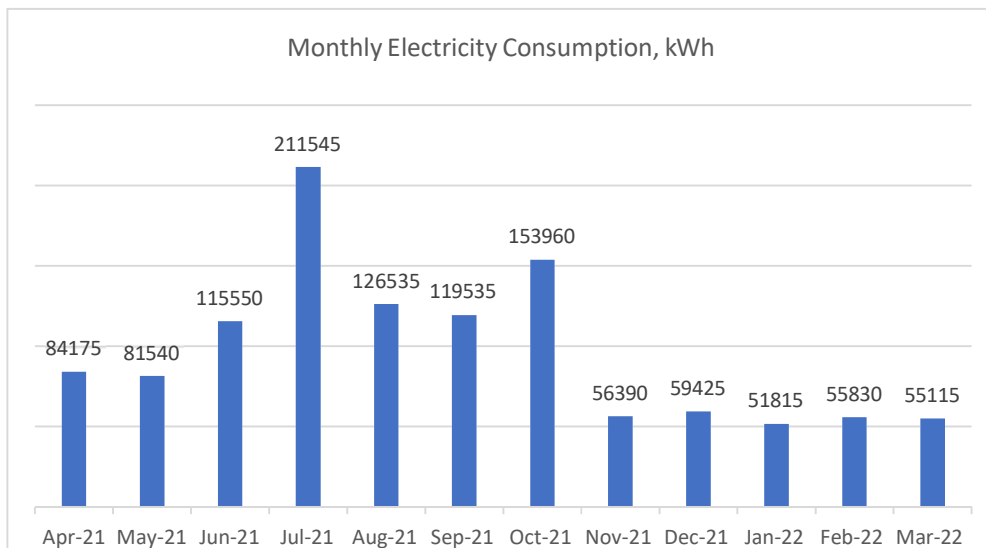
Monthly Electricity Consumption, kWh





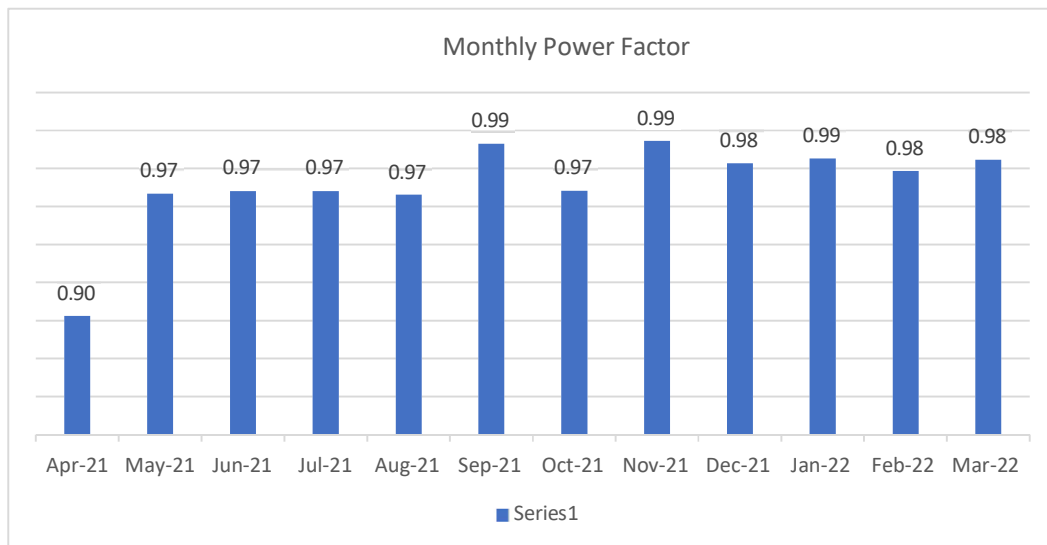
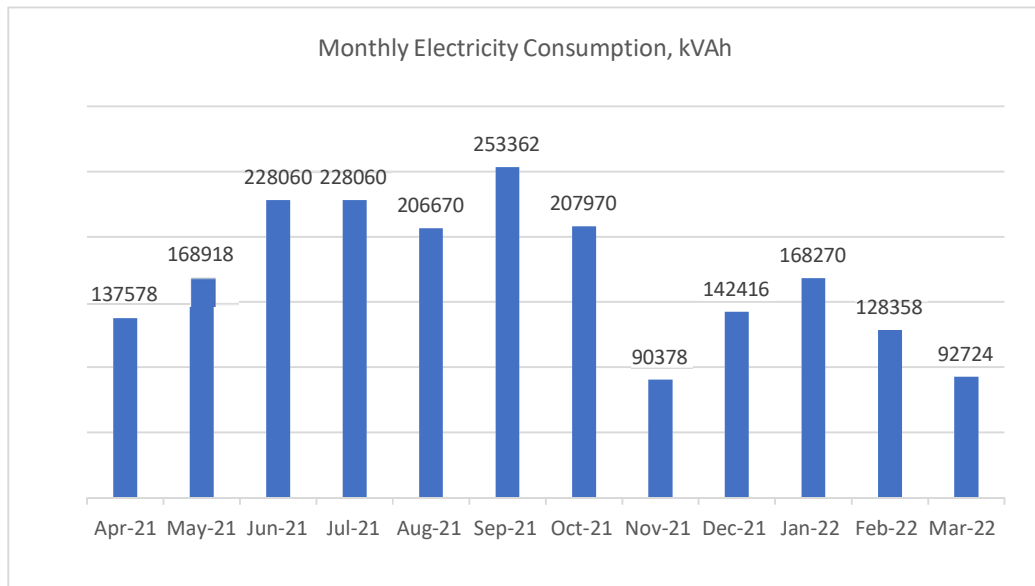
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	445	447	102805	84175	0.82	811659.50	169708.00	73693.76	1216.00	1056277	10.3
May-21	445	430	98955	81540	0.82	781224.50	163400.00	70848.34	0.00	1015473	10.3
Jun-21	445	490	135345	115550	0.85	1068725.50	186124.00	96667.31	34048.00	1385565	10.2
Jul-21	445	476	248230	211545	0.85	1960517.00	180804.00	162354.68	23408.00	2327084	9.4
Aug-21	445	476	151820	126535	0.83	1197298.00	160804.00	105113.25	23408.00	1486623	9.8
Sep-21	445	440	142170	119535	0.84	971193.00	180633.00	99476.00	180633.00	1431935	10.1
Oct-21	445	429	161660	153960	0.95	1276614.00	163058.00	107975.40	0.00	1547647	9.6
Nov-21	445	326	62265	56390	0.91	491393.50	126825.00	46366.39	0.00	664585	10.7
Dec-21	445	272	65845	59425	0.90	519675.50	126825.00	48487.54	0.00	694988	10.6
Jan-22	445	241	55950	51815	0.93	441505.00	126825.00	42624.75	0.00	610955	10.9
Feb-22	445	286	61470	55830	0.91	485113.00	126825.00	45895.35	0.00	657833	10.7
Mar-22	445	300	65610	55115	0.84	724812.00	165585.00	512055.00	0.00	1402452	21.4





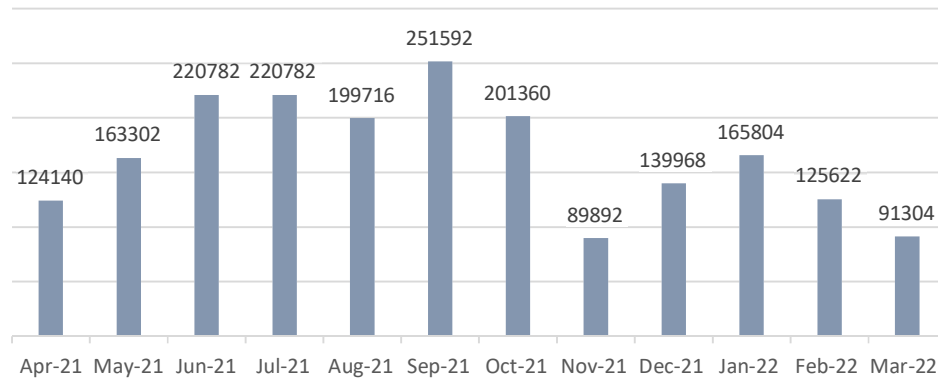
Aruchana
Registrar
 King George Medical University
 Lucknow

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	1137	600	137578	124140	0.90	792993.0	204379.0	102092.0	70558.0	1170022	8.5
May-21	1137	628	168918	163302	0.97	1333952.20	324045.00	124349.79	0.00	1782347	10.6
Jun-21	1137	628	228060	220782	0.97	1801174.00	324945.60	159458.97	0.00	2285579	10.0
Jul-21	1137	855	228060	220782	0.97	1801174.00	324945.60	159458.97	0.00	2285579	10.0
Aug-21	1137	953	206670	199716	0.97	1632193.0	361972.8	149562.4	0.00	2143728	10.4
Sep-21	1137	836	253362	251592	0.99	2001059.80	324045.00	174382.86	0.00	2499488	9.9
Oct-21	1137	500	207970	201360	0.97	1727992.0	254047.0	146896.0	0.00	2128935	10.2
Nov-21	1137	345	90378	89892	0.99	713486.20	324045.00	77814.84	0.00	1115346	12.3
Dec-21	1137	414	142416	139968	0.98	1124586.40	324045.00	108647.36	0.00	1557279	10.9
Jan-22	1137	534	168270	165804	0.99	1328833.00	324045.00	123965.85	0.00	1776844	10.6
Feb-22	1137	505	128358	125622	0.98	1013528.20	324045.00	100317.99	0.00	1437891	11.2
Mar-22	1137	500	92724	91304	0.98	702152.0	324540.0	89205.0	0.0	1115897	12.0

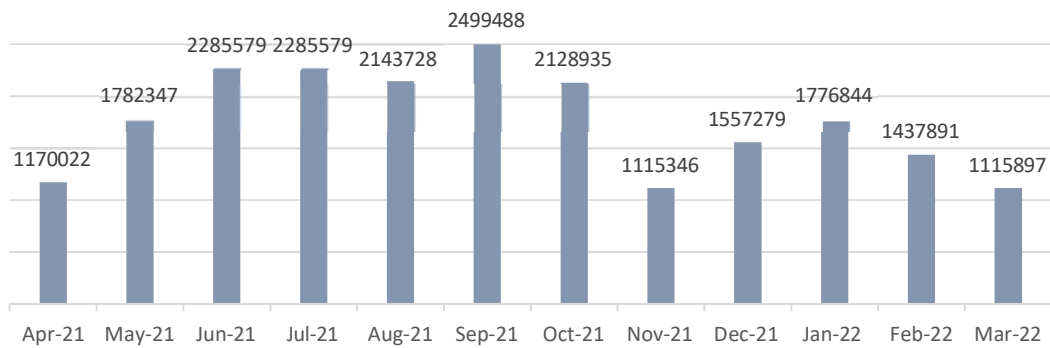


Aruhana
Registrar
King George Medical University
Lucknow

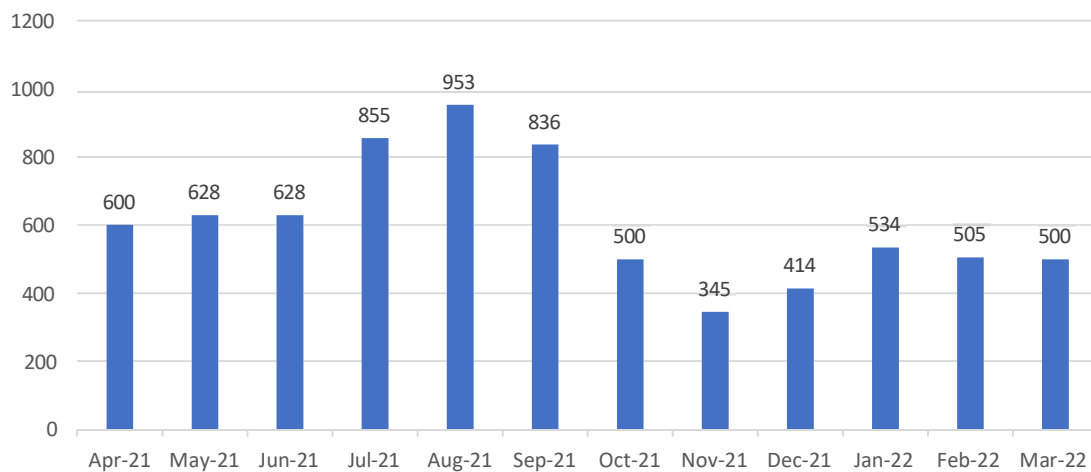
Monthly Electricity Consumption, kWh



Monthly Electricity Bill, Rs.



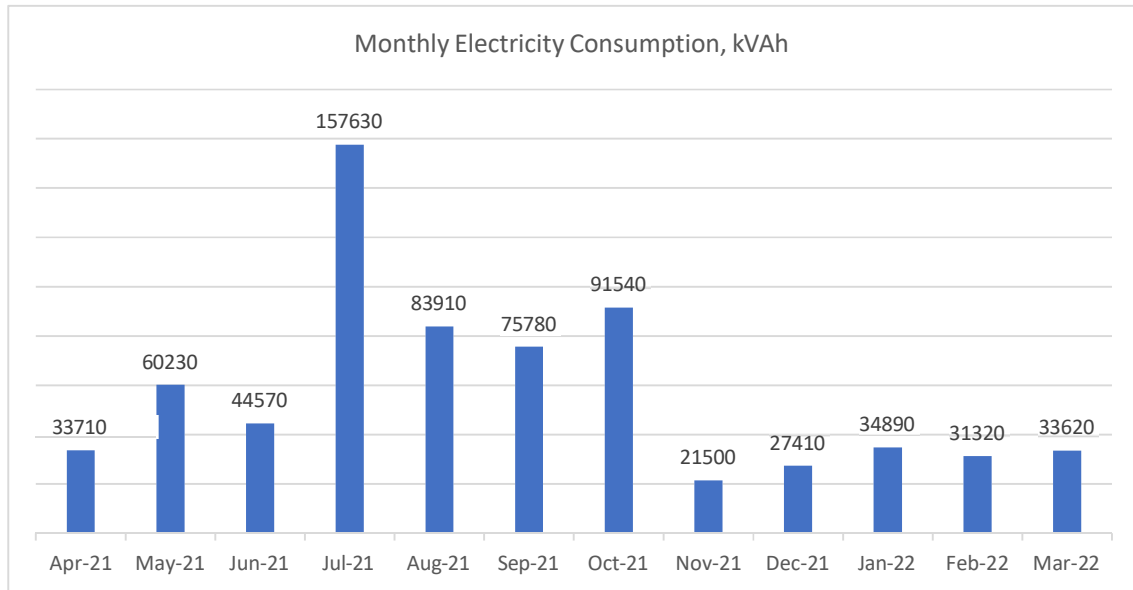
Monthly Electricity Bill, MD



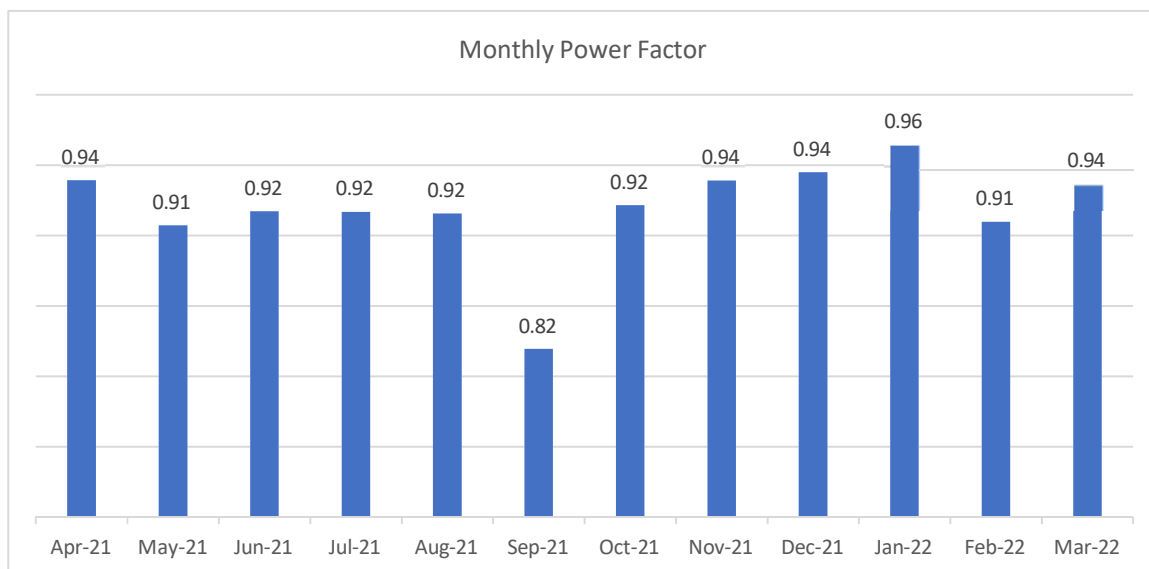
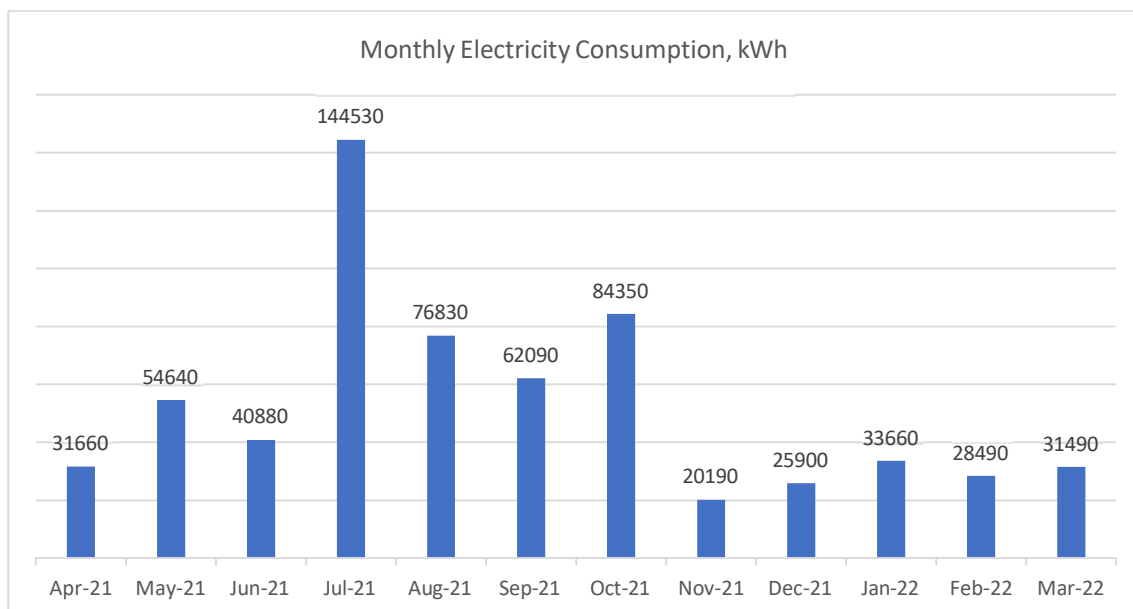
Aruna
Registrar
 King George Medical University
 Lucknow

Account No. 5134370261; New Dental Extension Block ; 703688 Registrar , KGMU

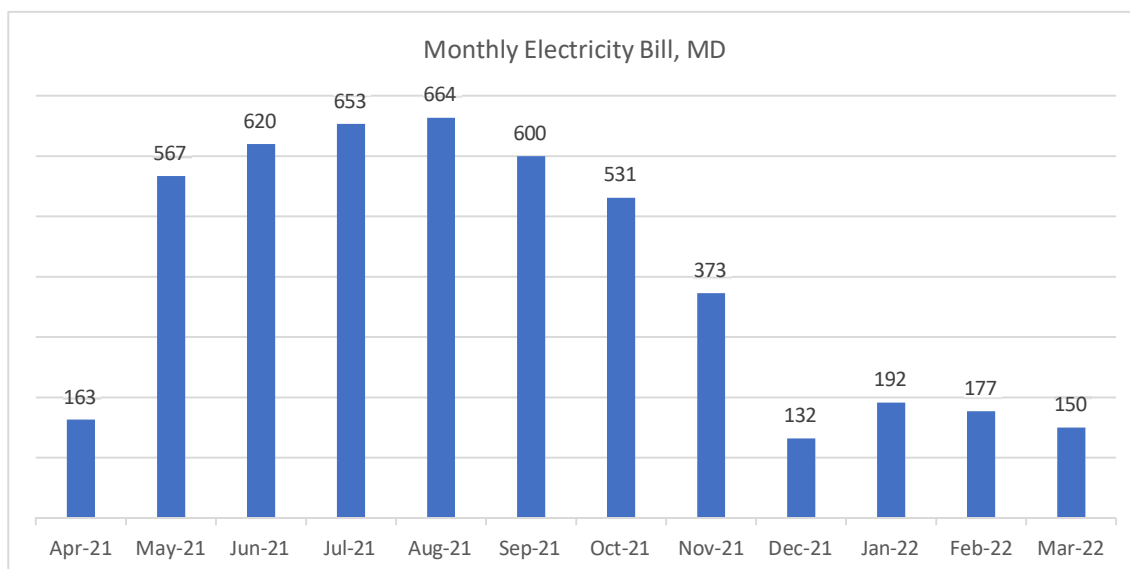
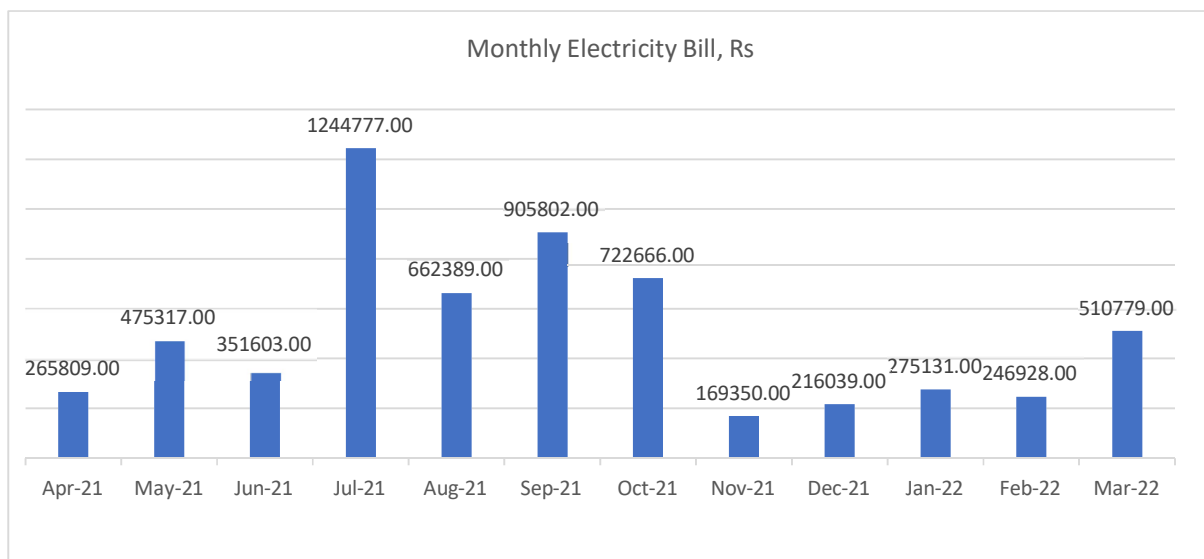
Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	737	163	33710	31660	0.94	265809.00	210045.00	35689.05	0.00	511543	15.2
May-21	737	567	60230	54640	0.91	475317.00	215460.00	51808.28	0.00	742585	12.3
Jun-21	737	620	44570	40880	0.92	351603.00	235562.00	44037.38	0.00	631202	14.2
Jul-21	737	653	157630	144530	0.92	1244777.00	248216.00	111974.48	0.00	1604967	10.2
Aug-21	737	664	83910	76830	0.92	662389.00	262206.00	68594.83	0.00	993190	11.8
Sep-21	737	600	75780	62090	0.82	905802.00	226138.00	61823.00	0.00	1193763	15.8
Oct-21	737	531	91540	84350	0.92	722666.00	210045.00	69953.33	0.00	1002664	11.0
Nov-21	737	373	21500	20190	0.94	169350.00	210045.00	28454.63	0.00	407850	19.0
Dec-21	737	132	27410	25900	0.94	216039.00	210045.00	31956.30	0.00	458040	16.7
Jan-22	737	192	34890	33660	0.96	275131.00	210045.00	36388.20	0.00	521564	14.9
Feb-22	737	177	31320	28490	0.91	246928.00	210045.00	34272.98	0.00	491246	15.7
Mar-22	737	150	33620	31490	0.94	510779.00	210045.00	35635.00	0.00	756459	22.5



Aruna
Registrar
 King George Medical University
 Lucknow



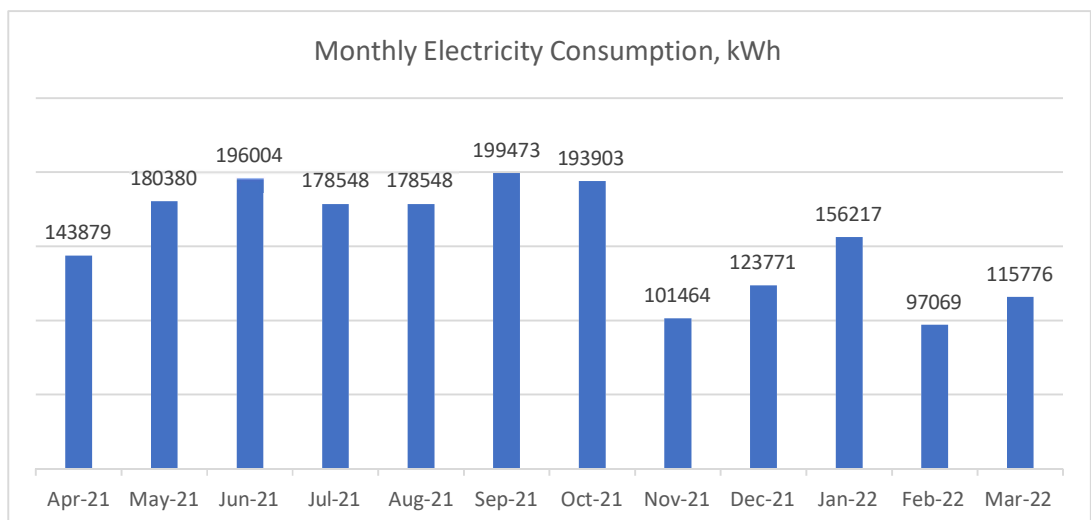
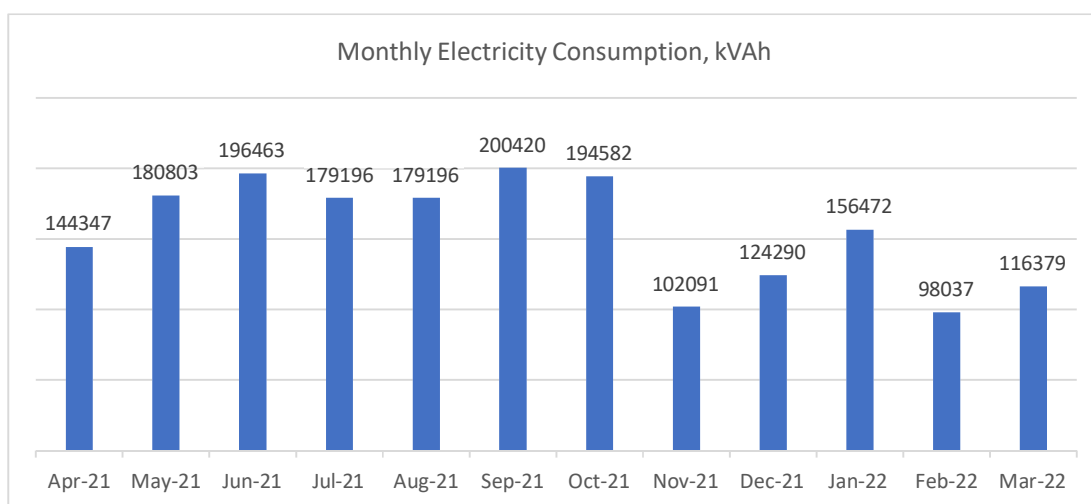
Arunima
Registrar
 King George Medical University
 Lucknow



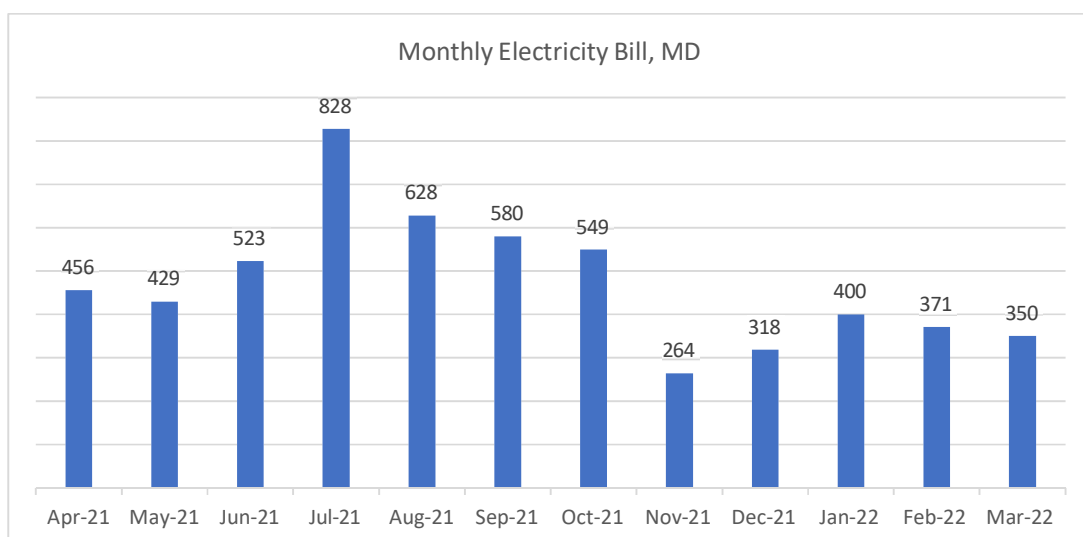
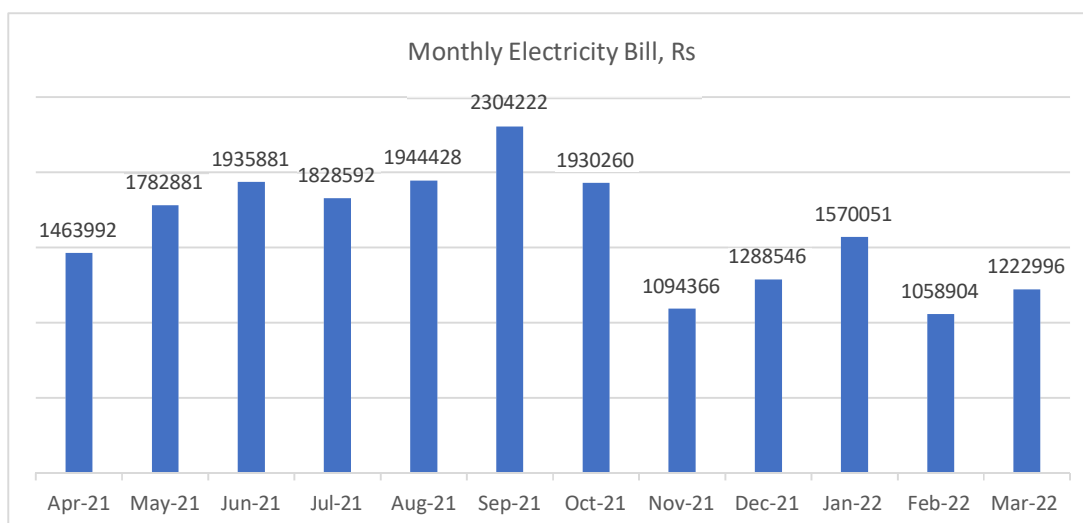
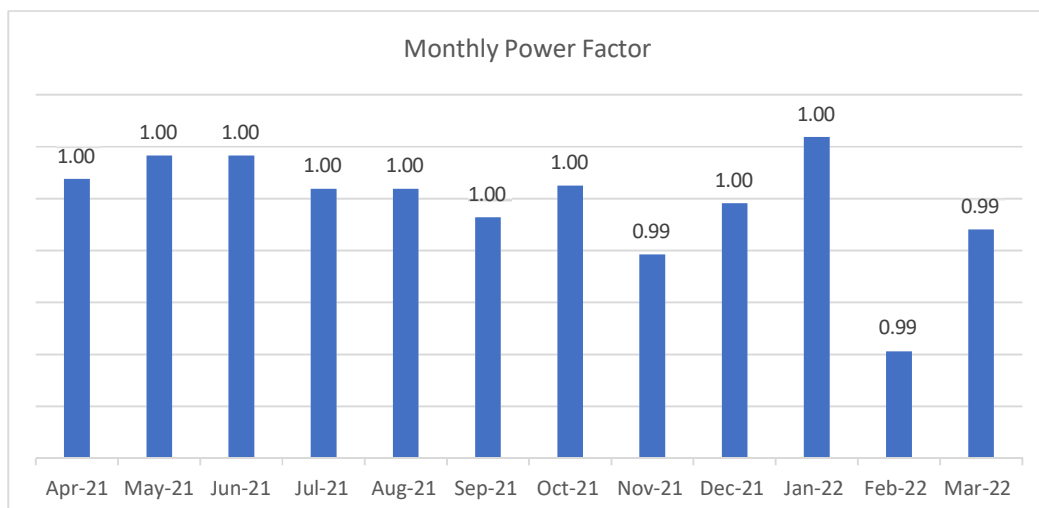
Account No. 9547481000; Cobalt substation; 613917 Registrar, KGMU

Aruna
Registrar
 King George Medical University
 Lucknow

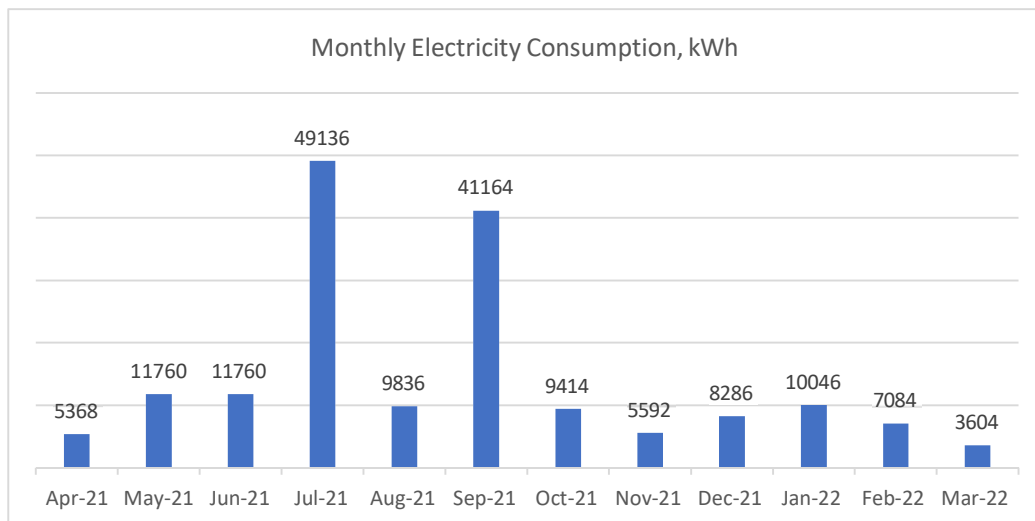
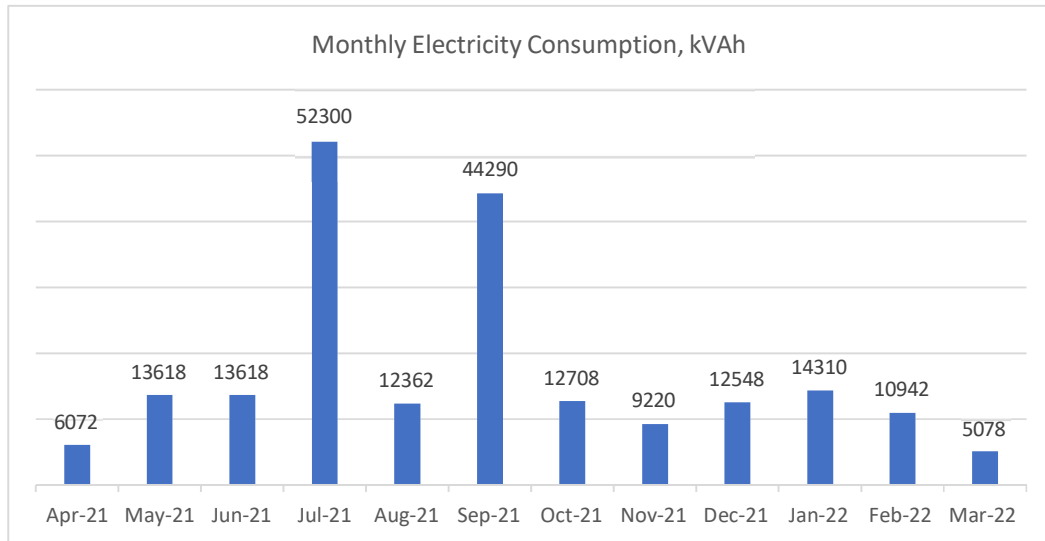
Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	659	456	144347	143879	1.00	1174038.54	187815.00	102138.87	0.00	1463992	10.1
May-21	659	429	180803	180380	1.00	1470679.01	187815.00	124387.05	0.00	1782881	9.9
Jun-21	659	523	196463	196004	1.00	1598104.43	202714.80	135061.44	0.00	1935881	9.9
Jul-21	659	828	179196	178548	1.00	1457602.85	243412.80	127576.17	0.00	1828592	10.2
Aug-21	659	628	179196	178548	1.00	1457602.85	243412.80	243412.80	0.00	1944428	10.9
Sep-21	659	580	200420	199473	1.00	1973197.00	194188.00	136837.00	0.00	2304222	11.5
Oct-21	659	549	194582	193903	1.00	1582798.73	212792.40	134669.33	0.00	1930260	9.9
Nov-21	659	264	102091	101464	0.99	830199.47	187815.00	76351.09	0.00	1094366	10.7
Dec-21	659	318	124290	123771	1.00	1010832.73	187815.00	89898.58	0.00	1288546	10.4
Jan-22	659	400	156472	156217	1.00	1272697.66	187815.00	109538.45	0.00	1570051	10.0
Feb-22	659	371	98037	97069	0.99	797212.07	187815.00	73877.03	0.00	1058904	10.8
Mar-22	659	350	116379	115776	0.99	950110.00	187815.00	85071.00	0.00	1222996	10.5

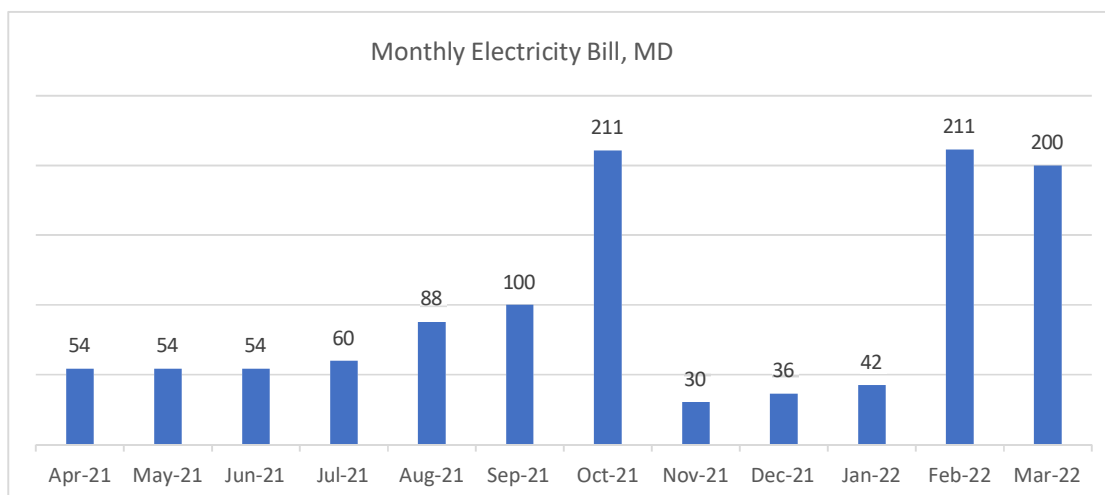
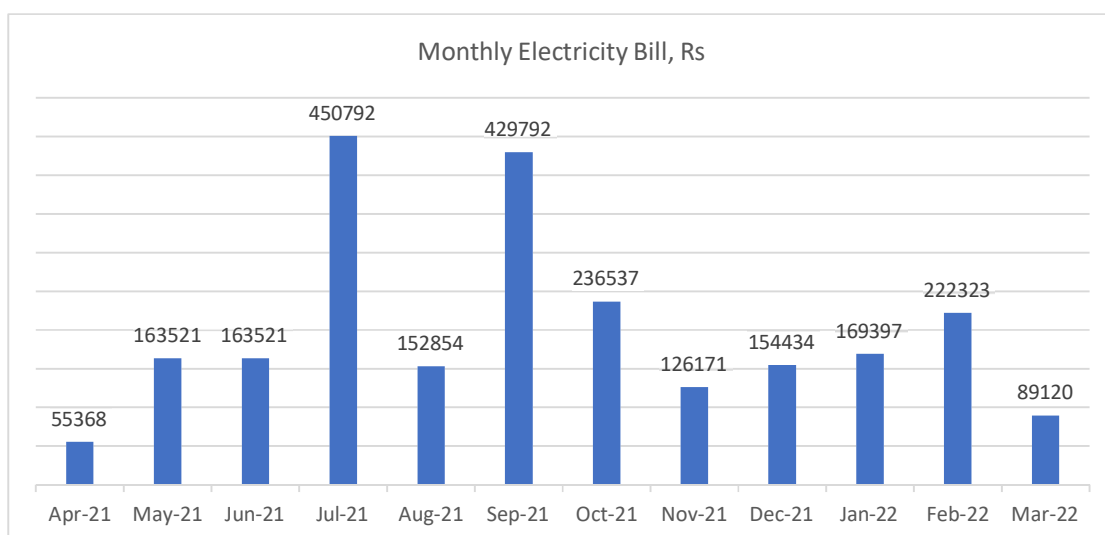
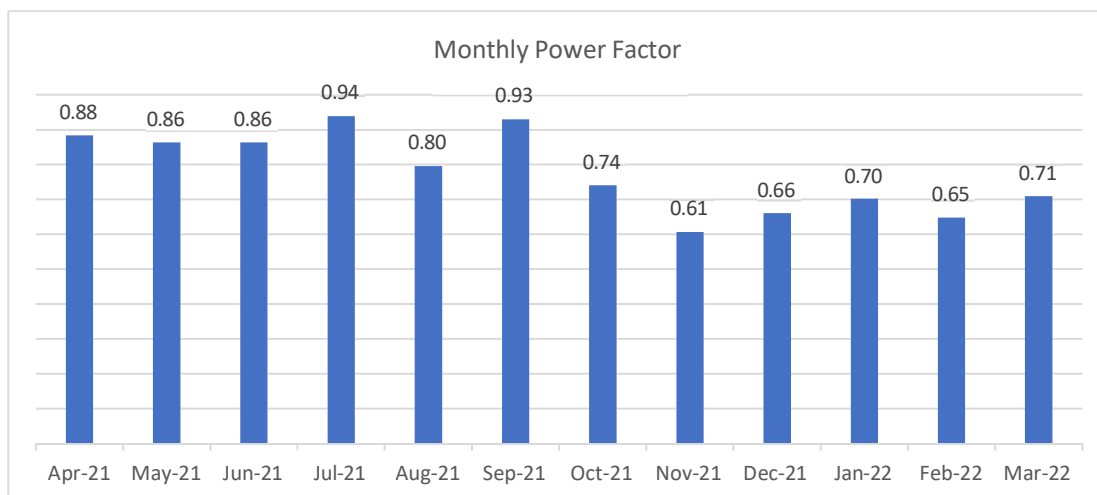


Anurupa
Registrar
 King George Medical University
 Lucknow



Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	158	54	6072	5368	0.88	5545.00	43035.00	6788.00	0.00	55368	9.12
May-21	158	54	13618	11760	0.86	107082.20	45030.00	11408.42	0.00	163521	12.01
Jun-21	158	54	13618	11760	0.86	107082.20	45030.00	11408.42	0.00	163521	12.01
Jul-21	158	60	52300	49136	0.94	371434.00	45030.00	34328.00	0.00	450792	8.62
Aug-21	158	88	12362	9836	0.80	97159.80	45030.00	10664.24	0.00	152854	12.36
Sep-21	158	100	44290	41164	0.93	355181.00	45030.00	29581.00	0.00	429792	9.70
Oct-21	158	211	12708	9414	0.74	99893.20	80073.60	16502.55	40067.20	236537	18.61
Nov-21	158	30	9220	5592	0.61	72338.00	45030.00	8802.60	0.00	126171	13.68
Dec-21	158	36	12548	8286	0.66	98629.20	45030.00	10774.44	0.00	154434	12.31
Jan-22	158	42	14310	10046	0.70	112549.00	45030.00	11818.43	0.00	169397	11.84
Feb-22	158	211	10942	7084	0.65	85941.80	80316.80	15510.92	40553.60	222323	20.32
Mar-22	158	200	5078	3604	0.71	40441.00	45030.00	3649.00	0.00	89120	17.55

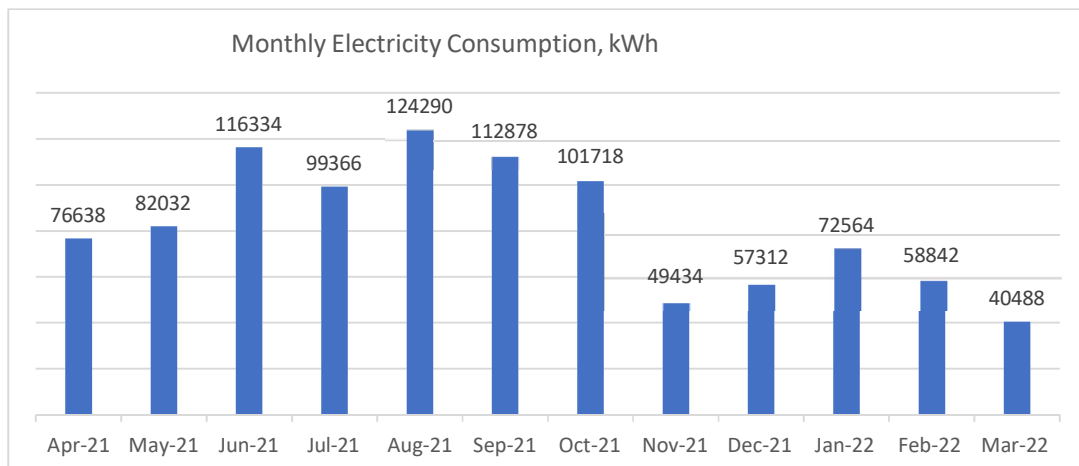
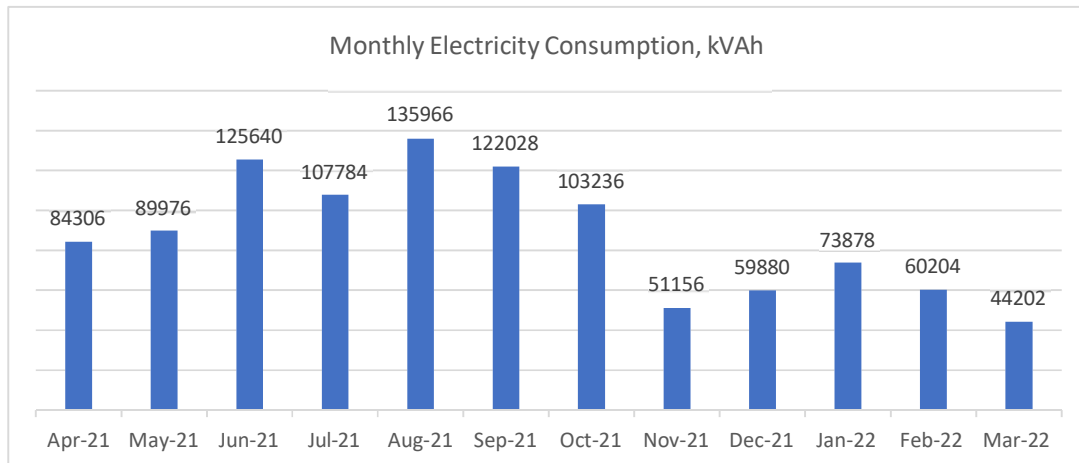




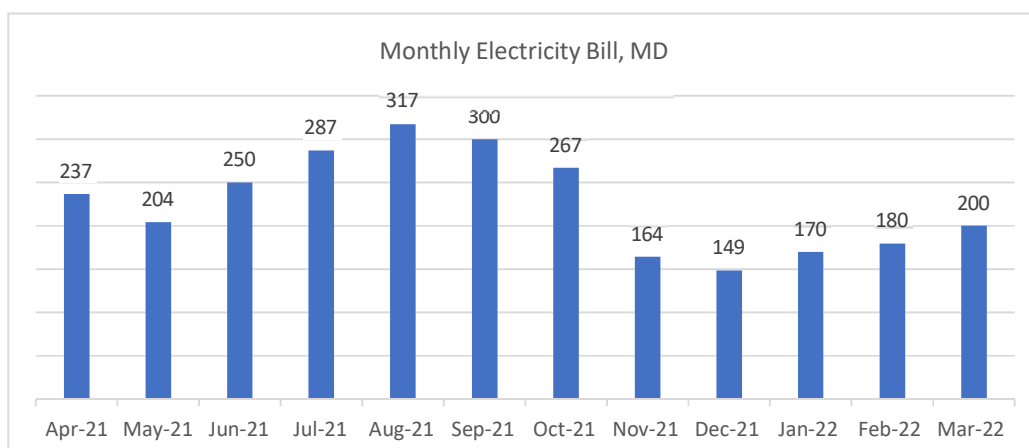
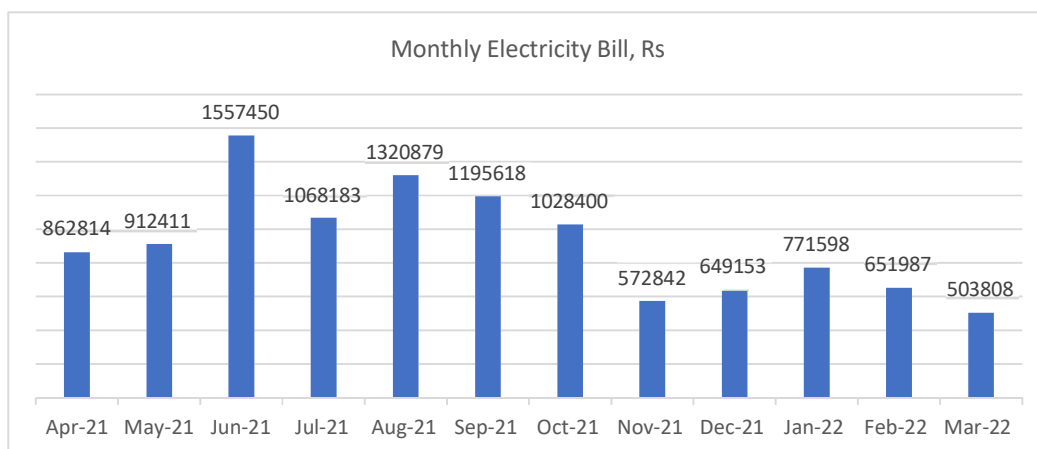
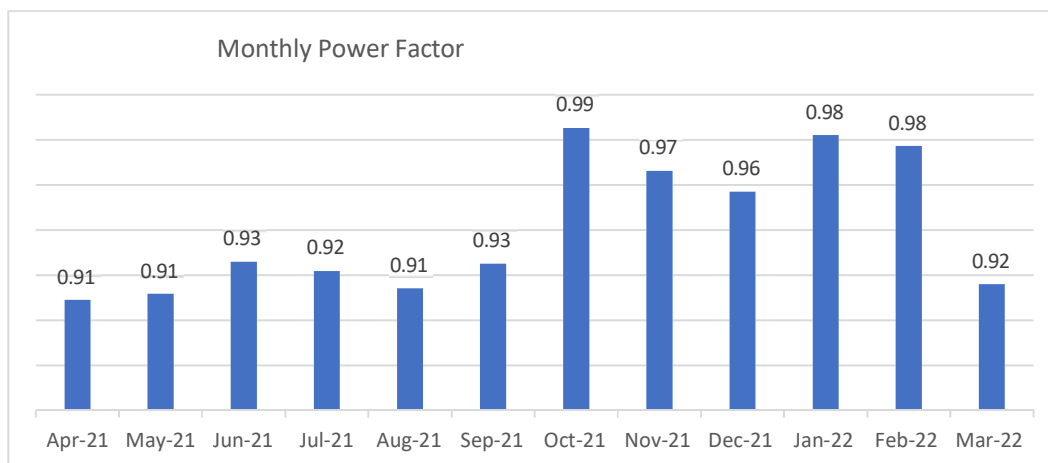
Aruchana
Registrar
 King George Medical University
 Lucknow

Account No. 7547481000; Queen marry Hospital; 30339 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	411	237	84306	76638	0.91	685482.92	117135.00	60196.34	0.00	862814	10.2
May-21	411	204	89976	82032	0.91	731619.71	117135.00	63656.60	0.00	912411	10.1
Jun-21	411	250	125640	116334	0.93	1345139.00	126209.00	86102.00	0.00	1557450	12.4
Jul-21	411	287	107784	99366	0.92	876523.41	117135.00	74524.38	0.00	1068183	9.9
Aug-21	411	317	135966	124290	0.91	1105840.34	122884.40	92154.38	0.00	1320879	9.7
Sep-21	411	300	122028	112878	0.93	995266.00	117135.00	83217.00	0.00	1195618	9.8
Oct-21	411	267	103236	101718	0.99	839516.33	117135.00	71748.85	0.00	1028400	10.0
Nov-21	411	164	51156	49434	0.97	415741.37	117135.00	39965.73	0.00	572842	11.2
Dec-21	411	149	59880	57312	0.96	486728.56	117135.00	45289.77	0.00	649153	10.8
Jan-22	411	170	73878	72564	0.98	600630.29	117135.00	53832.40	0.00	771598	10.4
Feb-22	411	180	60204	58842	0.98	489364.95	117135.00	45487.50	0.00	651987	10.8
Mar-22	411	200	44202	40488	0.92	350952.00	117135.00	35721.00	0.00	503808	11.4



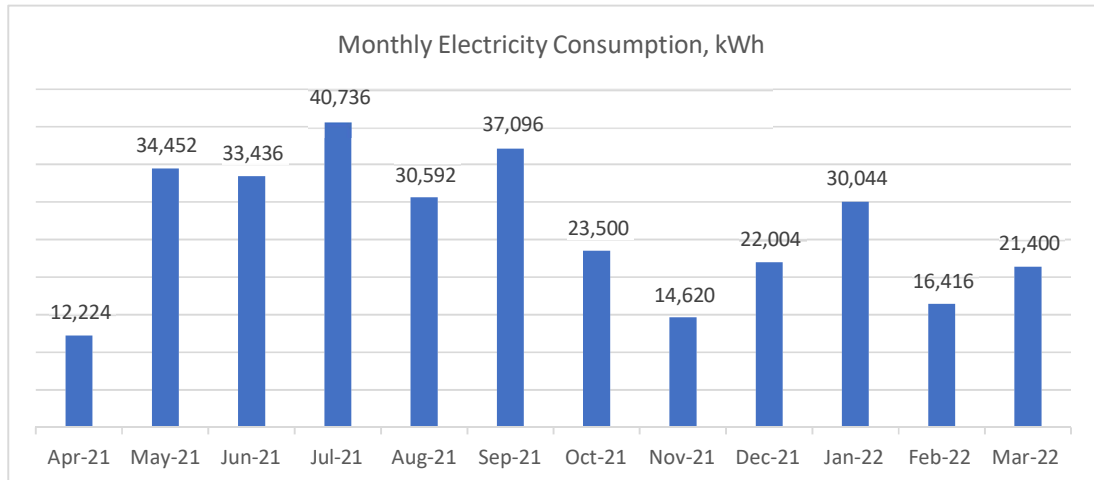
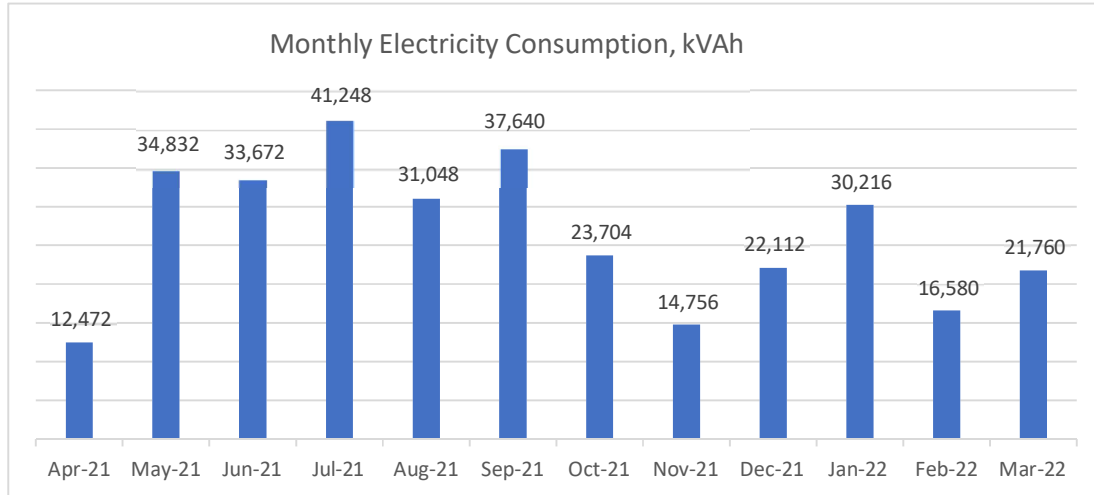
Aruna
Registrar
 King George Medical University
 Lucknow



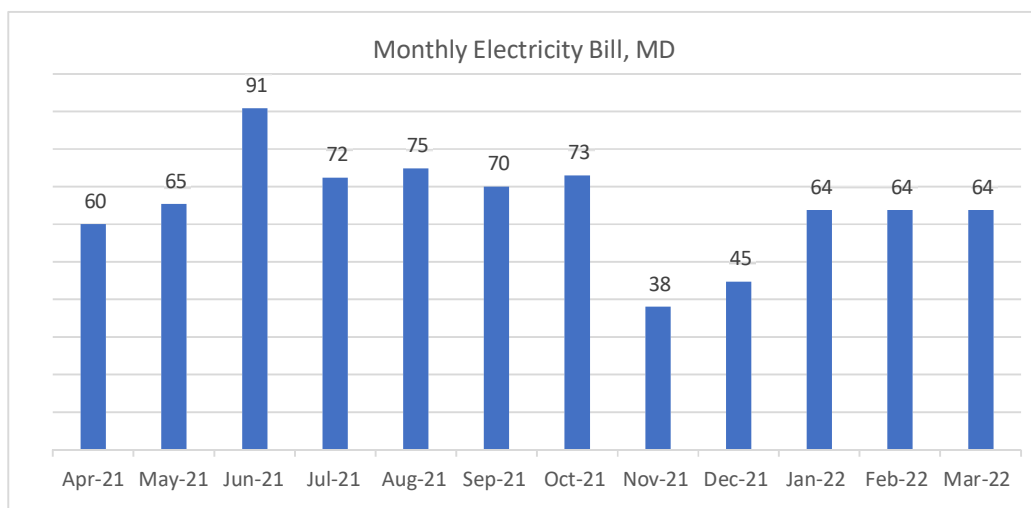
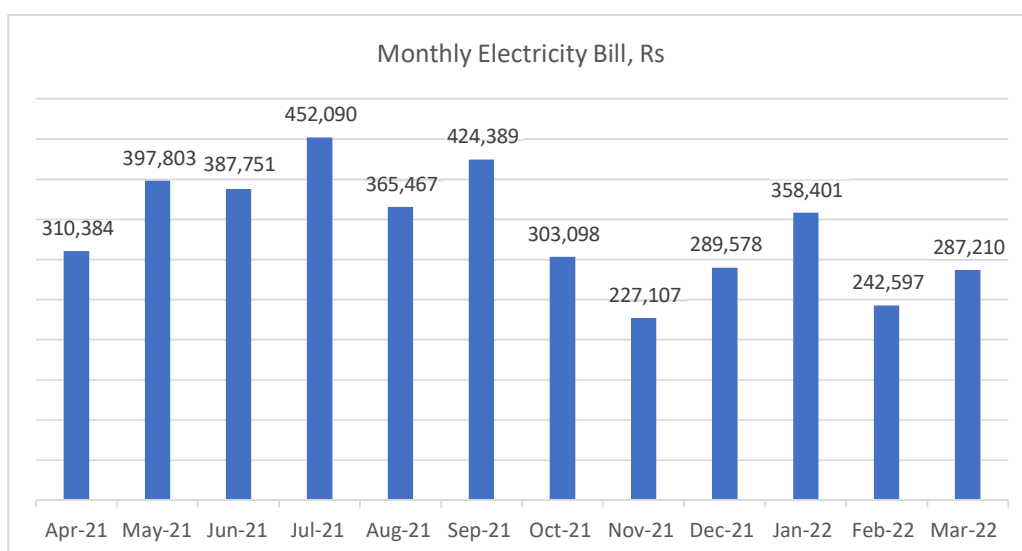
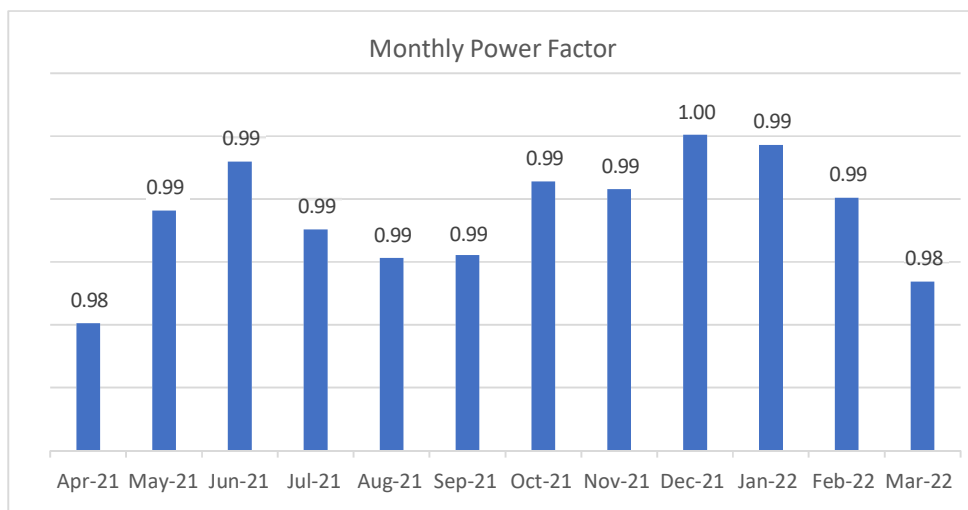
Aruna
Registrar
 King George Medical University
 Lucknow

Account No. 4540285915; QMH(New 100 Bedded hospital); 4540285915 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	333.33	60	12,472	12,224	0.98	2,00,703.00	95,190.00	14,491.00	0.00	3,10,384	24.9
May-21	333.33	65	34,832	34,452	0.99	2,74,872.80	95,190.00	27,739.71	0.00	3,97,803	11.4
Jun-21	333.33	91	33,672	33,436	0.99	2,65,508.80	95,190.00	27,052.41	0.00	3,87,751	11.5
Jul-21	333.33	72	41,248	40,736	0.99	3,25,359.20	95,190.00	31,541.19	0.00	4,52,090	11.0
Aug-21	333.33	75	31,048	30,592	0.99	2,44,779.20	95,190.00	25,497.69	0.00	3,65,467	11.8
Sep-21	333.33	70	37,640	37,096	0.99	2,99,796.00	95,190.00	29,403.00	0.00	4,24,389	11.3
Oct-21	333.33	73	23,704	23,500	0.99	1,86,761.60	95,190.00	21,146.37	0.00	3,03,098	12.8
Nov-21	333.33	38	14,756	14,620	0.99	1,16,072.40	95,190.00	15,844.68	0.00	2,27,107	15.4
Dec-21	333.33	45	22,112	22,004	1.00	1,74,184.80	95,190.00	20,203.11	0.00	2,89,578	13.1
Jan-22	333.33	64	30,216	30,044	0.99	2,38,206.40	95,190.00	25,004.73	0.00	3,58,401	11.9
Feb-22	333.33	64	16,580	16,416	0.99	1,30,482.00	95,190.00	16,925.40	0.00	2,42,597	14.6
Mar-22	333.33	64	21,760	21,400	0.98	1,90,026.00	95,190.00	1,994.00	0.00	2,87,210	13.2



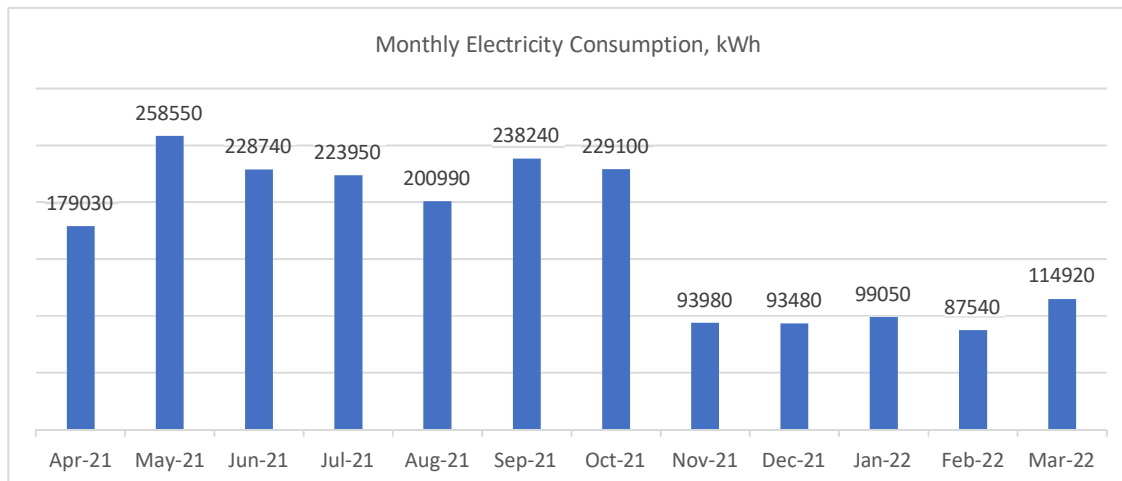
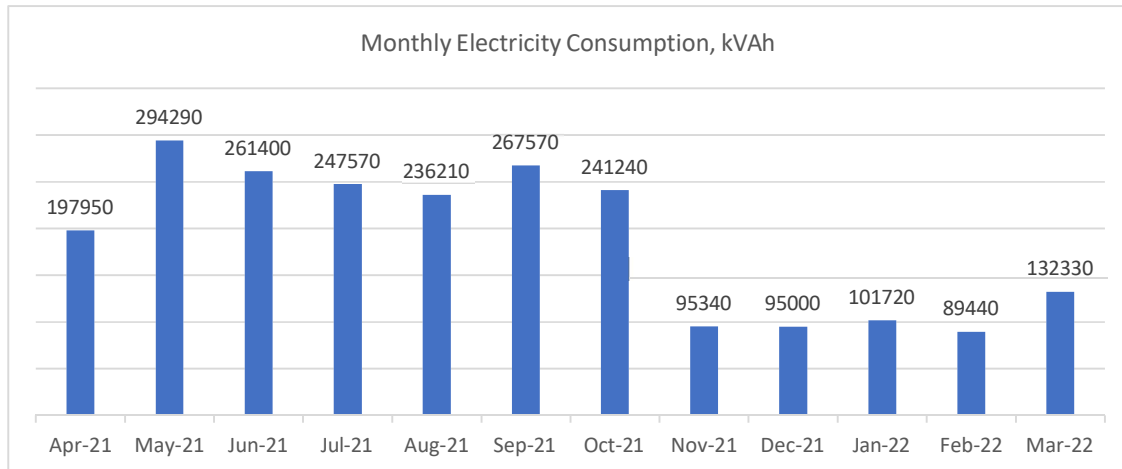
Aradhana
Registrar
King George Medical University
Lucknow



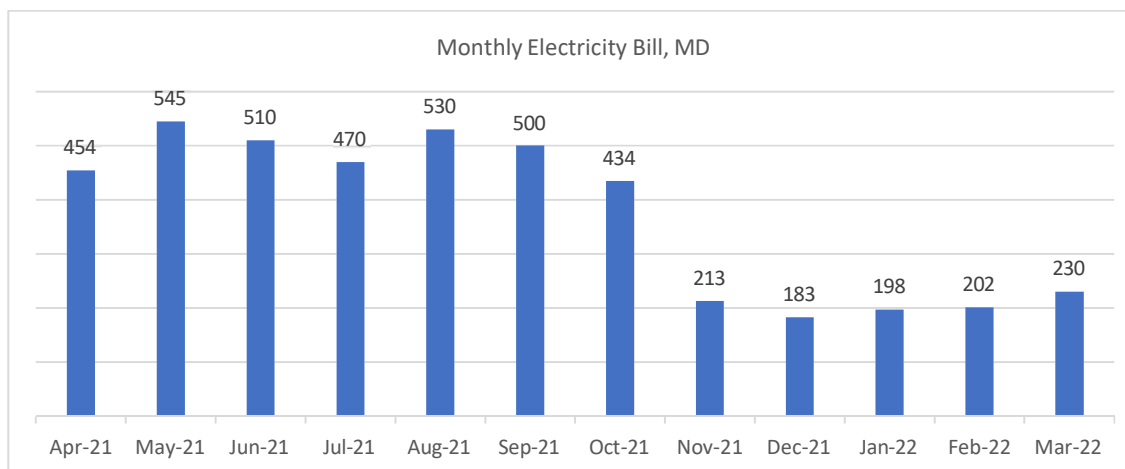
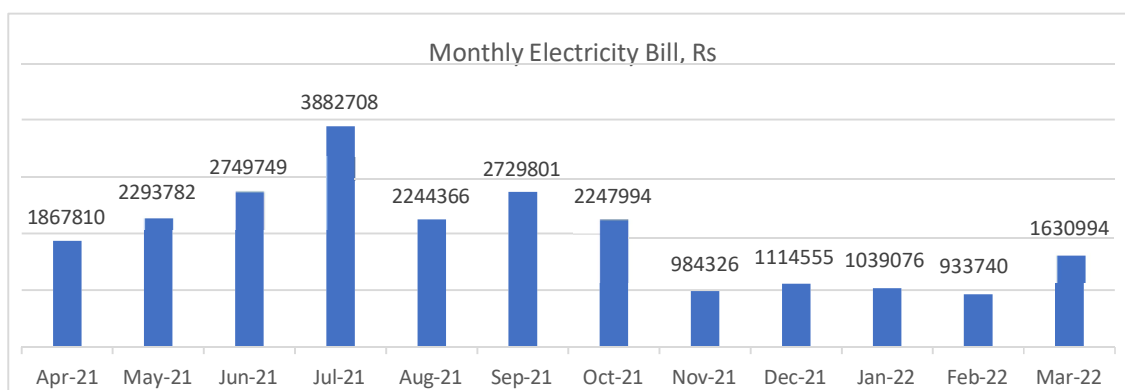
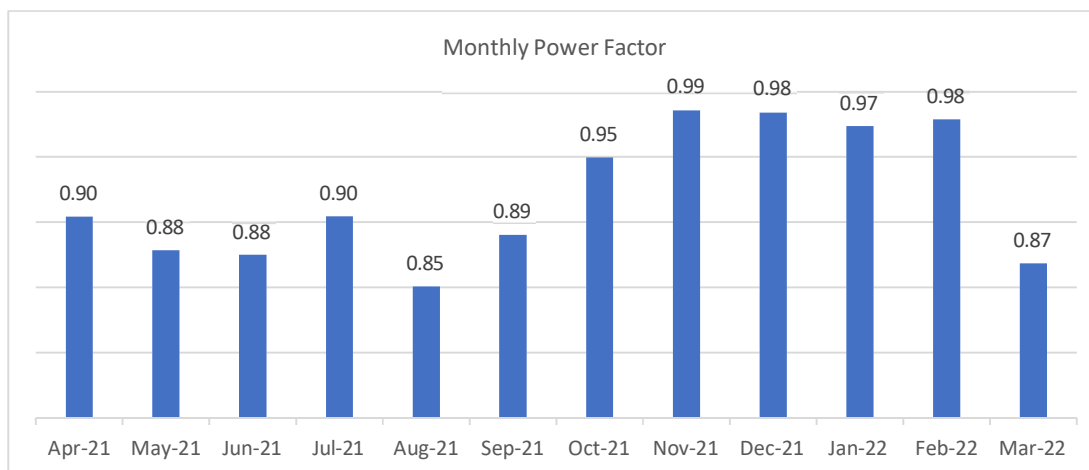
Archan
Registrar
 King George Medical University
 Lucknow

Account No. 5747481000; Trauma Center; 689414 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	540	454	197950	179030	0.90	1883305.00	174192.00	130312.28	0.00	1867810	9.4
May-21	540	545	294290	258550	0.88	2324391.00	207024.00	190129.73	0.00	2293782	7.8
Jun-21	540	510	261400	228740	0.88	2392945.00	168932.00	187872.00	0.00	2749749	10.5
Jul-21	540	470	247570	223950	0.90	1955303.00	178448.00	160031.33	0.00	3882708	15.7
Aug-21	540	530	236210	200990	0.85	1863339.00	201552.00	155033.33	0.00	2244366	9.5
Sep-21	540	500	267570	238240	0.89	2345873.00	209152.00	174776.00	0.00	2729801	10.2
Oct-21	540	434	241240	229100	0.95	1905296.00	165072.00	155277.60	0.00	2247994	9.3
Nov-21	540	213	95340	93980	0.99	752656.00	153900.00	67993.95	0.00	984326	10.3
Dec-21	540	183	95000	93480	0.98	750000.00	153900.00	67792.50	0.00	1114555	11.7
Jan-22	540	198	101720	99050	0.97	803088.00	153900.00	71774.10	0.00	1039076	10.2
Feb-22	540	202	89440	87540	0.98	706076.00	153900.00	64498.20	0.00	933740	10.4
Mar-22	540	230	132330	114920	0.87	1367657.00	172064.00	91273.00	0.00	1630994	12.3



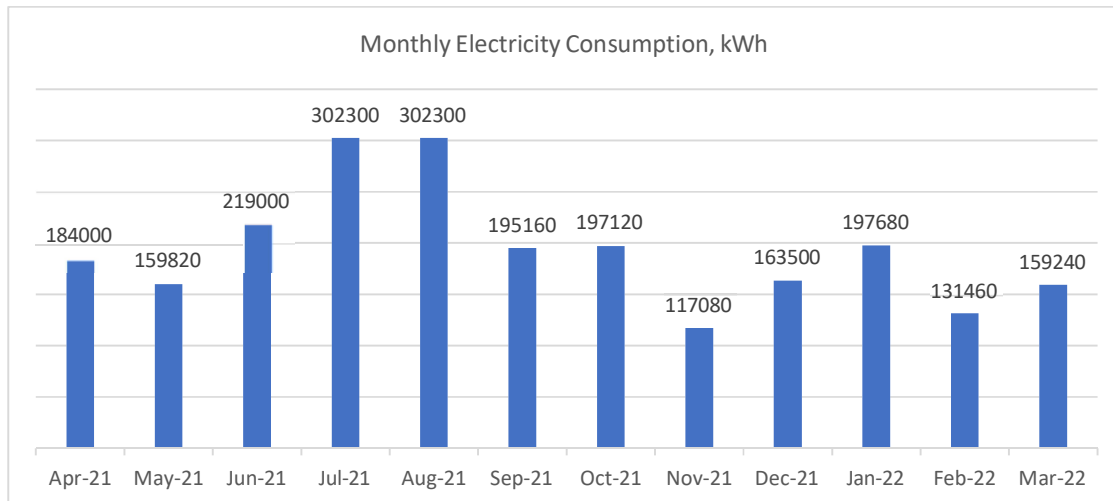
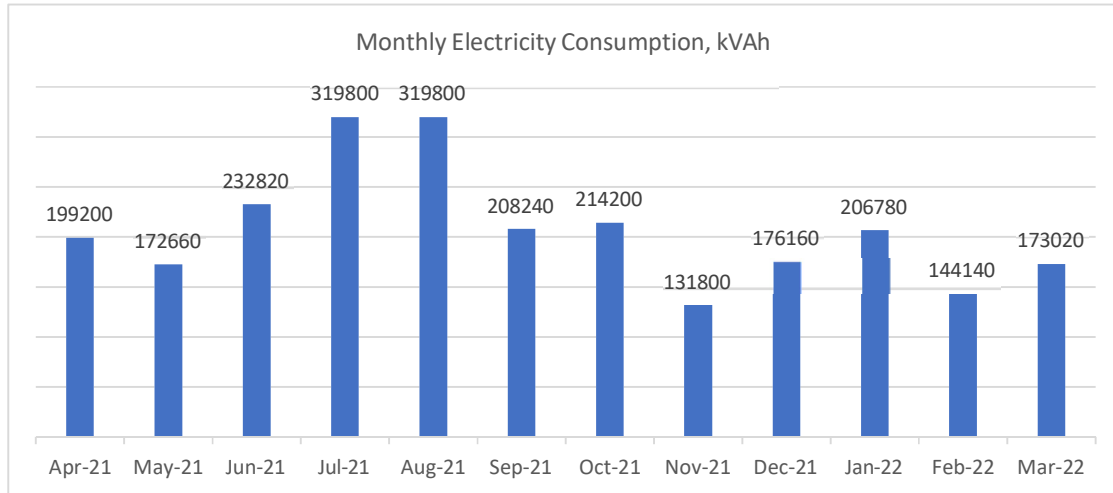
Arshana
Registrar
King George Medical University
Lucknow



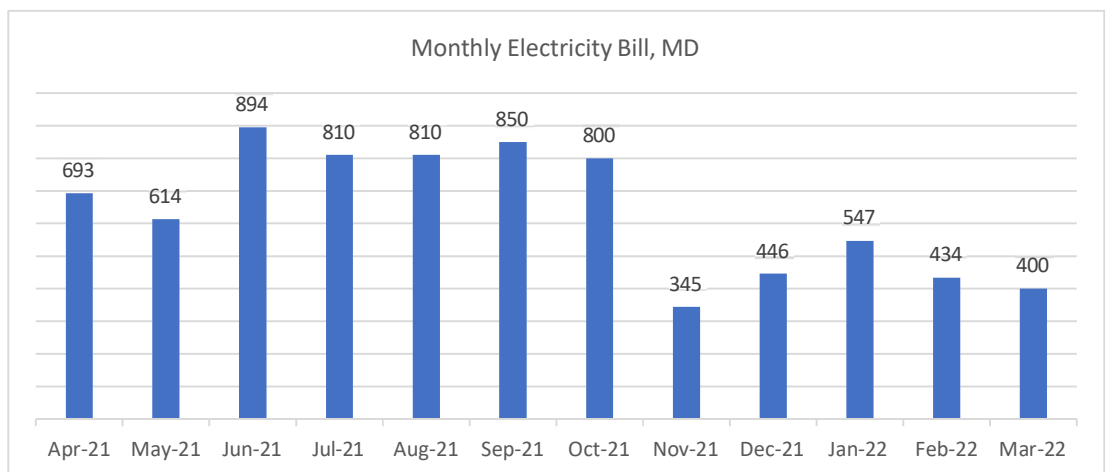
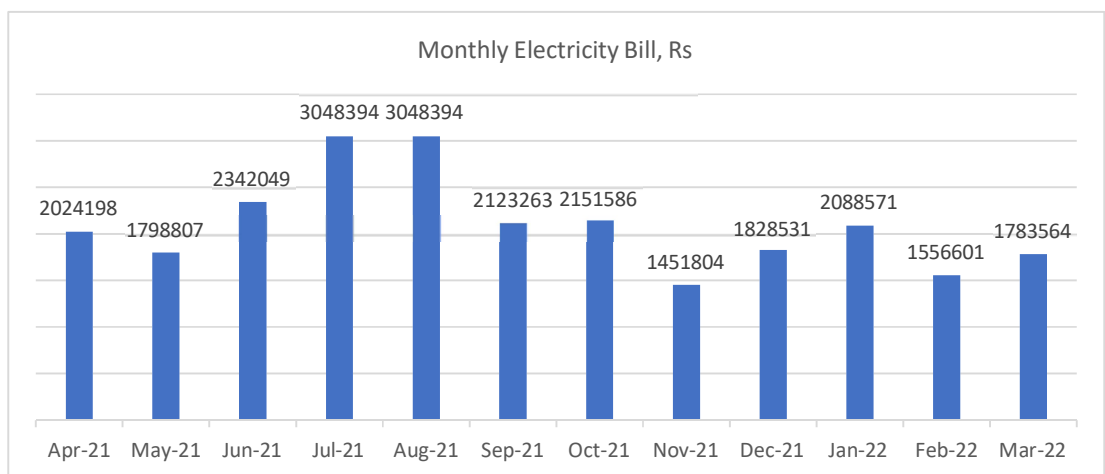
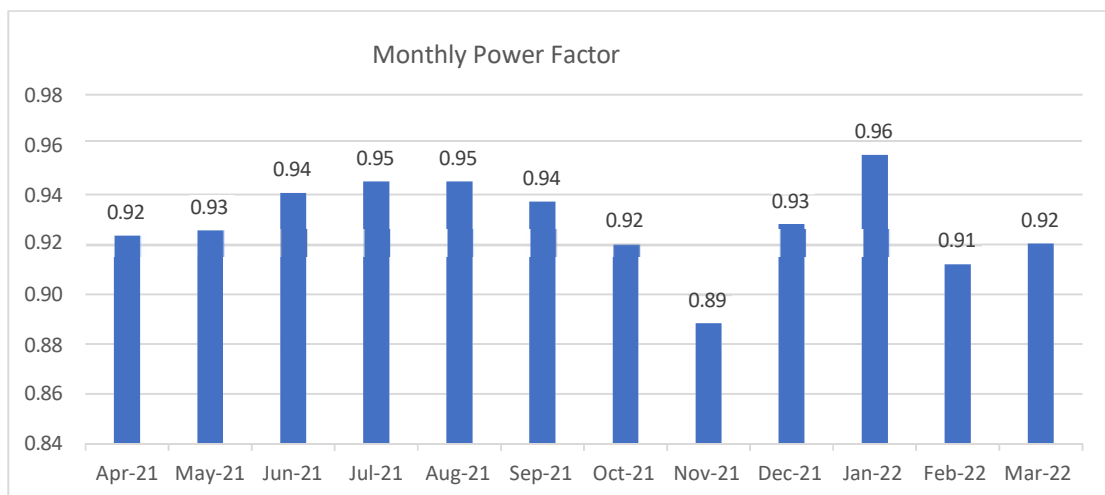
Archan
Registrar
 King George Medical University
 Lucknow

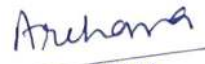
Account No. 7747481000; Old Mortuary substation; 005699 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	1087	693	199200	184000	0.92	1573180.00	309795.00	141223.13	0.00	2024198	10.16
May-21	1087	614	172660	159820	0.93	1363514.00	309795.00	125498.18	0.00	1798807	10.42
Jun-21	1087	894	232820	219000	0.94	1838778.00	339872.00	163398.75	0.00	2342049	10.06
Jul-21	1087	810	319800	302300	0.95	2525920.00	309795.00	212678.63	0.00	3048394	9.53
Aug-21	1087	810	319800	302300	0.95	2525920.00	309795.00	212678.63	0.00	3048394	9.53
Sep-21	1087	850	208240	195160	0.94	not obtain	328624.00	147991.00	0.00	2123263	10.20
Oct-21	1087	800	214200	197120	0.92	1691680.00	309795.00	150110.63	0.00	2151586	10.04
Nov-21	1087	345	131800	117080	0.89	1040720.00	309795.00	101288.63	0.00	1451804	11.02
Dec-21	1087	446	176160	163500	0.93	1391164.00	309795.00	127571.93	0.00	1828531	10.38
Jan-22	1087	547	206780	197680	0.96	1633062.00	309795.00	145714.28	0.00	2088571	10.10
Feb-22	1087	434	144140	131460	0.91	1138206.00	309795.00	108600.08	0.00	1556601	10.80
Mar-22	1087	400	173020	159240	0.92	not obtain	309795.00	125711.00	0.00	1783564	10.31



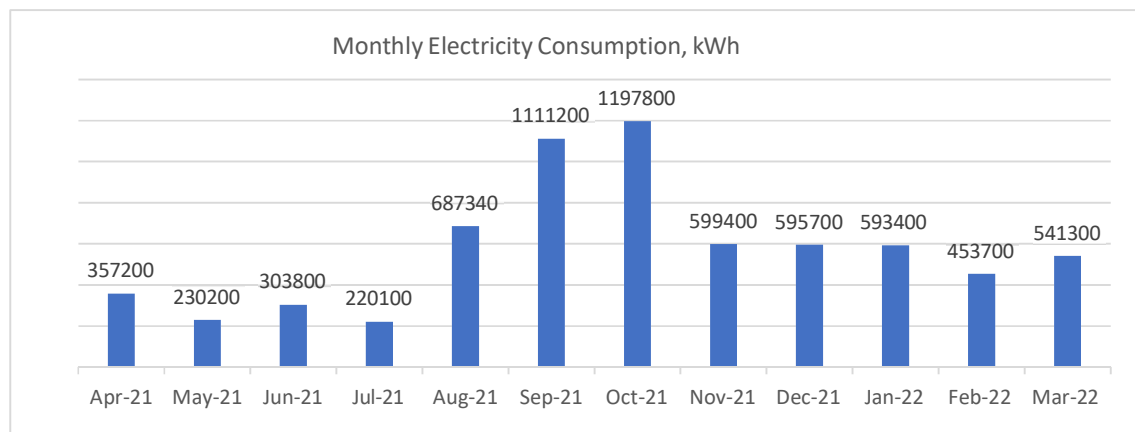
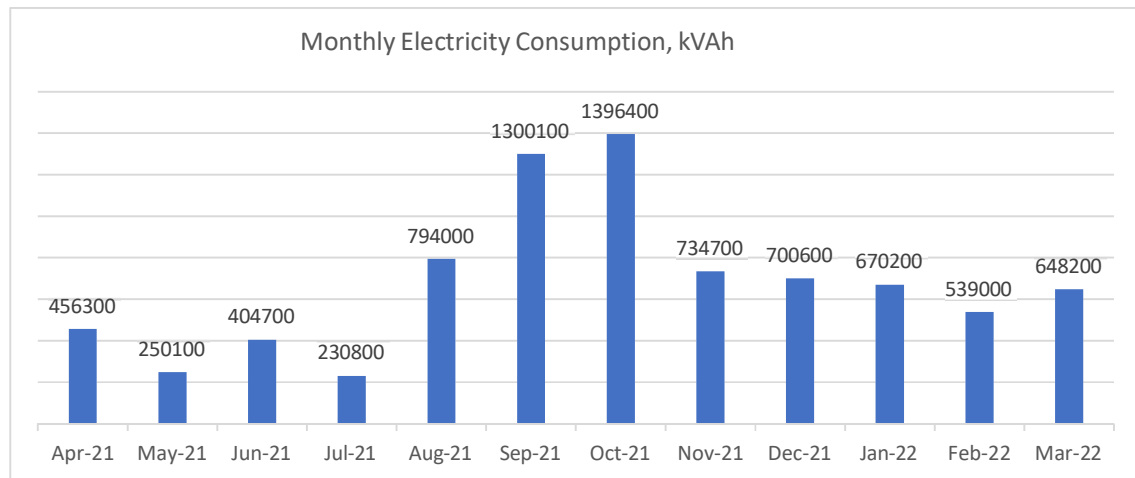
Aruna
Registrar
 King George Medical University
 Lucknow



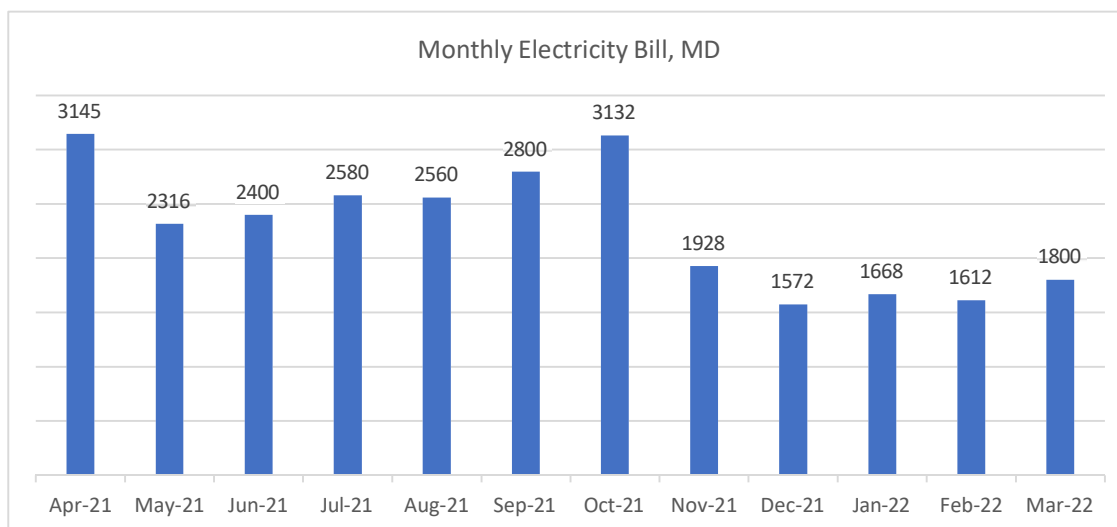
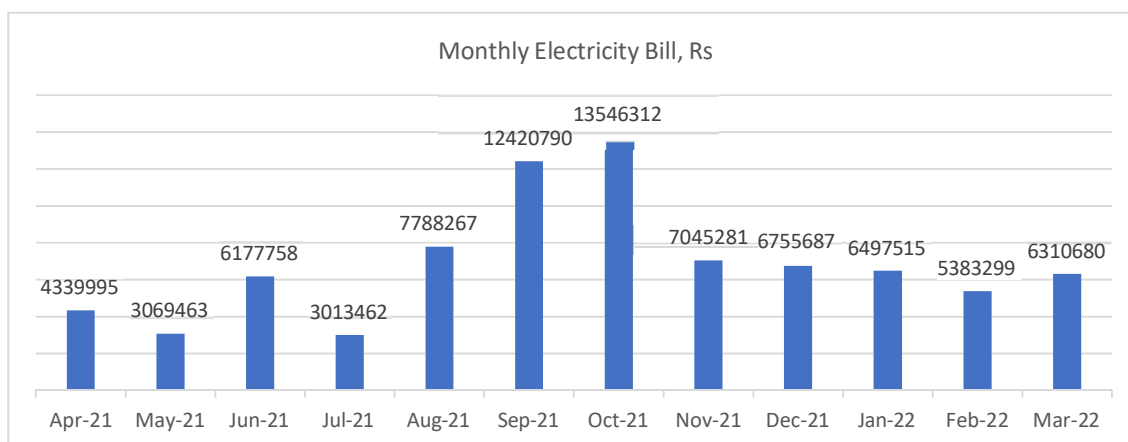
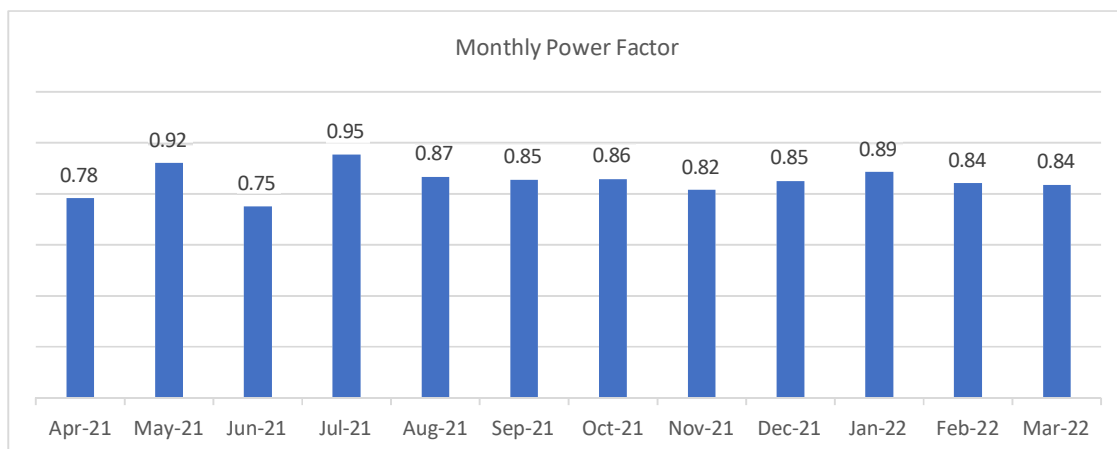

Registrar
 King George Medical University
 Lucknow

Account No. 9753334424; Teaching Block(Kalam Center; 703712 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022												
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Total Billed Unit (KVAH)	Electricity Bill Energy charge
Apr-21	2632	3145	456300	357200	0.78	3377030.00	617120.00	345845.00	389880.00	4339995	456300.00	9.5
May-21	2632	2316	250100	230200	0.92	1975230.00	880080.00	214152.75	0.00	3069463	250100.00	12.3
Jun-21	2632	2400	404700	303800	0.75	4929833.00	937840.00	310085.00	0.00	6177758	404700.00	15.3
Jul-21	2632	2580	230800	220100	0.95	1822820.00	980400.00	210241.50	0.00	3013462	230800.00	13.1
Aug-21	2632	2560	794000	687340	0.87	6272100.00	972800.00	543367.00	0.00	7788267	794000.00	9.8
Sep-21	2632	2800	1300100	1111200	0.85	10476660.00	1080720.00	863410.00	161120.00	12420790	1300100.00	9.6
Oct-21	2632	3132	1396400	1197800	0.86	11031060.00	1190160.00	945091.50	380000.00	13546312	1396400.00	9.7
Nov-21	2632	1928	734700	599400	0.82	5803630.00	750120.00	491531.25	0.00	7045281	734700.00	9.6
Dec-21	2632	1572	700600	595700	0.85	5534240.00	750120.00	471327.00	0.00	6755687	700600.00	9.6
Jan-22	2632	1668	670200	593400	0.89	5294080.00	750120.00	453315.00	0.00	6497515	670200.00	9.7
Feb-22	2632	1612	539000	453700	0.84	4257600.00	750120.00	375579.00	0.00	5383299	539000.00	10.0
Mar-22	2632	1800	648200	541300	0.84	Not Obtain	750120.00	440280.00	0.00	6310680	648200.00	9.7



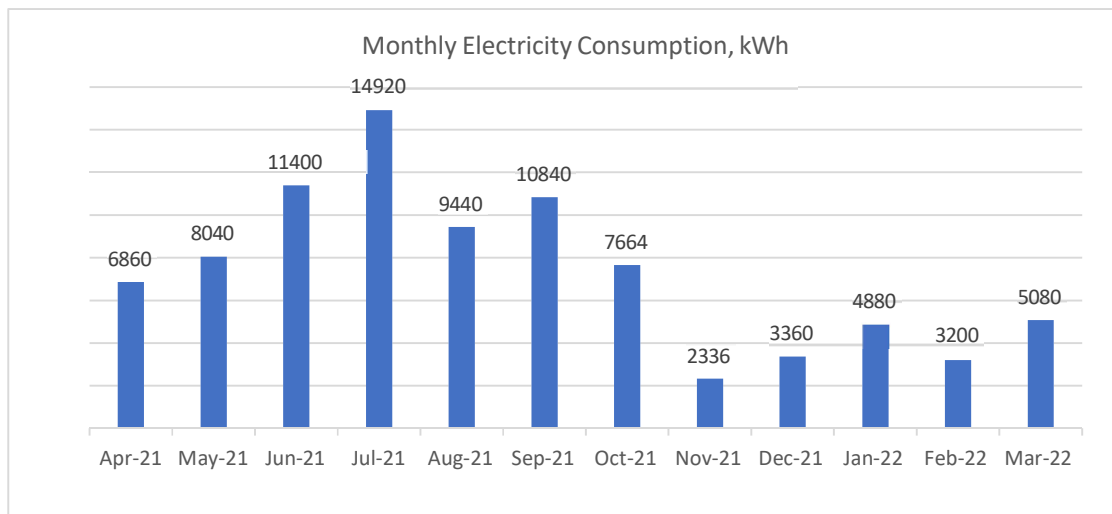
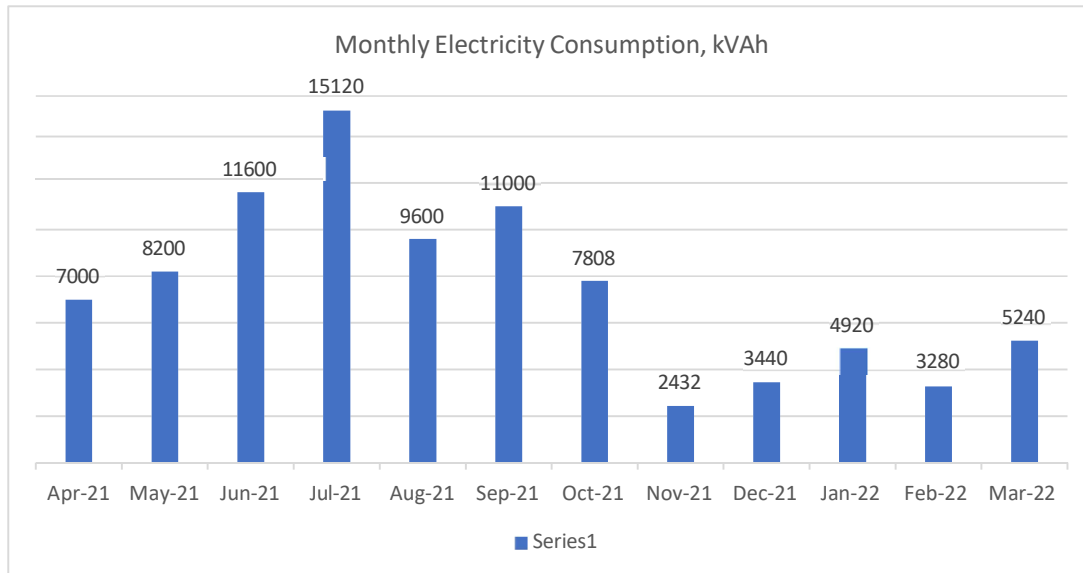
Anurupa
Registrar
 King George Medical University
 Lucknow

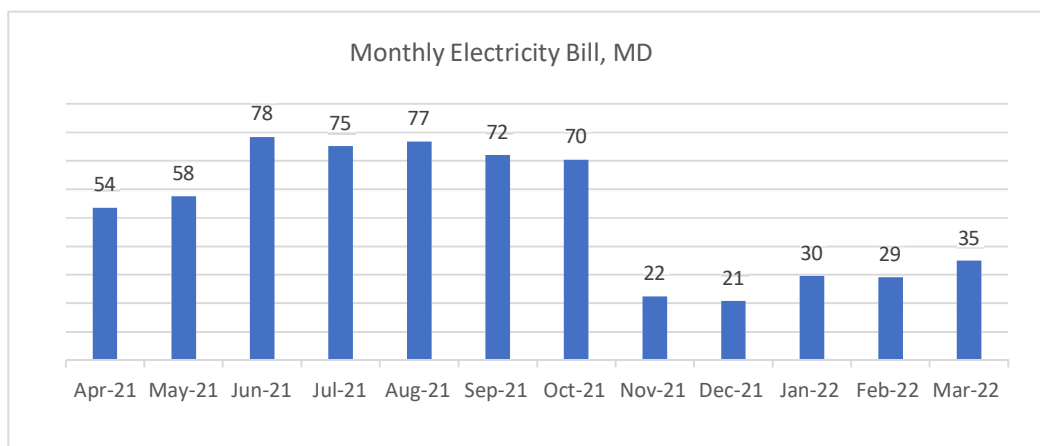
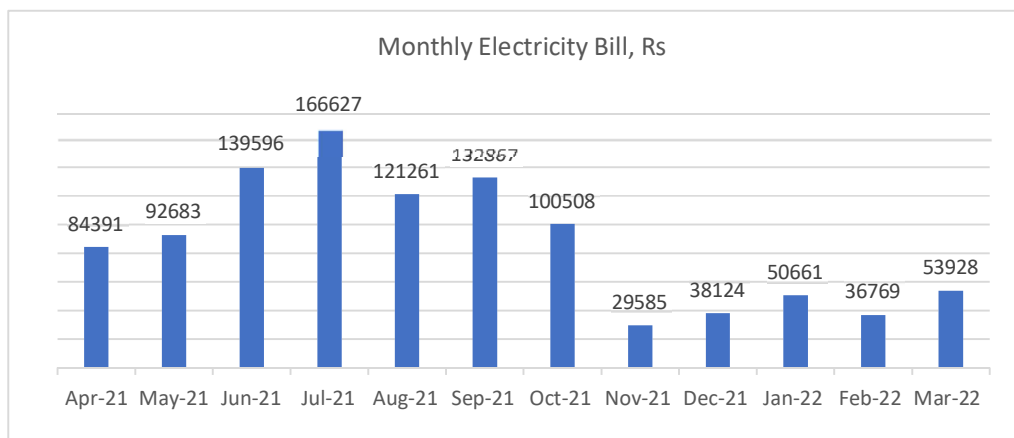
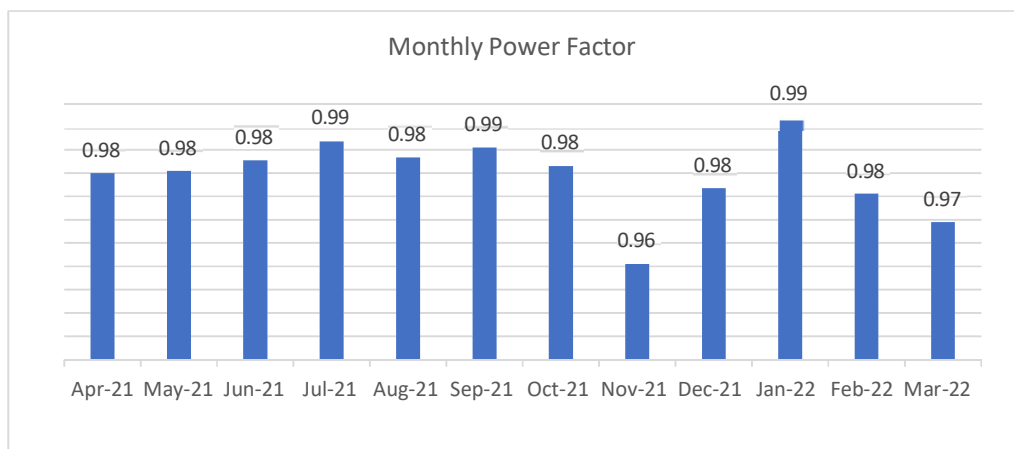


Archan
Registrar
 King George Medical University
 Lucknow

Account No. 1214770000; Old Dental building(Dental Science University Building , PHI); 678537
Registrar, KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge
Apr-21	45	54	7000	6860	0.98	64404.52	14472.00	5514.04	0.00	84391	12.1
May-21	45	58	8200	8040	0.98	63860.52	15552.00	6466.24	6804.00	92683	11.3
Jun-21	45	78	11600	11400	0.98	90652.52	21168.00	9739.24	18036.00	139596	12.0
Jul-21	45	75	15120	14920	0.99	118390.12	20304.00	11625.16	16308.00	166627	11.0
Aug-21	45	77	9600	9440	0.98	74892.52	20736.00	8460.04	17172.00	121261	12.6
Sep-21	45	72	11000	10840	0.99	87065.00	20304.00	9190.00	16308.00	132867	12.1
Oct-21	45	70	7808	7664	0.98	60771.56	19008.00	7012.17	13716.00	100508	12.9
Nov-21	45	22	2432	2336	0.96	18408.68	9112.50	2064.09	0.00	29585	12.2
Dec-21	45	21	3440	3360	0.98	26351.72	9112.50	2659.82	0.00	38124	11.1
Jan-22	45	30	4920	4880	0.99	38014.12	9112.50	3534.50	0.00	50661	10.3
Feb-22	45	29	3280	3200	0.98	25090.92	9112.50	2565.26	0.00	36769	11.2
Mar-22	45	35	5240	5080	0.97	40671.00	9504.00	3753.00	0.00	53928	10.3

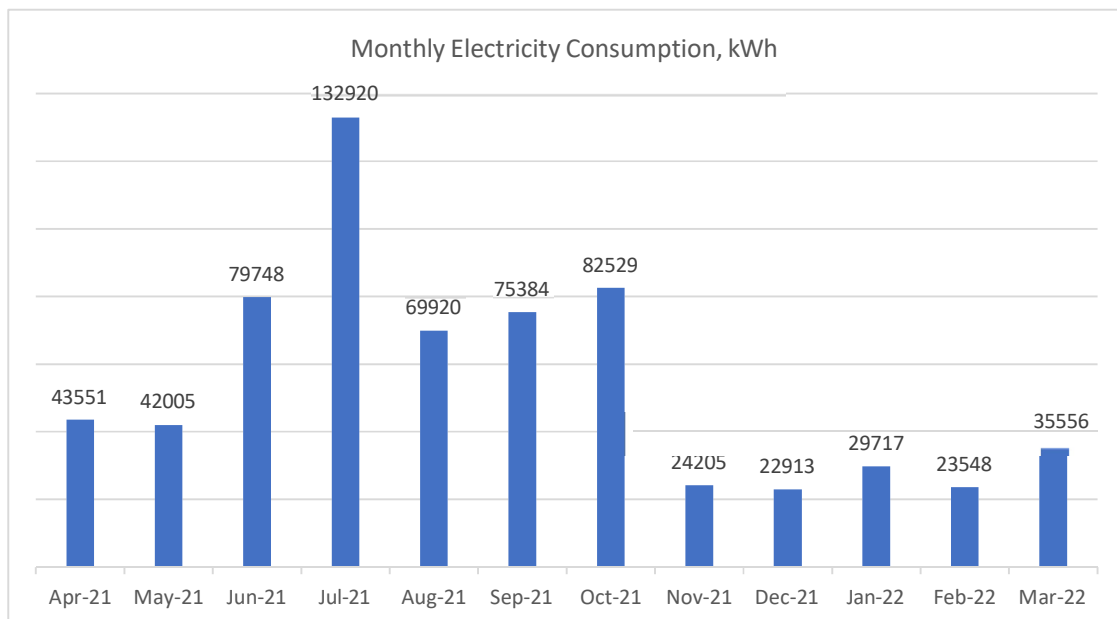
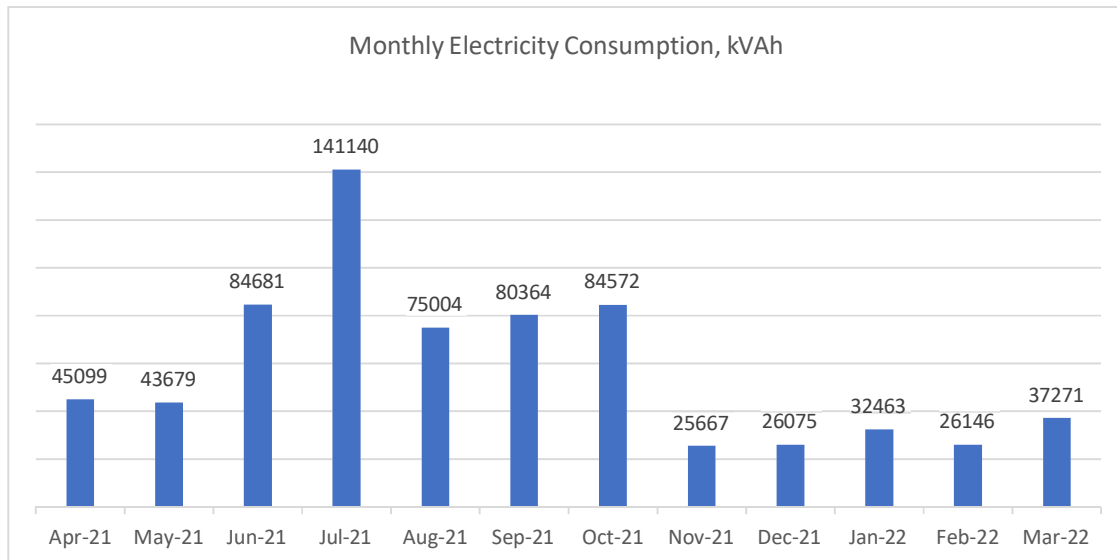


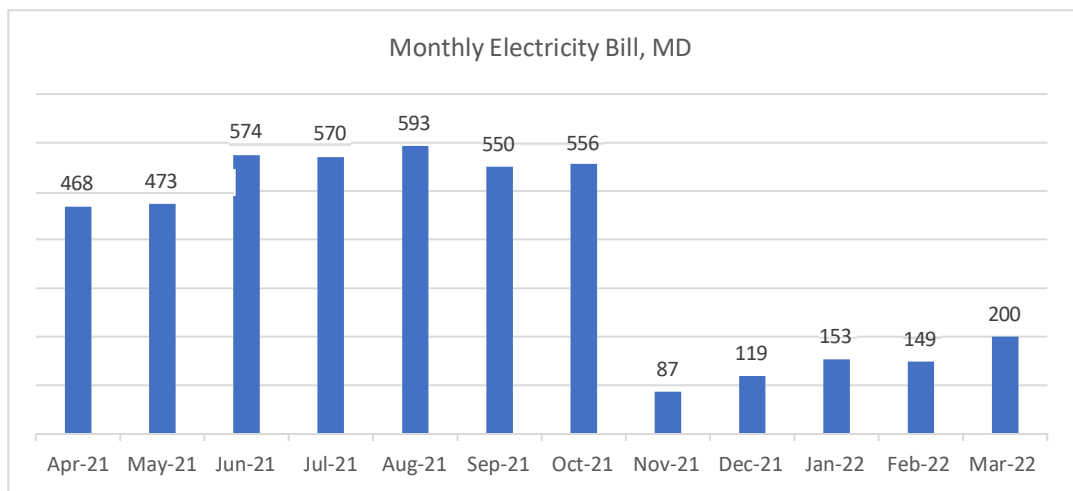
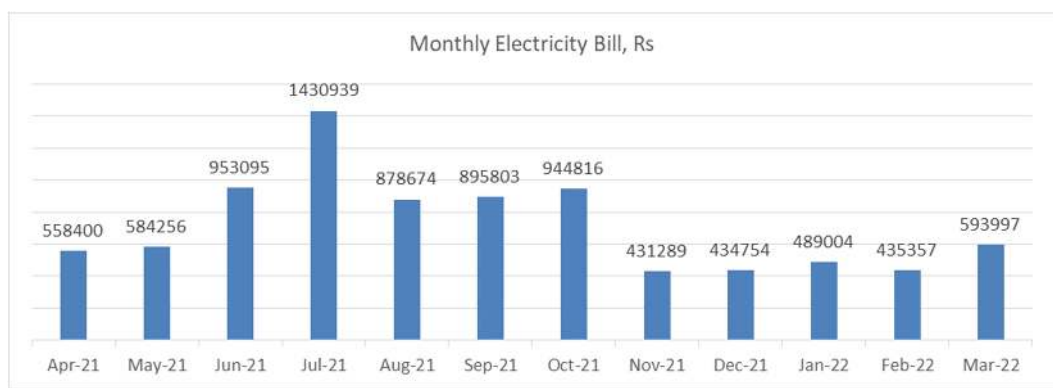
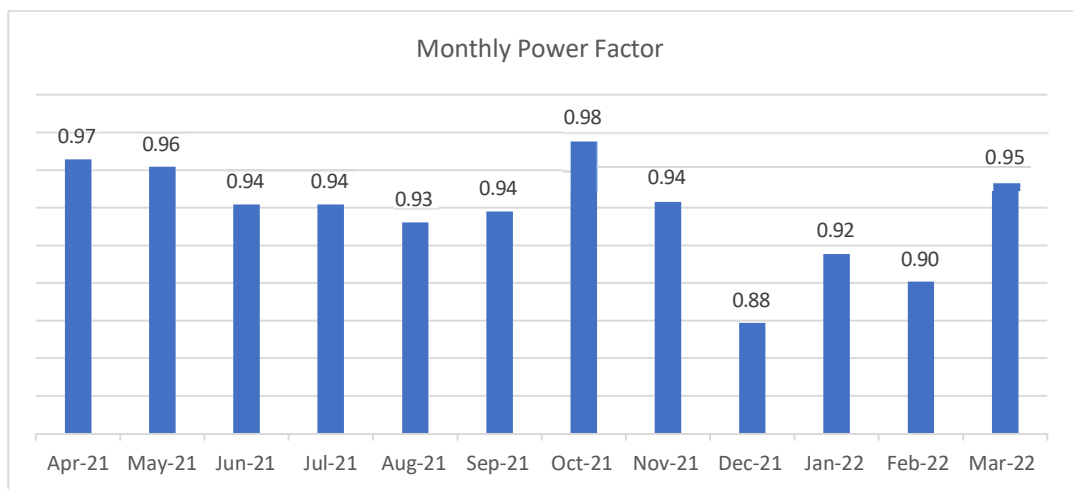


Aruna
Registrar
 King George Medical University
 Lucknow

Account No. 4697779403; New OPD Block.; 703687 Registrar, KGMU

Monthly Electrical bill detail KGMU Year 2021-2022												
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Total Billed Unit (KVAH)	Electricity Bill Energy charge Rs/KVAh
Apr-21	698	468	45099	43551	0.97	355782.10	198930.00	3687.87	0.00	558400	45099.00	12.4
May-21	698	473	43679	42005	0.96	344564.10	198930.00	40762.06	0.00	584256	43679.00	13.4
Jun-21	698	574	84681	79748	0.94	668479.90	218120.00	66494.99	0.00	953095	84681.00	11.3
Jul-21	698	570	141140	132920	0.94	1114506.00	216600.00	99832.95	0.00	1430939	141140.00	10.1
Aug-21	698	593	75004	69920	0.93	592031.60	225340.00	61302.87	0.00	878674	75004.00	11.7
Sep-21	698	550	80364	75384	0.94	634375.00	198930.00	62498.00	0.00	895803	80364.00	11.1
Oct-21	698	556	84572	82529	0.98	667618.80	211280.00	65917.41	0.00	944816	84572.00	11.2
Nov-21	698	87	25667	24205	0.94	202269.30	198930.00	30089.95	0.00	431289	25667.00	16.8
Dec-21	698	119	26075	22913	0.88	205492.50	198930.00	30331.69	0.00	434754	26075.00	16.7
Jan-22	698	153	32463	29717	0.92	255957.70	198930.00	34116.58	0.00	489004	32463.00	15.1
Feb-22	698	149	26146	23548	0.90	206053.40	198930.00	30373.76	0.00	435357	26146.00	16.7
Mar-22	698	200	37271	35556	0.95	358102.00	198930.00	36965.00	0.00	593997	37271.00	15.9

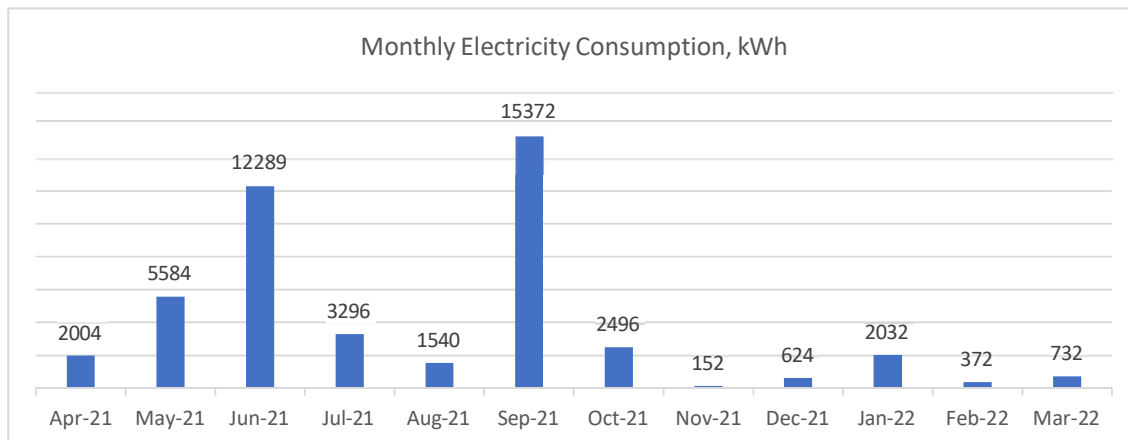
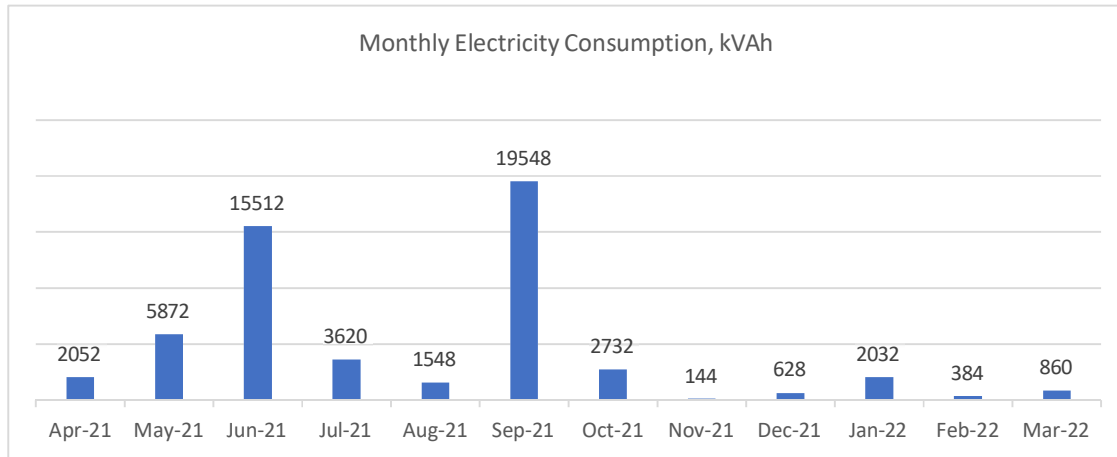




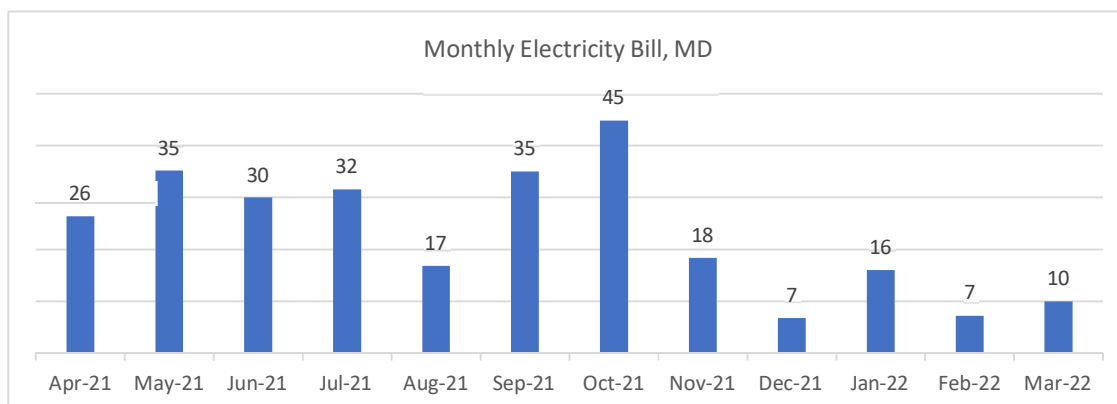
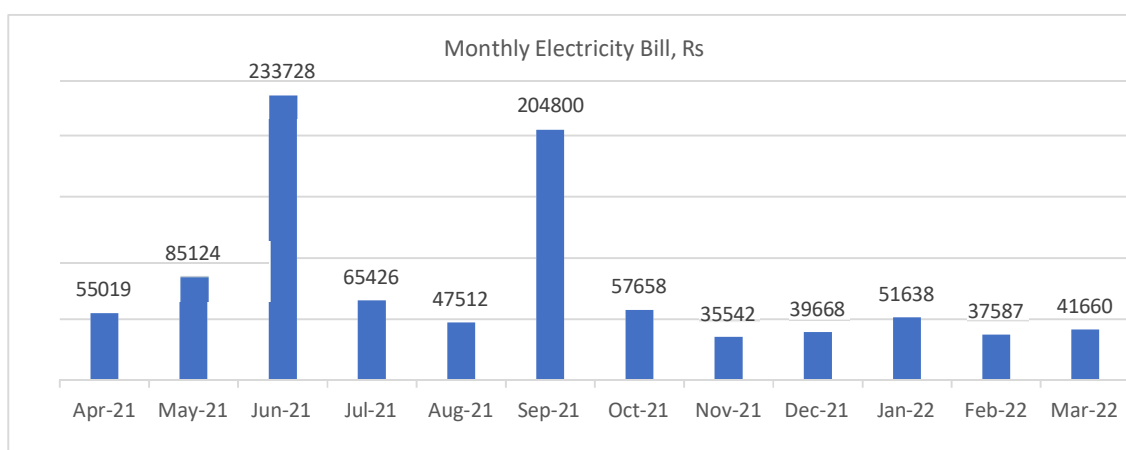
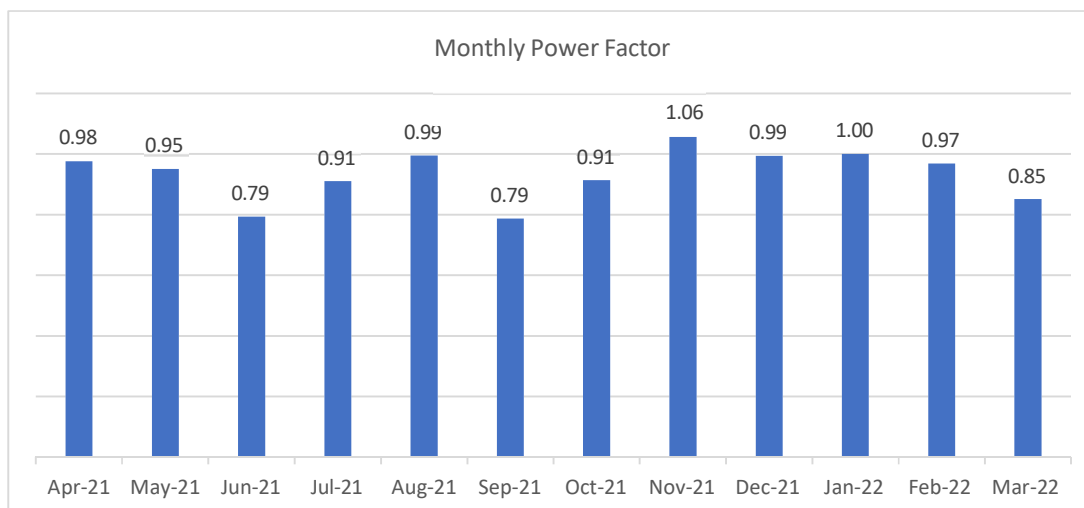
Arshana
Registrar
 King George Medical University
 Lucknow

Account No. 4747481000; Cancer unit; 678442 Registrar . KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	112	26	2052	2004	0.98	19436.92	31920.00	3661.72	0.00	55019	26.8
May-21	112	35	5872	5584	0.95	47265.46	31920.00	5938.91	0.00	85124	14.5
Jun-21	112	30	15512	12289	0.79	189986.00	31920.00	11822.00	0.00	233728	15.1
Jul-21	112	32	3620	3296	0.91	28940.94	31920.00	4564.57	0.00	65426	18.1
Aug-21	112	17	1548	1540	0.99	12277.19	31920.00	3314.79	0.00	47512	30.7
Sep-21	112	35	19548	15372	0.79	158595.00	31920.00	14285.00	0.00	204800	10.5
Oct-21	112	45	2732	2496	0.91	21715.28	31920.00	4022.65	0.00	57658	21.1
Nov-21	112	18	144	152	1.06	1142.06	31920.00	2479.65	0.00	35542	246.8
Dec-21	112	7	628	624	0.99	4980.00	31920.00	2767.55	0.00	39668	63.2
Jan-22	112	16	2032	2032	1.00	16115.79	31920.00	3602.68	0.00	51638	25.4
Feb-22	112	7	384	372	0.97	3045.00	31920.00	2622.41	0.00	37587	97.9
Mar-22	112	10	860	732	0.85	6835.00	31920.00	2905.00	0.00	41660	48.4



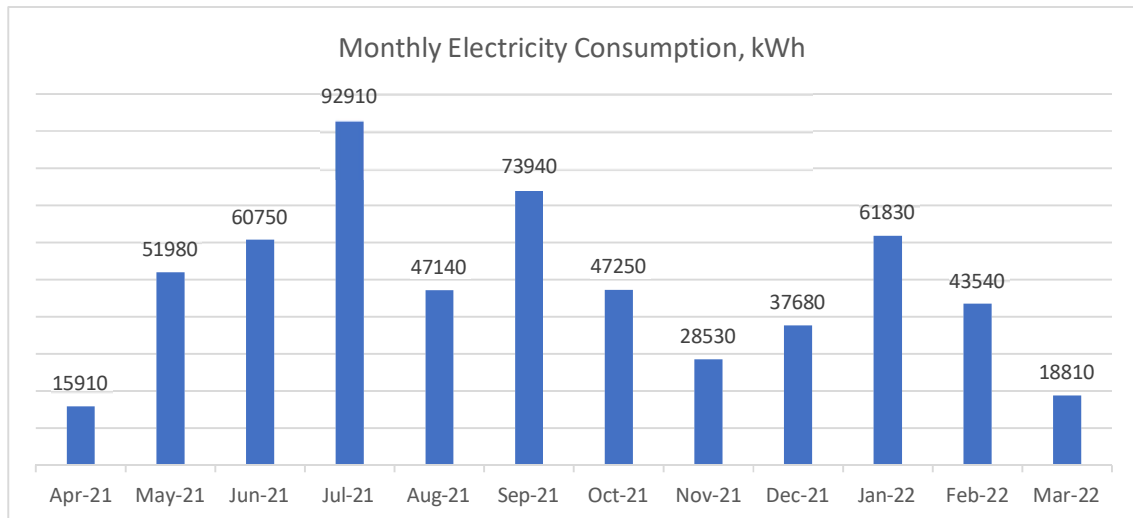
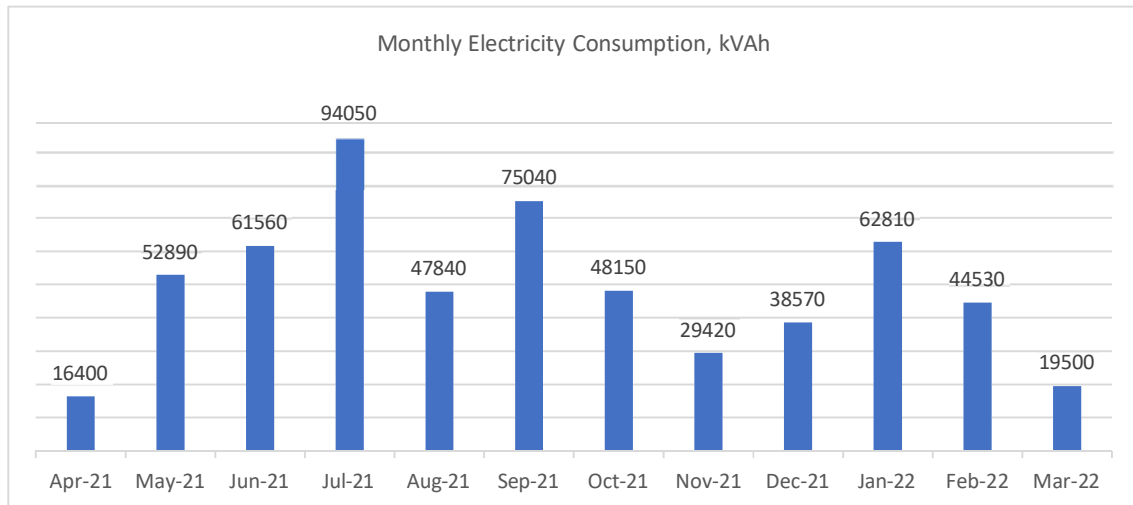
Aradhana
Registrar
King George Medical University
Lucknow



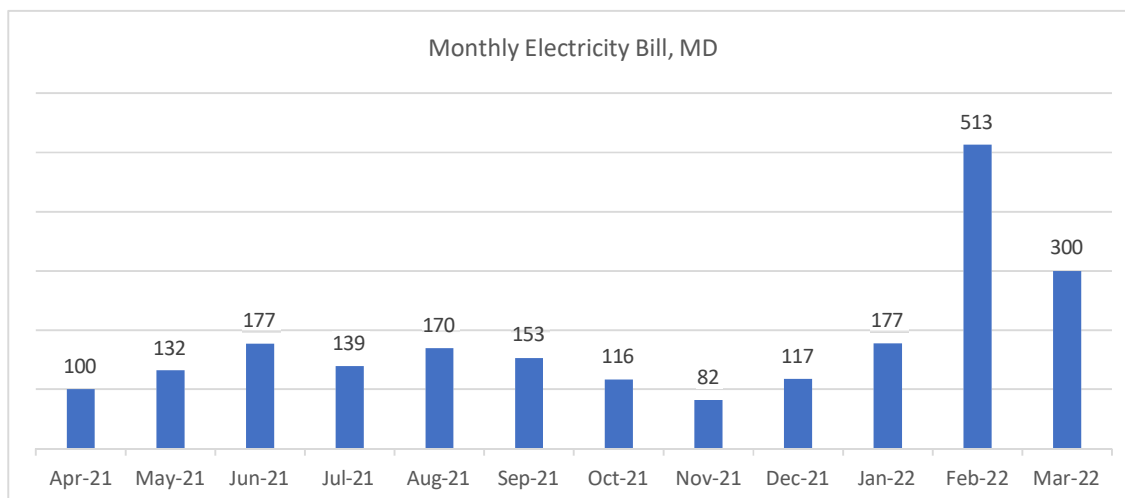
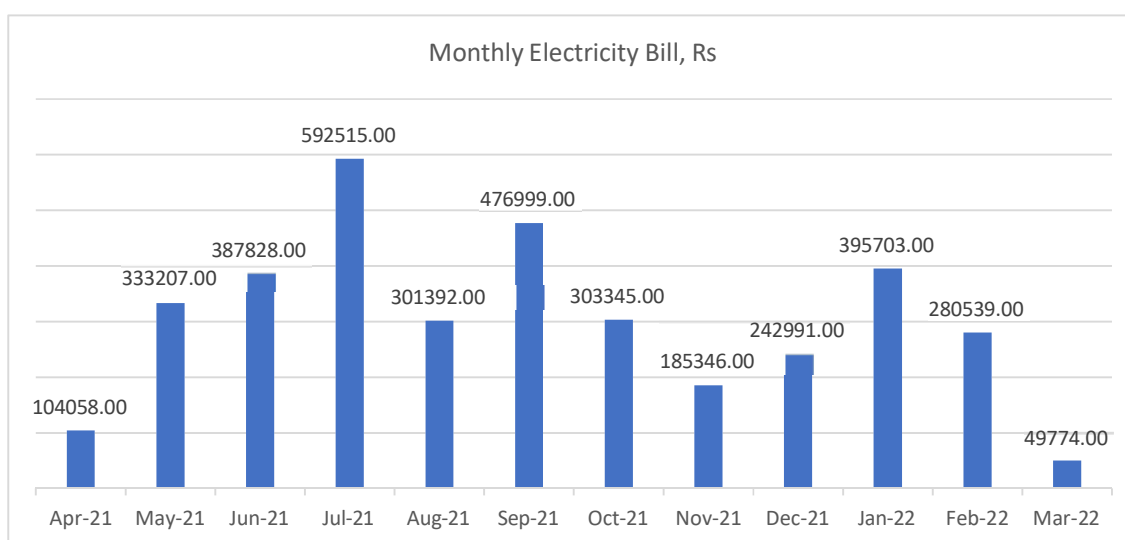
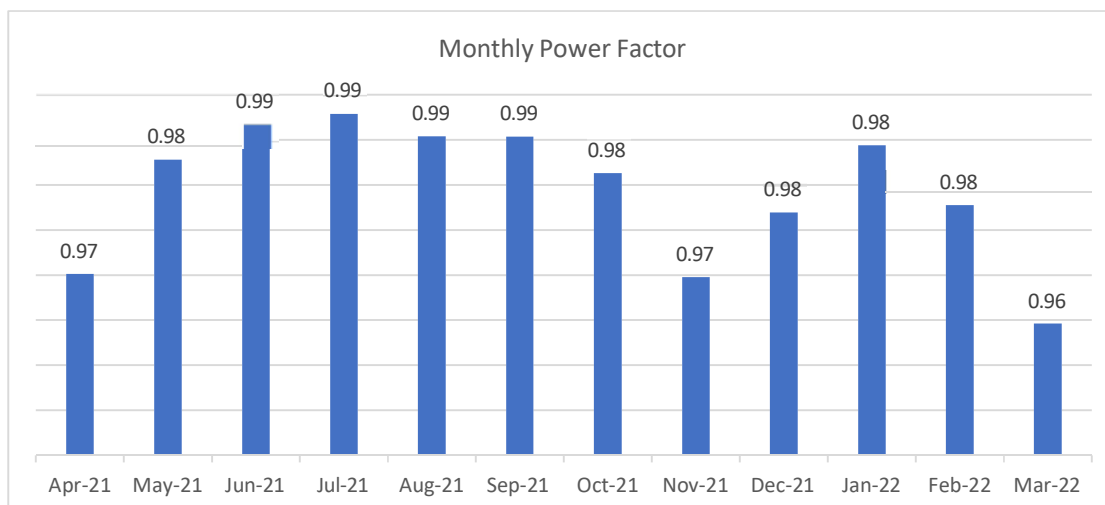
Aruchana
Registrar
 King George Medical University
 Lucknow

Type-5 Faculty building(J.N Road); 7200191928 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	444.44	100	16400	15910	0.97	104058.00	33041.00	6818.00	0.00	143917	8.8
May-21	444.44	132	52890	51980	0.98	333207.00	33041.25	18312.41	0.00	384561	7.3
Jun-21	444.44	177	61560	60750	0.99	387828.00	33041.25	21043.46	0.00	441913	7.2
Jul-21	444.44	139	94050	92910	0.99	592515.00	33041.25	31277.81	0.00	656834	7.0
Aug-21	444.44	170	47840	47140	0.99	301392.00	33041.25	16721.66	0.00	351155	7.3
Sep-21	444.44	153	75040	73940	0.99	476999.00	33041.00	25289.00	0.00	535329	7.1
Oct-21	444.44	116	48150	47250	0.98	303345.00	33041.25	16819.31	0.00	353206	7.3
Nov-21	444.44	82	29420	28530	0.97	185346.00	33041.25	10919.36	0.00	229307	7.8
Dec-21	444.44	117	38570	37680	0.98	242991.00	33041.25	13801.61	0.00	289834	7.5
Jan-22	444.44	177	62810	61830	0.98	395703.00	33041.25	21437.21	0.00	450181	7.2
Feb-22	444.44	513	44530	43540	0.98	280539.00	50787.00	16902.90	6732.00	354961	8.0
Mar-22	444.44	300	19500	18810	0.96	49774.00	33041.00	77419.00	0.00	160234	8.2

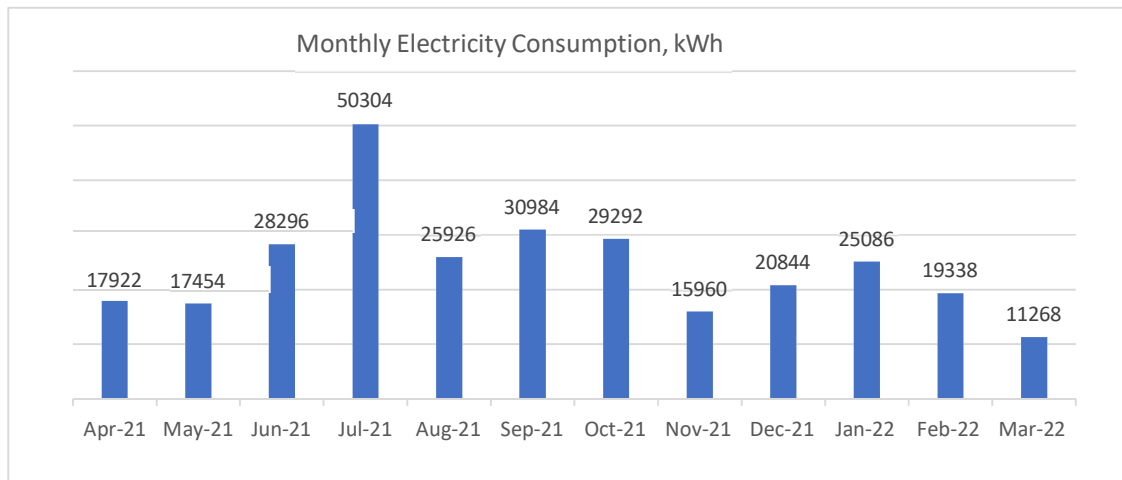
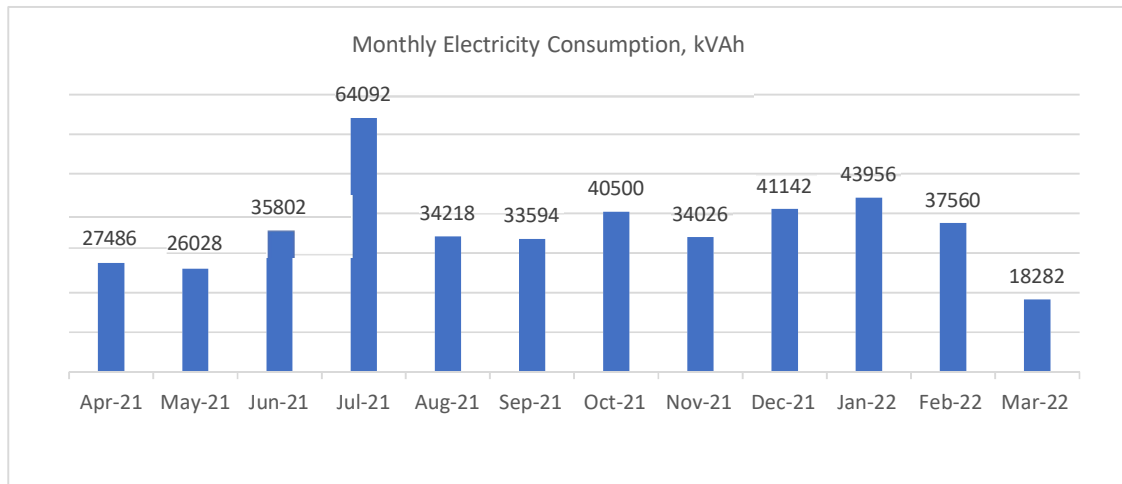


Arunima
Registrar
King George Medical University
Lucknow

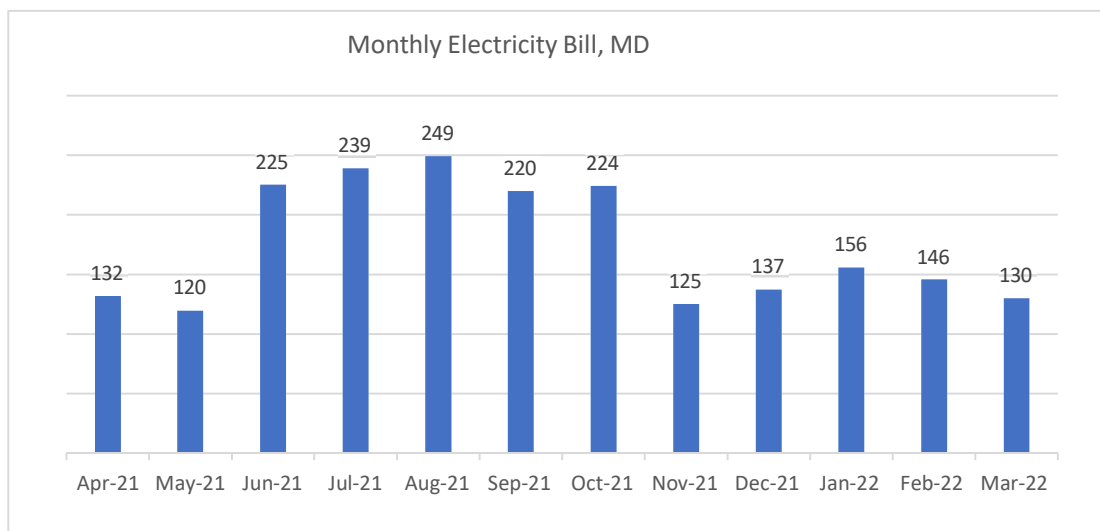
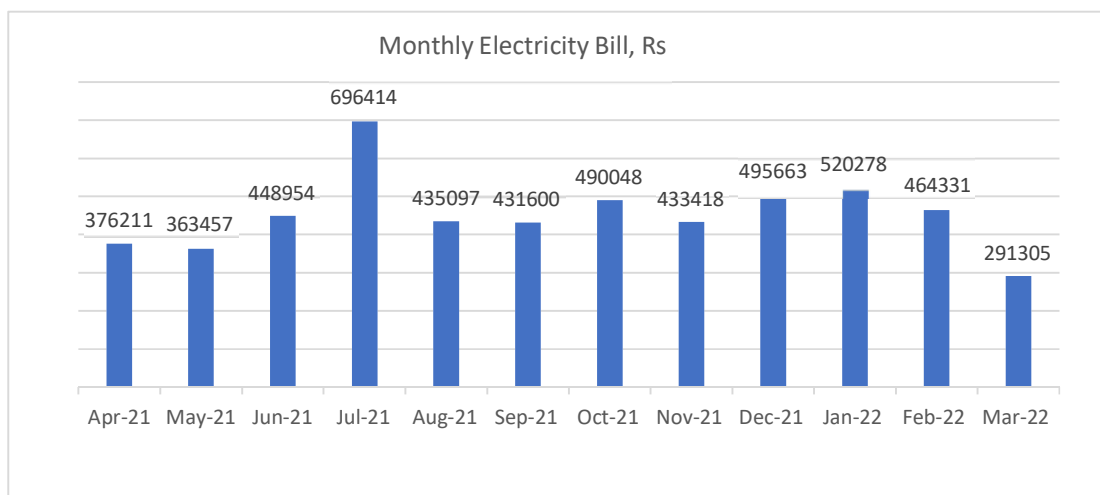
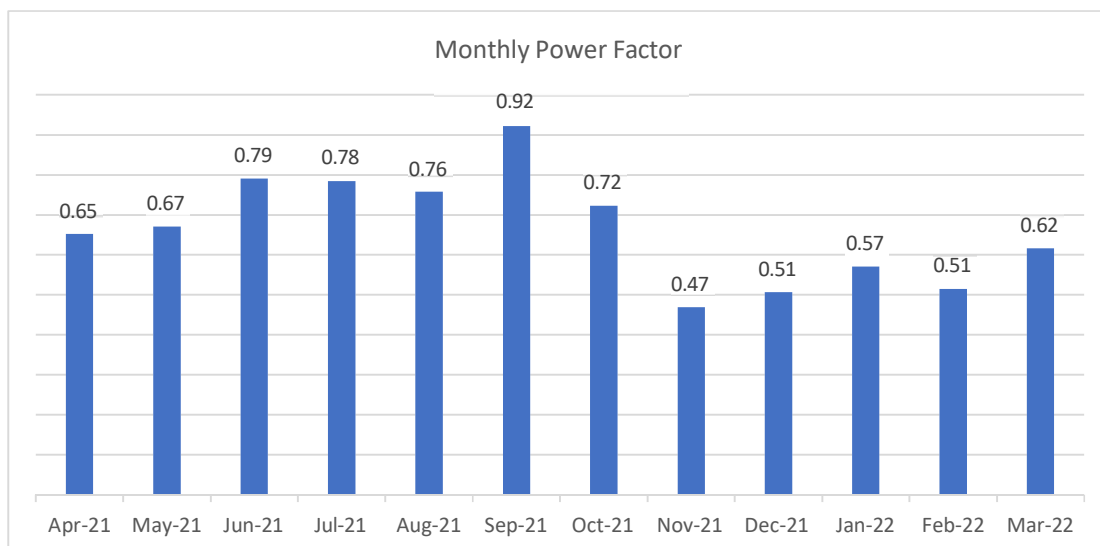


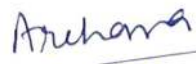
Arunima
 Registrar
 King George Medical University
 Lucknow

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	445	132	27486	17922	0.65	223138.58	126825.00	26247.27	0.00	376211	13.7
May-21	445	120	26028	17454	0.67	211274.84	126825.00	25357.49	0.00	363457	14.0
Jun-21	445	225	35802	28296	0.79	290805.87	126825.87	31322.32	0.00	448954	12.5
Jul-21	445	239	64092	50304	0.78	521001.60	126825.00	48587.00	0.00	696414	10.9
Aug-21	445	249	34218	25926	0.76	277916.67	126825.00	30355.64	0.00	435097	12.7
Sep-21	445	220	33594	30984	0.92	274801.00	126825.00	29974.00	0.00	431600	12.8
Oct-21	445	224	40500	29292	0.72	329033.50	126825.00	34189.39	0.00	490048	12.1
Nov-21	445	125	34026	15960	0.47	276354.56	126825.00	30238.47	0.00	433418	12.7
Dec-21	445	137	41142	20844	0.51	334257.45	126825.00	34581.00	0.00	495663	12.0
Jan-22	445	156	43956	25086	0.57	357154.97	126825.00	36298.50	0.00	520278	11.8
Feb-22	445	146	37560	19338	0.51	305110.72	126825.00	32395.18	0.00	464331	12.4
Mar-22	445	130	18282	11268	0.62	143850.00	126825.00	20630.00	0.00	291305	15.9

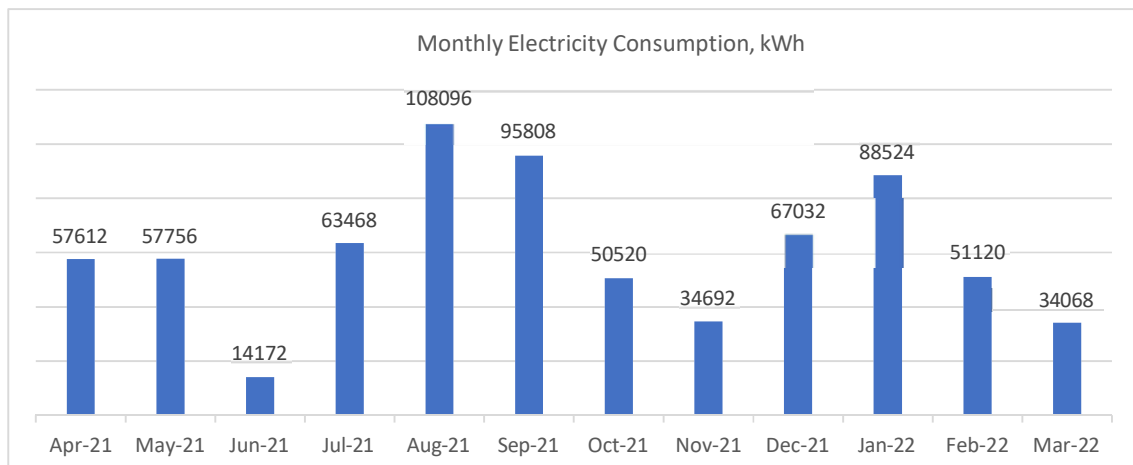
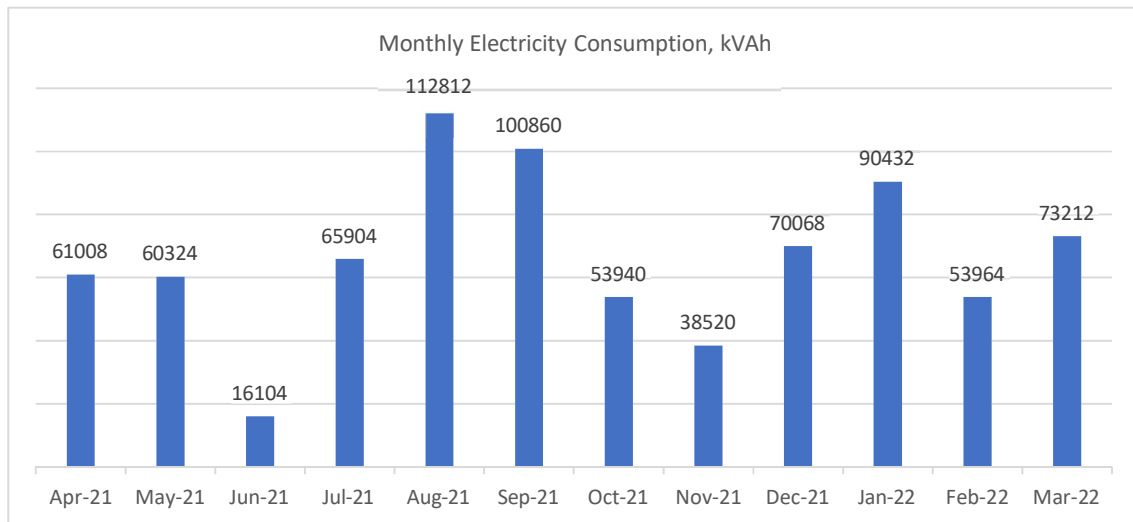


Arunima
Registrar
 King George Medical University
 Lucknow

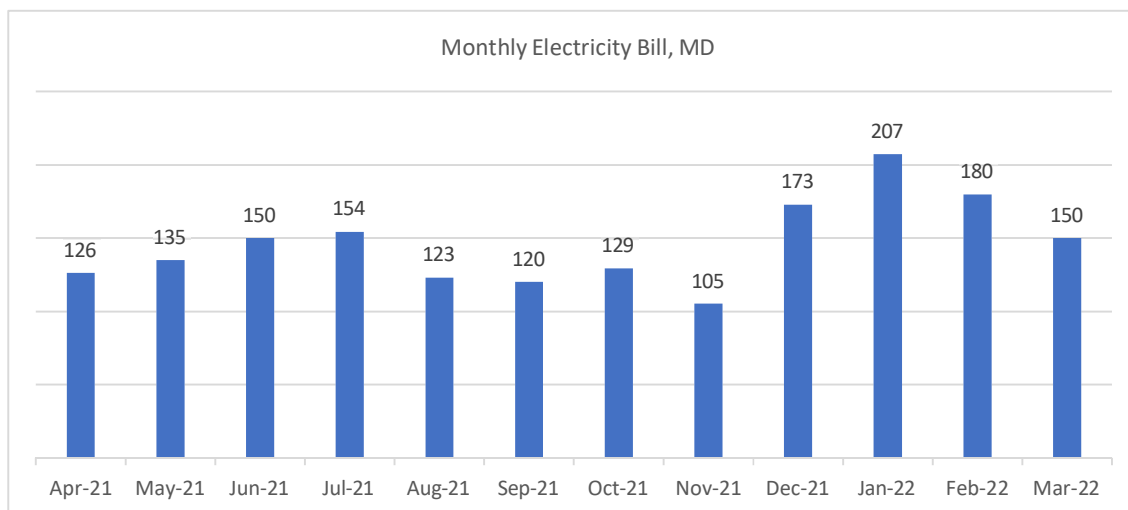
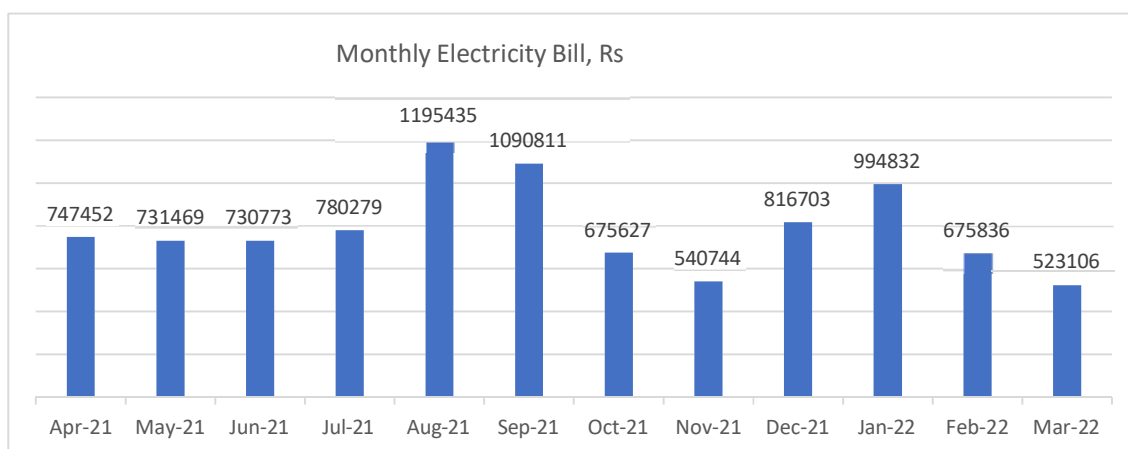
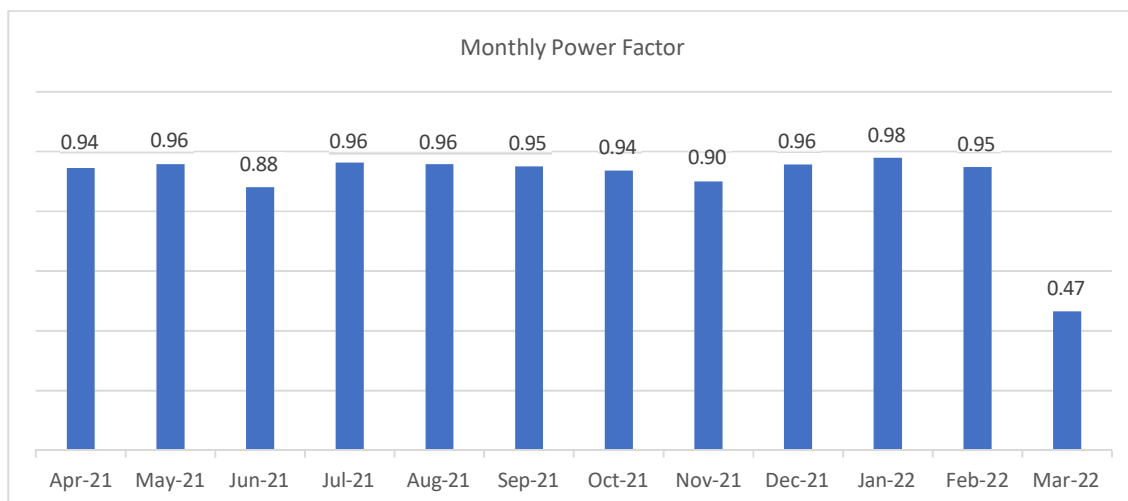



Registrar
 King George Medical University
 Lucknow

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	667	126	61008	57612	0.94	495907.10	190095.00	61450.16	0.00	747452	12.3
May-21	667	135	60324	57756	0.96	490341.39	190095.00	51032.73	0.00	731469	12.1
Jun-21	667	150	16104	14172	0.88	516632.00	190095.00	24046.00	0.00	730773	45.4
Jul-21	667	154	65904	63468	0.96	535745.85	190095.00	54438.06	0.00	780279	11.8
Aug-21	667	123	112812	108096	0.96	922276.00	190095.00	83064.00	0.00	1195435	10.6
Sep-21	667	120	100860	95808	0.95	824946.00	190095.00	75770.00	0.00	1090811	10.8
Oct-21	667	129	53940	50520	0.94	438394.78	190095.00	47136.73	0.00	675627	12.5
Nov-21	667	105	38520	34692	0.90	312922.24	190095.00	37726.29	0.00	540744	14.0
Dec-21	667	173	70068	67032	0.96	569628.32	190095.00	56979.25	0.00	816703	11.7
Jan-22	667	207	90432	88524	0.98	735330.18	190095.00	69406.89	0.00	994832	11.0
Feb-22	667	180	53964	51120	0.95	438590.07	190095.00	47151.38	0.00	675836	12.5
Mar-22	667	150	73212	34068	0.47	not obtain	190095.00	36928.00	0.00	523106	7.1



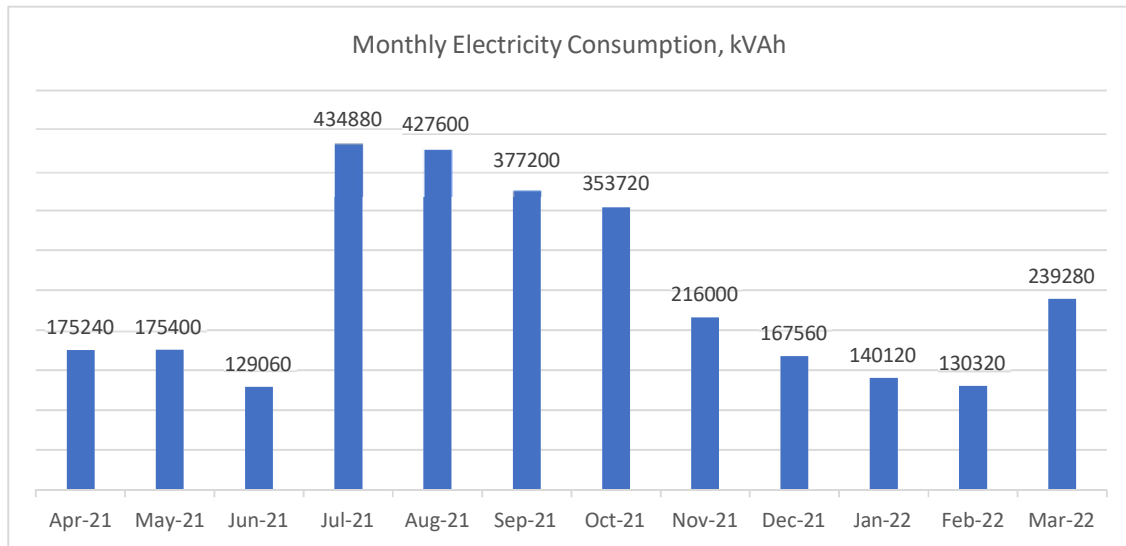
Archana
Registrar
 King George Medical University
 Lucknow



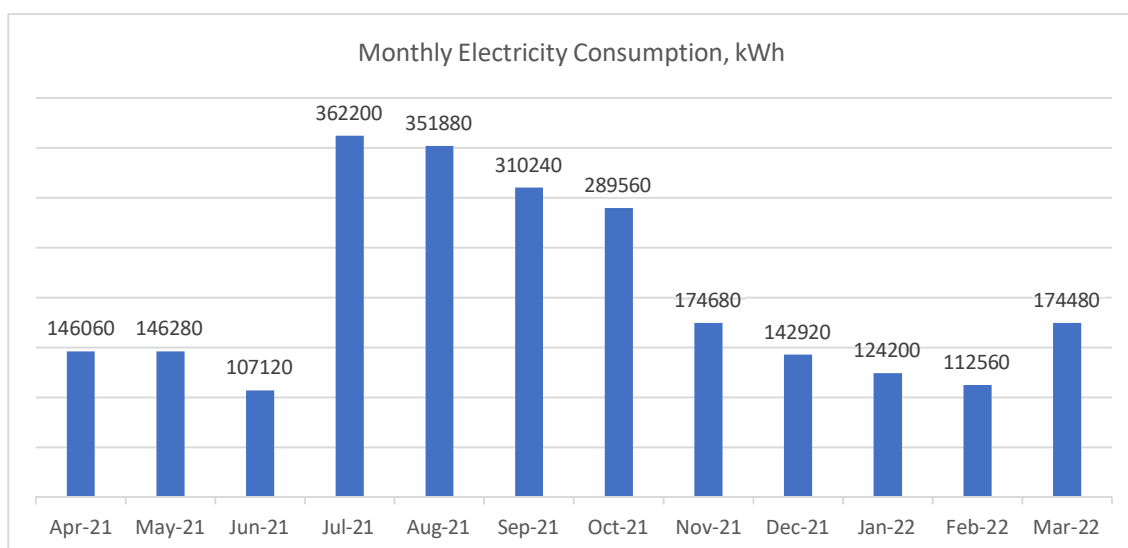
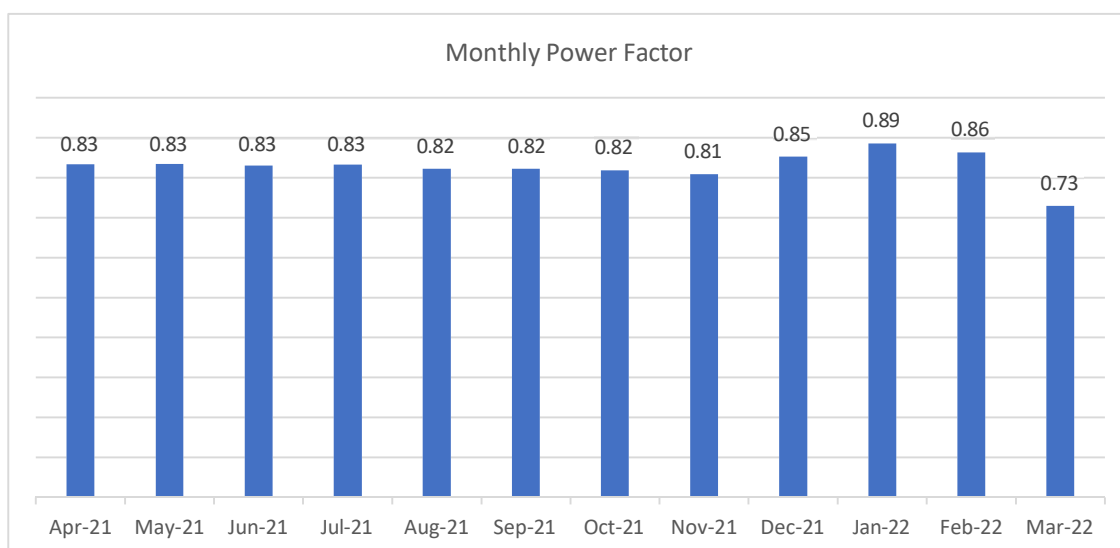
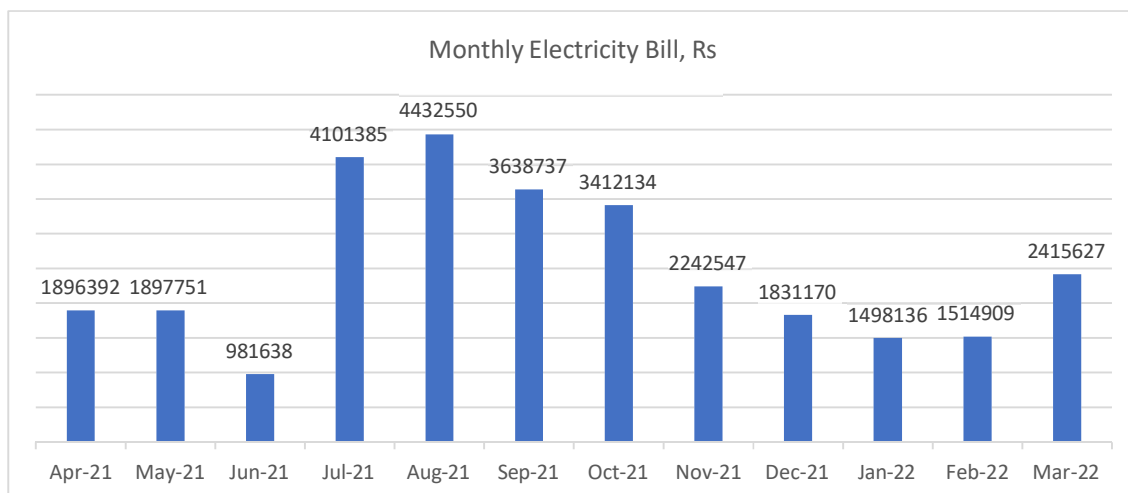
Archan
Registrar
 King George Medical University
 Lucknow

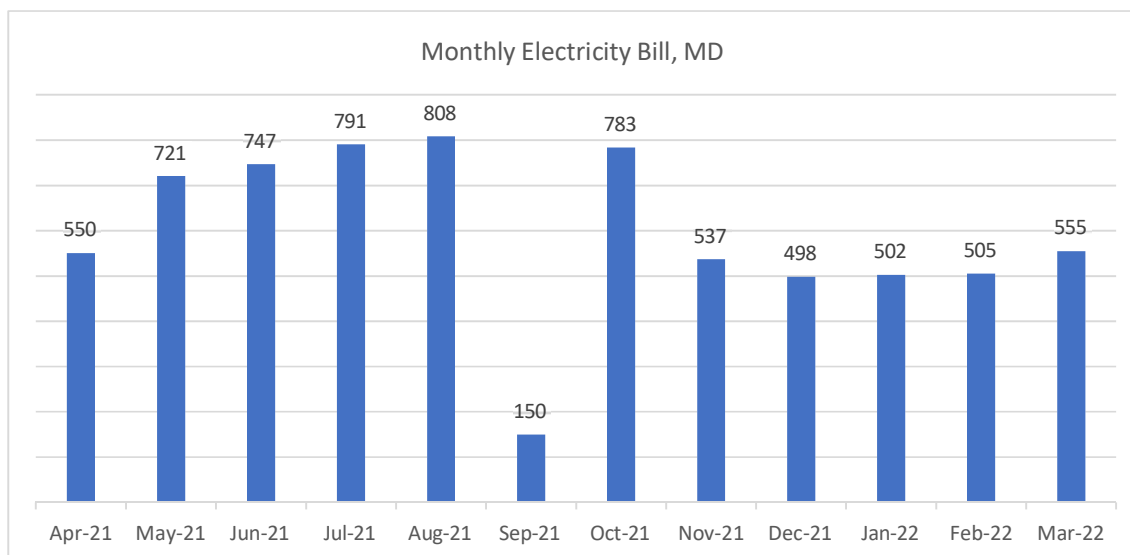
Account No. 1647481000; Shatabdi Hospital; 678594 Registrar, KGMU

Monthly Electrical bill detail KGMU Year 2021-2022												
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Total Billed Unit (KVAH)	Electricity Bill Energy charge Rs/KVAh
Apr-21	1334	560	175240	146060	0.83	1383896.00	380190.00	132306.45	0.00	1896392	175240.00	10.82
May-21	1334	721	175400	146280	0.83	1385160.00	380190.00	132401.00	0.00	1897751	175400.00	10.82
Jun-21	1334	747	129060	107120	0.83	535752.00	380190.00	65695.65	0.00	981638	129060.00	7.61
Jul-21	1334	791	434880	362200	0.83	3435052.00	380190.00	286143.15	0.00	4101385	434880.00	9.43
Aug-21	1334	808	427600	351880	0.82	3770540.00	380180.00	281829.75	0.00	4432550	427600.00	10.37
Sep-21	1334	150	377200	310240	0.82	3016580.00	380190.00	241967.00	0.00	3638737	377200.00	9.65
Oct-21	1334	783	353720	289560	0.82	2793888.00	380190.00	238055.85	0.00	3412134	353720.00	9.65
Nov-21	1334	537	216000	174680	0.81	1705900.00	380190.00	156456.75	0.00	2242547	216000.00	10.38
Dec-21	1334	498	167560	142920	0.85	1323224.00	380190.00	127756.05	0.00	1831170	167560.00	10.93
Jan-22	1334	502	140120	124200	0.89	1106448.00	380190.00	11497.85	0.00	1498136	140120.00	10.69
Feb-22	1334	505	130320	112560	0.86	1029028.00	380190.00	105691.35	0.00	1514909	130320.00	11.62
Mar-22	1334	555	239280	174480	0.73	1865187.00	380190.00	170250.00	0.00	2415627	239280.00	10.10



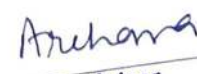
Aradhana
Registrar
King George Medical University
Lucknow

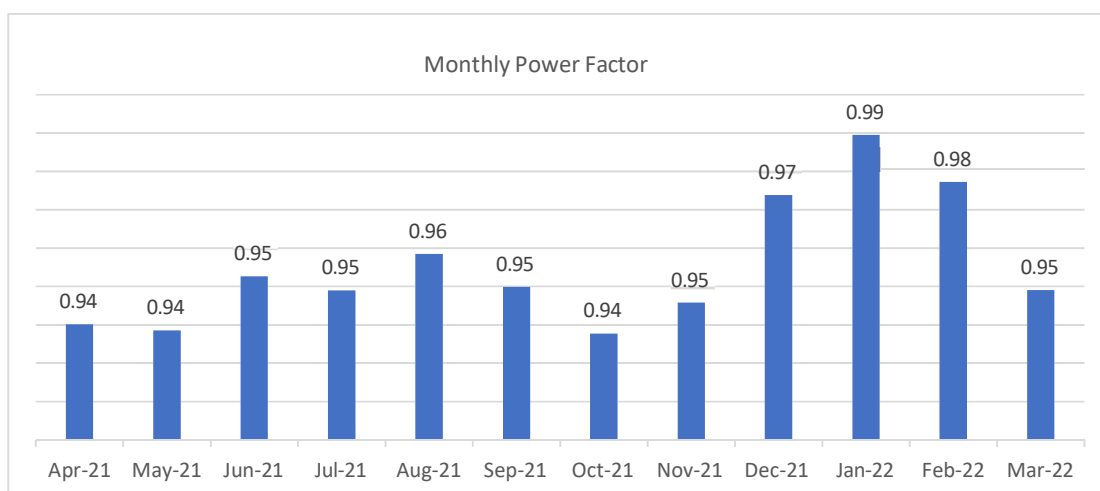
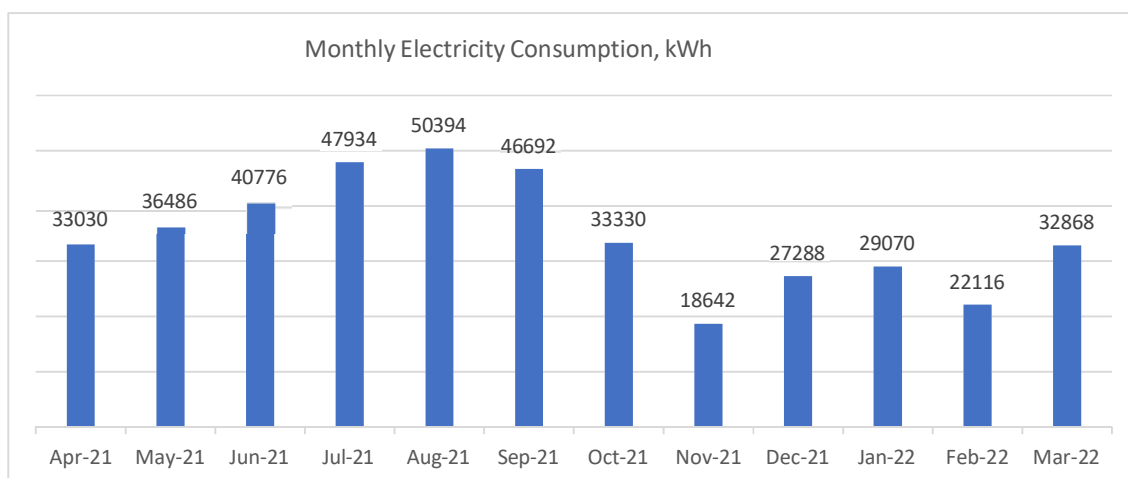
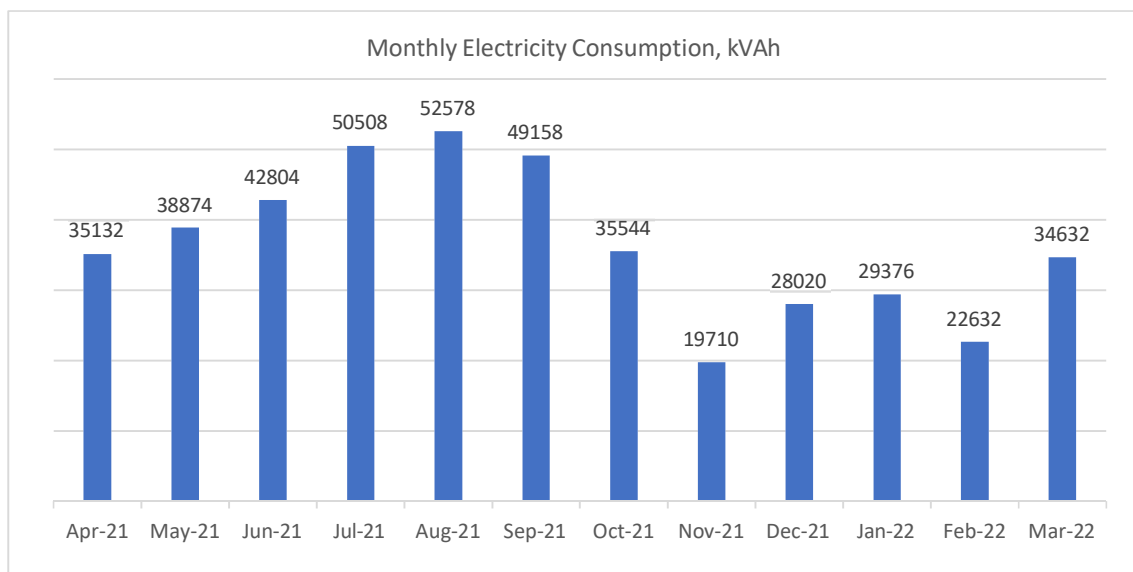


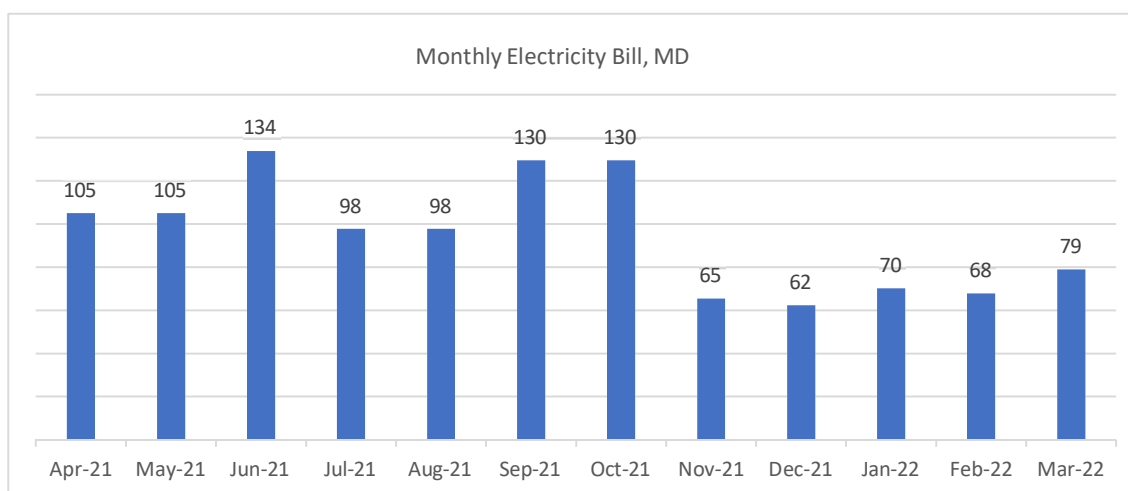
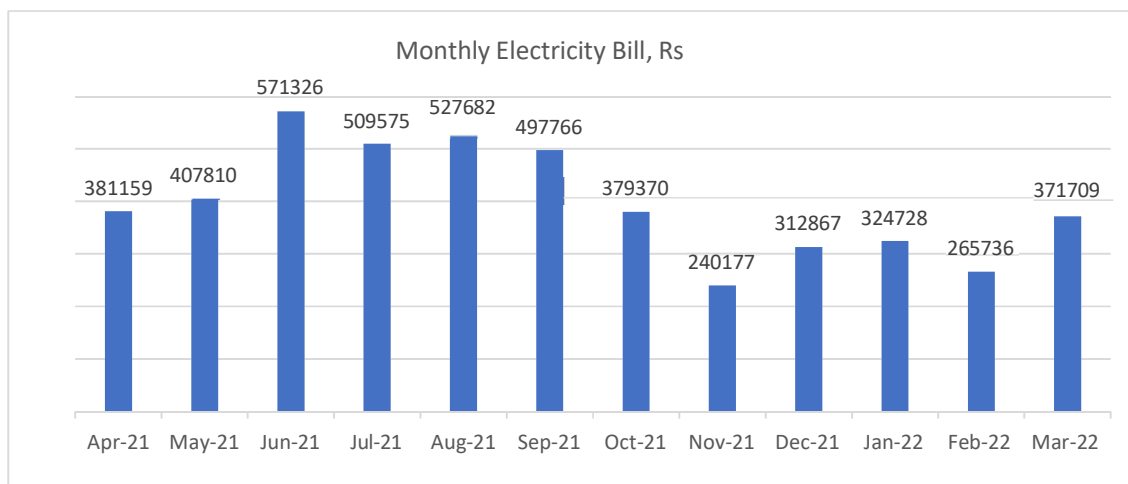


Account No. 2747481000; Cardiology Department; 577925 Registrar, KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	223	105	35132	33030	0.94	291094.81	63555.00	26509.04	0.00	381159	10.8
May-21	223	105	38874	36486	0.94	315802.74	63555.00	28451.83	0.00	407810	10.5
Jun-21	223	134	42804	40776	0.95	476921.00	63555.00	30850.00	0.00	571326	0.0
Jul-21	223	98	50508	47934	0.95	410468.00	63555.00	35551.77	0.00	509575	10.1
Aug-21	223	98	52578	50394	0.96	427312.19	63555.00	36815.04	0.00	527682	10.0
Sep-21	223	130	49158	46692	0.95	399483.65	63555.00	34727.00	0.00	497766	10.1
Oct-21	223	130	35544	33330	0.94	289396.00	63555.00	26419.00	0.00	379370	0.0
Nov-21	223	65	19710	18642	0.95	159865.27	63555.00	16756.52	0.00	240177	12.2
Dec-21	223	62	28020	27288	0.97	227483.74	63555.00	21827.91	0.00	312867	11.2
Jan-22	223	70	29376	29070	0.99	238517.51	63555.00	22655.44	0.00	324728	11.1
Feb-22	223	68	22632	22116	0.98	183641.58	63555.00	18539.74	0.00	265736	11.7
Mar-22	223	79	34632	32868	0.95	282291.00	63555.00	25863.00	0.00	371709	0.0


Registrar
 King George Medical University
 Lucknow

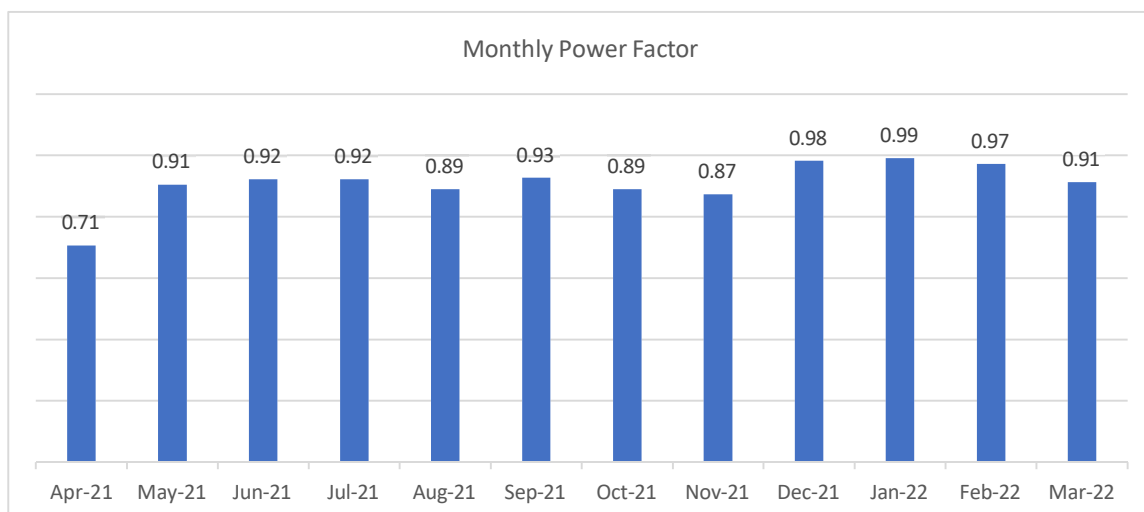
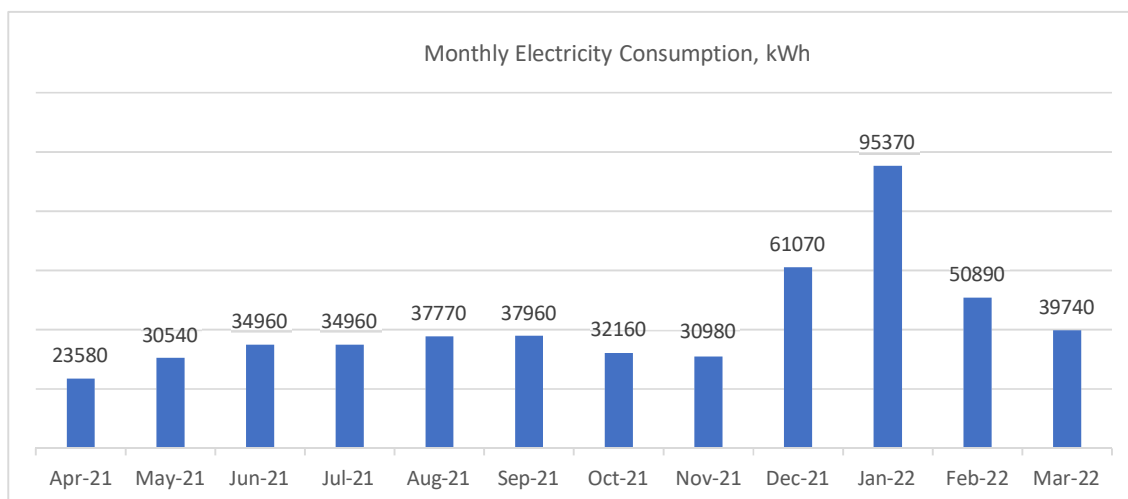
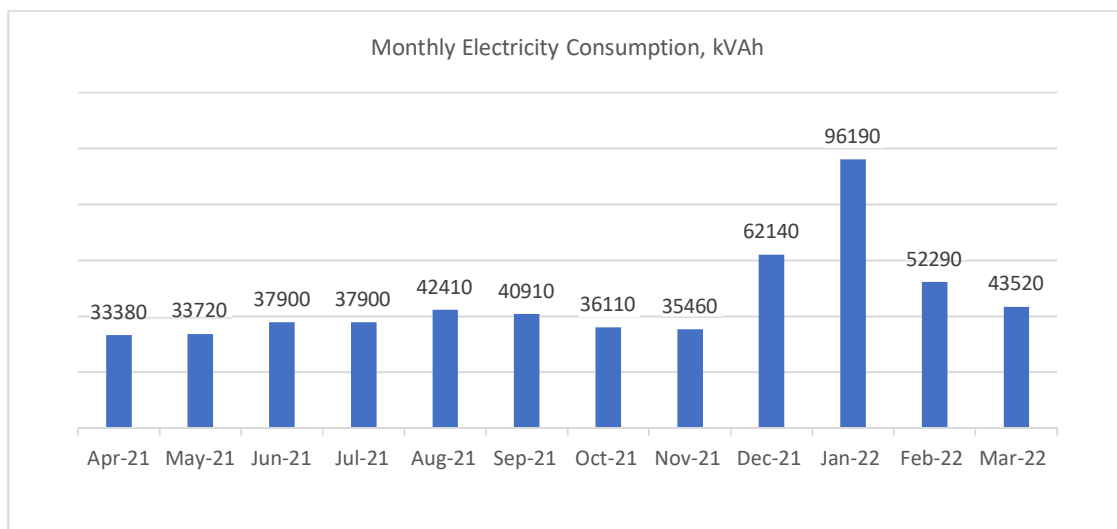




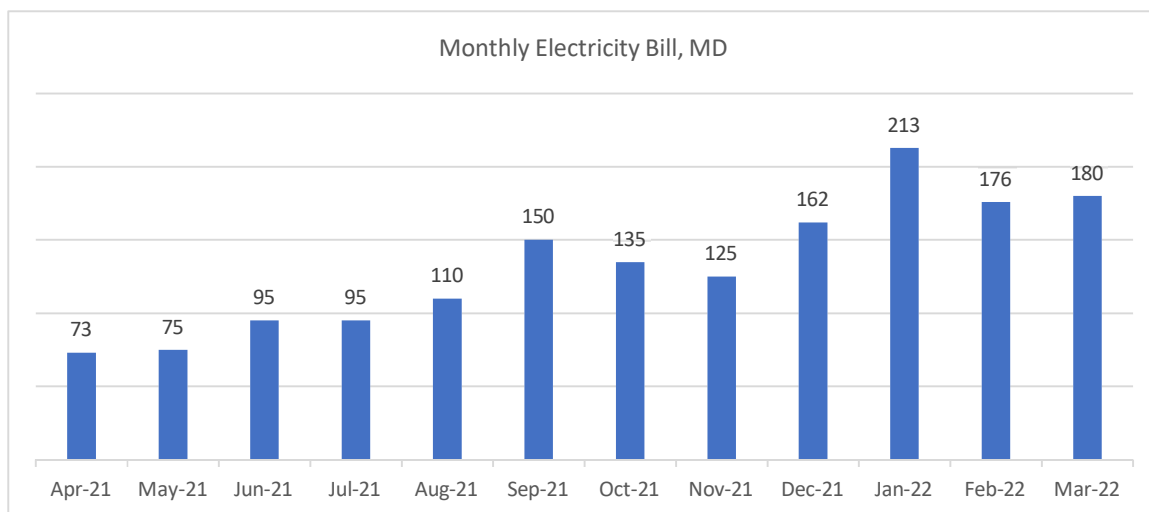
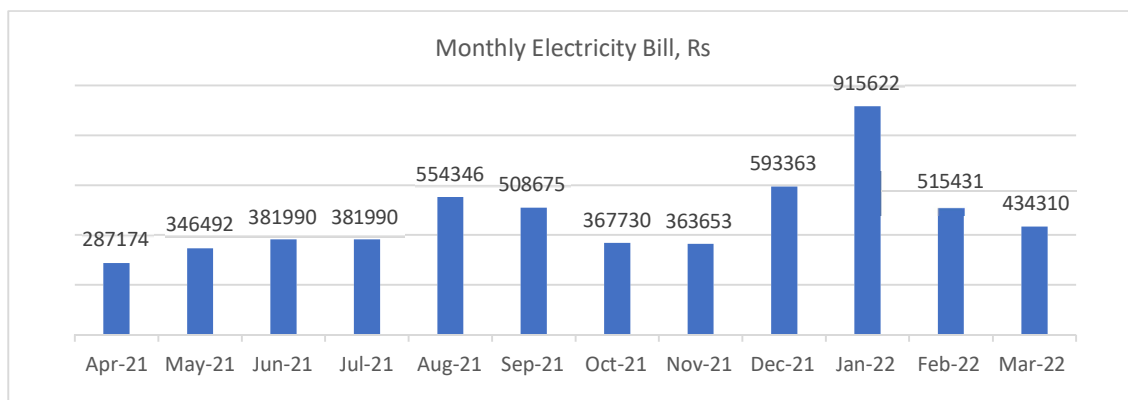
Account No. 7077481000; T.G. Hostel; 9202 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022												
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Total Billed Unit (KVAH)	Electricity Bill Energy charge Rs/KVAh
Apr-21	198	73	33380	23580	0.71	206772.00	56430.00	23972.00	0.00	287174	33720.00	8.52
May-21	198	75	33720	30540	0.91	265888.00	56430.00	24173.85	0.00	346492	33720.00	10.28
Jun-21	198	95	37900	34960	0.92	298910.00	56430.00	26650.00	0.00	381990	37900.00	10.08
Jul-21	198	95	37900	34960	0.92	298910.00	56430.00	26650.00	0.00	381990	37900.00	10.08
Aug-21	198	110	42410	37770	0.89	468594.00	56430.00	29322.00	0.00	554346	42410.00	13.07
Sep-21	198	150	40910	37960	0.93	423812.00	56430.00	28433.00	0.00	508675	40910.00	12.43
Oct-21	198	135	36110	32160	0.89	276301.00	65840.00	25589.00	0.00	367730	36110.00	10.18
Nov-21	198	125	35460	30980	0.87	282019.00	56430.00	25204.00	0.00	363653	35460.00	10.26
Dec-21	198	162	62140	61070	0.98	490406.00	61560.00	41397.45	0.00	593363	62140.00	9.55
Jan-22	198	213	96190	95370	0.99	759401.00	80940.00	63880.58	11400.00	915622	96190.00	9.52
Feb-22	198	176	52290	50890	0.97	412591.00	66880.00	35960.33	0.00	515431	52290.00	9.86
Mar-22	198	180	43520	39740	0.91	347900.00	56430.00	29980.00	0.00	434310	43520.00	9.98


Registrar
 King George Medical University
 Lucknow

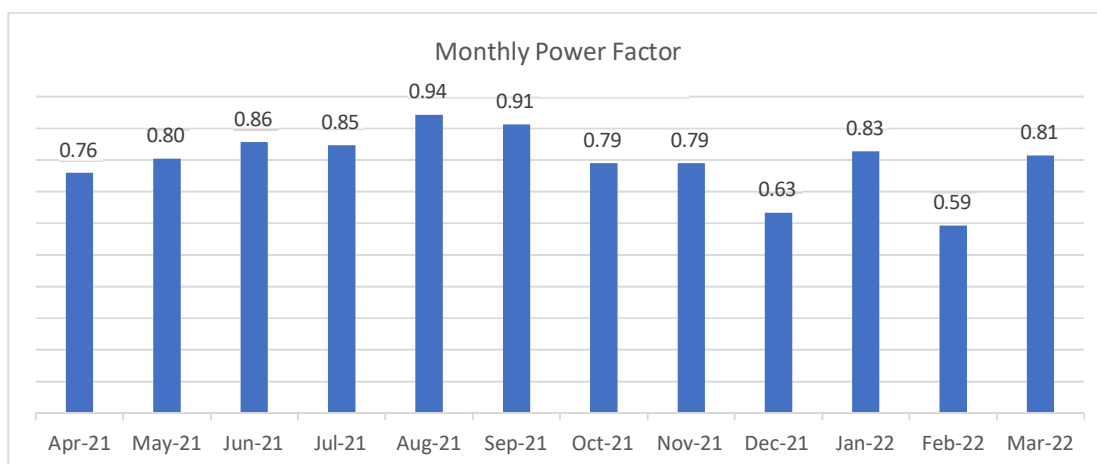
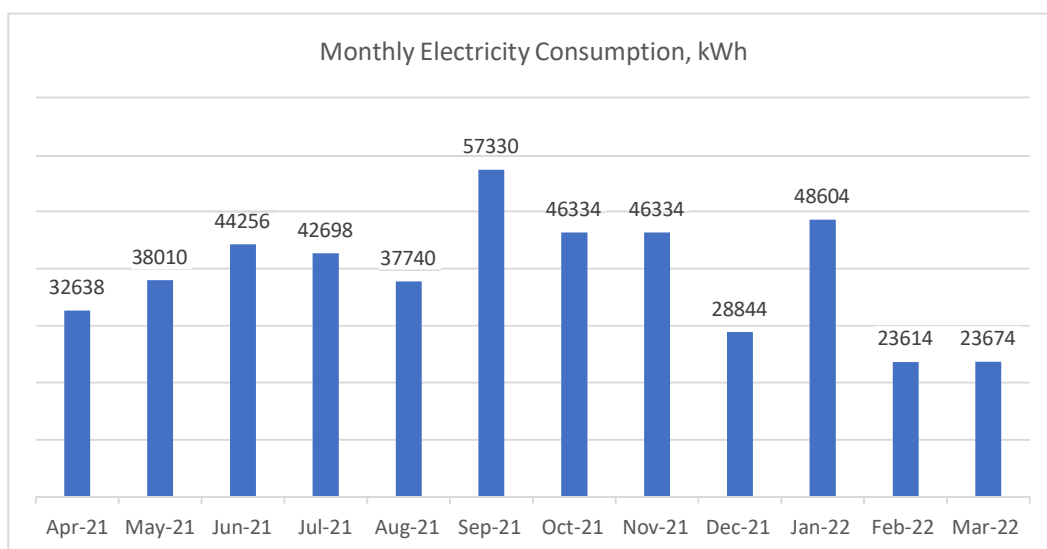
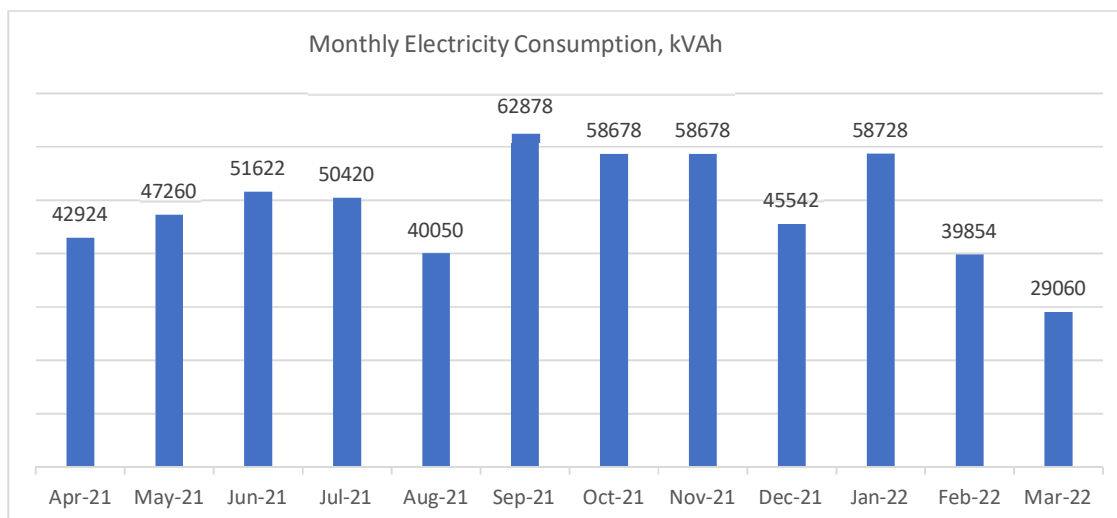


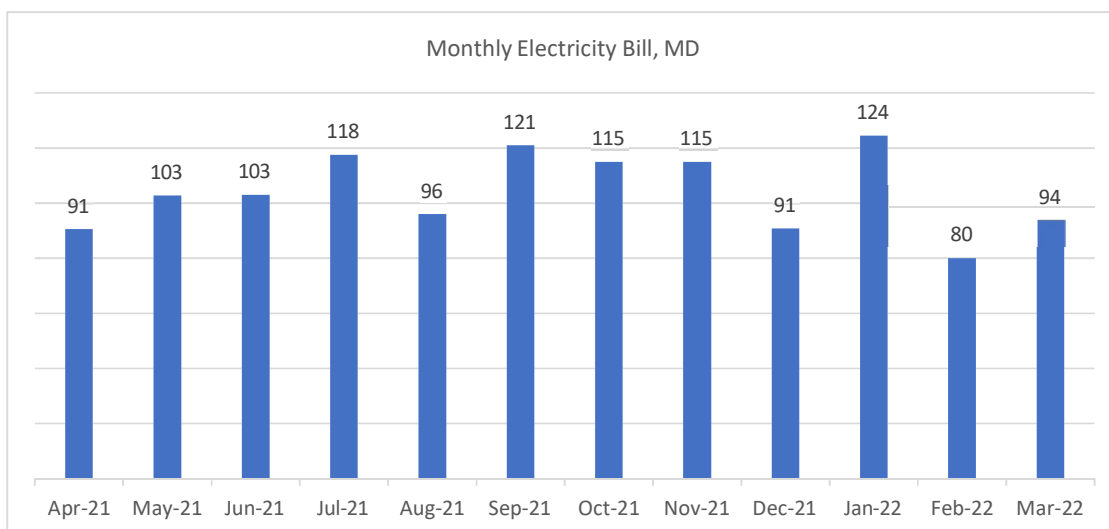
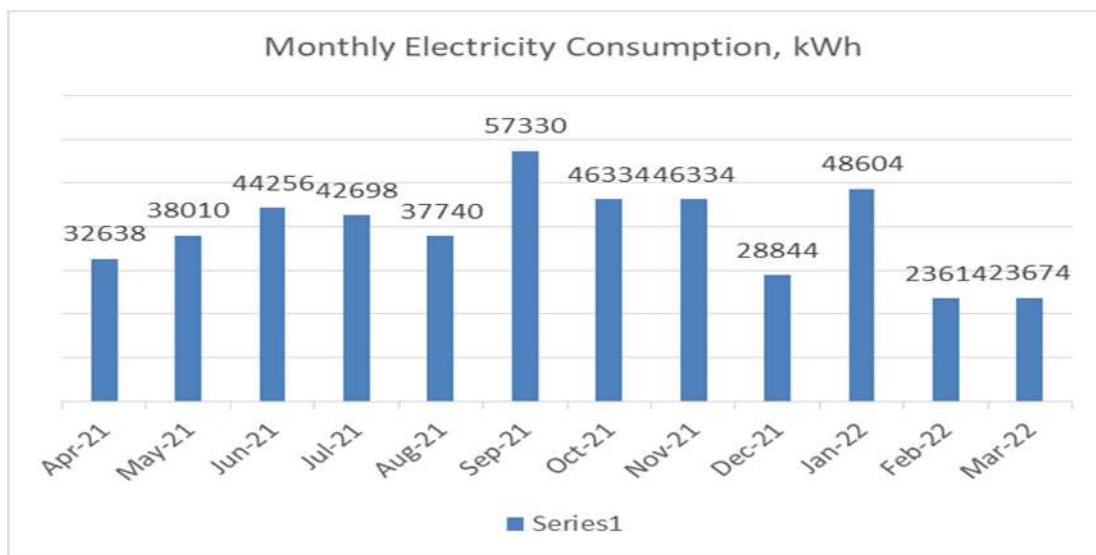
Aradhana
Registrar
 King George Medical University
 Lucknow



Account No. 6357245033; T.G. Hostel Residential Type -2; 100057 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	334	91	42924	32638	0.76	270421.20	24799.50	14761.04	0.00	309982	7.2
May-21	334	103	47260	38010	0.80	297738.00	24799.50	16126.88	0.00	338664	7.2
Jun-21	334	103	51622	44256	0.86	325220.00	24799.00	17500.00	0.00	367519	7.1
Jul-21	334	118	50420	42698	0.85	317646.00	24799.50	17122.28	0.00	359568	7.1
Aug-21	334	96	40050	37740	0.94	378784.00	24799.00	13855.00	0.00	417438	10.4
Sep-21	334	121	62878	57330	0.91	330806.00	24799.00	21046.00	0.00	376651	6.0
Oct-21	334	115	58678	46334	0.79	774763.00	24799.00	19723.00	0.00	819285	14.0
Nov-21	334	115	58678	46334	0.79	1004803.00	24799.00	19723.00	0.00	1049325	17.9
Dec-21	334	91	45542	28844	0.63	286914.60	24799.50	15585.71	0.00	327300	7.2
Jan-22	334	124	58728	48604	0.83	369986.40	24799.50	19739.30	0.00	414525	7.1
Feb-22	334	80	39854	23614	0.59	293441.40	24799.00	15912.05	0.00	334152	8.4
Mar-22	334	94	29060	23674	0.81	247383.00	24799.00	13543.00	0.00	285725	9.8

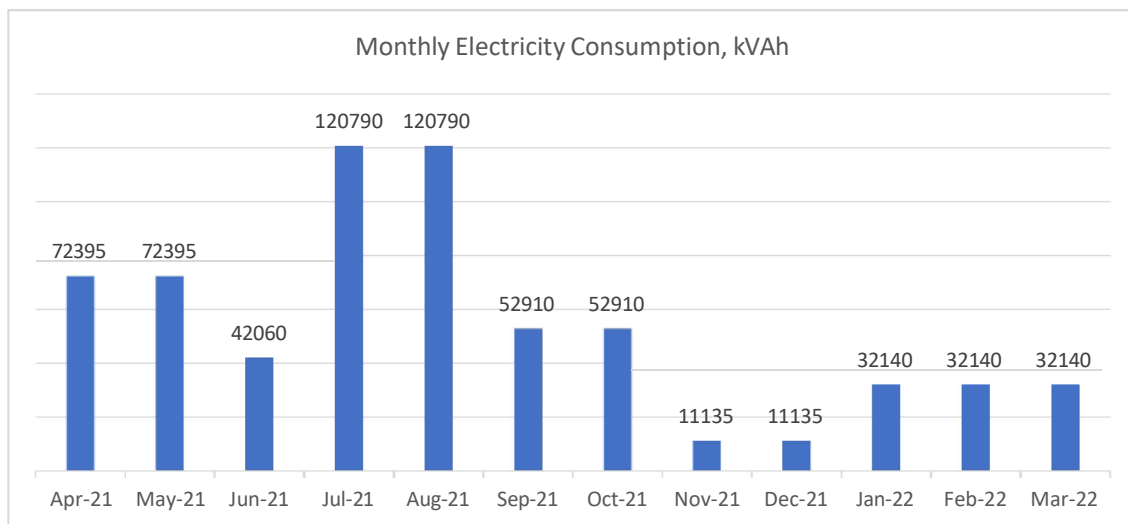




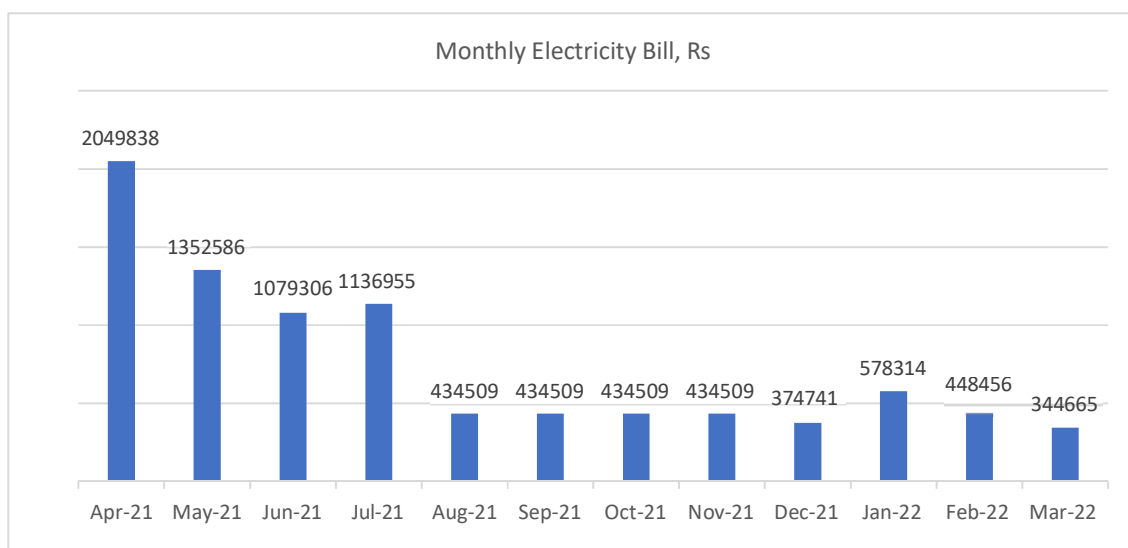
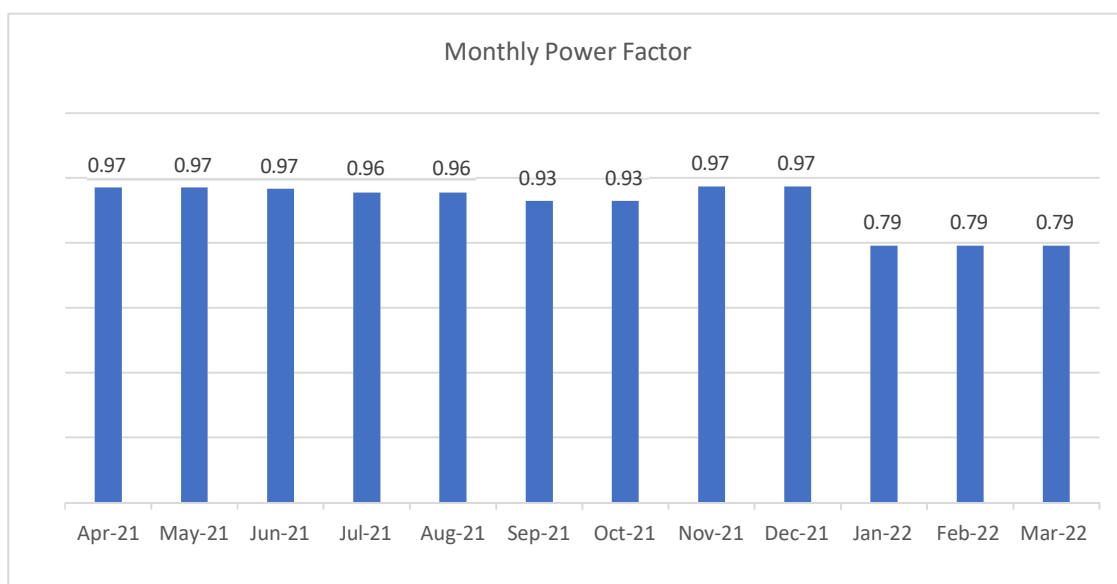
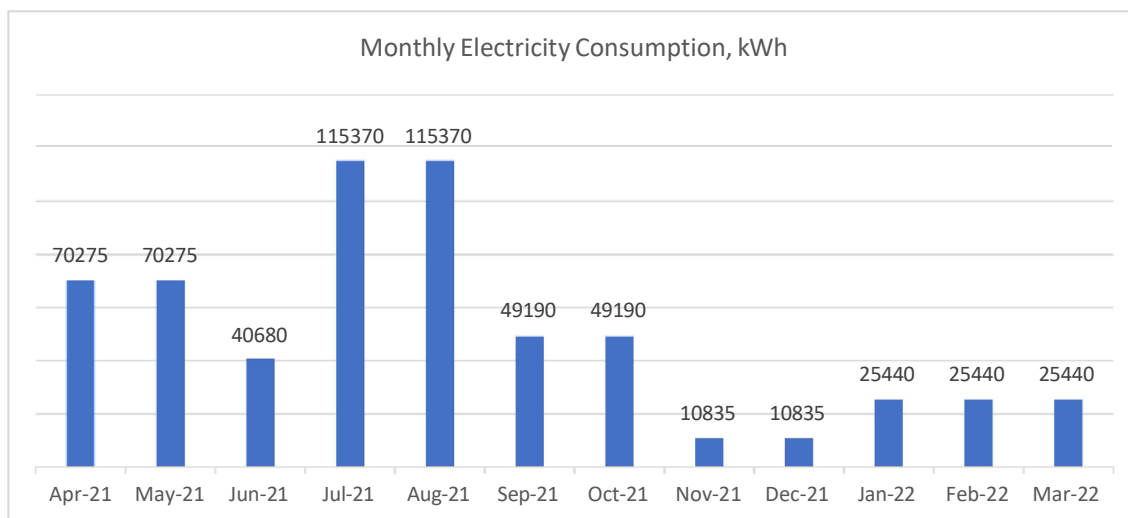
Aruna
 Registrar
 King George Medical University
 Lucknow

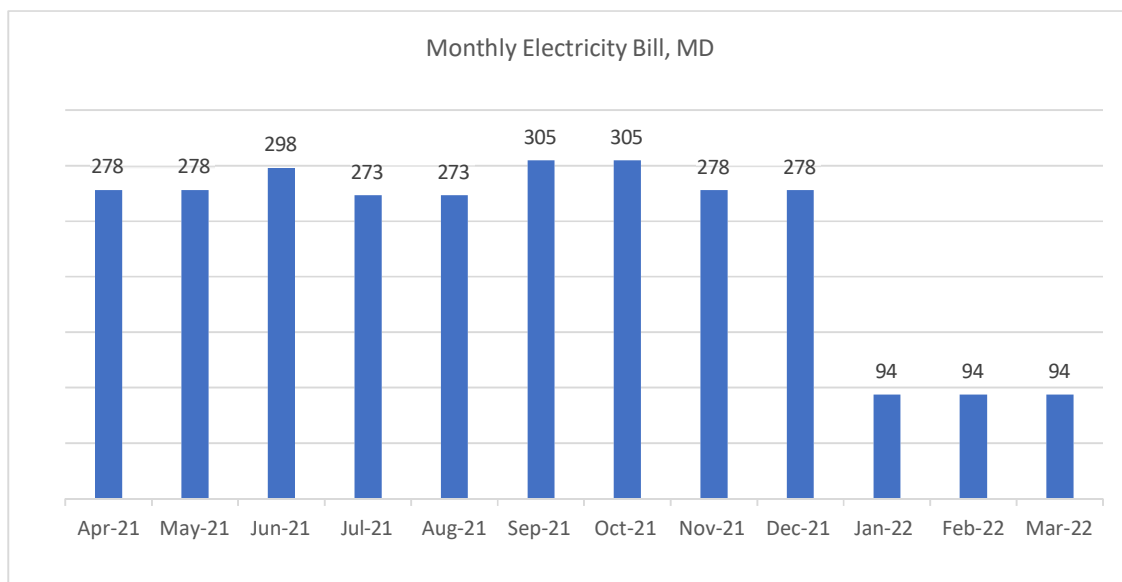
Account No. 2157481000; RALC Building (Artificial Limb Centre); 86966 Registrar, KGMU

Monthly Electrical bill detail KGMU Year 2021-2022								
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs/KVAh
Apr-21	334	278	121400	117470	0.97	0.00	2049838	16.88
May-21	334	278	144790	140550	0.97	0.00	1352586	9.34
Jun-21	334	298	116100	112530	0.97	0.00	1079306	9.30
Jul-21	334	273	120790	115370	0.96	0.00	1136955	9.41
Aug-21	334	273	120790	115370	0.96	0.00	434509	3.60
Sep-21	334	305	52910	49190	0.93	0.00	434509	8.21
Oct-21	334	305	52910	49190	0.93	0.00	434509	8.21
Nov-21	334	278	11135	10835	0.97	0.00	434509	39.02
Dec-21	334	94	32140	25440	0.79	0.00	374741	11.66
Jan-22	334	94	32140	25440	0.79	0.00	578314	17.99
Feb-22	334	102	40820	35860	0.88	0.00	448456	10.99
Mar-22	334	94	32140	25440	0.79	0.00	344665	10.72



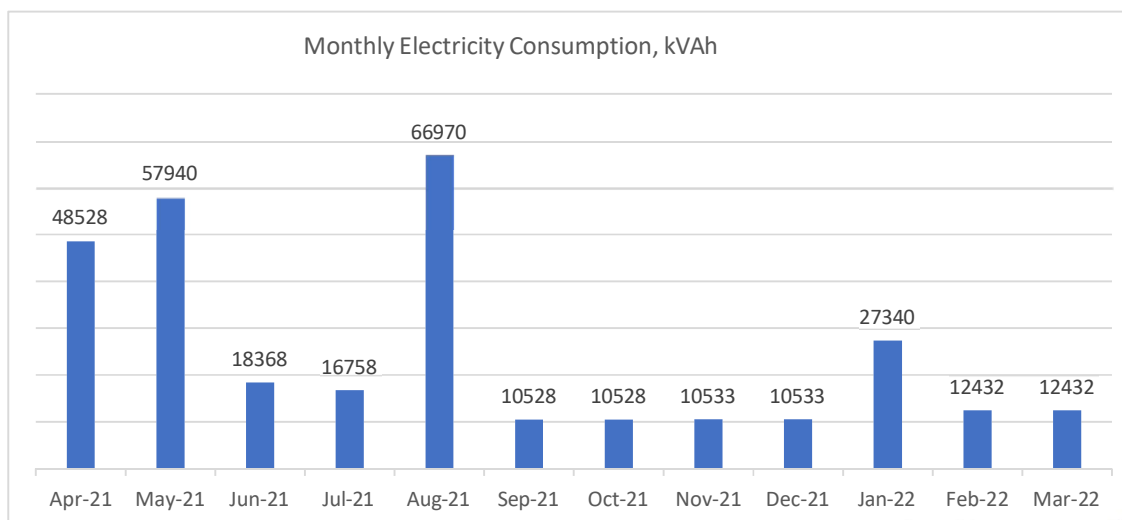
Archan
Registrar
 King George Medical University
 Lucknow

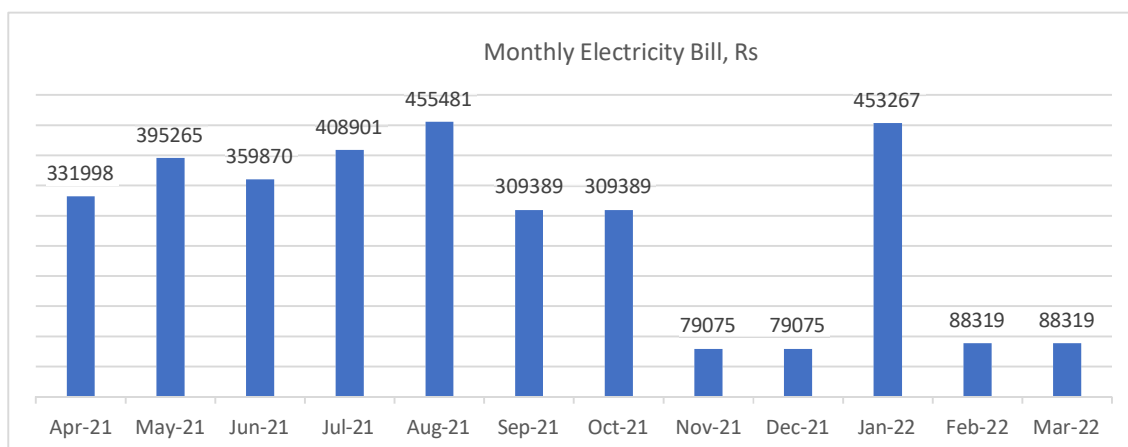
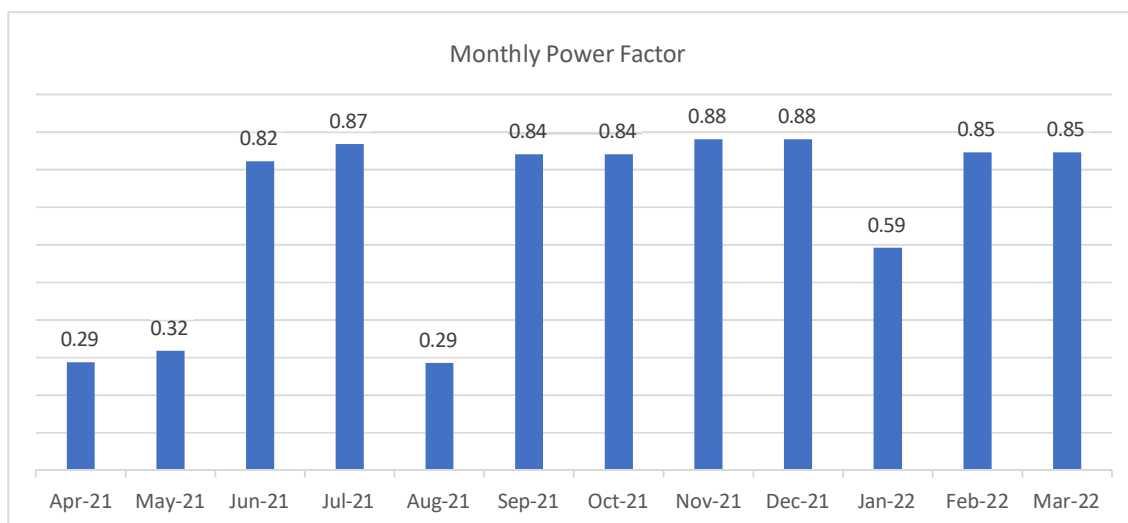
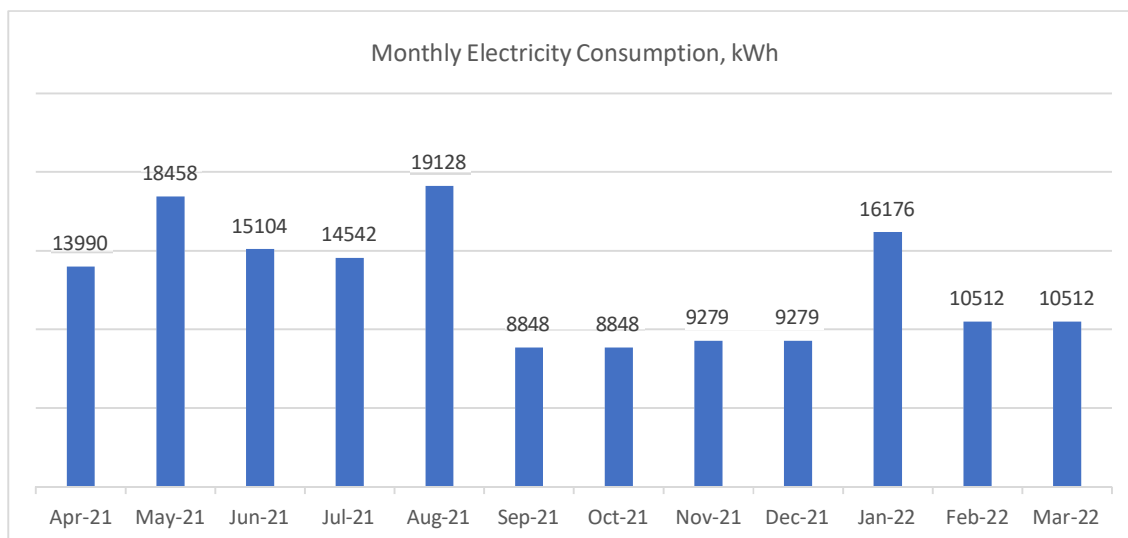


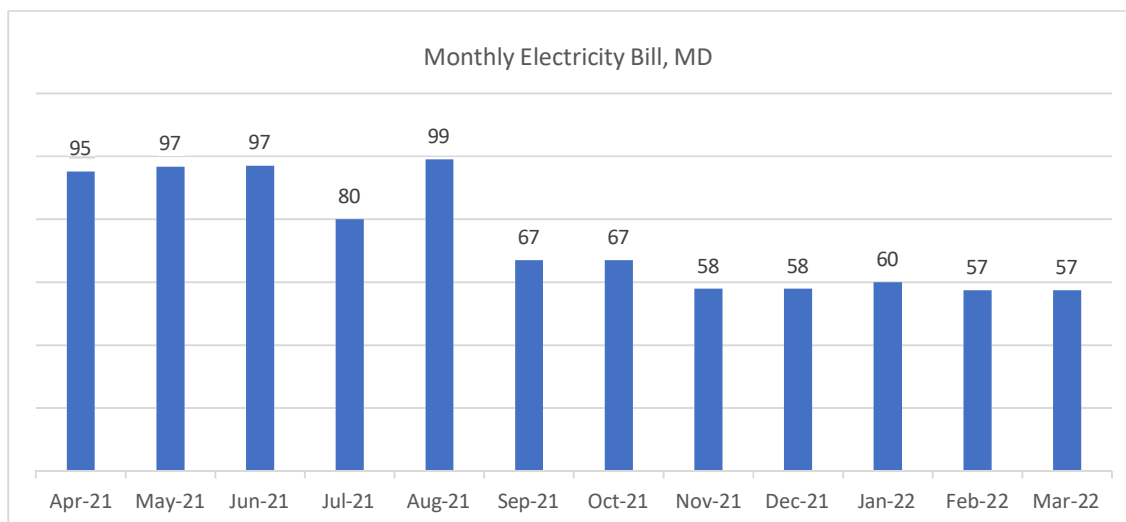


Account No. 4042748045; Employees Quarter Type-1; 4042748045 Registrar , KGMU

Monthly Electrical bill detail KGMU Year 2021-2022											
Months	Sanctioned Load (KVA)	MDI	KVAH	KWH	Power Factor	Total Electricity Charge	Fixed /Demand Charge	ED (electricity duty)	Excess Demand penalty	Total (Rs.)	Electricity Bill Energy charge Rs./KVAh
Apr-21	78	95	48528	13990	0.29	305726.40	9428.78	16843.10	0.00	331998	6.84
May-21	78	97	57940	18458	0.32	365022.00	9571.32	18822.13	1849.32	395265	6.82
Jun-21	78	97	18368	15104	0.82	348004.00	5791.00	6075.00	0.00	359870	19.59
Jul-21	78	80	16758	14542	0.87	397542.00	5791.00	5568.00	0.00	408901	24.40
Aug-21	78	99	66970	19128	0.29	421911.00	9801.00	21689.55	2079.00	455481	6.80
Sep-21	78	67	10528	8848	0.84	296675.50	5791.00	6922.00	0.00	309389	29.39
Oct-21	78	67	10528	8848	0.84	296675.50	5791.00	6922.00	0.00	309389	29.39
Nov-21	78	58	10533	9279	0.88	66357.90	5791.50	6925.37	0.00	79075	7.51
Dec-21	78	58	10533	9279	0.88	66357.90	5791.50	6925.37	0.00	79075	7.51
Jan-22	78	60	27340	16176	0.59	442013.00	9203.00	6925.37	2051.00	453267	16.58
Feb-22	78	57	12432	10512	0.85	78321.60	5791.50	4205.66	0.00	88319	7.10
Mar-22	78	57	12432	10512	0.85	78321.60	5791.50	4205.66	0.00	88319	7.10







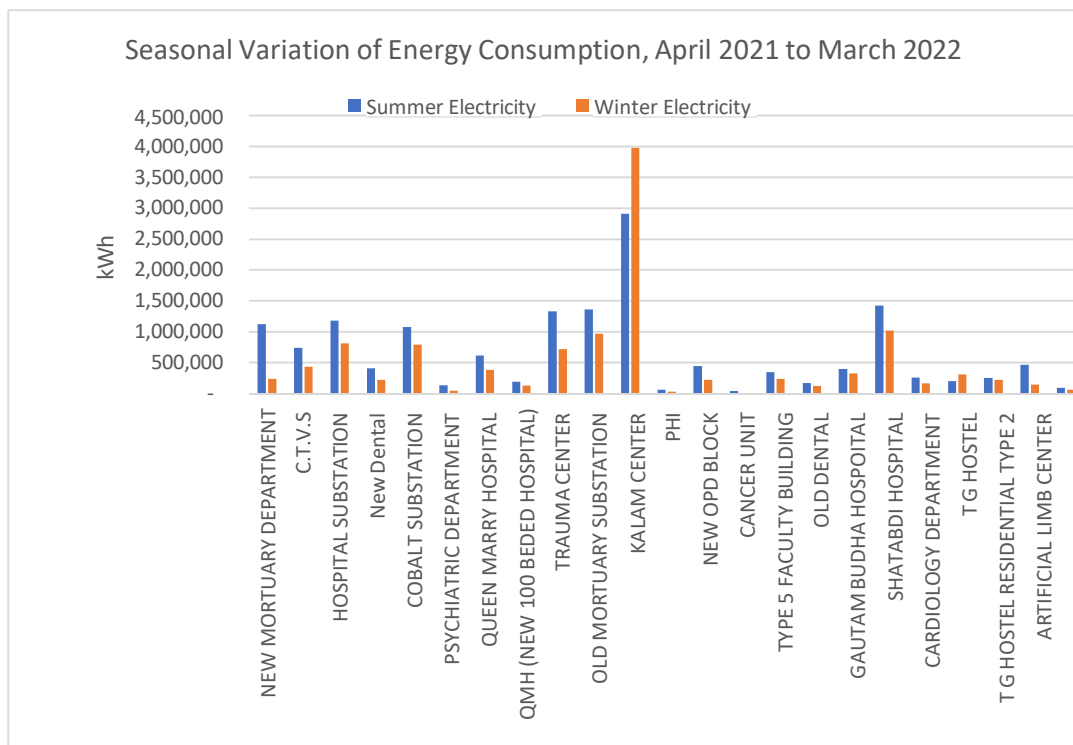
Seasonal Variation

Table : Seasonal Variation of Energy Consumption during April 2021 to March 2022

Connection Name	Summer Electricity	Winter Electricity
NEW MORTUARY DEPARTMENT	1,125,876	239,238
C.T.V.S	738,880	432,535
HOSPITAL SUBSTATION	1,180,314	813,950
New Dental	410,630	224,080
COBALT SUBSTATION	1,076,832	788,200
PSYCHIATRIC DEPARTMENT	129,024	44,026
QUEEN MARRY HOSPITAL	611,538	380,358
QMH (NEW 100 BEDED HOSPITAL)	188,536	127,984
TRAUMA CENTER	1,329,500	718,070
OLD MORTUARY SUBSTATION	1,362,580	966,080

KALAM CENTER	2,909,840	3,981,300
PHI	61,500	26,520
NEW OPD BLOCK	443,528	218,468
CANCER UNIT	40,085	6,408
TYPE 5 FACULTY BUILDING	342,630	237,640
OLD DENTAL	170,886	121,788
GAUTAM BUDHA HOSPOITAL	396,912	325,956
SHATABDI HOSPITAL	1,423,780	1,018,400
CARDIOLOGY DEPARTMENT	255,312	163,314
T G HOSTEL	199,770	310,210
T G HOSTEL RESIDENTIAL TYPE 2	252,672	217,404
ARTIFICIAL LIMB CENTER	461,160	147,180
EMPLOYEES QUARTER TYPE -1	90,070	64,606

Aradhana
Registrar
King George Medical University
Lucknow



Observation :- Winter Energy Consumption of Kalam Center is more than Summer; Working on Statuary for Energy Management is going on.

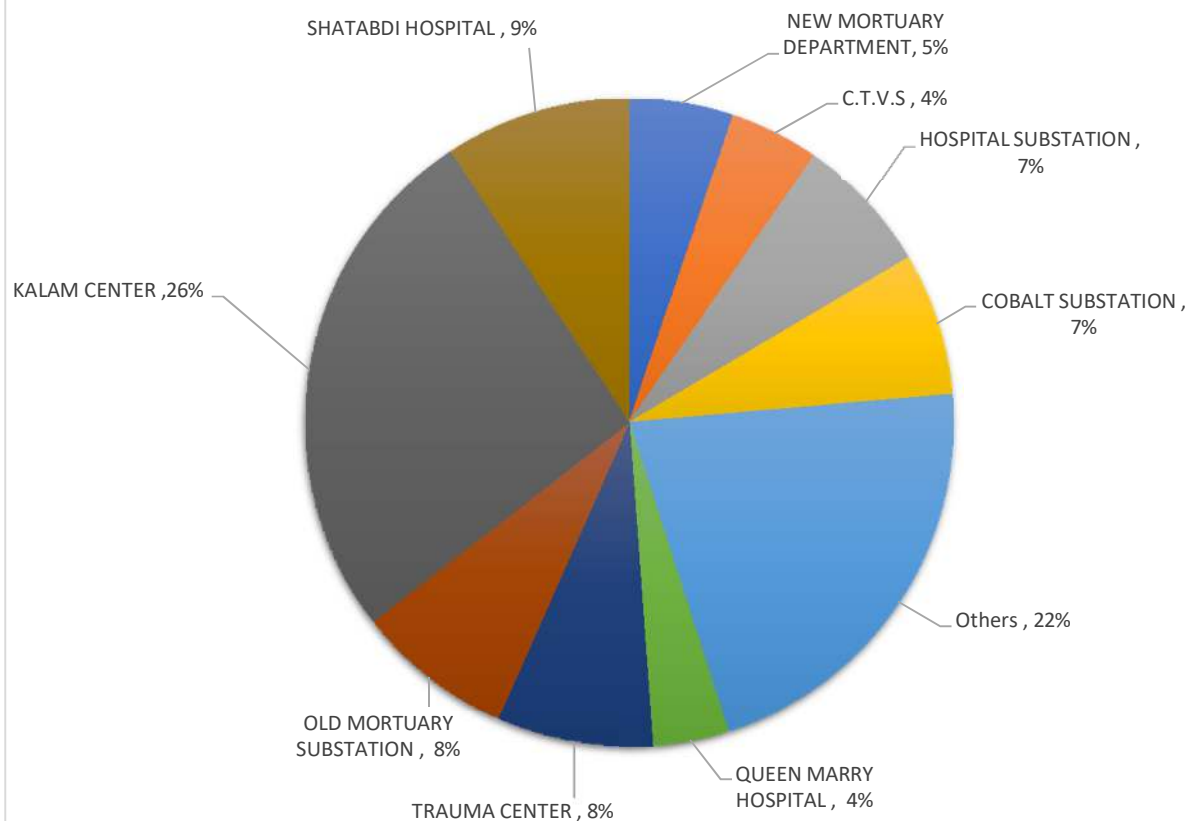
Archiya
Registrar
 King George Medical University
 Lucknow

Percentage Contribution of different Buildings in the total Electricity Consumption during April 2021 to March 2022

Department Name	Account No.	% Contribution in Total Electricity Consumption during April 2021 to March 2022
NEW MORTUARY DEPARTMENT	3747481000	5
C.T.V.S	9747481000	4
HOSPITAL SUBSTATION	8547481000	7
COBALT SUBSTATION	9547481000	7
Others (PSYCHIATRIC DEPARTMENT +QMH (NEW 100 BEDED HOSPITAL)+PHI+ Cancer Unit+Old Dental+ Employee Qtr, Type 1+Artificial Limb Center+TG Hostel+TG Hostel Residential Type 2+Cardiology Dept+New OPD Block+Type 5 Faculty Building+New Dental+Gautam Buddha Hospital)	1747481000	21
QUEEN MARRY HOSPITAL	7547481000	4
TRAUMA CENTER	5747481000	8
OLD MORTUARY SUBSTATION	7747481000	8
KALAM CENTER	9753334424	26
SHATABDI HOSPITAL	1647481000	9

Aruna
Registrar
 King George Medical University
 Lucknow

Contribution of Different Buildings in the Total Electricity Consumption FY-2021-22



The above chart indicates that the Kalam Center needs a special attention for Energy Conservation initiatives as it contributes around 1/4th of the total electricity consumption of the Hospital.

Aradhana
Registrar
 King George Medical University
 Lucknow

DG Sets Performance Analysis

On sample basis, the performance of some DG sets have been analysed based on the log book data which is as below :-

Trauma DG 1

Location	DG Spec kVA	Month	Running in Minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
Trauma DG 1	125	Apr-21	47	30	0.78	38.46	100
Trauma DG 1	125	May-21	127	117	2.11	55.45	100
Trauma DG 1	125	Jun-21	183	50	3.05	16.39	50
Trauma DG 1	125	Jul-21	126	56	2.10	26.67	75
Trauma DG 1	125	Aug-21	67	53	1.11	47.75	100
Trauma DG 1	125	Sep-21	57	25	0.95	26.32	75
Trauma DG 1	125	Oct-21	426	140	7.10	19.72	50
Trauma DG 1	125	Nov-21	127	83	2.11	39.34	100
Trauma DG 1	125	Dec-21	57	26	0.95	27.37	75
Trauma DG 1	125	Jan-22	245	66	4.08	16.18	50
Trauma DG 1	125	Feb-22	7	Not Available(NA)	0.11	NA	NA
Trauma DG 1	125	Mar-22	126	59	2.10	28.10	75

Trauma DG 2

Location	DG Spec KVA	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
Trauma DG2	250	Apr-21	62	25	1.03	24.19	25
Trauma DG2	250	May-21	543	175	9.05	19.34	25
Trauma DG2	250	Jun-21	426	122	7.10	17.18	25
Trauma DG2	250	Jul-21	124	46	2.07	22.26	25
Trauma DG2	250	Aug-21	38	12	0.63	18.95	25
Trauma DG2	250	Sep-21	68	33	1.13	29.12	25
Trauma DG2	250	Oct-21	31	11	0.52	21.29	25
Trauma DG2	250	Nov-21	NA	NA	NA	NA	NA
Trauma DG2	250	Dec-21	NA	10	NA	NA	NA
Trauma DG2	250	Jan-22	45	20	0.75	26.67	25
Trauma DG2	250	Feb-22	69	50	1.15	43.48	70
Trauma DG2	250	Mar-22	79	35	1.32	26.58	25

Trauma DG 3

DG Spec KVA	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
250	Apr-21	47	14	0.78	17.87	25
250	May-21	242	43	4.03	10.66	25
250	Jun-21	176	21	2.93	7.16	25
250	Jul-21	179	26	2.98	8.72	25
250	Aug-21	109	21	1.82	11.56	25
250	Sep-21	54	11	0.90	12.22	25
250	Oct-21	506	82	8.43	9.72	25
250	Nov-21	169	31	2.82	11.01	25
250	Dec-21	57	21	0.95	22.11	25
250	Jan-22	214	53	3.57	14.86	25
250	Feb-22	21	3	0.35	8.57	25
250	Mar-22	127	29	2.12	13.70	25

Trauma DG 4

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
250	Apr-21	47	37	0.78	47.23	75
250	May-21	255	146	4.25	34.35	50
250	Jun-21	211	97	3.52	27.58	25
250	Jul-21	158	63	2.63	23.92	25
250	Aug-21	100	60	1.67	36.00	50
250	Sep-21	54	28	0.90	31.11	50
250	Oct-21	468	261	7.80	33.46	50
250	Nov-21	171	134	2.85	47.02	75
250	Dec-21	57	53	0.95	55.79	75
250	Jan-22	242	89	4.03	22.07	25
250	Feb-22	12	NA	0.20	NA	NA
250	Mar-22	121	73	2.02	36.20	50

Rheumatology DG

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in lit	Hour	Litre /hour	Load %
250	Apr-21	168	30	2.80	10.71	25
250	May-21	870	116	14.50	8.00	25
250	Jun-21	1353	142	22.55	6.30	25
250	Jul-21	868	102	14.47	7.05	25
250	Aug-21	1768	188	29.47	6.38	25
250	Sep-21	1990	154	33.17	4.64	25
250	Oct-21	377	46	6.28	7.32	25
250	Nov-21	55	8	0.92	8.73	25
250	Dec-21	723	134	12.05	11.12	25
250	Jan-22	306	44	5.10	8.63	25
250	Feb-22	159	38	2.65	14.34	25
250	Mar-22	202	32	3.37	9.50	25

Microbiology DG

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
250	Apr-21	1050	356	17.50	20.34	25
250	May-21	1677	481	27.95	17.21	25
250	Jun-21	880	236	14.67	16.09	25
250	Jul-21	426	134	7.10	18.87	25
250	Aug-21	811	171	13.52	12.65	25
250	Sep-21	225	46	3.75	12.27	25
250	Oct-21	102	18	1.70	10.59	25
250	Nov-21	NA	NA	NA	NA	NA
250	Dec-21	60	18	1.00	18.00	25
250	Jan-22	245	50	4.08	12.24	25
250	Feb-22	150	30	2.50	12.00	25
250	Mar-22	139	48	2.32	20.72	25

Archan
Registrar
King George Medical University
Lucknow

Old Dental DG

DG Spec KVA	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
61	Apr-21	75	8	1.25	6.40	25 to 50
61	May-21	171	14	2.85	4.91	25 to 50
61	Jun-21	50	6	0.83	7.20	25 to 50
61	Jul-21	128	10	2.13	4.69	25 to 50
61	Aug-21	165	10	2.75	3.64	25
61	Sep-21	115	12	1.92	6.26	25 to 50
61	Oct-21	165	14	2.75	5.09	25 to 50
61	Nov-21	65	6	1.08	5.54	25 to 50
61	Dec-21	307	18	5.12	3.52	25
61	Jan-22	105	10	1.75	5.71	25 to 50
61	Feb-22	70	7	1.17	6.00	25 to 50
61	Mar-22	168	8	2.80	2.86	25

Gandhi Ward, DG 2

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
320 KVA	Apr-21	170	67	2.83	23.65	25
320 KVA	May-21	376	235	6.27	37.50	25
320 KVA	Jun-21	346	257	5.77	44.57	50
320 KVA	Jul-21	166	84	2.77	30.36	25
320 KVA	Aug-21	125	62	2.08	29.76	25
320 KVA	Sep-21	607	315	10.12	31.14	25
320 KVA	Oct-21	166	65	2.77	23.49	25
320 KVA	Nov-21	131	76	2.18	34.81	25
320 KVA	Dec-21	411	167	6.85	24.38	25
320 KVA	Jan-22	233	105	3.88	27.04	25
320 KVA	Feb-22	64	24	1.07	22.50	25
320 KVA	Mar-22	177	85	2.95	28.81	25

Gandhi Ward DG 1

DG Spec KVA	Month	Running Time in minutes	Monthly Fuel Consumption in lit	Hour	Litre /hour	Load %
320	Apr-21	107	52	1.78	29.16	25
320	May-21	359	198	5.98	33.09	25
320	Jun-21	379	195	6.32	30.87	25
320	Jul-21	149	68	2.48	27.38	25
320	Aug-21	61	52	1.02	51.15	50
320	Sep-21	596	315	9.93	31.71	25
320	Oct-21	306	185	5.10	36.27	25
320	Nov-21	111	55	1.85	29.73	25
320	Dec-21	405	187	6.75	27.70	25
320	Jan-22	114	65	1.90	34.21	25
320	Feb-22	29	15	0.48	31.03	25
320	Mar-22	58	19	0.97	31.66	25

Mortuary DG

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in lit	Hour	Litre /hour	Load %
50	Apr-21	1255	126	20.92	6.02	50
50	May-21	1605	128	26.75	4.79	25
50	Jun-21	645	58	10.75	5.40	25
50	Jul-21	326	30	5.43	5.52	25
50	Aug-21	802	80	13.37	5.99	25
50	Sep-21	289	39	4.82	8.10	50
50	Oct-21	102	13	1.70	7.65	50
50	Nov-21	40	4	0.67	6.00	25
50	Dec-21	110	6	1.83	3.27	25
50	Jan-22	190	14	3.17	4.42	25
50	Feb-22	50	5	0.83	6.00	25
50	Mar-22	104	11	1.73	6.35	50

RALC DG 4

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
500	Apr-21	NA	NA	NA	NA	NA
500	May-21	510	490	8.50	57.65	50
500	Jun-21	1072	410	17.87	22.95	25
500	Jul-21	559	437	9.32	46.91	50
500	Aug-21	1503	818	25.05	32.65	25
500	Sep-21	196	89	3.27	27.24	25
500	Oct-21	577	350	9.62	36.40	50
500	Nov-21	NA	NA	NA	NA	NA
500	Dec-21	843	622	14.05	44.27	50
500	Jan-22	326	233	5.43	42.88	50
500	Feb-22	238	215	3.97	54.20	50
500	Mar-22	237	160	3.95	40.51	50

Aruna
Registrar
 King George Medical University
 Lucknow

Central Library DG

DG Spec	Month	Running Time	Monthly Fuel Consumption in lit	Hour	Litre /hour	Load %
200	Apr-21	1060	240	17.67	13.58	25
200	May-21	1572	272	26.20	10.38	25
200	Jun-21	885	190	14.75	12.88	25
200	Jul-21	261	84	4.35	19.31	50
200	Aug-21	963	218	16.05	13.58	25
200	Sep-21	249	51	4.15	12.29	25
200	Oct-21	82	28	1.37	20.49	50
200	Nov-21	35	8	0.58	13.71	25
200	Dec-21	50	17	0.83	20.40	50
200	Jan-22	125	48	2.08	23.04	50
200	Feb-22	175	48	2.92	16.46	50
200	Mar-22	134	44	2.23	19.70	50

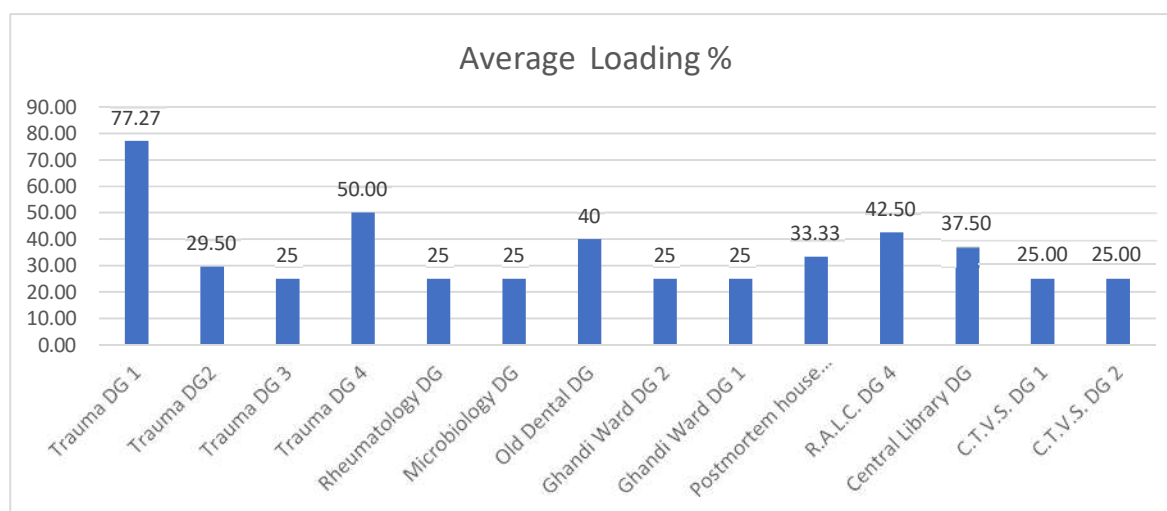
CTVS DG1

DG Spec	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
320	Apr-21	100	45	1.67	27.00	25
320	May-21	332	150	5.53	27.11	25
320	Jun-21	229	105	3.82	27.51	25
320	Jul-21	189	90	3.15	28.57	25
320	Aug-21	83	45	1.38	32.53	25
320	Sep-21	87	50	1.45	34.48	25
320	Oct-21	70	30	1.17	25.71	25
320	Nov-21	65	35	1.08	32.31	25
320	Dec-21	94	35	1.57	22.34	25
320	Jan-22	131	55	2.18	25.19	25
320	Feb-22	60	30	1.00	30.00	25
320	Mar-22	168	50	2.80	17.86	25

Arunima
Registrar
 King George Medical University
 Lucknow

CTVS DG 2

DG Spec KVA	Month	Running Time in minutes	Monthly Fuel Consumption in litre	Hour	Litre /hour	Load %
125	Apr-21	100	18	1.67	10.80	25
125	May-21	332	60	5.53	10.84	25
125	Jun-21	254	38	4.23	8.98	25
125	Jul-21	189	34	3.15	10.79	25
125	Aug-21	83	16	1.38	11.57	25
125	Sep-21	82	18	1.37	13.17	25
125	Oct-21	60	12	1.00	12.00	25
125	Nov-21	75	14	1.25	11.20	25
125	Dec-21	94	12	1.57	7.66	25
125	Jan-22	97	20	1.62	12.37	25
125	Feb-22	55	12	0.92	13.09	25
125	Mar-22	168	26	2.80	9.29	25



Observations :-

1. Average load of the DGs is around 32%
2. Average operating hrs is 0.70 hrs per day

Aruchana
Registrar
 King George Medical University
 Lucknow

Power Factor Analysis

Connection wise Power Factor

S. No.	Department Name	Account No.	Avg PF 2021-22
1	NEW MORTUARY DEPARTMENT	3747481000	0.84
2	2. C.T.V.S	9747481000	0.87
3	HOSPITAL SUBSTATION	8547481000	0.97
4	New Dental	5134370261	0.92
5	COBALT SUBSTATION	9547481000	1.00
6	PSYCHIATRIC DEPARTMENT	1747481000	0.78
7	QUEEN MARRY HOSPITAL	7547481000	0.94
8	QMH (NEW 100 BEDED HOSPITAL)	4540285915	0.99
9	TRAUMA CENTER	5747481000	0.92
10	OLD MORTUARY SUBSTATION	7747481000	0.93
11	KALAM CENTER	9753334424	0.85
12	PHI	1214770000	0.98
13	NEW OPD BLOCK	4697779403	0.94
14	CANCER UNIT	4747481000	0.93
15	TYPE 5 FACULTY BUILDING	7200191928	0.98
16	OLD DENTAL	6747481000	0.66
17	GAUTAM BUDHA HOSPOITAL	1133332000	0.90
18	SHATABDI HOSPITAL	1647481000	0.83
19	CARDIOLOGY DEPARTMENT	2747481000	0.96
20	T G HOSTEL	7077481000	0.91
21	T G HOSTEL RESIDENTIAL TYPE 2	6357245033	0.80
22	ARTIFICIAL LIMB CENTER	2157481000	0.91
23	EMPLOYEES QUARTER TYPE -1	4042748045	0.69

Aruna
Registrar
King George Medical University
Lucknow

Performance of APFC Installed at Various Locations

Performance of APFC Panels				
S.NO.	DEPARTMENT/PLACE	A/C NO.	CAPACITY IN (KVAR)	WORKING STATUS
1	HOSPITAL SUBSTATION	854748100 REGISTRAR,KGMU	800A ,495KVAR*2	OFF
2	QUEEN MARRY HOSPITAL	7547481000 REGISTRAR, KGMU	400KVAR 630A	FOUND OK
3	COBALT SUBSTATION	9547481000 REGISTRAR,KGMU	Not Available	-----
4	PSYCHIATRIC DEPARTMENT	1747481000 REGISTRAR,KGMU	250KVAR *2	FOUND OK
5	TRAUMA CENTRE	5747481000 REGISTRAR,KGMU	800A, 450 KVAR 800A, 450 KVAR	OFF FOUND OK
6	OLD MORTUARY SUBSTATION	7747481000 REGISTRAR,KGMU	800A,495 KVAR 800A,495 KVAR	OFF
7	CARDIOLOGY DEPARTMENT	2747481000 REGISTRAR,KGMU	Not Available	----
8	NEW MORTUARY SUBSTATION	3747481000 REGISTRAR,KGMU	2x495 kVAR	Not Connected
09	OLD DENTAL BUILDING	6747481000 REGISTRAR,KGMU	495KVAR 800A	FOUND OK
10	GAUTAM BUDHA HOSTEL	1133332000 REGISTRAR,KGMU	Not Available	
11	SHATABDI HOSPITAL	1647481000 REGISTRAR,KGMU	3x200 kVAR	OFF
12	C.T.V.S. DEPARTMENT	9747481000 REGISTRAR,KGMU	800A,495KVAR	OFF
13	NEW DENTAL	5134370261 REGISTRAR,KGMU	800A,495KVAR	FOUND OK
14	DENTAL SCIENCE UNIVERSITY	1214770000 REGISTRAR,KGMU	450 KVAR	OK
15	NEW OPD BLOCK	4697779403 REGISTRAR,KGMU	600KVAR	OFF

16	NEW OPD BLOCK	4697779403 REGISTRAR,KGMU	800A,495KVAR	FOUND OK
17	TEACHING BLOCK (KALAM CENTRE)	9753334425 REGISTRAR,KGMU	800A,495KVAR*2	OFF
18	TYPE -5 FACULTY BUILDING (J.N. ROAD)	7200191928 REGISTRAR,KGMU	400KVAR	FOUND OK
19	QMH (NEW 100 BADED HOSPITAL)	4540285915 REGISTRAR,KGMU	450 KVAR	OFF
20	VRIDDHA MANSIK	-----	400A, 250KVAR 400A	OFF
21	SATABADI PHASE1	-----	400A,200KVAR*3	OFF
22	SATABADI PHASE 2	-----	630A,300KVAR*4	OFF
23	T.G HOSTEL CAMPUS	7077481000	450KVAR,800A	FOUND OK
24	T.G EMPLOYEE RESIDENCE TYPE 2	6357245033	250KVAR,400A	OFF
25	COVID HOSPITAL PREMISES	2157481000	2x 550KVAR	01 is ON and another is OFF
26	EMPLOYEE RESIDENCE TYPE-1	4042748045	400A,250KVAR	FOUND OK

Aruna
Registrar
King George Medical University
Lucknow

Recommendations for Power Factor Improvement

Particulars	UoM	NEW MORTUARY DEPARTMENT
		A/C NO:- 3747481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	664
Sanctioned Load/Contract Demand	KVA	223
Operating PF avg.	PF	0.84
Annual Unit Consumed	kVAh	1441199
Annual Energy Billed	Rs.	16324531
Desired PF (nearby unity)	PF	0.99
PF correction		0.503
Penalty Charges	Rs./kVA	760
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	334
Saving in Maximum demand by improving the power factor close to unity	KVA	190
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	4661496
Percentage Saving in Energy was achieved, if power factor maintained	%	29%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	6.7
Payback Period	month	1.7

Aradhana
Registrar
 King George Medical University
 Lucknow

Particulars	UoM	NEW MORTUARY DEPARTMENT	C.T.V.S DEPARTMENT
		A/C NO:- 3747481000	A/C NO:- 9747481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA		490
Sanctioned Load/Contract Demand	KVA		445
Operating PF avg.	PF		0.87
Annual Unit Consumed	kVAh		1352125
Annual Energy Billed	Rs.		14281417
Desired PF (nearby unity)	PF		0.99
PF correction			0.424
Penalty Charges	Rs./kVA		760
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	KVAR		208
Saving in Maximum demand by improving the power factor close to unity	KVA		110
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.		3214502
Percentage Saving in Energy was achieved, if power factor maintained	%		23%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh		2.5
Payback Period	month		0.9

Aruna
Registrar
King George Medical University
Lucknow

Particulars	UoM	PSYCHIATRIC DEPARTMENT
		A/C NO:- 1747481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	211
Sanctioned Load/Contract Demand	KVA	158
Operating PF avg.	PF	0.78
Annual Unit Consumed	kVAh	207066
Annual Energy Billed	Rs.	2413829
Desired PF (nearby unity)	PF	0.99
PF correction		0.66
Penalty Charges	Rs./kVA	760
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	139
Saving in Maximum demand by improving the power factor close to unity	KVA	81
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	921008
Percentage Saving in Energy was achieved, if power factor maintained	%	38%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	1.7
Payback Period	month	2.2

Aradhana
Registrar
King George Medical University
Lucknow

Particulars	UoM	TEACHING BLOCK (KALAM CENTER)
		A/C NO:- 9753334424
Maximum Demand Recorded from Apr-21 Mar'22	kVA	3145
Sanctioned Load/Contract Demand	KVA	2632
Operating PF avg.	PF	0.85
Annual Unit Consumed	kVAh	8125100
Annual Energy Billed	Rs.	82348508
Desired PF (nearby unity)	PF	0.99
PF correction		0.477
Penalty Charges	Rs./kVA	760
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	1500
Saving in Maximum demand by improving the power factor close to unity	KVA	820
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	21476158
Percentage Saving in Energy was achieved, if power factor maintained	%	26%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	18.0
Payback Period	month	1.0

Aradhana
Registrar
King George Medical University
Lucknow

Particulars	UoM	OLD DENTAL
		A/C NO:- 6747481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	249
Sanctioned Load/Contract Demand	KVA	445
Operating PF avg.	PF	0.66
Annual Unit Consumed	kVAh	436686
Annual Energy Billed	Rs.	5446777
Desired PF (nearby unity)	PF	0.99
PF correction		0.996
Penalty Charges	Rs./kVA	
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	443
Saving in Maximum demand by improving the power factor close to unity	KVA	137
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	2989983
Percentage Saving in Energy was achieved, if power factor maintained	%	55%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	5.3
Payback Period	month	2.1

Aruhana
Registrar
King George Medical University
Lucknow

Particulars	UoM	GAUTAM BUDHA HOSPOITAL
		A/C NO:- 1133332000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	207
Sanctioned Load/Contract Demand	KVA	667
Operating PF avg.	PF	0.90
Annual Unit Consumed	kVAh	797148
Annual Energy Billed	Rs.	9503066
Desired PF (nearby unity)	PF	0.99
PF correction		0.342
Penalty Charges	Rs./kVA	
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	228
Saving in Maximum demand by improving the power factor close to unity	KVA	35
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	1593400
Percentage Saving in Energy was achieved, if power factor maintained	%	17%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	2.7
Payback Period	month	2.1

Aruhana
Registrar
King George Medical University
Lucknow

Particulars	UoM	SHATABDI HOSPITAL
		A/C NO:- 1647481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	808
Sanctioned Load/Contract Demand	KVA	1334
Operating PF avg.	PF	0.83
Annual Unit Consumed	kVAh	2966380
Annual Energy Billed	Rs.	29862976
Desired PF (nearby unity)	PF	0.99
PF correction		0.53
Penalty Charges	Rs./kVA	
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	707
Saving in Maximum demand by improving the power factor close to unity	KVA	243
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	8976660
Percentage Saving in Energy was achieved, if power factor maintained	%	30%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	8.5
Payback Period	month	1.1

Archan
Registrar
 King George Medical University
 Lucknow

Particulars	UoM	T G HOSTEL
		A/C NO:- 7077481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	213
Sanctioned Load/Contract Demand	KVA	198
Operating PF avg.	PF	0.91
Annual Unit Consumed	kVAh	552270
Annual Energy Billed	Rs.	5650776
Desired PF (nearby unity)	PF	0.99
PF correction		0.313
Penalty Charges	Rs./kVA	760
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	KVAR	67
Saving in Maximum demand by improving the power factor close to unity	KVA	34
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	893533
Percentage Saving in Energy was achieved, if power factor maintained	%	16%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	0.8
Payback Period	month	1.1

Arunima
Registrar
King George Medical University
Lucknow

Particulars	UoM	T G HOSTEL RESIDENTIAL TYPE 2
		A/C NO:- 6357245033
Maximum Demand Recorded from Apr-21 Mar'22	kVA	124
Sanctioned Load/Contract Demand	KVA	334
Operating PF avg.	PF	0.80
Annual Unit Consumed	kVAh	585694
Annual Energy Billed	Rs.	5400134
Desired PF (nearby unity)	PF	0.99
PF correction		0.608
Penalty Charges	Rs./kVA	
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	203
Saving in Maximum demand by improving the power factor close to unity	KVA	44
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	1895675
Percentage Saving in Energy was achieved, if power factor maintained	%	35%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	2.4
Payback Period	month	1.5

Aruhana
Registrar
King George Medical University
Lucknow

Particulars	UoM	ARTIFICIAL LIMB CENTER (RALC BUILDING)
		A/C NO:- 2157481000
Maximum Demand Recorded from Apr-21 Mar'22	kVA	305
Sanctioned Load/Contract Demand	KVA	334
Operating PF avg.	PF	0.91
Annual Unit Consumed	kVAh	878065
Annual Energy Billed	Rs.	9102897
Desired PF (nearby unity)	PF	0.99
PF correction		0.313
Penalty Charges	Rs./kVA	
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	105
Saving in Maximum demand by improving the power factor close to unity	KVA	48
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	1435105
Percentage Saving in Energy was achieved, if power factor maintained	%	16%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	1.3
Payback Period	month	1.0

Aruchana
Registrar
King George Medical University
Lucknow

Particulars	UoM	EMPLOYEES QUARTER TYPE -1
		A/C NO:- 4042748045
Maximum Demand Recorded from Apr-21 Mar'22	kVA	99
Sanctioned Load/Contract Demand	KVA	78
Operating PF avg.	PF	0.69
Annual Unit Consumed	kVAh	302890
Annual Energy Billed	Rs.	3358346
Desired PF (nearby unity)	PF	0.99
PF correction		0.907
Penalty Charges	Rs./kVA	760
Capacitors Required for maintaining nearby unity pf at every load condition (Contract Demand/Max, Demand whichever is greater)	kVAR	90
Saving in Maximum demand by improving the power factor close to unity	KVA	51
Avg. Annual saving has been achieved on improving power factor to nearby unity	Rs.	1715895
Percentage Saving in Energy was achieved, if power factor maintained	%	51%
Investments Required for the capacitor Bank (APFC Panel)	INR in Lakh	1.1
Payback Period	month	0.8

Aruna
Registrar
King George Medical University
Lucknow

Ref : kVAR Selection Chart ; [Ch-01_gopsons.qxd \(beeindia.gov.in\)](#)

Maximum Demand Analysis

The MD analysis for the period April 2021 to March 2022 has been done as below

S.No.	Location	Contract Demand	Highest Value of MD During the Year	Annual Excess Demand Penalty Amount (Rs.)
1	New Mortuary Department	223	664	1923373.6
2	C.T.V.S DEPARTMENT	445	490	262713
3	Hospital Substation	1137	953	70558
4	New Dental Extension Block	737	664	NIL
5	Cobalt Substation	659	828	NIL
6	PSYCHIATRIC DEPARTMENT	158	211	80620.8
7	Queen Mary Hospital	411	317	NIL
8	QMH (New 100 Bebed)	333	91	NIL
9	Trauma Center	540	545	NIL
10	Old Mortuary Substation	1087	894	NIL
11	TEACHING BLOCK (KALAM CENTER	2632	3145	931000
12	Dental Science University	45	78	88344
13	New OPD Block	698	593	NIL
14	Cancer Unit	112	45	NIL
15	Type 5 Faculty Building	444	513	6732
16	Old Dental	445	249	NIL
17	Gautam Budha HOSPITAL	667	207	NIL
18	Shatabdi Hospital	1334	808	NIL
19	Cardiology Department	223	134	NIL
20	T. G Hostel	198	213	NIL
21	T. G Residential Type 2	334	124	NIL
22	Artificial LIMB Center	334	305	NIL
23	Employees Quarter	78	99	5979.32

Observations :-

1. Some of the connections have lower sanctioned load than actual demand and these connections are paying MD penalty charges A total of Rs. 33.69 Lac penalty on MD extra charges have been paid by the hospital
2. the Contract Demand Reduction Possibility Exists ; this will help in reduction of the penalty charges on the MD ; the report does not recommend any reduction at this stage as the expansion possibility of the load and planning of the Hospital not known

Arunima
Registrar
King George Medical University
Lucknow

Transformers Study

About 25 No. of transformers are installed at KGMU to meet their power requirement. Capacity details of Transformer are summarized in below table;

Table 1 Transformer details installed at KGMU

S.NO.	NAME OF SUBSTATION	T/F-1	T/F-2	T/F-3	T/F-4	TRANSFORMER MAKE
1	TEACHING BLOCK	1000KVA	1000KVA	-----	-----	CG-MAKE 250+250=500
2	OLD MURCHARY	1000KVA	1000KVA	-----	-----	CG-MAKE 350LTRS.
3	NEW MURCHARY	1000KVA	630KVA	-----	-----	ALSTOM LTD. 250LTRS.
4	HOSPITAL MAIN BUILDING	1000KVA	1000KVA	-----	-----	ALSTOM LTD.600LTRS.
5	TRAUMA CENTRE	800KVA	800KVA	-----	-----	ALSTOM LTD.500LTRS.
6	TRAUMA CENTRE 2nd FLOOR	750KVA	-----	-----	-----	CG-MAKE
7	DENTAL OLD (DENTAL VIGYAN)	630KVA	-----	---	---	ALSTOM
8	NEW DENTAL (DENTAL UNIVERSITY)	750KVA	750KVA	-----	-----	CG-MAKE 200LTRS.
9	PSYCHIATRY DEPTT.	750KVA	750KVA	-----	-----	GREAVES
10	QUEEN MARRY	630KVA	-----	-----	-----	AREVA
11	SHATABDI PHASE 2nd	1250KVA	1250KVA	1250KVA	1250KVA	CG-MAKE 300LTRS.
12	GAUTAM BUDDHA HOSTEL	630KVA	1000KVA	-----	-----	AREVA 300+150=450LTRS.
13	C.T.V.S.	750KVA	750KVA	-----	-----	CG-MAKE 300LTRS.
14	TYPE-5 QUARTER (JAGAT NARAYAN ROAD)	630KVA	-----	-----	-----	KIRLOSKER-MAKE
15	R.A.L.C. DEPTT.	1000KVA	1000KVA	-----	-----	KIRLOSKER-MAKE
16	SERVANT QUARTER, TYPE-1 (RALC)	400KVA	---	-----	---	MIRZAPUR ELECTRICAL INDUSTRIES
17	NEW O.P.D.	750KVA	630KVA	---	---	ABB& KIRLOSKER-MAKE
18	T.G. HOSTEL	800KVA	400KVA	400KVA	---	ALSTOM, AREVA & MIRZAPUR ELECTRICAL INDUSTRIAL LTD.

Aruchana
Registrar
 King George Medical University
 Lucknow

19	SATABDI PHASE 1st	750KVA	750KVA	750KVA	----	AREVA-MAKE
20	33/11KV SUBSTATION	5000KVA	5000KVA	-----	-----	SCHNIEDER-MAKE
21	NEW GIRLS HOSTEL	400KVA	----	----	----	CG-MAKE
22	SKILL DEPTT.	400KVA	----	----	----	SAINATH INDUSTRIES
23	LORI CARDIOLOGY DEPTT.	400KVA	----	----	----	BY LEASA (LESA TRANSFORMER)
24	COBALT	1000KVA	----	----	----	SERVOKON
25	PHI BUILDING(HYGIENE)	250KVA	----	----	----	BY LEASA (LESA TRANSFORMER)

To ascertain the loading on the transformer's, hourly loading pattern has been developed of loading Transformer. The typical loading pattern is discussed below;

Table 2 Transformer Analysis

Location	UoM	New 100 Bedded Hospital	Main hospital TR--1	Queen Marry Hospital	RALC TR-1
Transformer Capacity	kVA	630	1000	630	1000
No load Voltage, LV	V	433			433
Measurement					
V avg.	V	424	397	410	419
V min.	V	422	397	412	418
V max	V	424	398	413	419
I avg.	A	125	659	253	576
I min.	A	122	644	251	577
I max.	A	145	672	254	579
PF avg.		0.99	0.98	0.81	0.82
PF min.		0.98	0.98	0.8	0.82
PF max.		0.99	0.98	0.81	0.83
Apparent Power avg.	kVA	91.8	453.1	189.0	445.2
Apparent Power min.	kVA	89.2	442.8	193.4	428.2
Apparent Power max.	kVA	106.5	463.2	186.3	425.3

Loading (%) avg	%	15%	45%	30%	45%
Loading (%) min	%	14%	44%	31%	43%
Loading (%) max	%	17%	46%	30%	43%
Voltage THD avg.	%f	1.06	1.1	1.8	5.4
Voltage THD min.	%f	1.04	1.13	1.8	5.23
Voltage THD max.	%f	1.15	1.15	1.99	5.6
Current THD avg.	%f	5.08	3.9	4.8	37.88
Current THD min.	%f	3.08	3.5	3.6	21.6
Current THD max.	%f	4.6	4.1	5.2	39

Observations & Recommendations

- New 100 Bedded Hospital, Main Hospital TR-1, Queen Marry Hospital & RALC TR-1 transformer is installed with rated capacity of 630kVA, 1000KVA, 630KVA & 1000KVA respectively. During Audit team noticed maximum loading on these transformers are about 17%, 46%, 30% & 43% respectively. It shows the transformer is optimally loaded except New 100 Bedded Hospital.

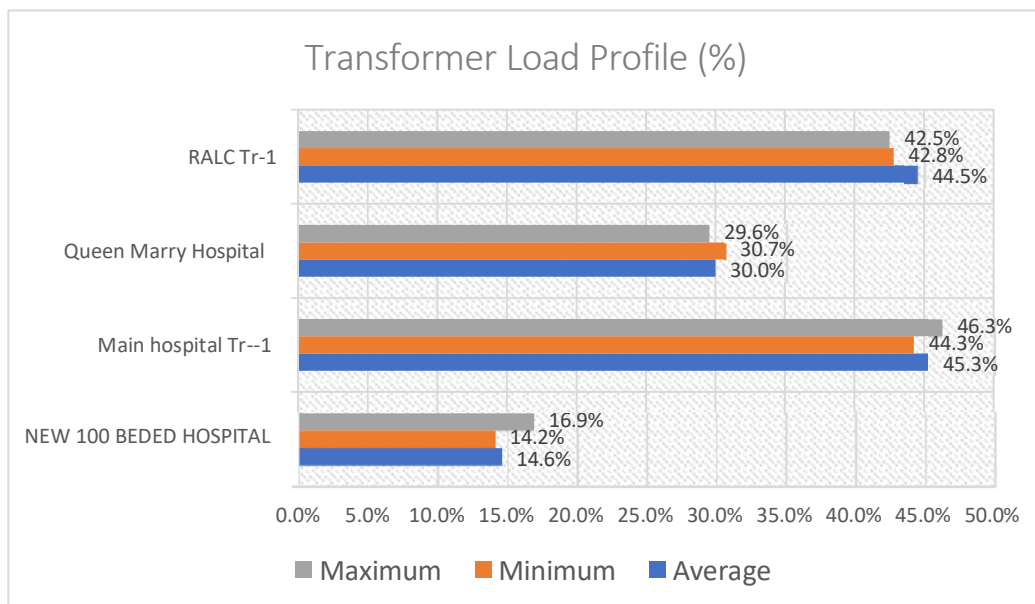


Figure 1 % Loading of the Transformer

- It is evident from table that Power factor of New 100 Bedded Hospital, Main Hospital TR-1, Queen Marry Hospital & RALC TR-1 transformer is about 0.99, 0.98, 0.81 & 0.82 respectively. Higher power factor of New 100 Bedded Hospital & Main Hospital TR-1 because of operation of APFC panel. Thus, Audit team recommends installation of Power factor for Transformer installed at Queen Marry Hospital & RALC.

Aruna
Registrar
 King George Medical University
 Lucknow

- It is evident from the above figure that the maxm. voltage THD (%) for New 100 Bedded Hospital, Main Hospital TR-1 & Queen Marry Hospital transformer was observed to be in range of 1.0% to 2.0% which is in the prescribed limit as per IEE standard of Voltage harmonics of 5%.

However, voltage THD (%) for RALC TR-1 transformer was varied in range from 5.2% to 5.6% with average voltage THD (%) noticed to be about 5.4% which is slightly on higher side of prescribed limit as per IEE standard of Voltage harmonics of 5%.

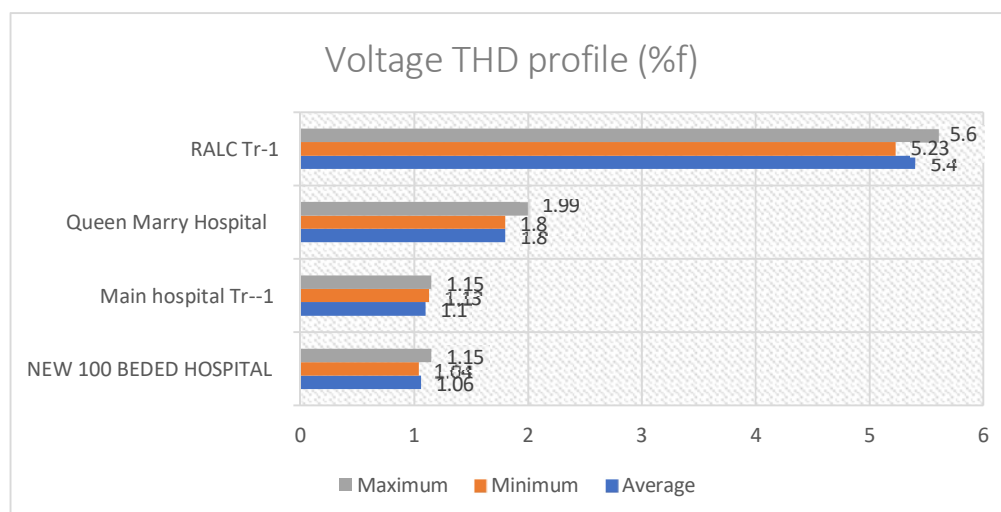


Figure 2 Voltage THD profile (%f)

Table 3 Transformer Analysis

Location	UoM	New OPD		CTVS		Gautam Buddha Hostel	
		AC Plant	TR-1	TR- 1	TR-2	TR- 1	TR-2
Transformer Capacity	kVA	750	630	750	750	630	1000
No load Voltage, LV	V	433	433				
Measurement							
V avg.	V	400	404	400	400	416	396
V min.	V	400	404	409	400	414	394
V max	V	401	405	409	400	416	396
I avg.	A	398	110	243	186	39.18	109
I min.	A	389	111	239	184	37.19	108
I max.	A	399	114	245	190	41.97	112
PF avg.		0.86	0.9	0.9	0.9	0.92	0.93

PF min.		0.87	0.9	0.89	0.9	0.92	0.92
PF max.		0.87	0.92	0.9	0.91	0.92	0.93
Apparent Power avg.	kVA	304.0	99.0	216.5	170.6	32.9	98.4
Apparent Power min.	kVA	312.6	102.8	212.2	173.8	30.8	67.8
Apparent Power max.	kVA	294.0	106.6	211.1	176.2	27.8	99.2
Loading (%) avg	%	41%	16%	29%	23%	5%	10%
Loading (%) min	%	42%	16%	28%	23%	5%	7%
Loading (%) max	%	39%	17%	28%	23%	4%	10%
Voltage THD avg.	%f	1.5	1.7	1.29	1.52	1.32	1.52
Voltage THD min.	%f	1.4	1.5	1.26	1.5	1.3	1.5
Voltage THD max.	%f	1.58	1.7	1.4	1.54	1.34	1.58
Current THD avg.	%f	2.1	2.2	5.8	3.1	10.25	4.9
Current THD min.	%f	2.2	2.1	5.2	2.79	8.6	4.5
Current THD max.	%f	2.3	2.4	5.92	3.13	12.6	5.2

Observations & Recommendations

- New OPD having rated capacity of AC Plant (750KVA) & TR-1 (630KVA), CTVS TR-1 & 2 each having of 750kVA & Gautam Buddha Hostel (TR-1 & 2) having capacity of 630KVA & 1000kVA respectively. From Above table team noticed Gautam Buddha Hostel transformer TR-1 & 2 having maximum loading of 5% and 10% respectively, which is noticed to be about on lower side. Thus, recommends transfer of load on 1 transformer, this will reduce the loading loss of 1 transformer.

Aruna
Registrar
King George Medical University
Lucknow

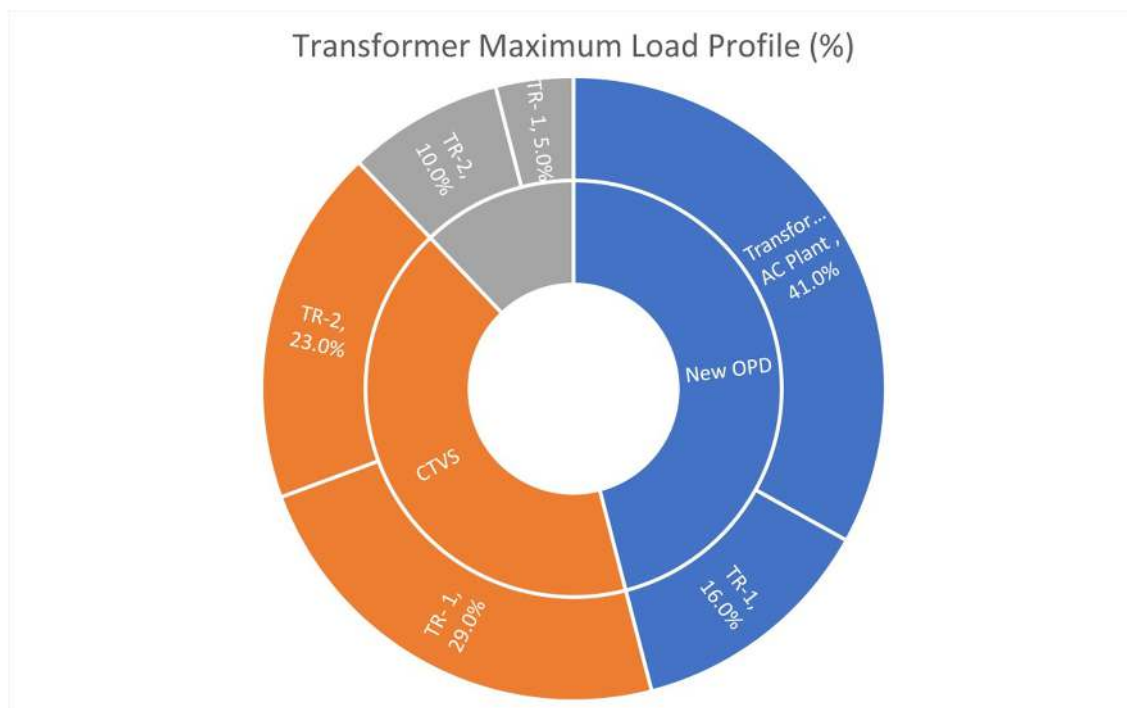
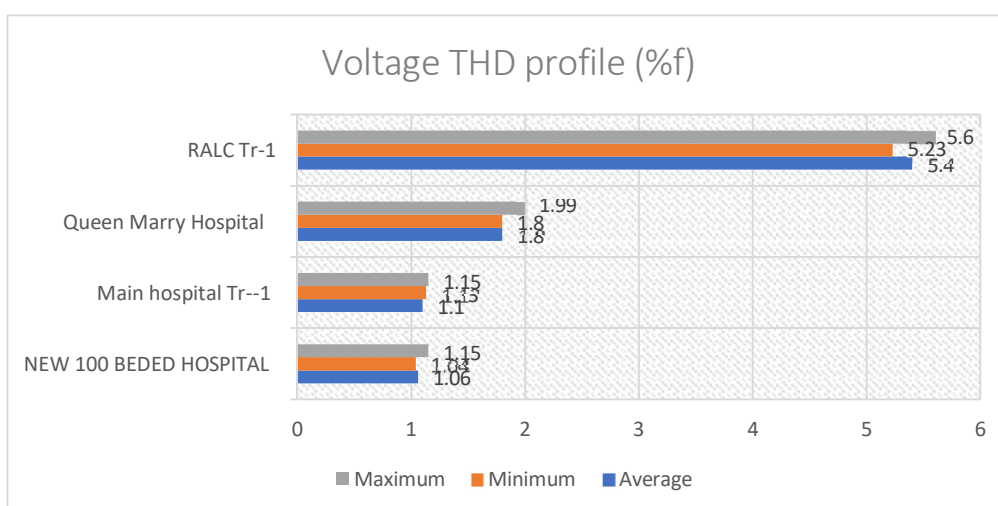


Figure 3 % Loading of the Transformer

- It is evident from table that Average Power factor of New OPD AC Plant & TR-1, CTVS TR-1 & 2 & Gautam Buddha Hostel TR-1 & 2 are about 0.87, 0.9, 0.89, 0.9, 0.92 & 0.92 respectively. Lower power factor was noticed across the transformers. Thus, Audit team **recommends** installation of Power factor and increase the power factor 0.99 at every load condition will results in saving in energy.
- It is evident from the above figure that the maxm. voltage THD (%) for New OPD AC Plant & TR-1, CTVS TR-1 & 2 & Gautam Buddha Hostel TR-1 & 2 are about 1.58%, 1.7%, 1.4%, 1.54%, 1.34% & 1.58% respectively, which is in the prescribed limit as per IEE standard of Voltage harmonics of 5%.



Aruhana
Registrar
 King George Medical University
 Lucknow

Figure 4 Voltage THD profile (%f)

Table 4 Transformer Analysis

Shatabdi						
Location	UoM	Phase-1 (TR-1)	Phase-1 (TR-3)	Phase-2 (TR-1)	Phase-2 (TR-2)	Phase-2 (TR-4)
Transformer Capacity	kVA	750	750	1250	1250	1250
No load Voltage, LV	V					
Measurement						
V avg.	V	402	422	410	405	422
V min.	V	400	420	409	402	422
V max	V	403	425	410	405	422
I avg.	A	236	396	242	990	318
I min.	A	230	383	240	886	316
I max.	A	239	406	244	992	322
PF avg.		0.89	0.88	0.85	0.82	0.84
PF min.		0.88	0.87	0.85	0.82	0.84
PF max.		0.9	0.88	0.85	0.82	0.84
Apparent Power avg.	kVA	170.1	268.1	171.8	694.4	424.4
Apparent Power min.	kVA	159.3	255.1	170.0	616.9	461.9
Apparent Power max.	kVA	170.6	276.8	173.3	695.8	411.9
Loading (%) avg	%	23%	36%	14%	56%	34%
Loading (%) min	%	21%	34%	14%	49%	37%
Loading (%) max	%	23%	37%	14%	56%	33%
Voltage THD avg.	%f	1.37	1.7	1.6	1.8	2.28
Voltage THD min.	%f	1.3	1.6	1.6	1.6	2.2
Voltage THD max.	%f	1.51	1.73	1.7	2.6	2.37
Current THD avg.	%f	3.39	4.1	2.2	4.6	2.29
Current THD min.	%f	3.33	3.9	2.2	4.2	2.2
Current THD max.	%f	3.49	4.14	2.3	5.4	2.31

Observations & Recommendations

- In order to meet the electricity demand of Shatabdi area, power has been supplied into 2 phases; 1st phase having 3 Transformers (2W+1SB) with installed capacity of 750KVA & 2nd phase are having 4 Transformers (3W+1SB) with installed capacity of 1250KVA.

Maximum loading of Shatabdi phase- 1 TR-1 & 2 and phase- 2 TR 1, 2 & 4 are about 23%, 37%, 14%, 56% and 37% respectively, which is optimally loaded except Phase 2 Transformer 1. Thus, recommends transfer of load of TR1 to TR 2 & 4, if loading pattern on these transformers varied in same range, this will reduce the loading loss of Pase 2 TR 1.

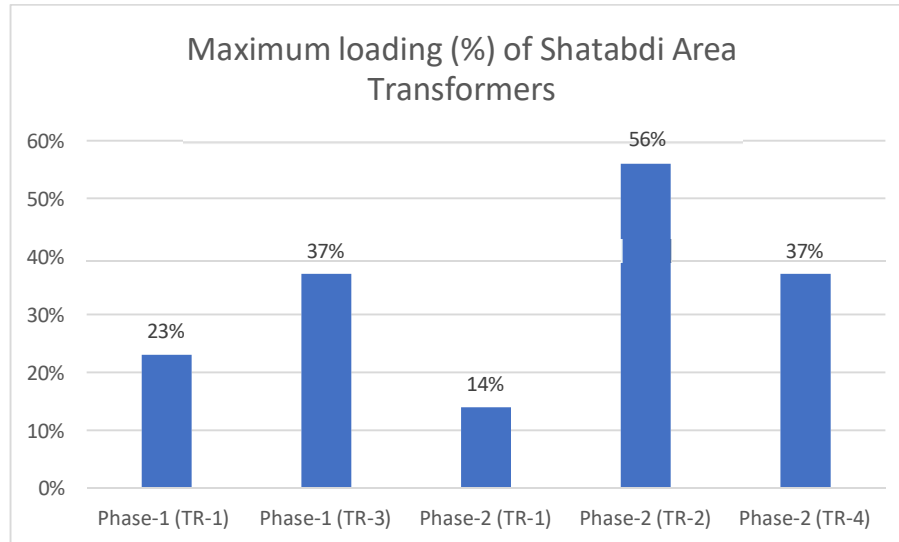
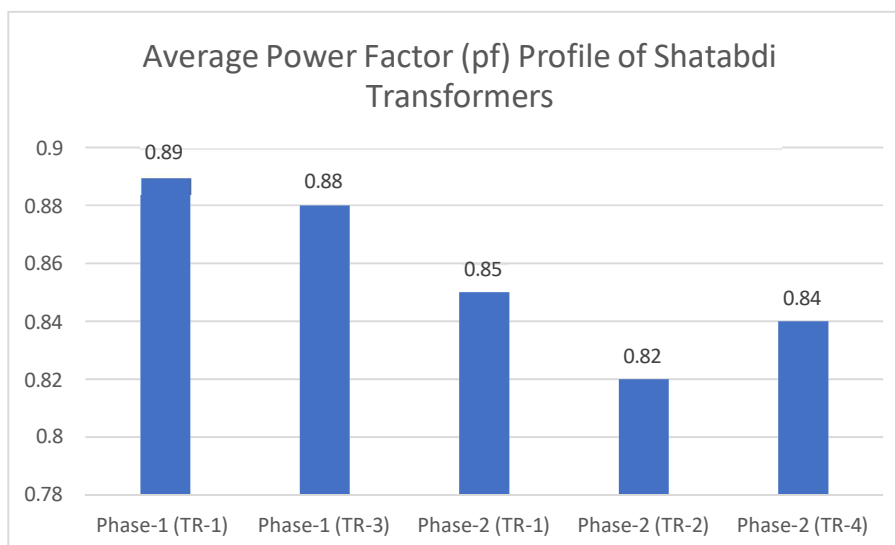


Figure 5 % Loading of the Transformer

- It is evident from table that Average Power factor of Shatabdi phase- 1 TR-1 & 2 and phase- 2 TR 1, 2 & 4 are about 0.89, 0.88, 0.85, 0.82 & 0.84 respectively. Lower power factor was noticed across the transformers. Thus, Audit team recommends installation of Power factor and increase the power factor 0.99 at every load condition will results in saving in energy.



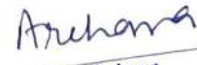
Aruna
Registrar
 King George Medical University
 Lucknow

Figure 6 Power factor profile of the Transformer

- It is evident from the above table that maxm. voltage THD (%) of Shatabdi phase- 1 TR-1 & 2 and phase- 2 TR 1, 2 & 4 are about 1.51%, 1.73%, 1.7%, 2.6% & 2.37% respectively, which is in the prescribed limit as per IEE standard of Voltage harmonics of 5%.

Table 5 Transformer Analysis

Location	UoM	New Dental TR- 1	Psychiatric Department	Kalam Centre TR-1	TG Hostel TR- 1	TG Hostel TR-3
Transformer Capacity	kVA	750	750	1000	400	400
No load Voltage, LV	V			433	433	433
Measurement						
V avg.	V	396	412	407	409	409
V min.	V	396	410	407	408	408
V max	V	397	412	409	411	410
I avg.	A	490	192	175	30	22
I min.	A	482	185	179	27	20
I max.	A	493	198	187	31	24
PF avg.		0.87	0.92	0.84	0.96	0.94
PF min.		0.86	0.9	0.85	0.94	0.92
PF max.		0.88	0.94	0.85	0.96	0.96
Apparent Power avg.	kVA	336.1	137.0	123.4	26.8	22.5
Apparent Power min.	kVA	359.9	131.4	126.2	24.2	20.0
Apparent Power max.	kVA	335.2	141.3	132.5	28.6	25.2
Loading (%) avg	%	45%	18%	12%	6.7%	5.6%
Loading (%) min	%	48%	18%	13%	6.1%	5.0%
Loading (%) max	%	45%	19%	13%	7.2%	6.3%
Voltage THD avg.	%f	1.34	1.9	2.1	1.7	1.67
Voltage THD min.	%f	1.32	1.64	2.1	1.66	1.65


Registrar
 King George Medical University
 Lucknow

Voltage THD max.	%f	1.39	2.1	2.3	1.73	1.7
Current THD avg.	%f	1.8	5.2	8.3	7	11.27
Current THD min.	%f	1.4	4.8	8.2	6.9	10
Current THD max.	%f	1.9	5.61	8.5	7.48	12.4

Observations & Recommendations

- New Dental TR-1, Psychiatric Department, Kalam Centre TR-1 & TG Hostel 1 & 3 transformer is installed with rated capacity of 750kVA, 750KVA, 1000KVA, 400KVA & 400KVA respectively. During Audit team noticed maximum loading on these transformers are about 48%, 19%, 13%, 7.2% & 6.3% respectively. It shows the transformer is optimally loaded except TG Hospital TR 1 & 3. Thus, Team recommends to shift the load on 1 (one) TG transformer, if they having common bus coupler, this will results in saving in load loss.

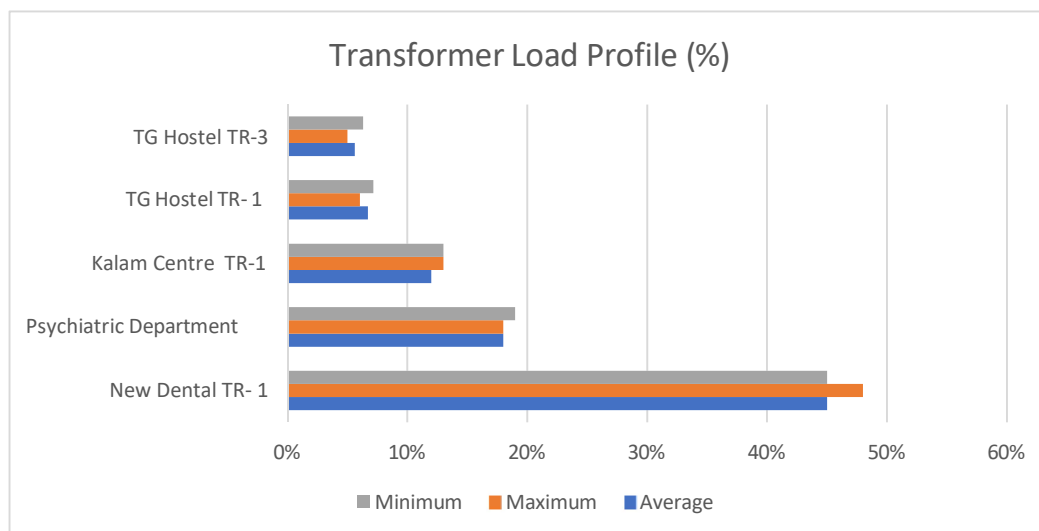


Figure 7 % Loading of the Transformer

- It is evident from table that Average Power factor of New Dental TR-1, Psychiatric Department, Kalam Centre TR-1 & TG Hostel 1 & 3 transformer are about 0.87, 0.92, 0.84, 0.96 & 0.94 respectively. Lower power factor was noticed across the transformers. Thus, Audit team recommends installation of Power factor and increase the power factor 0.99 at every load condition will results in saving in energy.

Aradhana
Registrar
 King George Medical University
 Lucknow

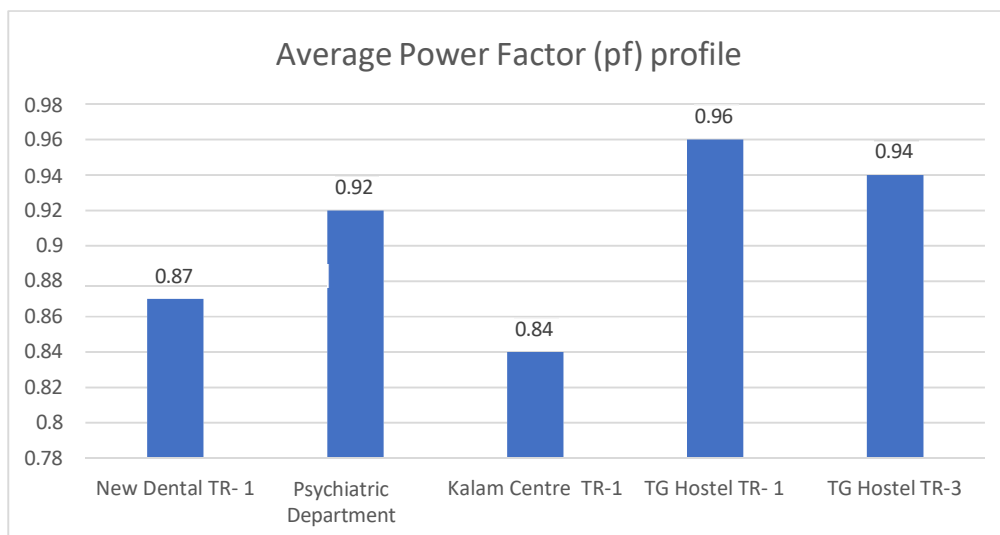


Figure 8 Power factor profile of the Transformer

- It is evident from the above table that maxm. voltage THD (%) of New Dental TR-1, Psychiatric Department, Kalam Centre TR-1 & TG Hostel 1 & 3 transformer are about 1.39%, 2.1%, 2.3%, 1.73% & 1.7% respectively, which is in the prescribed limit as per IEE standard of Voltage harmonics of 5%. It is also noticed from above table that Maximum Current THD (%) are about 1.9%, 5.6%, 8.5%, 7.5% & 12.4% respectively. Slightly higher Current THD is due to low load.

Archan
 Registrar
 King George Medical University
 Lucknow

Pumps

Monoblock Pumps at New OPD

Pump Identification	Unit	Pump 1	Pump 2
Rated Parameters			
Running Status		Running	Running
Pump Make		Kirloskar	Kirloskar
Speed	RPM	1480	1480
Rated Flow	m ³ /hr	54	54
Rated Head	M	32	32
Rated Power	KW	11.18	11.18
Motor Efficiency	%	95.0	95.0
Parameters Measured			
Measured Flow	m ³ /hr	48.12	51.2
Discharge Pressure (A)	Kg/cm ²	3.4	3.4
Suction Pressure (B)	Kg/cm ²	0.3	0.3
Fluid Density	Kg/ m ³	1000	1000
Performance Evaluation			
Total Head $(=(A-B) \times 10)$	M	31.0	31.0
Head Utilization	%	96.9	96.9
Flow Utilization	%	89.1	94.8
Measured Input power	KW	11	11
Shaft Power	KW	10	10
Hydraulic Power	KW	4.1	4.3
Pump Efficiency	%	39.0	41.6
Overall (Pump Set) Efficiency	%	37.1	39.5
Throttling Suction	%	Nil	Nil
Throttling Discharge	%	Nil	Nil
Running Hour		6 hour/day	6 hour/day

Monoblock Pumps at Buddha Hostel

Pump Identification	Unit	Pump 1	Pump 2
Rated Parameters			
Running Status		Standby	Running
Pump Make		Kirloskar	Kirloskar
Speed	RPM	2940	2940
Rated Flow	m ³ /hr	60.1	60.1
Rated Head	M	56	56
Rated Power	KW	15	15
Motor Efficiency	%	90.5	90.5
Parameters Measured			
Measured Flow	m ³ /hr		55.4
Discharge Pressure (A)	Kg/cm ²		5.5
Suction Pressure (B)	Kg/cm ²		0.3
Fluid Density	Kg/ m ³		1000
Performance Evaluation			
Total Head $(=(A-B) \times 10)$	M	Tripping Problem Found	52.0
Head Utilization	%		92.9
Flow Utilization	%		92.2
Measured Input power	KW		14
Shaft Power	KW		13
Hydraulic Power	KW		7.9
Pump Efficiency	%		60.0
Overall (Pump Set) Efficiency	%		54.3
Throttling Suction	%		Nil
Throttling Discharge	%		Nil
Running Hour			6 hour/day

Aruchana
Registrar
 King George Medical University
 Lucknow

Monoblock Pumps at Trauma Center

Pump Identification	Unit	Pump 1	Pump 2	Pump 3
Rated Parameters				
Running Status		Running	Running	Running
Pump Make		Crompton	Kirloskar	Kirloskar
Speed	RPM	-	-	-
Rated Flow	m ³ /hr	26.28	26.28	26.28
Rated Head	M	72	40	40
Rated Power	KW	11	9	9
Motor Efficiency	%	95.0	90.0	90.0
Parameters Measured				
Measured Flow	m ³ /hr	22.1	18.2	18.6
Discharge Pressure (A)	Kg/cm ²	5.8	3.8	3.8
Suction Pressure (B)	Kg/cm ²	-0.1	-0.1	-0.1
Fluid Density	Kg/ m ³	1000	1000	1000
Performance Evaluation				
Total Head (=(A-B)X10)	M	59.0	39.0	39.0
Head Utilization	%	81.9	97.5	97.5
Flow Utilization	%	84.1	69.3	70.8
Measured Input power	KW	8	8	7
Shaft Power	KW	8	7	7
Hydraulic Power	KW	3.6	1.9	2.0
Pump Efficiency	%	45.6	28.2	29.6
Overall (Pump Set) Efficiency	%	43.3	25.4	26.6
Throttling Suction	%	Nil	Nil	Nil
Throttling Discharge	%	Nil	Nil	Nil
Running Hour		24 hour/day		

Aruna
Registrar
 King George Medical University
 Lucknow

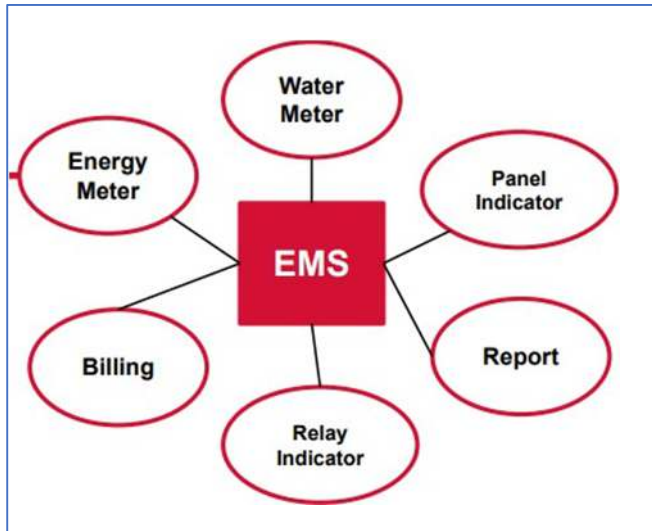
Recommendations for Pumps replacement with EE Pumps

Present System	UOM	TRAUMA	
		Pump 2	Pump 3
Pump Efficiency	%	28.20	29.60
Average Power consumption of Pump	KW	8.00	7.00
Operating days per annum	days	365	365
Operating hours per day	hrs	24	24
Energy consumption	KWh	70080.00	61320.00
Proposed System; New Energy Efficient Pumps			
Pump Efficiency	%	50	50
Power consumption	KW	4.51	4.14
Operating days per annum	days	365	365
Operating hours per day	hrs	24	24
Energy consumption	KWh	39525.12	36301.44
Net reduction in power consumption	KWH	30554.88	25018.56
Electric Power Rate	Rs per KWh	13.52	13.52
Monetary Saving for One Pump	Rs Lacs	4.13	3.38
Investment	Rs Lacs	1.50	
Payback Period	months	2.40	

Aruna
Registrar
King George Medical University
Lucknow

Energy Management System

Integrated Energy Management System (EMS), collect electrical energy consumption as well as helps in monitoring critical indicators on Control Panels. It is also capable of sending Alerts, Alarms, Notifications over Voice/SMS/ Email etc which can be easily configurable by the user himself. The below is the EMS schematics :-



Features :-

- IoT Based System
- Wireless and Retrofit
- Remote Monitoring and Control
- Maintain Energy Efficiency
- Save Energy by Corrective Actions
- Covers All Industrial Electrical Parameters like kVA, kVArH, kWh, kW, PF, Voltage, Current, Harmonics etc
- System Auto Alert on Identified Violation, Area of Loss & Suggest Preventive Steps

Recommendations :

EMS can be used for better energy management .

Arunima

Registrar
King George Medical University
Lucknow

Air Conditioning Systems

The importance of Air Conditioning in Hospitals goes beyond the comfort. Air Conditioning and HVAC Systems Control Temperature and Humidity, Ventilation, and Air Filtration, Which All Matter to Hospitals. HVAC units play a significant role in maintaining the safety of hospitals. Most hospitals admit patients with a wide variety of illnesses, some of which are highly dangerous via airborne transmission. In combination with the vulnerable nature of patients, it becomes vital to maintain correct air ventilation and temperature control, as recycled contaminated air moving between wards could prove fatal.



Fig. Chiller system at KGMU



Fig. Window and Split ACs

List of available Window and Split ACs are as below:-

S.NO.	DEPARTMENT NAME	No of Window ACs	No of Split ACs
1	ADMINISTRATIVE BUILDING	5	51
2	VICE CHANCELLOR'S OFFICE	4	14
3	RESEARCH CELL DEPARTMENT OF MEDICAL EDUCATION	7	4
4	CENTRAL LIBRARY	11	79
5	NEW GUEST HOUSE	0	28
6	OLD GUEST HOUSE	0	7
7	ANATOMY DEPARTMENT	2	42
8	PHI BUILDING	13	26
9	PHYSIOLOGY AND BIOMETRIC DEPARTMENT	27	28
10	MICROBIOLOGY DEPARTMENT	6	14
11	PATHALOGY DEPARTMENT	44	89
12	SURGERY DEPARTMENT /WARD	17	28
13	UROLOGY DEPARTMENT	34	13
14	PHARMACOLOGY DEPARTMENT	16	16
15	MEDICINE DEPARTMENT	2	0
16	EYE DEPARTMENT(NEW/OLD)	16	13
17	PLASTIC SURGERY/BURN SURGERY DEPARTMENT	46	33
18	CHILD DEPARTMENT	21	23
19	SPM DEPARTMENT	23	15
20	T.B.H DEPARTMENT	3	22
21	SAVICHEEDAN HOUSE	0	7
22	NEW DENTAL FAULTY BUILDING AND DEAN'S OFFICE	1	12
23	OLD DENTAL BUILDING	67	43
24	ELECTRICAL DEPARTMENT	1	2

Arunima
Registrar
King George Medical University
Lucknow

Arunima
Registrar
King George Medical University
Lucknow

25	CONSTRUCTION DEPARTMENT	6	4
26	NEW O.P.D BUILDING	0	5
27	OLD O.P.D BUILDING	7	52
28	KALAM CENTRE	0	24
29	FORENSIC MEDICINE DEPARTMENT	0	29
30	ENVIRONMENT DEPARTMENT	2	8
31	GANDHI WARD	11	18
32	NEUROLOGY DEPARTMENT	31	28
33	RESIDENT HOSTEL	2	5
34	NEHRU P.G HOSTEL	1	2
35	SARDAR PATEL HOSTEL	0	0
36	NEW CV. HOSTEL	0	2
37	OLD CV. HOSTEL	0	0
38	MAHAMAYA HOSTEL	0	0
39	CHATRA CHATRA VAS	0	0
40	DK. HOSTEL	0	0
41	NURSES HOSTEL	0	0
42	PEDIATRIC SURGERY DEPARTMENT	23	20
43	CENTRAL STORE	0	1
44	L.P. MEDICINE COUNTER	1	3
45	MAIN HOSPITAL BUILDING INCLUDING ALL SURGICAL WARDS	33	97
46	PRIVATE DELUXE WARD	0	24
47	INFECTIOUS DISEASES DEPARTMENT	16	26
48	CENTRE FOR ADVANCE RESEARCH	0	32
49	H.I.V UNIT	5	10
50	Mental Department	31	14

51	Geriatric Department	50	50
52	Lari Cardiology	44	8
53	Trauma Center	8	20
54	Rheumatology Department	0	56
55	RALC Covid Hospital	0	52
Total		637	1199

Energy Savings Possibilities in Windows and Split ACs

There are 1836 numbers of Window and Split ACs are operating of different make in the KGMU complex in different locations. The 80% of the ACs are of 1.5 TR capacity and these are recommended here for energy savings replacing with higher Star rated ACs; can be undertaken as and when requirement basis.

Energy Savings replacing with higher Star rated ACs

Type of AC	TR	Star Level	Energy Input , kW	Star Level 5 Energy Input , kW	Savings Per AC, kW	Nos Considered	Total Savings Possible, kWh	Savings Possibility, INR
Window	1.5	2	1.95	1.60	0.3552525	254.8	135777.52	1968773.97
Window	1.5	3	1.82	1.60	0.2205016	254.8	84275.70	1221997.64
Split	1.5	2	1.60	1.17	0.426303	479.6	306682.40	4446894.80
Split	1.5	3	1.51	1.17	0.3349524	479.6	240964.74	3493988.77

The savings is calculated with the below considerations: -

Star Level	EER /ISER Window ACs		EER/ISER Split ACs	
	Minimum	Maximum	Minimum	Maximum
1 Star	2.5	2.69	3.1	3.29
2 Star	2.7	2.89	3.3	3.49
3 Star	2.9	3.09	3.5	3.99
4 Star	3.1	3.29	4	4.49
5 Star	3.3	NIL	4.5	NIL
EER Rating= TR Capacity (in BTU)/Input Power in Watt)				
1 TR = 12000 BTU				
Cooling Capacity of 1 TR = 3.517 kW				

Ref: https://www.beestarlabel.com/Content/Files/AC_Notification.pdf

Archan
Registrar
King George Medical University
Lucknow

Working Hrs have been calculated considering 06 months, 25 days per month and 10 hrs daily usages

Total AC	Total No	1.5 TR	2 Star	3 Star
Window	637	509.6	254.8	254.8
Split	1199	959.2	479.6	479.6

Again, inverter technology can be used while replacing an AC and there is a potential of about 35% of electricity savings over a standard air conditioner.

Archana
Registrar
King George Medical University
Lucknow

Other Air-Conditioned Plant Details

DETAILS OF AIR CONDITIONED PLANTS INSTALLED IN KGMU CAMPUS			
SR NO.	MAKE/MODEL	Plant Details (TON/HP)	PLACE OF INSTALLATION
1	TRAIN PLANT	300*1=300TR.	TRAUMA CENTRE 4th FLOOR; N.ICU PICU 5th FLOOR; CCU DEPTT. & EYE BANK.
2	DAIKIN V.R.V	12*8=96HP 18*1=18HP 24*1=24HP 36*2=72HP 26*1=26HP 30*3=90HP 48*1=48HP	TRAUMA CENTRE G.F; CASULATY, HALL, DENTAL UNIT, EMERGENCY MEICINE (02ROOM), ORTHO O.T. 1st FLOOR: R.S.O (ABC WARD), HALL, EMERGENCY WARD, TRAUMA SURGERY WARD & O.T, NEURO SURGERY O.T. 2nd FLOOR; MEDICINE STORE, DR. ROOM, MEDICINE 3 ROOM.
3	L.G	03*03=9TON	TRAUMA CENTRE CASULATY EXTENSION
4	VOLTAS PLANT	300*2=600TR.	TRAUMA CENTRE G.F; DIGNOSIS AREA, EMERGENCY MEDICINE 1st FLOOR; R.S.O WARD, NEURO POSTOP, 2nd FLOOR; MEDICINE WARD, NEUROLOGY WARD & PEDIATRIC ORTHO WARD & ORTO WARD, 3rd FLOOR; NEURO SURGERY , TRAUMA SURGERY VENTILATOR UNIT (C.C.U).
5	TRAIN PLANT	175*4=700TR.	SHATABDI PHASE-1
6	TRAIN PLANT	400*5=2000TR.	SHATABDI PHASE-2
7	BLUE STAR PLANT	250*2=500TR. 300*1=300TR.	C.T.V.S.
8	BLUE STAR PLANT	280*2=560TR. 320*1=320TR.	KALAM CENTRE
9	DAIKIN DUCTABLE	11*3=33TR. 16*2=32TR.	QUEEN MARY O.T & POST OPERATIVE
10	DAIKIN VOLTAS HITACHI	8.5*3=25.5TR. 8.5*2=17TR. 3*2=6TR. 5.5*5=27.5TR.	LARI CARDIOLOGY DEPARTMENT ICU & OPD
11	DAIKIN V.R.V	6*2=12HP	ANIMAL HOUSE PHARMACOLOGY
12	DAIKIN V.R.V	20HP*1=20HP 12HP*1=12HP 6HP*1=6HP 14HP*1=14HP	GANDHI WARD MEDICINE ICU & DR. ROOM.
13	DAIKIN V.R.V	22*2=44HP 14*2=28HP	SURGERY GENERAL O.T & POST OPERATIVE
14	DAIKIN V.R.F	30*1=30HP 28*1=28HP	PEDIATRIC ONCOLOGY 2nd FLOOR & 3rd FLOOR,
15	VOLTAS	34*1=34HP 20*1=20HP	PEDIATRIC WARD & ROOMS.
16	BLUE STAR	7.5*3=22.5TR.	PEDIATRIC WARD & ROOMS BACK SIDE
17	DAIKIN V.R.V	8HP*1=8HP 24HP*2=48HP 22HP*1=22HP 20HP*3=60HP	V.C OFFICE, EXAMINATION HALL & SALBY HALL
18	DAIKIN V.R.V DAIKIN	14HP*2=28HP 16HP*2=32HP 14HP*5=70HP 12HP*1=12HP	PLASTIC SURGERY DR. ROOM, O.T
19	DAIKIN	20HP*3=60HP	PLASTIC SURGERY
20	CAREER PLANT	270*2=540TR.	NEW OPD
21	CAREER PLANT	270*2=540TR.	NEW DENTAL
22	VOLTAS CASSETE	5*2=10TR.	6th FLOOR HALL
23	L.G DUCTABLE	8.5*2=17TR.	NEW DENTAL
24	VOLTAS DUCTABLE	10*2=20TR. 7.5*2=15TR.	OLD DENTAL 2nd FLOOR
25	CAREER DUCTABLE	8.5*8=68TR. 5.5*8=44TR.	EYE DEPARTMENT O.T1 O.T 2.
26	VOLTAS	7.5*3=22.5TR.	SEMINOR HALL
27	BLUE STAR DUCTABLE	8.75*1=8.75TR	R.A.L.C ORTHO O.T.
28	CARRIER	3.0*57=171TR 1.0*21=21TR 1.5*15=22.5TR 2.0*16=32TR 4.0*17=68TR AHU OF 7000CFM 01 NO, 8000 CFM 01 NO, 9000 CFM 02 NO, 12000CFM 02 NO.	R.A.L.C CAMPUS
29	VOLTAS	120*1=120TR.	CONVESTION CENTRE
30	TRAIN PLANT	125*2=250TR.	CONVESTION CENTRE
31	DAIKIN ELECTRIC	03HP*30=90HP 20HP*2=40HP 16HP*2=32HP 14HP*2=28HP 10HP*1=10HP	SKILL DEVELOPMENT & RADIO FM DEPTT. (2nd FLOOR CONVESTION CENTRE)

Arunima
Registrar
 King George Medical University
 Lucknow

Chillers Performance Study

Shatabdi Phase I Hospital

Sr. No.	Particulars	Chiller # 1	Chiller # 2	Chiller # 3	Chiller # 4
1	Make	Trance	Trance	Trance	Trance
2	Rated TR	175	175	175	175
3	Date of Measurement	19/08/2022	19/08/2022	19/08/2022	19/08/2022
4	Voltage, V	Standby	409	Standby	415
5	Current, A		165.7		159.7
6	Power Consumption, kW		102.2		98.2
7	PF		0.87		0.86
8	Chilled Water Inlet Temp, °C		12		11
9	Chilled Water Outlet Temp, °C		7		7
10	Cooling Water Inlet Temp, °C		36		36
11	Cooling Water Outlet Temp, °C		39		39.2
12	Chilled Water Inlet Pressure (kg/cm ²)		2.2		2.2
13	Chilled Water Outlet Pressure (kg/cm ²)		1.2		1.2
14	Cooling Water Inlet Pressure (kg/cm ²)		3.2		3.2
15	Cooling Water Outlet Pressure (kg/cm ²)		2.8		2.8
16	Chilled Water Flow (m ³ /hr)		105		108
17	Cooling Water Flow (m ³ /hr)		245		236
18	Output TR		174		143
19	Specific Power Consumption(kW/TR)		0.59		0.69
20	COP		5.98		5.12

Aruna
Registrar
 King George Medical University
 Lucknow

New OPD

Sr. No.	Particulars	Chiller # 1	Chiller # 2
1	Make	Carrier	Carrier
2	Rated TR	270	270
3	Date of Measurement	20/08/2022	20/08/2022
4	Loading %		66
5	Voltage, V	Standby	404
6	Current, A		145.3
7	Power Consumption, kW		89.6
8	PF		0.88
9	Chilled Water Inlet Temp, °C		15
10	Chilled Water Outlet Temp, °C		11
11	Cooling Water Inlet Temp, °C		26.5
12	Cooling Water Outlet Temp, °C		30
13	Chilled Water Inlet Pressure (kg/cm ²)		4.8
14	Chilled Water Outlet Pressure (kg/cm ²)		4.0
15	Cooling Water Inlet Pressure (kg/cm ²)		4.2
16	Cooling Water Outlet Pressure (kg/cm ²)		4.0
17	Chilled Water Flow (m ³ /hr)		128
18	Cooling Water Flow (m ³ /hr)		280
19	Output TR		169
20	Specific Power Consumption(kW/TR)		0.53
21	COP		6.65

Aruna
Registrar
King George Medical University
Lucknow

New Dental

Sr. No.	Particulars	Chiller # 1	Chiller # 2
1	Make	Carrier	Carrier
2	Rated TR	270	270
3	Date of Measurement	21/08/2022	21/08/2022
4	Loading %	50	66
5	Voltage, V	405	406
6	Current, A	128.7	238.7
7	Power Consumption, kW	78.6	147.2
8	PF	0.87	0.88
9	Chilled Water Inlet Temp, °C	16.1	16.2
10	Chilled Water Outlet Temp, °C	12.2	11.1
11	Cooling Water Inlet Temp, °C	37.3	37.5
12	Cooling Water Outlet Temp, °C	40.3	41.6
13	Chilled Water Inlet Pressure (kg/cm ²)	4.2	4.4
14	Chilled Water Outlet Pressure (kg/cm ²)	3.5	3.8
15	Cooling Water Inlet Pressure (kg/cm ²)	5	4.2
16	Cooling Water Outlet Pressure (kg/cm ²)	4.2	3.5
17	Chilled Water Flow (m ³ /hr)	110	112
18	Cooling Water Flow (m ³ /hr)	145	152
19	Output TR	142	189
20	Specific Power Consumption(kW/TR)	0.55	0.78
21	COP	6.35	4.51

Aruchana
Registrar
 King George Medical University
 Lucknow

Kalam Center

Sr. No.	Particulars	Chiller # 1	Chiller # 2	Chiller # 3
1	Make	Blue Star	Blue Star	Blue Star
2	Rated TR	280	280	320
3	Date of Measurement	21/08/2022	21/08/2022	21/08/2022
4	Loading %	90	Standby	60
5	Voltage, V	406		409
6	Current, A	293.7		232.7
7	Power Consumption, kW	175.4		113.7
8	PF	0.85		0.69
9	Chilled Water Inlet Temp, °C	18		18
10	Chilled Water Outlet Temp, °C	12		14
11	Cooling Water Inlet Temp, °C	31		31
12	Cooling Water Outlet Temp, °C	3		34
13	Chilled Water Inlet Pressure (kg/cm ²)	3.8		3.8
14	Chilled Water Outlet Pressure (kg/cm ²)	3.5		3.5
15	Cooling Water Inlet Pressure (kg/cm ²)	4.8		5.5
16	Cooling Water Outlet Pressure (kg/cm ²)	4.4		4.2
17	Chilled Water Flow (m ³ /hr)	120		110
18	Cooling Water Flow (m ³ /hr)	155		156
19	Output TR	239		146
20	Specific Power Consumption(kW/TR)	0.74		0.78
20	COP	4.77		4.5

CTVS

Sr. No.	Particulars	Chiller # 1	Chiller # 2	Chiller # 3
1	Make	Blue Star	Blue Star	Blue Star
2	Rated TR	300	250	250
3	Date of Measurement	19/08/2022	19/08/2022	19/08/2022
4	Loading %	60	Standby	Standby
5	Voltage, V	396		
6	Current, A	169.3		
7	Power Consumption, kW	99		
8	PF	0.86		

9	Chilled Water Inlet Temp, °C	16.1		
10	Chilled Water Outlet Temp, °C	11.5		
11	Cooling Water Inlet Temp, °C	24.		
12	Cooling Water Outlet Temp, °C	28.		
13	Chilled Water Inlet Pressure (kg/cm ²)	5.8		
14	Chilled Water Outlet Pressure (kg/cm ²)	4.4		
15	Cooling Water Inlet Pressure (kg/cm ²)	5		
16	Cooling Water Outlet Pressure (kg/cm ²)	3		
17	Chilled Water Flow (m ³ /hr)	128		
18	Cooling Water Flow (m ³ /hr)	210		
19	Output TR	195		
20	Specific Power Consumption(kW/TR)	0.51		
20	COP	6.85		

Aruna
Registrar
King George Medical University
Lucknow

Chilled Water Condenser Pumps Study
CTVS

Chilled Water PUMP's

Pump Identification		Pump-1	Pump-2	Pump-3	Pump-4	Pump-5
Rated Parameters	Unit					
Running Status		Standby	Running	Standby	Running	Standby
Pump Make		Kirloskar	Kirloskar	Kirloskar	Kirloskar	Kirloskar
Speed	RPM		2880	2880	2880	2880
Rated Flow	m ³ /hr		93.6	93.6	93.6	93.6
Rated Head	M		35	35	35	35
Rated Power	KW	13.5	10	10	10	10
Motor Efficiency	%	91.0	63.0	63.0	63.0	63.0
Parameters Measured						
Measured Flow	m ³ /hr	NIL	62.3	NIL	65.4	
Discharge Pressure (A)	Kg/cm ²	NIL	5.8	NIL	5.8	
Suction Pressure (B)	Kg/cm ²	NIL	3	NIL	3	
Fluid Density	Kg/ m ³	NIL	1000	NIL	1000	
Performance Evaluation						
Total Head $(=(A-B) \times 10)$	M	NIL	28.0	NIL	28.0	NIL
Head Utilization	%	NIL	80.0	NIL	80.0	NIL
Flow Utilization	%	NIL	66.6	NIL	69.9	NIL
Measured Input power	KW	NIL	10	NIL	10	NIL
Shaft Power	KW	NIL	6	NIL	6	NIL
Hydraulic Power	KW	NIL	4.8	NIL	5.0	NIL
Pump Efficiency	%	NIL	76.2	NIL	79.5	NIL
Overall (Pump Set) Efficiency	%	NIL	48.0	NIL	50.1	NIL
Throttling Suction	%	NIL	Nil	NIL	Nil	NIL
Throttling Discharge	%	NIL	Nil	NIL	Nil	NIL

CTVS

Condenser water pumps

Pump Identification	Unit	Pump-1	Pump-2	Pump-3	Pump-4
Rated Parameters					
Running Status		Standby	Running	Standby	Standby
Pump Make		Kirloskar	Kirloskar	Kirloskar	Kirloskar
Speed	RPM	1450	1450	1450	1450
Rated Flow	m ³ /hr	245.1	245.1	245.1	245.1
Rated Head	M	30.48	30.48	30.48	30.48
Rated Power	KW	30	30	30	30
Motor Efficiency	%	92.0	92.0	92.0	92.0
Parameters Measured					
Measured Flow	m ³ /hr	NIL	221.2	NIL	NIL
Discharge Pressure (A)	Kg/cm ²	NIL	6.2	NIL	NIL
Suction Pressure (B)	Kg/cm ²	NIL	3.2	NIL	NIL
Fluid Density	Kg/ m ³	NIL	1000	NIL	NIL
Performance Evaluation					
Total Head (=(A-B)X10)	M	NIL	30.0	NIL	NIL
Head Utilization	%	NIL	98.4	NIL	NIL
Flow Utilization	%	NIL	90.2	NIL	NIL
Measured Input power	KW	NIL	29	NIL	NIL
Shaft Power	KW	NIL	27	NIL	NIL
Hydraulic Power	KW	NIL	18.1	NIL	NIL
Pump Efficiency	%	NIL	66.9	NIL	NIL
Overall (Pump Set) Efficiency	%	NIL	61.6	NIL	NIL
Throttling Suction	%	NIL	NIL	Nil	NIL
Throttling Discharge	%	NIL	NIL	Nil	NIL

Archan
Registrar
 King George Medical University
 Lucknow

KALAM CENTRE

Chilled Water PUMP's

Pump Identification	Unit	Pump-1	Pump-2
Rated Parameters			
Running Status		Standby	Running
Pump Make		KSB	KSB
Speed	RPM	2925	2925
Rated Flow	m ³ /hr	150	150
Rated Head	M	35	35
Rated Power	KW	22	22
Motor Efficiency	%	92.1	92.1
Parameters Measured			
Measured Flow	m ³ /hr	NIL	140.2
Discharge Pressure (A)	Kg/cm ²	NIL	4.0
Suction Pressure (B)	Kg/cm ²	NIL	2.6
Fluid Density	Kg/ m ³	NIL	1000
Performance Evaluation			
Total Head $(=(A-B) \times 10)$	M	NIL	14.0
Head Utilization	%	NIL	40.0
Flow Utilization	%	NIL	93.5
Measured Input power	KW	NIL	7
Shaft Power	KW	NIL	7
Hydraulic Power	KW	NIL	5.3
Pump Efficiency	%	NIL	78.6
Overall (Pump Set) Efficiency	%	NIL	72.4
Throttling Suction	%	NIL	NIL
Throttling Discharge	%	NIL	NIL

KALAM CENTRE

Condenser water pump's

Pump Identification	Unit	Pump-1	Pump-2
Rated Parameters			
Running Status		Running	Standby
Pump Make		NA	NA
Speed	RPM	NA	NA
Rated Flow	m ³ /hr	254	254
Rated Head	M	40	40
Rated Power	KW	45	45
Motor Efficiency	%	92.9	92.9
Parameters Measured			
Measured Flow	m ³ /hr	245.2	NIL
Discharge Pressure (A)	Kg/cm ²	4.8	NIL
Suction Pressure (B)	Kg/cm ²	2.4	NIL
Fluid Density	Kg/ m ³	1000	NIL
Performance Evaluation			
Total Head (=(A-B)X10)	M	24.0	NIL
Head Utilization	%	60.0	NIL
Flow Utilization	%	96.5	NIL
Measured Input power	KW	28	NIL
Shaft Power	KW	26	NIL
Hydraulic Power	KW	16.0	NIL
Pump Efficiency	%	62.1	NIL
Overall (Pump Set) Efficiency	%	57.7	NIL
Throttling Suction	%	Nil	NIL
Throttling Discharge	%	Nil	NIL

NEW DENTAL

Chilled Water PUMP's

Pump Identification	Unit	Pump-1	Pump-2	Pump-3
Rated Parameters				
Running Status		Standby	Running	Standby
Pump Make		Wilo	Wilo	Wilo
Speed	RPM	2905	2905	2905
Rated Flow	m ³ /hr	147	147	147
Rated Head	M	27	27	27
Rated Power	KW	15	15	15
Motor Efficiency	%	89.0	89.0	89.0
Parameters Measured				
Measured Flow	m ³ /hr	NIL	130.5	NIL
Discharge Pressure (A)	Kg/cm ²	NIL	4.8	NIL
Suction Pressure (B)	Kg/cm ²	NIL	2.4	NIL
Fluid Density	Kg/ m ³	NIL	1000	NIL
Performance Evaluation				
Total Head $(=(A-B) \times 10)$	M	NIL	24.0	NIL
Head Utilization	%	NIL	88.9	NIL
Flow Utilization	%	NIL	88.8	NIL
Measured Input power	KW	NIL	14	NIL
Shaft Power	KW	NIL	13	NIL
Hydraulic Power	KW	NIL	8.5	NIL
Pump Efficiency	%	NIL	67.8	NIL
Overall (Pump Set) Efficiency	%	NIL	60.4	NIL
Throttling Suction	%	NIL	Nil	NIL
Throttling Discharge	%	NIL	Nil	NIL

Archan
Registrar
 King George Medical University
 Lucknow

NEW DENTAL

Condenser water pump's

Pump Identification	Unit	Pump-1	Pump-2	Pump-3
Rated Parameters				
Running Status		Running	Standby	Standby
Pump Make		Wilo	Wilo	Wilo
Speed	RPM	2940	2940	2940
Rated Flow	m ³ /hr	245	245	245
Rated Head	M	27	27	27
Rated Power	KW	30	30	30
Motor Efficiency	%	92.6	92.6	92.6
Parameters Measured				
Measured Flow	m ³ /hr	235.2	NIL	NIL
Discharge Pressure (A)	Kg/cm ²	4.4	NIL	NIL
Suction Pressure (B)	Kg/cm ²	2.1	NIL	NIL
Fluid Density	Kg/ m ³	1000	NIL	NIL
Performance Evaluation				
Total Head $(=(A-B) \times 10)$	M	23.0	NIL	NIL
Head Utilization	%	85.2	NIL	NIL
Flow Utilization	%	96.0	NIL	NIL
Measured Input power	KW	23	NIL	NIL
Shaft Power	KW	22	NIL	NIL
Hydraulic Power	KW	14.7	NIL	NIL
Pump Efficiency	%	68.0	NIL	NIL
Overall (Pump Set) Efficiency	%	63.0	NIL	NIL
Throttling Suction	%	Nil	NIL	NIL
Throttling Discharge	%	Nil	NIL	NIL

Archan
Registrar
 King George Medical University
 Lucknow

New OPD

Chilled Water PUMP's

Pump Identification	Unit	Pump-1	Pump-2	Pump-3
Rated Parameters				
Running Status		Running	Running	Standby
Pump Make		Wilo	Wilo	Wilo
Speed	RPM	2905	2905	2905
Rated Flow	m ³ /hr	147	147	147
Rated Head	M	26	26	26
Rated Power	KW	15	15	15
Motor Efficiency	%	89.0	89.0	89.0
Parameters Measured				
Measured Flow	m ³ /hr	118.5	120.4	NIL
Discharge Pressure (A)	Kg/cm ²	4.8	4.8	NIL
Suction Pressure (B)	Kg/cm ²	2.4	2.4	NIL
Fluid Density	Kg/ m ³	1000	1000	NIL
Performance Evaluation				
Total Head (=A-B)X10)	M	24.0	24.0	NIL
Head Utilization	%	92.3	92.3	NIL
Flow Utilization	%	80.6	81.9	NIL
Measured Input power	KW	13	13	NIL
Shaft Power	KW	12	12	NIL
Hydraulic Power	KW	7.7	7.9	NIL
Pump Efficiency	%	66.5	66.1	NIL
Overall (Pump Set) Efficiency	%	59.2	58.8	NIL
Throttling Suction	%	Nil	Nil	NIL
Throttling Discharge	%	Nil	Nil	NIL

Arunima
Registrar
 King George Medical University
 Lucknow

NEW OPD

Condenser water pump's

Pump Identification	Unit	Pump-1	Pump-2	Pump-3
Rated Parameters				
Running Status		Running	Running	Standby
Pump Make		Wilo	Wilo	Wilo
Speed	RPM	2940	2940	2940
Rated Flow	m ³ /hr	245	245	245
Rated Head	M	26	26	26
Rated Power	KW	30	30	30
Motor Efficiency	%	92.6	92.6	92.6
Parameters Measured				
Measured Flow	m ³ /hr	228.1	224.4	NIL
Discharge Pressure (A)	Kg/cm ₂	4.4	4.4	NIL
Suction Pressure (B)	Kg/cm ₂	2.1	2.1	NIL
Fluid Density	Kg/m ³	1000	1000	NIL
Performance Evaluation				
Total Head (=(A-B)X10)	M	23.0	23.0	NIL
Head Utilization	%	88.5	88.5	NIL
Flow Utilization	%	93.1	91.6	NIL
Measured Input power	KW	25	25	NIL
Shaft Power	KW	23	23	NIL
Hydraulic Power	KW	14.3	14.1	NIL
Pump Efficiency	%	62.9	61.0	NIL
Overall (Pump Set) Efficiency	%	58.3	56.5	NIL
Throttling Suction	%	Nil	Nil	NIL
Throttling Discharge	%	Nil	Nil	NIL

SHATABADI PHASE -1

Chilled Water PUMP's

Pump Identification	Unit	Pump-1	Pump-2	Pump-3	Pump-4
Rated Parameters					
Running Status		Running	Running	Running	Standby
Pump Make		Kirloskar	Kirloskar	Kirloskar	Kirloskar
Speed	RPM	1440	1440	1440	1440
Rated Flow	m ³ /hr	190.08	190.08	190.08	190.08
Rated Head	M	54.8	54.8	54.8	54.8
Rated Power	KW	7.5	7.5	7.5	7.5
Motor Efficiency	%	86.0	86.0	86.0	86.0
Parameters Measured					
Measured Flow	m ³ /hr	142.2	148.3	144.2	NIL
Discharge Pressure (A)	Kg/cm ²	2.2	2.2	2.2	NIL
Suction Pressure (B)	Kg/cm ²	1	1	1	NIL
Fluid Density	Kg/ m ³	1000	1000	1000	NIL
Performance Evaluation					
Total Head (=(A-B)X10)	M	12.0	12.0	12.0	NIL
Head Utilization	%	21.9	21.9	21.9	NIL
Flow Utilization	%	74.8	78.0	75.9	NIL
Measured Input power	KW	7	7	7	NIL
Shaft Power	KW	6	6	6	NIL
Hydraulic Power	KW	4.6	4.8	4.7	NIL
Pump Efficiency	%	77.4	81.4	77.7	NIL
Overall (Pump Set) Efficiency	%	66.6	70.0	66.8	NIL
Throttling Suction	%	NIL	NIL	NIL	NIL
Throttling Discharge	%	NIL	NIL	NIL	NIL

SHATABADI PHASE -1

Condenser water pump's

Pump Identification		Pump-1	Pump-2	Pump-3	Pump-4
Rated Parameters	Unit				
Running Status		Running	Standby	Standby	Running
Pump Make		Kirloskar	Kirloskar	Kirloskar	Kirloskar
Speed	RPM	1450	1450	1450	1450
Rated Flow	m ³ /hr	NA	NA	NA	NA
Rated Head	M	NA	NA	NA	NA
Rated Power	KW	18.5	18.5	18.5	18.5
Motor Efficiency	%	90.6	90.6	90.6	90.6
Parameters Measured					
Measured Flow	m ³ /hr	230	NIL	NIL	235
Discharge Pressure (A)	Kg/cm ²	4.0	NIL	NIL	4.0
Suction Pressure (B)	Kg/cm ²	2	NIL	NIL	2
Fluid Density	Kg/ m ³	1000	NIL	NIL	1000
Performance Evaluation					
Total Head (=(A-B)X10)	M	20.0	NIL	NIL	20.0
Head Utilization	%	NIL	NIL	NIL	NIL
Flow Utilization	%	NIL	NIL	NIL	#
Measured Input power	KW	18	NIL	NIL	18
Shaft Power	KW	16	NIL	NIL	16
Hydraulic Power	KW	12.5	NIL	NIL	12.8
Pump Efficiency	%	77.6	NIL	NIL	80.0
Overall (Pump Set) Efficiency	%	70.3	NIL	NIL	72.5
Throttling Suction	%	NIL	NIL	NIL	NIL
Throttling Discharge	%	NIL	NIL	NIL	NIL

Observation:

The efficiency of the pumps are found more than 50% which is acceptable.

Cooling Towers Study

Shatabdi Phase I

Sr. No.	Particulars	Unit	UNIT I	UNIT II	UNIT III	UNIT IV
1	Fan Rated kW		9.3	9.3	9.3	9.3
2	Application		Chiller	Chiller	Chiller	Chiller
3	Range	°C	NA	NA	NA	NA
4	Approach	°C	NA	NA	NA	NA
5	Rated Water Flow	m ³ /hr.	NA	NA	NA	NA
6	Rated Hot Cooling Water Inlet to Tower	°C	NA	NA	NA	NA
7	Rated Cold Cooling Water Outlet from Tower	°C	NA	NA	NA	NA
8	Design Air Inlet Temperature (DBT)	°C	NA	NA	NA	NA
9	Design Air Inlet Temperature (WBT)	°C	NA	NA	NA	NA
Measured Parameters						
	CT FAN		Fan 1	Fan 2	Fan 3	Fan 4
10	Voltage	V	406			406
11	Ampere	I	11			10.5
12	Measured Power	kW	6.4	0.0	0	6.2
13	Power Factor	P.F	0.83			0.84
14	Total Cooling Water Flow	m ³ /hr.	210			220
15	Riser Throttling	%	NIL	NIL	NIL	NIL
16	Hot Cooling Water Inlet to Tower	°C	39	NIL	NIL	39
17	Cold Cooling Water Outlet from Tower	°C	27	NIL	NIL	27
18	Air Inlet (DBT)	°C	30	NIL	NIL	30
19	(WBT)	°C	22	NIL	NIL	22
20	Operating Range	°C	12.00	NIL	NIL	12.00
21	Approach	°C	5.00	NIL	NIL	5.00
22	Effectiveness of Cooling Tower	%	70.6	NIL	NIL	70.6
23	Cooling Duty Handled by C.T	TR	833	NIL	NIL	873
24	Heat Dissipated	Million kcal/hr	2.52	NIL	NIL	2.64
25	Evaporation loss	m ³ /hr.	3.86	NIL	NIL	4.04
26	Evaporation loss	%	1.84	NIL	NIL	1.84
27	Remarks		Running	Standby	Standby	Running

Arunima
Registrar
 King George Medical University
 Lucknow

New OPD

Sr. No.	Particulars	Unit	UNIT I		UNIT II	
1	Fan Rated kW		11.2	11.2	11.2	11.2
2	Application		Chiller	Chiller	Chiller	Chiller
3	Range	°C	NA	NA	NA	NA
4	Approach	°C	NA	NA	NA	NA
5	Rated Water Flow	m ³ /hr.	NA	NA	NA	NA
6	Rated Hot Cooling Water Inlet to Tower	°C	NA	NA	NA	NA
7	Rated Cold Cooling Water Outlet from Tower	°C	NA	NA	NA	NA
8	Design Air Inlet Temperature (DBT)	°C	NA	NA	NA	NA
9	Design Air Inlet Temperature (WBT)	°C	NA	NA	NA	NA
Measured Parameters						
	CT FAN		Fan 1	Fan 2	Fan 3	Fan 4
10	Voltage	V	401	401.8	NIL	NIL
11	Ampere	I	15.2	16.3	NIL	NIL
12	Measured Power	kW	9.0	9.6	NIL	NIL
13	Power Factor	P.F	0.85	0.85	NIL	NIL
14	Total Cooling Water Flow	m ³ /hr.	121	125	NIL	NIL
15	Riser Throttling	%	Nil	Nil	NIL	NIL
16	Hot Cooling Water Inlet to Tower	°C	31	31	NIL	NIL
17	Cold Cooling Water Outlet from Tower	°C	26	26	NIL	NIL
18	Air Inlet (DBT)	°C	30	30	NIL	NIL
19	(WBT)	°C	22	22	NIL	NIL
20	Operating Range	°C	5.00	5.00	NIL	NIL
21	Approach	°C	4.00	4.00	NIL	NIL
22	Effectiveness of Cooling Tower	%	55.6	55.6	NIL	NIL
23	Cooling Duty Handled by C.T	TR	200	207	NIL	NIL
24	Heat Dissipated	Million kcal/hr	0.61	0.63	NIL	NIL
25	Evaporation loss	m ³ /hr.	0.93	0.96	NIL	NIL
26	Evaporation loss	%	0.77	0.77	NIL	NIL
27	Remarks		Running	Running	Standby	Standby But

Aruna
Registrar
 King George Medical University
 Lucknow

New Dental

Sr. No.	Particulars	Unit	UNIT I		UNIT II	
1	Fan Rated kW		11.2	11.2	11.2	11.2
2	Application		Chiller	Chiller	Chiller	Chiller
3	Range	°C	NA	NA	NA	NA
4	Approach	°C	NA	NA	NA	NA
5	Rated Water Flow	m³/hr.	NA	NA	NA	NA
6	Rated Hot Cooling Water Inlet to Tower	°C	NA	NA	NA	NA
7	Rated Cold Cooling Water Outlet from Tower	°C	NA	NA	NA	NA
8	Design Air Inlet Temperature (DBT)	°C	NA	NA	NA	NA
9	Design Air Inlet Temperature (WBT)	°C	NA	NA	NA	NA
Measured Parameters						
	CT FAN		Fan 1	Fan 2	Fan 3	Fan 4
10	Voltage	V	401.8	401.8	NIL	NIL
11	Ampere	I	14.2	14.1	NIL	NIL
12	Measured Power	kW	8.5	8.4	NIL	NIL
13	Power Factor	P.F	0.86	0.86	NIL	NIL
14	Total Cooling Water Flow	m³/hr.	108	110	NIL	NIL
15	Riser Throttling	%	Nil	Nil	NIL	NIL
16	Hot Cooling Water Inlet to Tower	°C	41	41	NIL	NIL
17	Cold Cooling Water Outlet from Tower	°C	36	36	NIL	NIL
18	Air Inlet (DBT)	°C	31	31	NIL	NIL
19	(WBT)	°C	24	24	NIL	NIL
20	Operating Range	°C	5.00	5.00	NIL	NIL
21	Approach	°C	12.00	12.00	NIL	NIL
22	Effectiveness of Cooling Tower	%	29.4	29.4	NIL	NIL
23	Cooling Duty Handled by C.T	TR	179	182	NIL	NIL
24	Heat Dissipated	Million kcal/hr	0.54	0.55	NIL	NIL
25	Evaporation loss	m³/hr.	0.83	0.84	NIL	NIL
26	Evaporation loss	%	0.77	0.77	NIL	NIL
27	Remarks		Running	Running	Standby	Standby But

Aruhana
Registrar
King George Medical University
Lucknow

Kalam Center

Sr. No.	Particulars	Unit	UNIT I	UNIT II	UNIT III	UNIT IV
1	Fan Rated kW		5.5	5.5	5.5	5.5
2	Application		Chiller	Chiller	Chiller	Chiller
3	Range	°C	NA	NA	NA	NA
4	Approach	°C	NA	NA	NA	NA
5	Rated Water Flow	m³/hr.	NA	NA	NA	NA
6	Rated Hot Cooling Water Inlet to Tower	°C	NA	NA	NA	NA
7	Rated Cold Cooling Water Outlet from Tower	°C	NA	NA	NA	NA
8	Design Air Inlet Temperature (DBT)	°C	NA	NA	NA	NA
9	Design Air Inlet Temperature (WBT)	°C	NA	NA	NA	NA
Measured Parameters						
	CT FAN		Fan 1	Fan 2	Fan 3	Fan 4
10	Voltage	V	401.2	401.1	401.3	401.1
11	Ampere	I	6.8	6.9	7.1	7.1
12	Measured Power	kW	3.3	3.4	3.5	3.5
13	Power Factor	P.F	0.7	0.7	0.7	0.7
14	Total Cooling Water Flow	m³/hr.	74	70	65	68
15	Riser Throttling	%	Nil	Nil	Nil	Nil
16	Hot Cooling Water Inlet to Tower	°C	34.2	34.1	34	34.2
17	Cold Cooling Water Outlet from Tower	°C	31.2	31.3	31.2	31
18	Air Inlet (DBT)	°C	30	30	30	30
19	(WBT)	°C	24	24	24	24
20	Operating Range	°C	3.00	2.80	2.80	3.20
21	Approach	°C	7.20	7.30	7.20	7.00
22	Effectiveness of Cooling Tower	%	29.4	27.7	28.0	31.4
23	Cooling Duty Handled by C.T	TR	73	65	60	72
24	Heat Dissipated	Million kcal/hr	0.22	0.20	0.18	0.22
25	Evaporation loss	m³/hr.	0.34	0.30	0.28	0.33
26	Evaporation loss	%	0.46	0.43	0.43	0.49
27	Remarks		Standby	Running	Standby	Running

Aruhana
Registrar
King George Medical University
Lucknow

CTVS

Sr. No.	Particulars	Unit	UNIT I	UNIT II	UNIT III	UNIT IV
1	Fan Rated kW		9.3	9.3	9.3	9.3
2	Application		Chiller	Chiller	Chiller	Chiller
3	Range	°C	NA	NA	NA	NA
4	Approach	°C	NA	NA	NA	NA
5	Rated Water Flow	m ³ /hr.	NA	NA	NA	NA
6	Rated Hot Cooling Water Inlet to Tower	°C	NA	NA	NA	NA
7	Rated Cold Cooling Water Outlet from Tower	°C	NA	NA	NA	NA
8	Design Air Inlet Temperature (DBT)	°C	NA	NA	NA	NA
9	Design Air Inlet Temperature (WBT)	°C	NA	NA	NA	NA
Measured Parameters						
	CT FAN		Fan 1	Fan 2	Fan 3	Fan 4
10	Voltage	V	NIL	401.8	NIL	401.8
11	Ampere	I	NIL	10.7	NIL	10.5
12	Measured Power	kW	NIL	6.3	NIL	6.1
13	Power Factor	P.F	NIL	0.84	NIL	0.84
14	Total Cooling Water Flow	m ³ /hr.	NIL	72	NIL	68
15	Riser Throttling	%	NIL	Nil	NIL	Nil
16	Hot Cooling Water Inlet to Tower	°C	NIL	28	NIL	28
17	Cold Cooling Water Outlet from Tower	°C	NIL	25	NIL	24.8
18	Air Inlet (DBT)	°C	NIL	24	NIL	24
19	(WBT)	°C	NIL	18	NIL	18
20	Operating Range	°C	NIL	3.00	NIL	3.20
21	Approach	°C	NIL	7.00	NIL	6.80
22	Effectiveness of Cooling Tower	%	NIL	30.0	NIL	32.0
23	Cooling Duty Handled by C.T	TR	NIL	71	NIL	72
24	Heat Dissipated	Million kcal/hr	NIL	0.22	NIL	0.22
25	Evaporation loss	m ³ /hr.	NIL	0.33	NIL	0.33
26	Evaporation loss	%	NIL	0.46	NIL	0.49
27	Remarks		Standby	Running	Standby	Running

Archan
Registrar
 King George Medical University
 Lucknow

Study of Air Handling Units (AHUs)

The chilled water through secondary pumps circulate to the AHUs which in turn deliver cool air to the premises. It is important to note that the AHUs are operated manually and there is no control through BMS.

AHU of CTVS

Floor ID		Third Floor	Third Floor	Second Floor	Second Floor	First Floor	Ground Floor
AHU ID	Unit	Ward	Private Ward	ICU	Doctors Room	Rest Area	OPD
Design Details							
AHU Number		3	2			6	1
Supply Air flow	CFM	10000	15000	8000	5900	4000	7000
Power consumption	kW	5.5	5.5	3.7	3.7	2.2	3.7
Measurement							
Area	m ²	2.16	2.70	1.44	1.08	0.72	1.35
Velocity	m/s	2.10	2.30	2.40	2.40	1.60	2.40
Return Air DBT	°C	28	28	31	31	27	31
Return Air WBT		14	14	15	15	18	15
Return Air RH	%	17.1	17.1	14.6	14.6	41.3	14.6
Supply Air DBT	°C	19	17	19.0	19.0	15.0	19.0
Supply Air WBT		9	7	8	8	12	8
Supply Air RH	%	22.50	18	16.1	16.1	70.7	16.1
Power consumption	kW	3.82	3.99	2.80	2.10	1.33	4.33
Calculations							
Air Flow	CFM	9604	13148	7317	5488	2439	6860
Air Flow	Kg/hr	18942	25933	14432	10824	4811	13530
Return Air Enthalpy	kJ/Kg	38.90	38.90	41.50	41.50	50.50	41.50

Supply Air Enthalpy	kJ/Kg	26.8	22.5	24.6	24.6	34.0	24.6
Cooling Delivered	TR	18.10	33.59	19.26	14.45	6.25	18.06
Sp. Power Consumption	kW/TR	0.21	0.12	0.15	0.15	0.21	0.24
Sp. Air Consumption	CFM/TR	531	391	380	380	390	380
Remark		All AHU Filters are dirty					

Observation: All AHU Filters are Dirty.

AHU of Kalam Centre

Floor ID		Sixth Floor	First Floor
AHU ID	Unit		
Design Details			
AHU Number		21	2
Supply Air flow	CFM		
Power consumption	kW	11	3.7
Measurement			
Area	m ²	3.84	1.50
Velocity	m/s	2.10	2.40
Return Air DBT	°C	28	31
Return Air WBT		14	15
Return Air RH	%	17.1	14.6
Supply Air DBT	°C	19	19.0
Supply Air WBT		9	8
Supply Air RH	%	22.50	16.1
Power consumption	kW	7.40	2.59
Calculations			
Air Flow	CFM	17074	7622
Air Flow	Kg/hr	33675	15034

Return Air Enthalpy	kJ/Kg	38.90	41.50
Supply Air Enthalpy	kJ/Kg	26.8	24.6
Cooling Delivered	TR	32.18	20.07
Sp. Power Consumption	kW/TR	0.23	0.13
Sp. Air Consumption	CFM/TR	531	380
Remark		All AHU Filters are dirty	

Observation:

All AHU filters are dirty.

AHU of New Dental

Floor ID		Fifth Floor	Third Floor	Ground Floor
AHU ID	Unit	North Wing	South Wing	
Design Details				
AHU Number				
Supply Air flow	CFM	16000	12000	16000
Power consumption	kW	7.5	5.5	7.5
Measurement				
Area	m ²	3.15	2.16	3.15
Velocity	m/s	2.10	2.30	2.40
Return Air DBT	°C	28	28	25
Return Air WBT		14	14	14
Return Air RH	%	17.1	17.1	27.7
Supply Air DBT	°C	17	18	19
Supply Air WBT		7	8	10
Supply Air RH	%	18	20.3	29.12

Aruchana
Registrar
King George Medical University
Lucknow

Power consumption	kW	4.20	3.10	4.10
Calculations				
Air Flow	CFM	14006	10519	16006
Air Flow	Kg/hr	27624	20746	31571
Return Air Enthalpy	kJ/Kg	38.90	38.90	39.00
Supply Air Enthalpy	kJ/Kg	22.5	24.6	29.1
Cooling Delivered	TR	35.78	23.43	24.61
Sp. Power Consumption	kW/TR	0.12	0.13	0.17
Sp. Air Consumption	CFM/TR	391	449	650
Remark		All AHU Filters are dirty		

AHUs of New OPD .

Floor ID		Fourth Floor	Fourth Floor	Third Floor	Third Floor	Second Floor	Second Floor
AHU ID	Unit	South Wing	North Wing	Neuro Surgery	South Wing	North Wing	South Wing
Design Details							
AHU Number							
Supply Air flow	CFM	10000	25000	20000	10000	20000	10000
Power consumption	kW	5.5	11	7.5	5.5	7.5	5.5
Measurement							
Area	m ²	2.16	4.86	3.60	2.16	3.60	2.16
Velocity	m/s	2.10	2.10	2.10	2.10	2.40	2.10
Return Air DBT	°C	28	28	28	28	25	26

Archan
Registrar
King George Medical University
Lucknow

Return Air WBT		14	14	14	14	14	13
Return Air RH	%	17.1	17.1	17.1	17.1	27.7	19.2
Supply Air DBT	°C	19	18	17	18	19	15.0
Supply Air WBT		9	8	7	8	10	9
Supply Air RH	%	22.50	20.3	18	20.3	29.12	44.3
Power consumption	kW	3.82	7.51	4.08	3.08	4.10	3.21
Calculations							
Air Flow	CFM	9604	21609	16006	9604	18293	9604
Air Flow	Kg/hr	18942	42620	31571	18942	36081	18942
Return Air Enthalpy	kJ/Kg	38.90	38.90	38.90	38.90	39.00	36.30
Supply Air Enthalpy	kJ/Kg	26.8	24.6	22.5	24.6	29.1	26.9
Cooling Delivered	TR	18.10	48.14	40.89	21.39	28.13	14.06
Sp. Power Consumption	kW/TR	0.21	0.16	0.10	0.14	0.15	0.23
Sp. Air Consumption	CFM/TR	531	449	391	449	650	683
Remark				All AHU Filters are dirty			

Aruchana
Registrar
King George Medical University
Lucknow

AHUs of NEW OPD

Floor ID		First Floor	First Floor	First Floor	Ground Floor	Ground Floor
AHU ID	Unit	North Wing 1	North Wing 2	South Wing	South Wing	North Wing
Design Details						
AHU Number						
Supply Air flow	CFM	5500	15000	10000	28000	8000
Power consumption	kW	3.7	5.5	5.5	11	3.7
Measurement						
Area	m2	1.30	2.70	2.16	5.18	1.84
Velocity	m/s	1.60	2.10	1.80	2.40	2.00
Return Air DBT	°C	31	30	27	26	31
Return Air WBT		15	17	18	15	15
Return Air RH	%	14.6	16.1	41.3	29.3	14.6
Supply Air DBT	°C	19.0	20.0	15.0	18.0	19.0
Supply Air WBT		8	10	12	11	8
Supply Air RH	%	16.1	24.5	70.7	41.4	16.1
Power consumption	kW	2.04	3.11	3.16	7.48	2.15
Calculations						
Air Flow	CFM	4404	12005	8232	26342	7791
Air Flow	Kg/hr	8686	23678	16236	51956	15368
Return Air Enthalpy	kJ/Kg	41.50	41.60	50.50	41.70	41.50
Supply Air Enthalpy	kJ/Kg	24.6	29.1	34.0	31.5	24.6

Cooling Delivered	TR	11.59	23.34	21.11	41.86	20.51
Sp. Power Consumption	kW/TR	0.18	0.13	0.15	0.18	0.10
Sp. Air Consumption	CFM/TR	380	514	390	629	380
Remark		All AHU Filters are dirty				

SHATABADI PHASE -1

Floor ID		Second Floor	First Floor	First Floor	First Floor	Ground Floor	Ground Floor
AHU ID	Unit	OT	Sister Room	OT	OT	DSALF	CSD
Design Details							
AHU Number				1	2		
Supply Air flow	CFM	8000	8000	4000	4000	22500	9000
Power consumption	kW	5.5	5.5	5.5	5.5	15	5.5
Measurement							
Area	m ²	1.33	1.27	1.00	1.00	4.27	1.68
Velocity	m/s	2.20	2.30	1.80	1.80	1.90	1.80
Return Air DBT	°C	30	31	30	31	31	31
Return Air WBT		18	19	18	18	18	17
Return Air RH	%	30.15	31.44	30.15	27.02	27.02	22.76
Supply Air DBT	°C	17	19.0	19.0	19.0	17.0	18.0
Supply Air WBT		7	8	8	8	7	7
Supply Air RH	%	18.02	16.14	16.14	16.14	18.02	13.7

Power consumption	kW	3.87	3.43	3.55	3.66	10.67	2.79
Calculations							
Air Flow	CFM	6214	6160	3811	3811	17185	6403
Air Flow	Kg/hr	12256	12150	7517	7517	33896	12628
Return Air Enthalpy	kJ/Kg	50.49	53.67	50.49	50.46	50.46	47.39
Supply Air Enthalpy	kJ/Kg	22.6	24.7	24.7	24.7	22.6	22.5
Cooling Delivered	TR	27.04	27.85	15.34	15.32	74.72	24.78
Sp. Power Consumption	kW/TR	0.14	0.12	0.23	0.24	0.14	0.11
Sp. Air Consumption	CFM/TR	230	221	248	249	230	258
Remark							

Recommendation for filter cleaning is being provided based on various parameters such as difference between design and actual CFM/kW, average air flow speed etc.

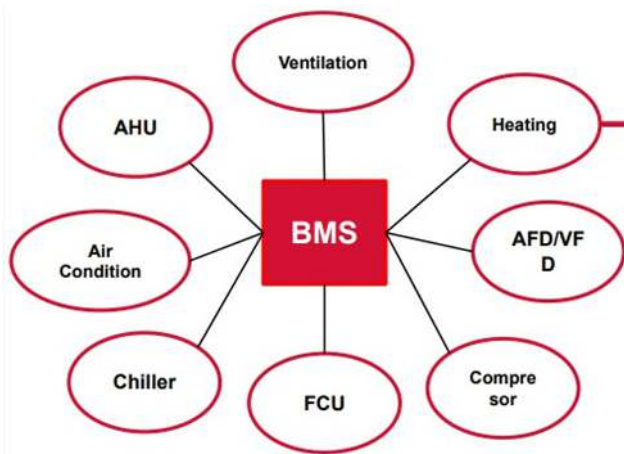
Aruna
Registrar
King George Medical University
Lucknow

IoT Based Building Management System for Energy Savings

Existing System

- No automatic operation as per the actual need
- No automatic switching off of equipment in case of non-usages
- High electricity bills due to unnecessary usage of heavy load equipment
- No centralised operating system is reported

The solution is HVAC automation system or Building Management Systems (BMS) as below:-

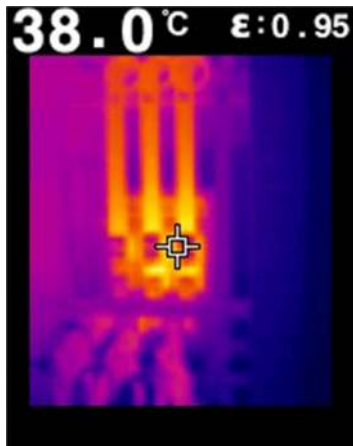


- E. Effect of variation in evaporator temperature on compressor power consumption – A 1°C raise in evaporator temperature can help to save almost 3 % on power consumption
- F. Effect of variation of condenser temperature on compressor power consumption –
- G. Effect of poor maintenance on compressor power consumption

Aradhana
Registrar
King George Medical University
Lucknow

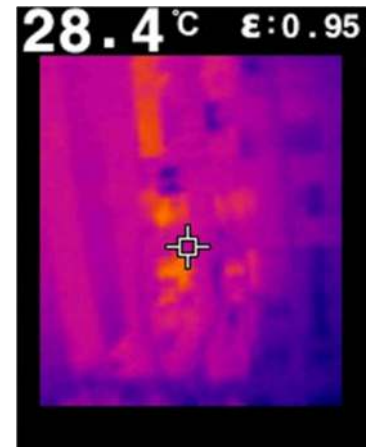
Thermographic Study

TRANSFORMER'S



DESCRIPTION-SHATABADI PHASE -1 TR-3

SURFACE TEMPERATURE-38.0



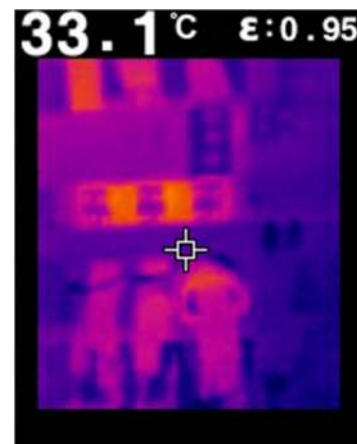
DISRIPTION-SHATABADI PHASE -1 TR-2

SURFACE TEMPERATURE-28.4



DISRIPTION –SHATABADI PHASE -2 TR-1

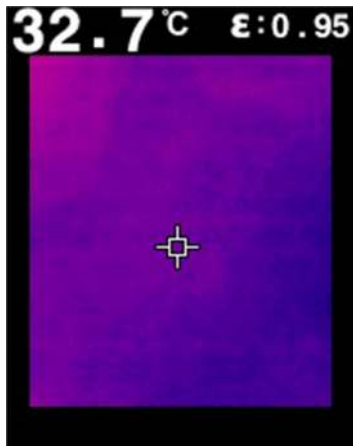
SURFACE TEMPERATURE-33.4



DESCRIPTION-SHATABADI PHASE-1 TR-3

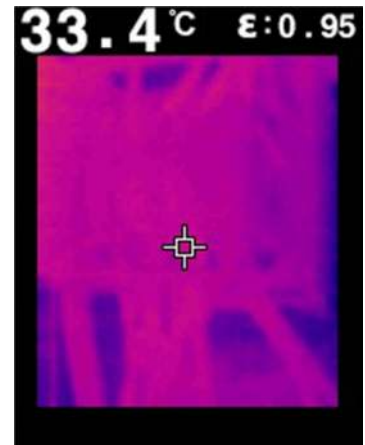
SURFACE TEMPERATURE-33.1

Aruhana
Registrar
King George Medical University
Lucknow



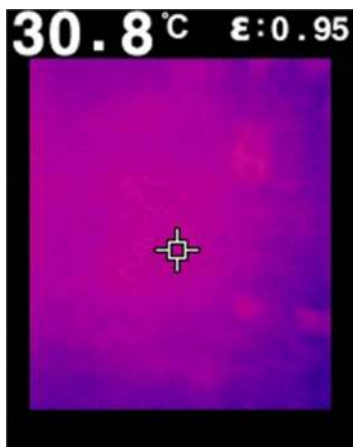
DESCRIPTION –CTVS TR -1

SURFACE TEMPERATURE-32.7



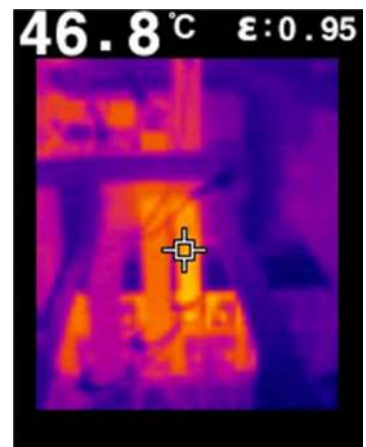
DESCRIPTION –CTVS TR-2

SURFACE TEMPRETURE-33.4



DESCRIPTION –NEW DENTAL TR-1

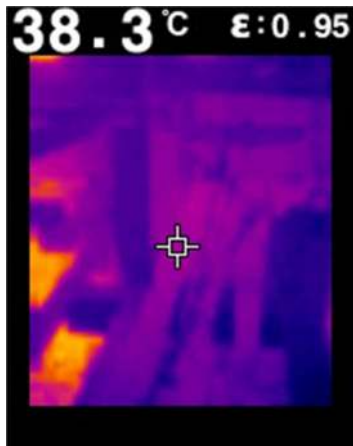
SURFACE TEMPERATURE-30.8



DESCRIPTION-GAUTAM BUDHA HOSTEL TR-1

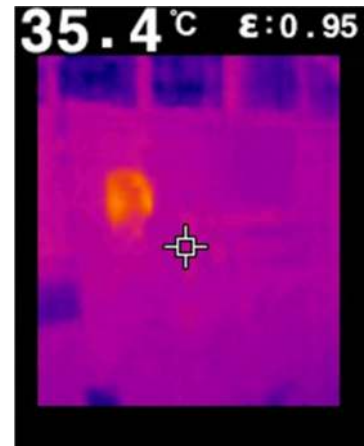
SURFACE TEMPERATURE-46.8

Aruhana
Registrar
King George Medical University
Lucknow



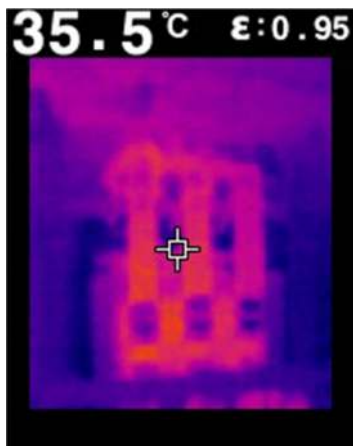
DESCRIPTION –NEW DENTAL TR -2

SURFACE TEMPERATURE-38.3



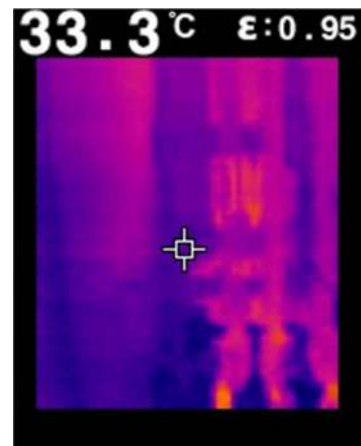
DESCRIPTION –TG HOSTEL TR-3

SURFACE TEMPERATURE -35.4



DESCRIPTION –TG HOSTEL TR -1

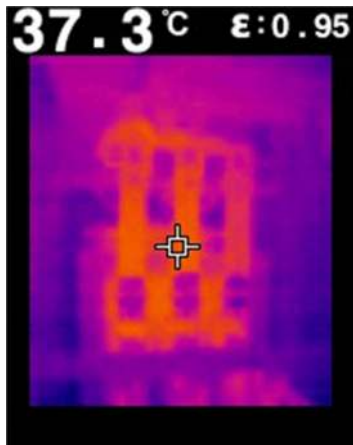
SURFACE TEMPERATURE-35.5



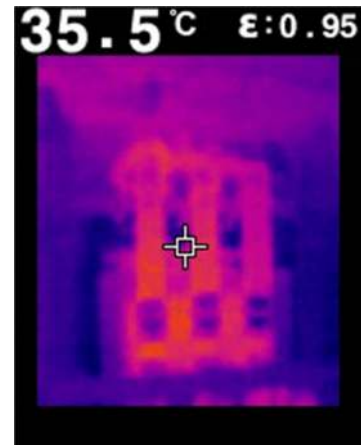
DESCRIPTION –RALC TR-1

SURFACE TEMPERATURE- 33.3

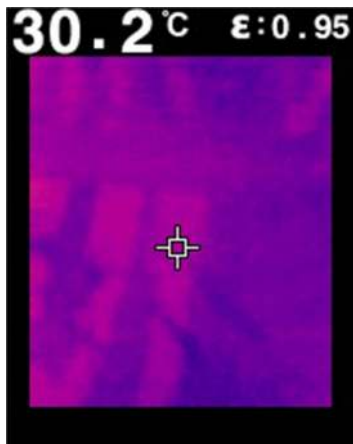
Aruhana
Registrar
King George Medical University
Lucknow



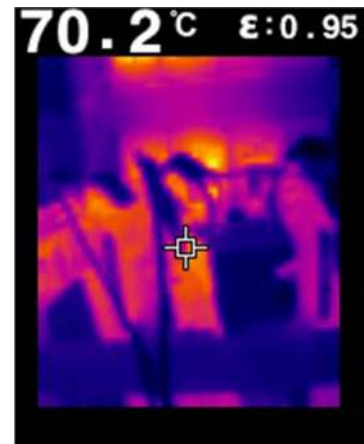
DESCRIPTION –QUEEN MERRY HOSPITAL
SURFACE TEMPERATURE-37.3



DESCRIPTION –TYPE -5 FACULTY BUILDING
SURFACE TEMPERATURE- 35.5

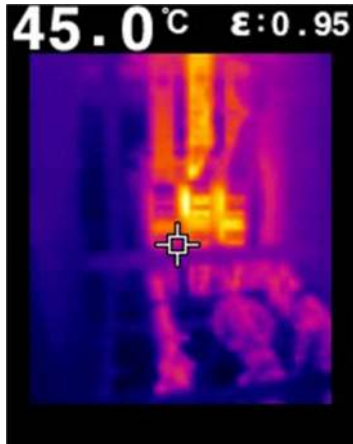


DESCRIPTION –NEW OPD TR-1
SURFACE TEMPERATURE-30.2

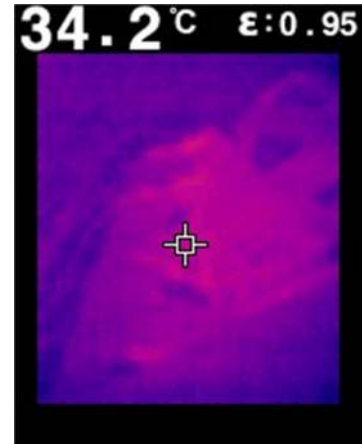


DESCRIPTION –NEW OPD TR AC PLANT
SURFACE TEMPERATURE- 70.2

Aradhana
Registrar
King George Medical University
Lucknow



DESCRIPTION –MAIN HOSPITAL
SURFACE TEMPREATURE-45

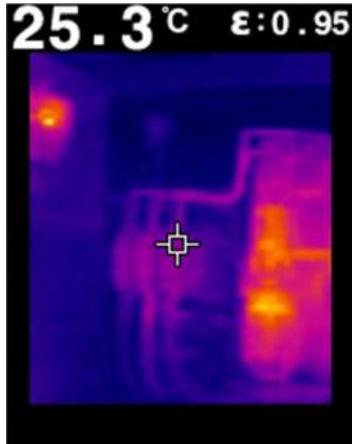


DESCRIPTION –QUEEN MERRY 100 BEDED
SURFACE TEMPREATURE- 34.2

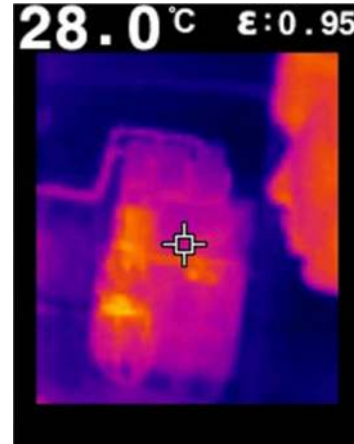
Aradhana

Registrar
King George Medical University
Lucknow

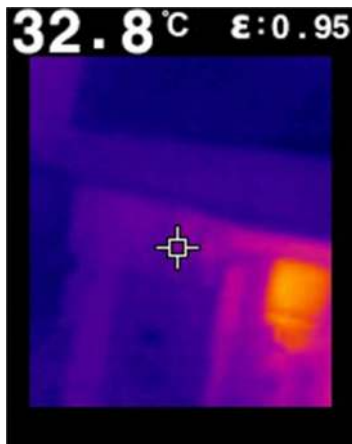
SHATABADI PHASE -1



DESCRIPTION –CHILLER-4
SURFACE TEMPERATURE-25.3



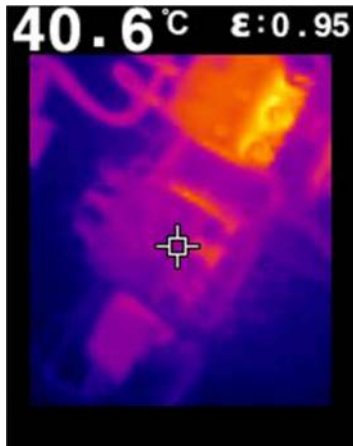
DESCRIPTION –CHILLER-2
SURFACE TEMPERATURE- 28



DESCRIPTION –CT FAN -4
SURFACE TEMPERATURE-32.8

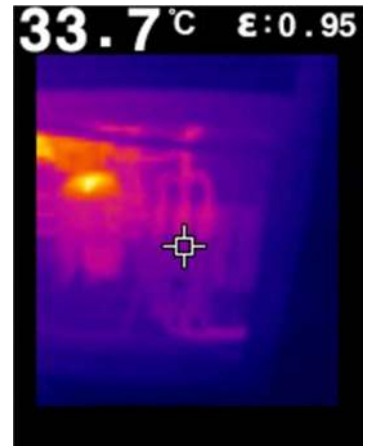


DESCRIPTION –CT FAN -3
SURFACE TEMPERATURE- 33.5



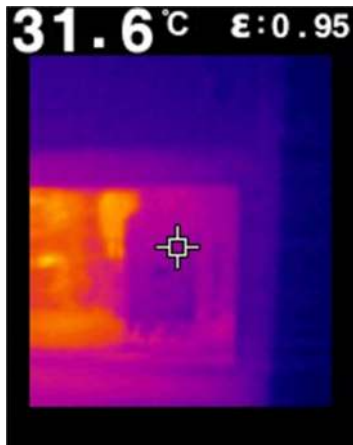
DESCRIPTION –CONDENSER PUMP -4

SURFACE TEMPREATURE-40.6



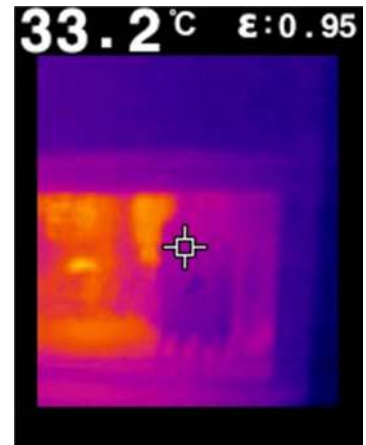
DESCRIPTION –CONDENSER PUMP-1

SURFACE TEMPERATURE- 33.7



DESCRIPTION –CHIELD WATER PUMP-1

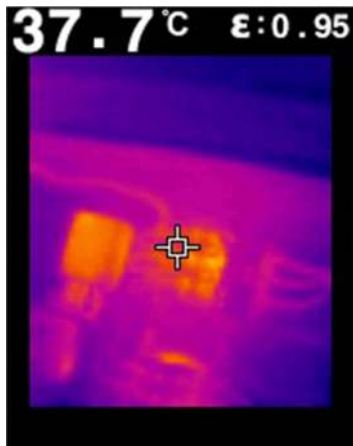
SURFACE TEMPERATURE-31.6



DESCRIPTION – CHIELD WATER PUMP-2

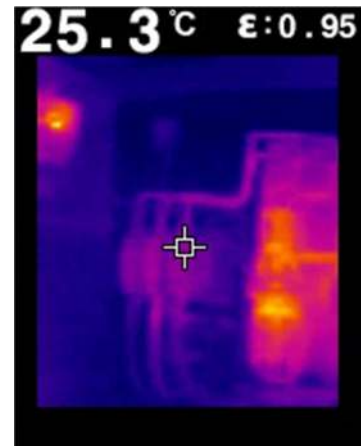
SURFACE TEMPERATURE- 33.2

Arunima
Registrar
King George Medical University
Lucknow



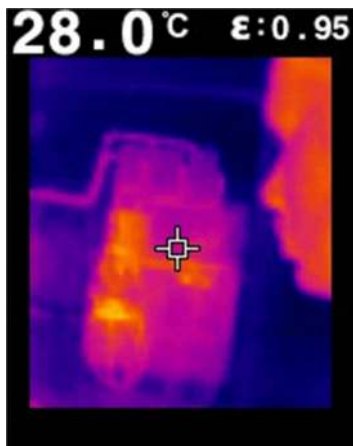
DESCRIPTION –GROUND FLOOR AHU

SURFACE TEMPREATURE-37.7



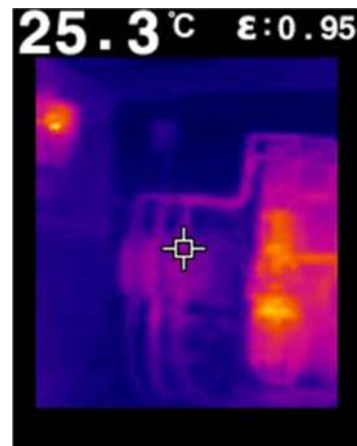
DESCRIPTION – CHIELD WATER PUMP-2

SURFACE TEMPREATURE- 25.3



DESCRIPTION –GROUND FLOOR AHU

SURFACE TEMPREATURE-28

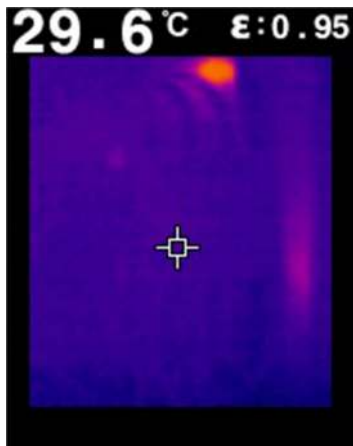


DESCRIPTION – AHU-2 CHD

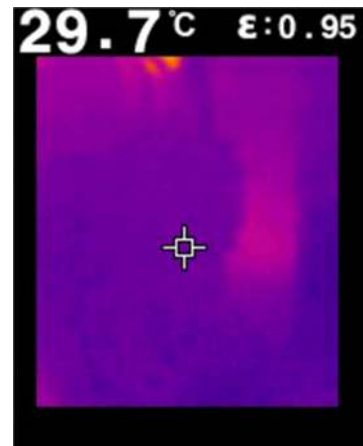
SURFACE TEMPREATURE- 25.3

Arunima
Registrar
King George Medical University
Lucknow

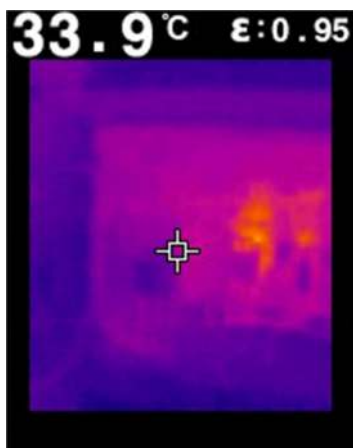
CTVS



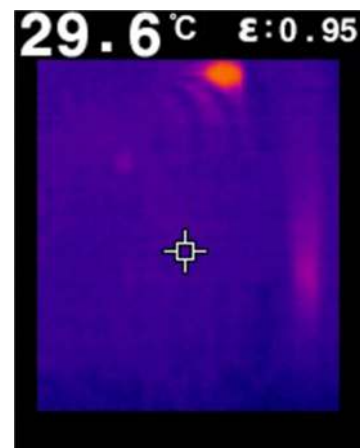
DESCRIPTION –CHILLER-3
SURFACE TEMPREATURE- 29.6



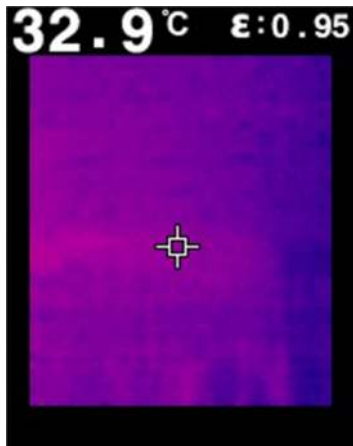
DESCRIPTION – CHILLER -1
SURFACE TEMPREATURE-29.7



DESCRIPTION –CT FAN -3
SURFACE TEMPREATURE-33.9

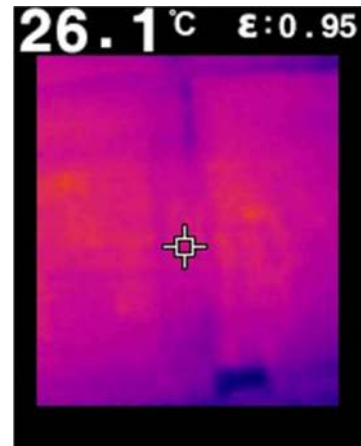


DESCRIPTION – CT FAN -1
SURFACE TEMPREATURE- 29.6



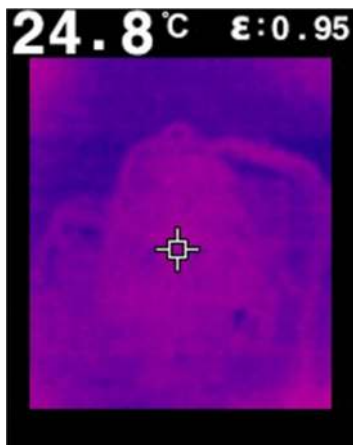
DESCRIPTION –CHILLED WATER PUMP-2

SURFACE TEMPREATURE-32.9



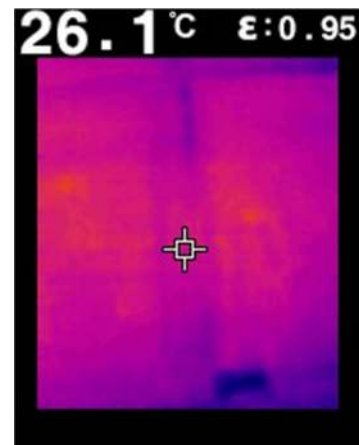
DESCRIPTION – CONDENSER PUMP -2

SURFACE TEMPREATURE- 26.1

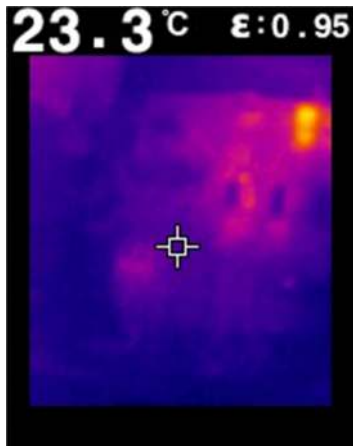


DESCRIPTION –CHILLED WATER PUMP- 2

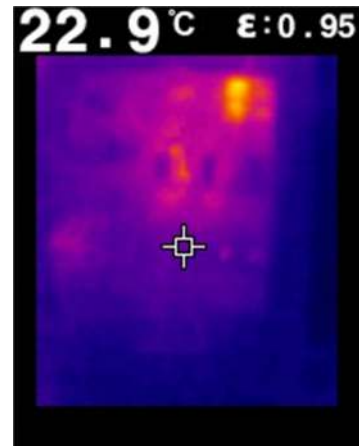
SURFACE TEMPERATURE-24.8



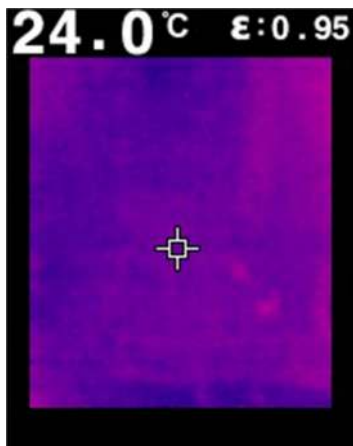
DESCRIPTION-CHILLED WATER PUMP-4



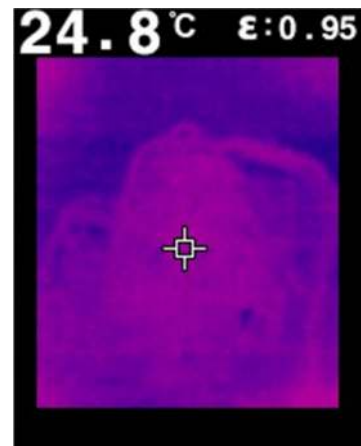
DESCRIPTION –3RD FLOOR AHU-2
SURFACE TEMPERATURE-23.3



DESCRIPTION –3RD FLOOR AHU -1
SURFACE TEMPERATURE- 22.9

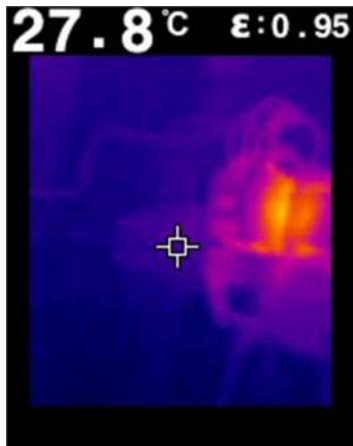


DESCRIPTION –2ND FLOOR AHU-2
SURFACE TEMPERATURE- 24



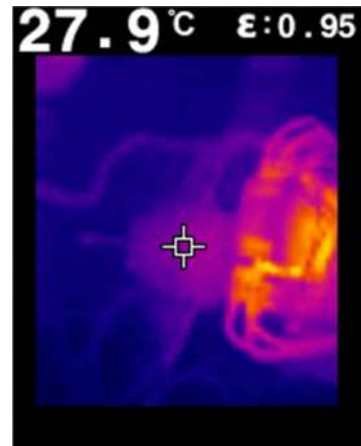
DISCRIPTION –2ND FLOOR AHU -02
SURFACE TEMPERATURE-24.8

Archan
Registrar
King George Medical University
Lucknow



DESCRIPTION –1ST FLOOR AHU-2

SURFACE TEMPERATURE-27.8

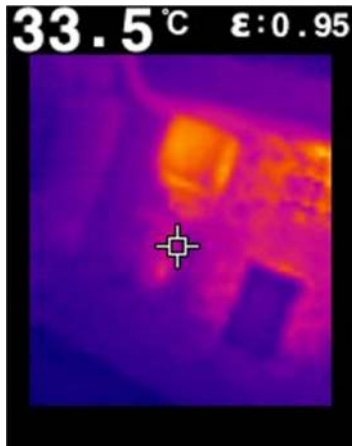


DESCRIPTION – 1ST FLOOR AHU –ROOM NO-4

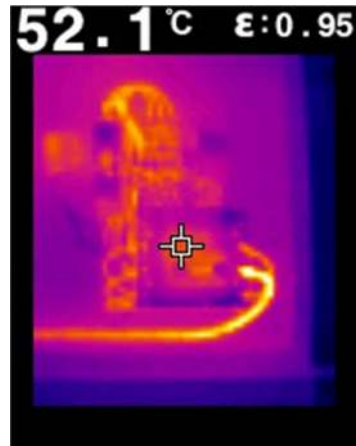
SURFACE TEMPERATURE- 27.9

Archi
Registrar
King George Medical University
Lucknow

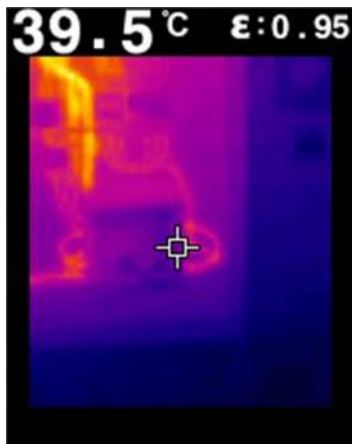
NEW OPD



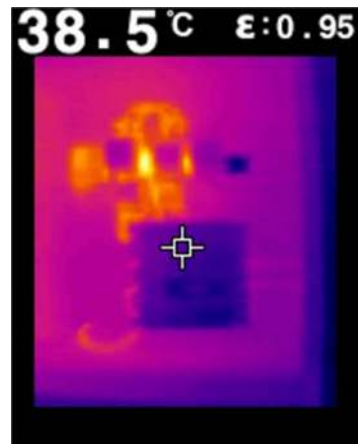
DESCRIPTION CONDENSER PUMP-1
SURFACE TEMPERATURE-33.5



DESCRIPTION – CHILLER -2
SURFACE TEMPERATURE- 52.1



DESCRIPTION-CHILLED WATER PUMP -1
SURFACE TEMPERATURE-39.5

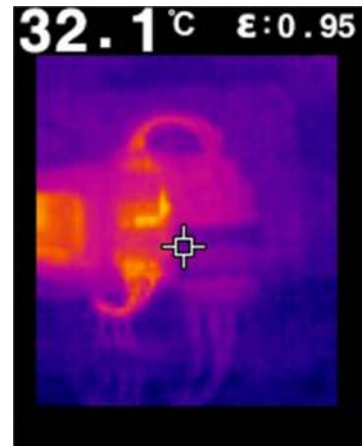


DESCRIPTION – CONDENSER PUMP-2
SURFACE TEMPERATURE- 38.5

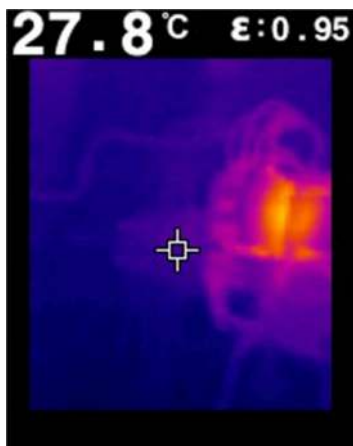
Arunima
Registrar
King George Medical University
Lucknow



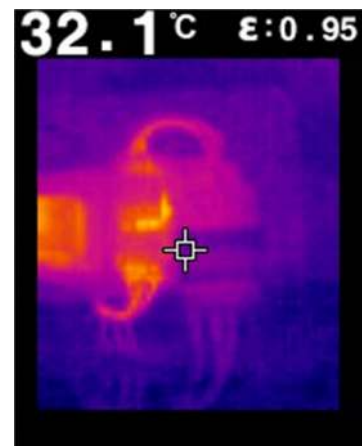
DESCRIPTION – CT FAN -1
SURFACE TEMPERATURE-35



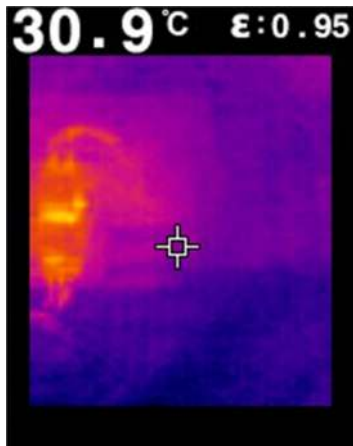
DISCRIPTION – CHILLED WATER PUMP-2
SURFACE TEMPERATURE- 32.1



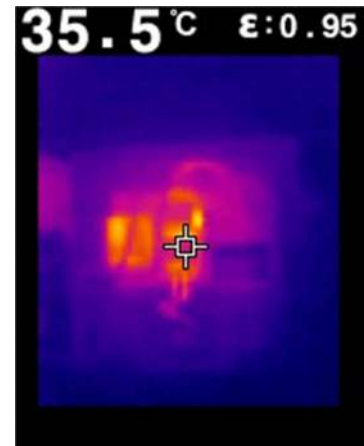
DESCRIPTION – CT FAN -1
SURFACE TEMPERATURE-27.8



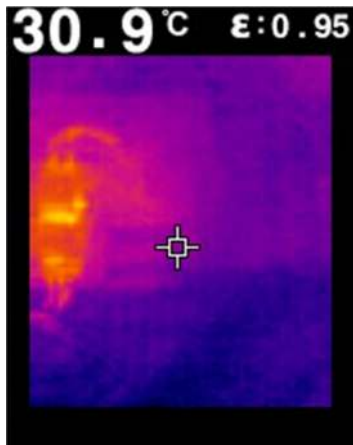
DESCRIPTION – CT FAN -2
SURFACE TEMPERATURE- 32.1



DESCRIPTION – 4TH FLOOR AHU NORTH WING
SURFACE TEMPERATURE-30.9



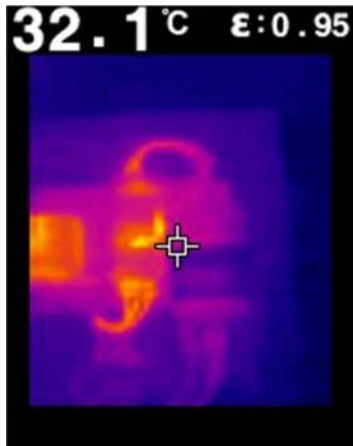
DESCRIPTION – 4TH FLOOR AHU SOUTH WING
SURFACE TEMPERATURE- 35.5



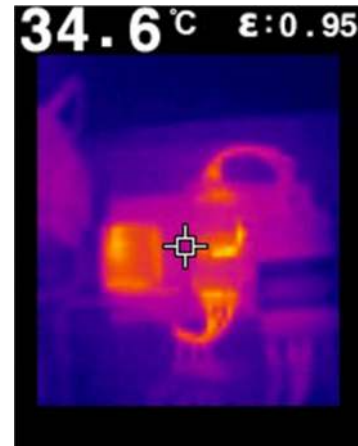
DESCRIPTION – 3RD FLOOR AHU NEURO
SURFACE TEMPERATURE-30.9

Archana
Registrar
King George Medical University
Lucknow

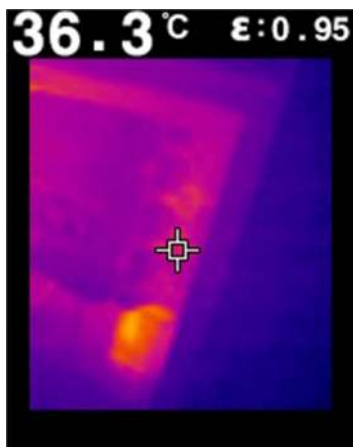
NEW DENTAL



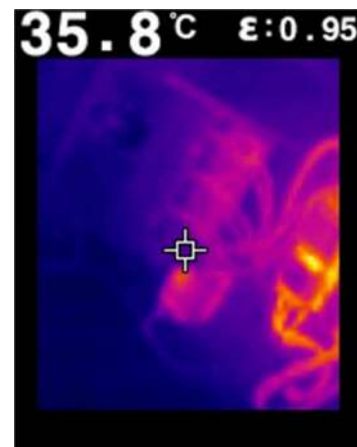
DESCRIPTION – CHILLER -2
SURFACE TEMPERATURE-32.1



DESCRIPTION – CHILLER -1
SURFACE TEMPERATURE- 34.6

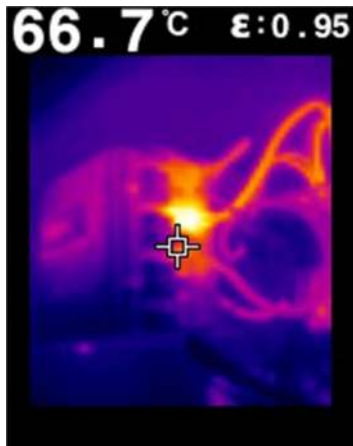


DESCRIPTION-CT FAN -1
SURFACE TEMPERATURE-36.3



DESCRIPTION-CT FAN -2
SURFACE TEMPERATURE-35.8

Archiya
Registrar
King George Medical University
Lucknow



DESCRIPTION-CONDENSER PUMP-2
SURFACE TEMPERATURE-66.7



DESCRIPTION-CHILLED WATER P-2
SURFACE TEMPERATURE-38

Archan
Registrar
King George Medical University
Lucknow

No abnormal temperature indication found .

Concentrated Solar Systems Performance

Present Applications

The steam is utilized in the Hospital Kitchen situated in the Shatabdi Phase II building Ground Floor and food is supplied to all the Hospital departments.



Fig. Patient Kitchen



Key Observations

- LPG Boiler is also in operation as backup steam generator of the Solar Concentrator which consumes 02 cylinders per day
- The kitchen uses another LPG Oven for daily general uses which consumes 01 -02 cylinders per days
- The system capacity is more than the steam requirement of the kitchen
- The steam generation should be started from 10:30 am onwards and keep on generating steam till the evening .
- The better maintenance practices can increase the operation of the CST
- Around 15-16 kg / cm² remains unused which can find other applications

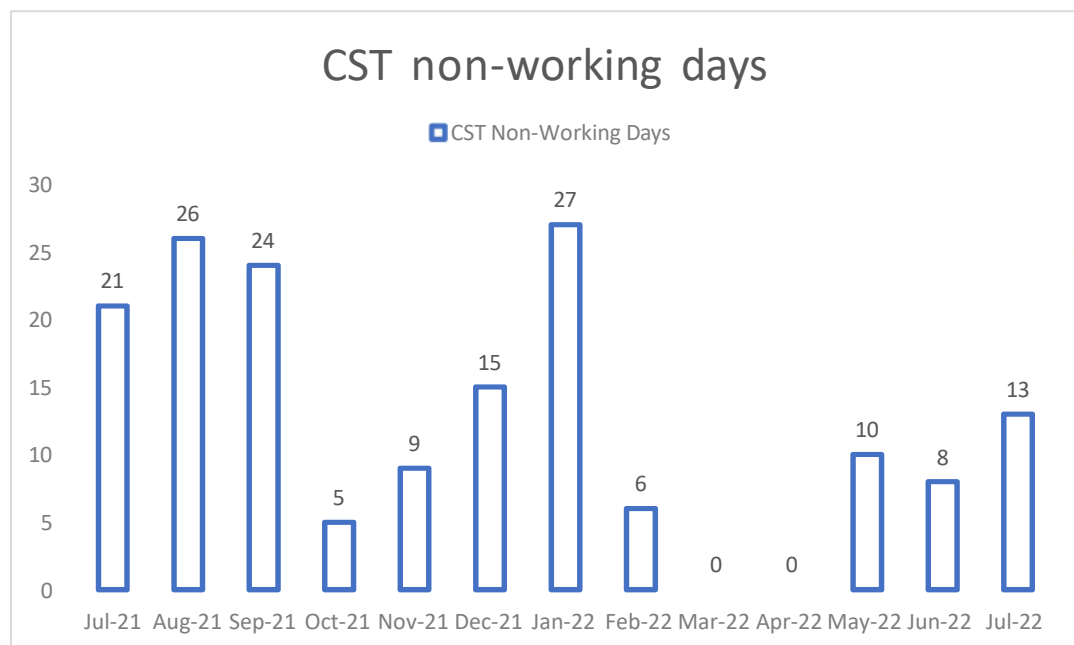
Aruhana
Registrar
King George Medical University
Lucknow

- The generated steam should be used within the evening time as the steam gets Converted into water overnight and become non-usable. The Patient kitchen is used for preparing all the items except roti making which is done in a separate kitchen above the Kitchen 1905.



Performance of Concentrated Solar Thermal (CST)

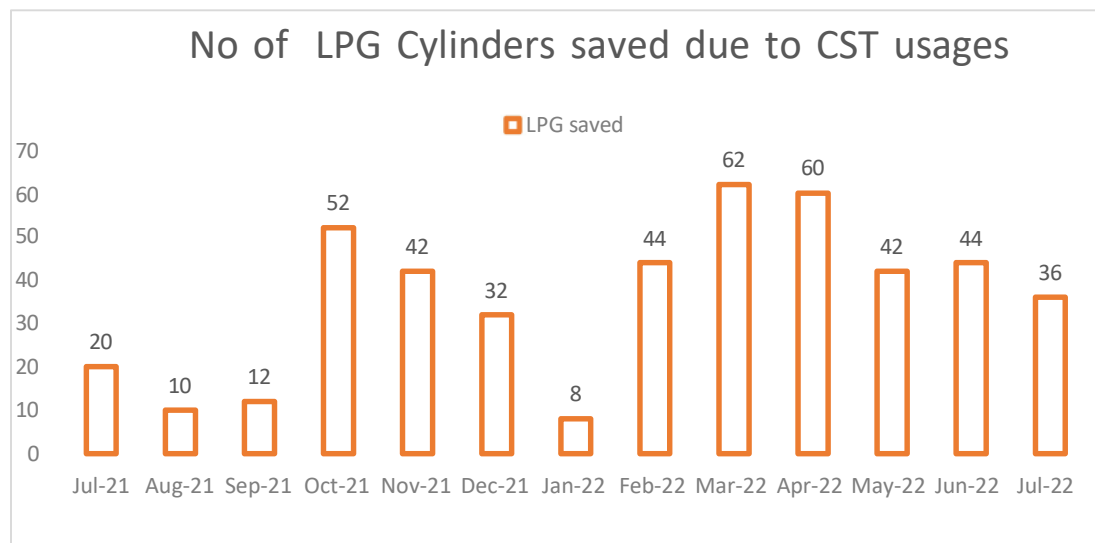
The below chart shows the non-working of CST on monthly basis.



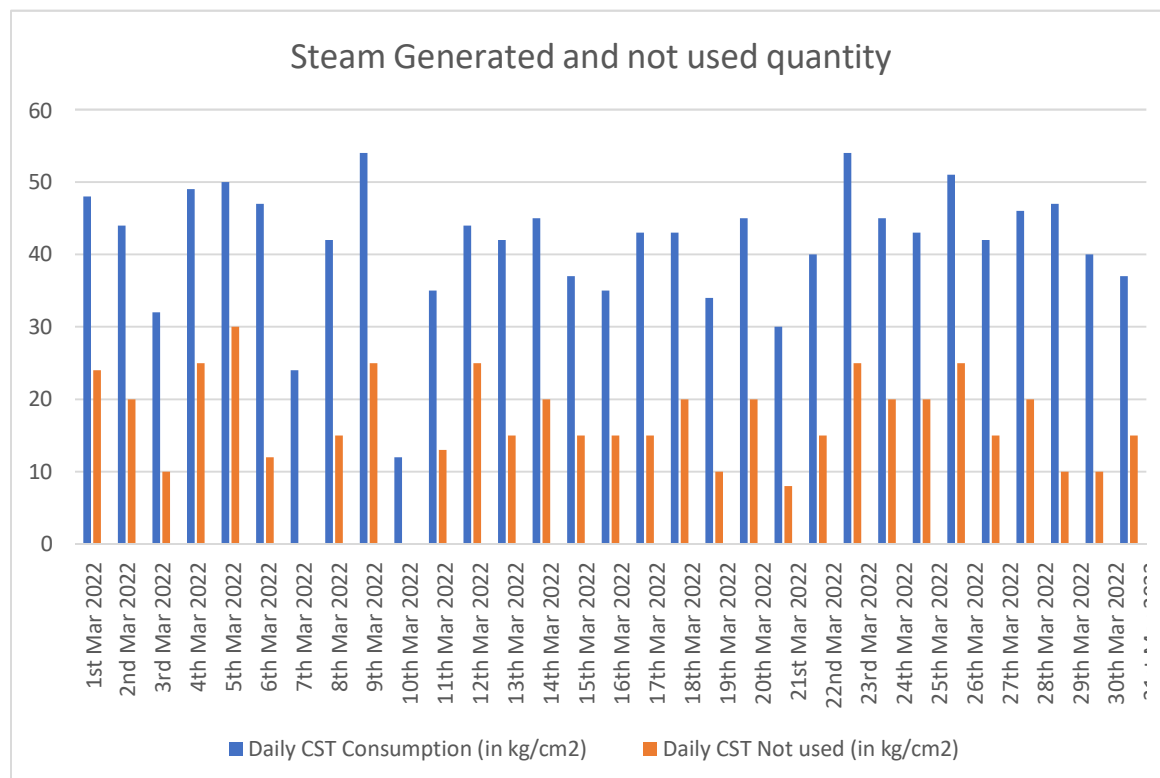
Archiya
Registrar
King George Medical University
Lucknow

The CST operation has been affected in Rainy season as well as extreme winter. But, it has performed extremely well from February and there was not a single day generation loss in March and April.

The below chart shows the LPG cylinders (Commercial , 19 kgs) got saved on monthly basis due to the use of CST:-



Again, CST has performed extremely well in some months like February, March, April, May ,etc and it shows that the total steam generated did not use a major percentage, say for example the below chart for the Month of March :-




Registrar
 King George Medical University
 Lucknow

Suggested Applications

It is noted from the above that the steam generation capacity of the 30 parabola systems is more than the required quantity, so, a part of the steam can be diverted to other applications like steam sterilizers. These have a designed steam pressure requirement of 2 kg/ cm² which can be met by the CST system. The usage will save a power requirement of 18 kW per machine.

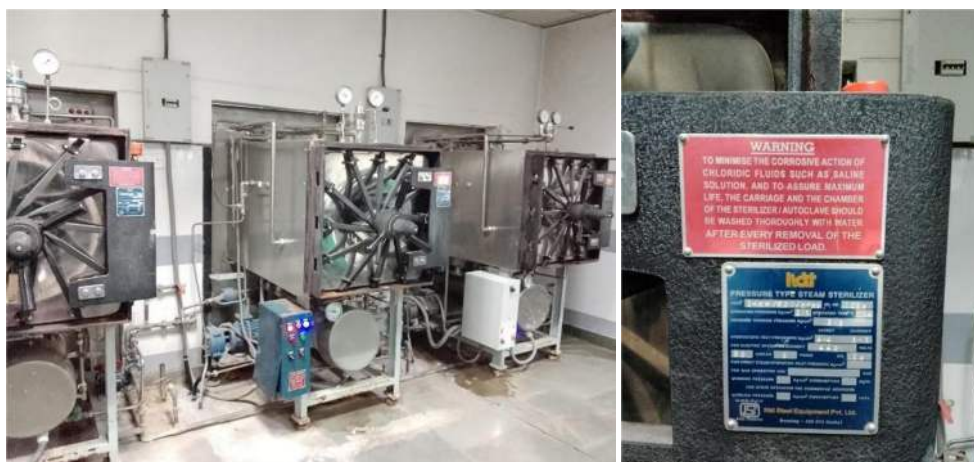


Fig.Steam Sterilizers

A total 54 kW capacity of power can be saved from 03 sterilizers located in the Shatabdi Phase-I building ground floor which is at a distance of around 100 ft from the location of the rooftop of Shatabdi Phase-II building where the CST is installed.

Aruhana
Registrar
King George Medical University
Lucknow

Solar PV Power Plants Potential (Grid Connected)

Importance of Solar PV Energy in Healthcare Sectors

India is a tropical country, which receives adequate solar radiation for 300 days. It makes a huge potential for solar energy in the country and the state like Uttar Pradesh. The below points explain the importance of the Solar PV Energy in the Healthcare sector such as KGMU:-

- Solar power is a fundamental choice for healthcare sector — not only because solar energy helps reduce air pollution and makes the world a cleaner, healthier and better place. Hospitals, clinics, nursing homes, testing laboratories all use a large amount of electricity.
- A great way to reduce electricity bills- Running medical equipment such as scanners etc uses a large amount of electricity and some of these facilities run 24x7 with air conditioning making their utility bills touch the sky. For such reasons installing a solar energy system is a great way to reduce electricity bills.
- Hospitals have large rooftop Space - hospitals have large spaces such as rooftop, parking lot canopies etc to install solar panels.
- Clean and Green Operation- unlike Diesel and Grid Power which are originated from highly polluting energy sources like Coal and Diesel; Solar PV Power sources help to have clean and green operations.
- Financial Sustainability – through savings energy cost, the solar plants help in achieving financial sustainability
- NAAC and other similar certification - Choosing alternate energy can reduce KGMU 's carbon emissions and have a positive effect on environmental health.

Economical without Net Metering –

The Net Metering in Uttar Pradesh State is not operational since Jan 2019 in spite of the fact that the generating power through Solar PV is beneficial at KGMU campus since it is operational 24x7 for 365 days.

Aruhana

Registrar
King George Medical University
Lucknow

Potential of Further Solar Plants

There are 107 Buildings exist in the KGMU campus covering various departments, hospitals, hostels, Canteens, guest houses, etc. Solar PV is already installed in 23 Rooftops. Based on our preliminary assessment another 27 Rooftops can be used for Solar PV Power generation with a potential of 2135 kW and generating 29,91,800 units per annum. The list of these buildings are as below: -

S. No.	Name of Department /Buildings	Solar Available (Yes/No)	Tentative Solar Capacity, kW
1	Old Administrative Buildmg	No	99.00
2	Old Administrative Buildmg	No	62.00
3	Old Administrative Buildmg	No	120.00
4	Old CV. Hostel & New CV. Hostel	No	165.00
5	Works Department (Civil Sectio)	No	20.00
6	Anesthesia Department	No	8.50
7	Pharmacology Department	No	98.00
8	Pharmacology Extension Building	No	13.00
9	New OPD. Building	No	103.00
10	New Dental Building Near Gamla Ghar	No	86.00
11	Faculty of Dental Science	No	42.00
12	Ophthalmic Department (South Wing)	No	16.00
13	New VI. Hostel	No	62.00
14	Buddha Hostel Block -A,B,C	No	40.00
15	Buddha Hostel Block -D	No	10.50
16	Buddha Hostel Block -E, F, G	No	48.00
17	Married Block Buddha Hostel	No	18.00
18	Department Of Psychiatry	No	67.00
19	CTVS. Building	No	18.00
20	Cardiology Administrative & OPD. Building	No	31.00
21	Scientific Conversion Centre	No	340.00
22	SP. Hostel	No	270.00
23	New Nehru Hostel	No	25.00
24	Old Nehru Hostel	No	38.00
25	Old Dental Building	No	95.00
26	QMH. Main Building	No	220.00
27	RCH. Building at QMH.	No	22.00

The buildings with existing solar plants also may accommodate additional Solar PV capacity.

Arunima
Registrar
 King George Medical University
 Lucknow

Application of Heat Reflective Coating

Heat Reflective Paints – Importance

Reflective roof top coatings can make a home energy efficient by reducing air conditioning load as well as any cooling load. Several researches have shown that external colors of a building have significant impact on cooling load of the building. A white reflective roof coating can potentially reduce up to 60% of heat coming in from the ceiling. But the results vary in different situations.

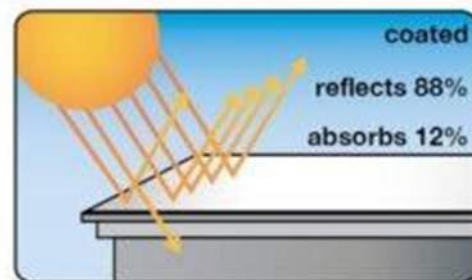
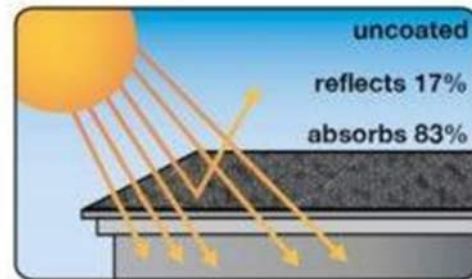
The concrete roofs tend to get darker over time. Due to the properties of the concrete roof materials as well as due to the darkness of the roof, the concrete roofs absorb heat and get heated increasing the roof temperature beyond 70 deg C in summer. This heat enters into the building and thereby increases the HVAC

How does a reflective coat helps?

A reflective roof coating saves energy in building by reflective UV rays back into the atmosphere. Most roofing systems absorb UV rays, and that heat is transferred into the building. A reflective roof doesn't allow those UV rays into the building, and therefore reduces the amount of heat coming in.

Application Potential in KGMU Buildings

A part of the KGMU buildings have Solar PV Power Plants which protect the rooftop getting heated. There are a few buildings which can be used to install Solar PV Plants as mentioned in the chapter 17 above. The balance buildings are potential for the application of the White Reflective Coating.



The following Benefits can be accrued using the WRC:-

Rooftop coatings not only prevent extra heat from entering a house, but have many other benefits too:-

- It can increase the life of the roof by 15 years or more.
- Dense cities with lot of swellings in a small area have tendencies of getting heated up significantly. If houses have reflective rooftops, then the amount of heat waves can be reduced.
- In general it can add to greening by reducing waste and saving electricity

Aruchana
Registrar
King George Medical University
Lucknow

A list of such potential buildings

S. No.	Name of Department /Buildings	Plinth Area in SQM. Approx.
1	Mortuary House	730.50
2	Microbiology Lab (ICTC. Unit)	335.82
3	Microbiology Deaparrtment (Old Blood Bank Building)	334.52
4	SPM Building	367.29
5	PHI Building	1,285.49
6	Pawer Grid Vishram Sadan	676.29
7	Canteen -1905	229.52
8	Midwifery Hostel	498.53
9	Nurses School	809.67
10	Nurses Hostel	2,727.00
11	Sanjha Chulha Near Ghandhi Ward	117.24
12	Forensic Department	220.00
13	Forensic Department Extensioon Building	575.92
14	Alumni Guest House	318.19
15	Central Store	272.78
16	Central Store Building -2	508.00
17	Electric Department	225.00
18	Plastic Surgery Department	1,217.00
19	Pediatric Surgery Department	363.37
20	Neurology Department	1,277.60
21	Private Word. (Paraplegia Ward)	968.09
22	General Surgery Department	1,764.78
23	Respiratory Extension Building	579.96
24	Rain Basera Near Respiratory Medicine Department	227.94
25	Isolation Ward	216.23
26	Environment Cell	261.00
27	Animals House	169.00
28	CT. Scan Centre	380.00
29	Old VL Hostel	821.69
30	UG & PG Girls Hostel	821.69
31	Chatra Vas	477.60
32	DK.Hostel	1,000.39
33	Psychiatry OPD.	546.65
34	Psychiatry Children OPD	842.25
35	Drug De- Addicition Store	274.00
36	VC. Residence	601.00
37	University Guest House	650.71
38	RH. Hostel	1,103.00
39	MCH. A- Block at QMH.	1,151.46
40	MCH. B- Block at QMH.	669.78
41	NCLRH. Hostel	452.93
42	New LRH. Hostel	306.67
43	Center for Excellence of Midwidwey Training in QMH.	785.06
Building OF RALC. & IDH. CAMPUS		
1	RALC. Main Building	3,145.85
2	RALC Building Near Petrol Pump	615.44
Building of TG. CAMPUS		
1	Multistory Teachers Flats	735.04
2	Multistory Boys Hostel	1,278.93
3	Mess/Gym	521.00
4	Naveen Boys Hostel	639.22
5	Dental Hygienist Hostel	367.95
6	Multistory Building (Type-II)	387.71
7	Faculty Residence Building -1	326.18
8	Faculty Residence Building -2	277.45

Induction Cooking in the Cooking Areas

The Energy Audit team surveyed the cooking areas such as canteens, Hostels of KGMU during 3rd week of August month and have the below information :-

S. No.	Name of Fooding Facility	FACILITY DETAILS			
		Type of Fuel	Type of food (Flame/ Steam based)	Number of cylinders/ units/ quantity of fuel	Total Annul LPG Cylenders
1	Divyang Ek Ummeed	Electricity	Tea & Snacks	Electricity Induction	0
2	M/S Mohini Caters Center	LPG, Electricity	Meal (Roti , Rice, Vegetables & Snacks	02 cylinder per day	720
3	C V Hall Mess	LPG	Meal	02 cylinders per day	720
4	Annapurna Kitchen	LPG cylinder & Electricity	Meal	01 cylinder per day	365
5	M/S Brijesh Singh	LPG & Electricity	Meal	2 cylinder per day	720
6	Patient Diet Kitchen (Central Kitchen) of M/s Jaiswal Canteen	LPG, Solar Thermal (CST)	Meal	02 cylinders when solar steam not generated or 01 cylinder when solar steam is used for cooking	500
7	Kitchen 1905	LPG	Meal	1.5-02 cylinders per day	540
8	Nitin Kapoor Cafeteria	LPG, Electricity	Meal	02-03 cylinders per day	750
9	Roti Making Facility	LPG	Meal	08 Cylinders per day	2880
10	Rajendra Kumar	LPG	Meal	0.5 cylinder per day	180
11	Shri Julfikar Hussain	Electricity	Tea & Snacks	Electricity Induction	0
12	Shri Sanjeet Kumar Tiwari	Electricity	Tea & Snacks	Electricity Induction	0
13	Shri Mohammed Nadeem	LPG & Electricity	Meal	25-30 cylinders per month	360
14	Shri Mohammed Amir	LPG & Electricity	Meal	30 cylinders per month	360
15	M/s Chai Canteen	LPG & Electricity	Meal	15-18 cylinders per month	450

Arunima
Registrar
 King George Medical University
 Lucknow

The observations :-

1. The meal cooking facilities use LPG
2. The tea and snacks facilities do not use LPG
3. Electric based cooking is already in practice in tea and snacks facilities like Induction Plate, Sandwich Makers, Kettle, micro wave , electric hot case,etc.
4. Total LPG Cylinders are used annually 8545 numbers (approximately) of commercial cylinders, 19 kgs capacity each.
5. The big kitchens have apprehension about the utilisation and cost about using Electric / Induction Cooking



Fig . 1905 Kitchen & Patient Kitchen for Meals and Tea & Snacks joint

Recommendations :-

The commercial scale Induction cooking as well as Steam Cookers can be piloted in a particular cooking area which makes meals and the decision can be taken based on that experience.

Aruchana
Registrar
King George Medical University
Lucknow

District Cooling System

Introduction:

At present, air conditioning loads in the Hospital are met by on-site cooling technologies consisting of either window or room air conditioners or central chillers powered by the electricity grid. The efficiency and refrigerant consumption of on-site cooling equipment varies significantly depending on the product, building and cooling system design, operation and maintenance.

The overall energy and refrigerant use for air conditioning has a potential to have far lower if clusters of buildings and even whole KGMU is connected to a District Cooling System (DCS). Global experience and detailed analyses and existing projects in India show that these systems are also more reliable, cost-effective and could be highly beneficial.

Expected Benefits :-

1. Infrastructure benefits
 - a. Peak power demand reduction
 - b. Long-term grid balancing services
2. Environmental Benefits
 - a. Energy Efficiency can be better achieved
 - b. Climate change benefits
 - c. Water savings
 - d. Refrigerant savings
3. Besides there can be capital cost benefits for the individual systems and equipment as well as operating cost benefits

Working Principle :

DCS distributes (supplies and collects back) cooling energy in the form of chilled water from a central district cooling plant to multiple buildings through a distribution network of insulated, underground pipes for space and process cooling. Individual users purchase chilled water for their own building from the operator of the DCS and do not need to install their own chillers or cooling towers.



Figure 7: A schematic of typical district cooling systems
(source: emsd.gov.hk)

Aradhana
Registrar
King George Medical University
Lucknow

A DCS can be broadly divided into three parts:

- An air conditioning plant – generates chilled water for cooling purposes
- Distribution network (DN) – distributes chilled water to end users
- Energy transfer station (ETS) - interface with buildings' own air-conditioning systems

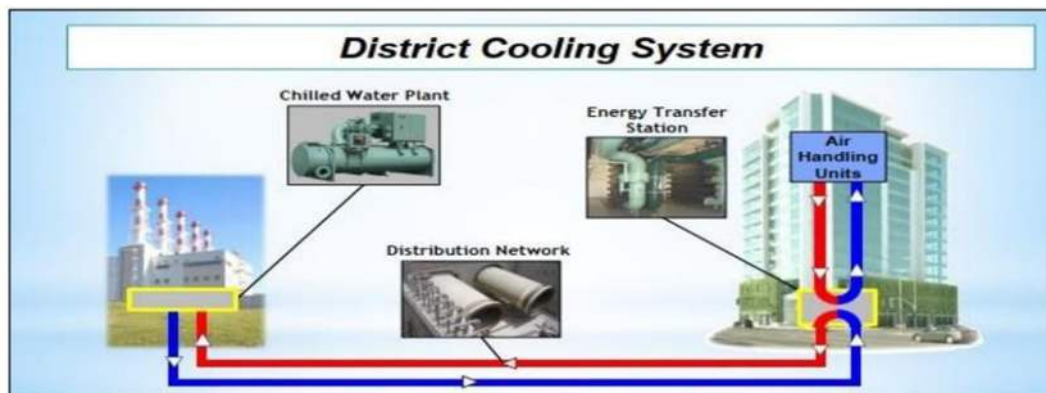


Figure 8: Key components of a typical district cooling system
(source: fujita-ec.com)

Feasibility of DCS in KGMU:

Although DCS is being used in various infrastructure projects but these are new projects. KGMU is an old installation and the Air Conditioning system is already in place. Considering this DCS may not be useful for the hospital.

Aruna
Registrar
King George Medical University
Lucknow

Carbon Footprint and Sustainability Practices of the KGMU

A carbon footprint is a total greenhouse gas (GHG) emissions caused directly and indirectly by a person, organisation, event or product and is expressed as a Carbon Dioxide equivalent(CO₂-e).

The KGMU is highly conscious regarding the energy consumption within the campus. This is testimony to the fact that it has executed a number of energy efficiency as well as renewable energy projects to reduce the energy consumption as well as dependency on the fossil fuel based energy sources.

Some of the energy conservation and renewable energy measures as were executed: -

- The management replaces regular 250 W sodium lights with 120 W LED lights. Around 600 such LED lights installed for the indoor areas of the hospital, replacing the old 150 lights and addition of remaining 450 new lights. The team also replaces 12 High-mast lights of 850 W with those of 250 W lights, in the outdoor areas.
- installation of APFC panels for Power Factor improvement and thereby KVAh Consumption reduction
- use of Concentrated Solar Thermal system to provide steam for the cooking in lieu of LPG
- installation of Rooftop Solar PV power plants of 1370 kW

besides the above measures, the Hospital is also undertaking waste management and plantation activities.

The carbon footprint of the hospital is as below based on the present energy consumption :-

Items	Units / Yr	Quantity	Emission Factor	kg of CO ₂ e
Electricity Consumption	kWh	26282700	0.85	22340295
Petrol	Litres	0	2.296	0
Diesel	Litres	40610	2.653	107738.33
LPG	kg	168891	2.983	503801.853
Carbon Footprint(t CO ₂ e)	22951.83518			
Carbon emission Per sqm	0.229518352			
Carbon Emission per bed	5.100407818			

There should be a regular effort to further improve on the carbon footprint as mentioned above. This is possible by undertaking various energy conservation and renewable energy measures as mentioned in various chapters in this report. Besides taking such measures, the hospital also need to undertake a regular maintenance of the already installed systems in operation for its best result expected.

Aruna
Registrar
King George Medical University
Lucknow

Standard operating practices for efficient use of energy at KGMU.

Hospitals usually function 24 hrs per day all year round. It usually consists of large buildings and need to control the internal climate .

As per CMIE Prowess database Energy expenses in Hospitals is around 3-8 % of the total expenses ; 15-20% of the Hospital O&M expenses. So, Energy Efficiency is very important and this justifies the importance of having a Standard Operating Practices (SOP) for efficient usages of energy. The below steps can be followed in this regard:-

1. Need to find out energy consumption quantity (Electricity, Solar, DG, LPG) to find out different form of Energy Consumption
2. Energy saving approaches – to be undertaken wherever possible like
 - a. Switching off
 - b. Maintenance
 - c. Refurbishment
3. Thermal insulation to be checked on regular basis
4. Ventilation to be maintained as per the national building code , 2005
5. Lighting -sunshades and blinds are to be fitted on the affected windows
6. Benchmarking indicators are important and annual energy consumption per sq m of the campus area or annual energy consumption per inpatient bed in the hospital to be followed and there should be continuous effort to better the benchmark figs.
7. Energy Efficiency Opportunity
 - a. Space cooling and heating
 - i. Eliminating energy waste without compromising patient’s comfort
 - ii. Check Controls
 1. Thermostat is located where sunlight, draughts, radiators or equipment affect the reading
 2. Thermostat being set to minimum level
 3. It is important to ensure that the time settings are reviewed every month or so to check that they are correct

Try to keep external doors open only when absolutely necessary; during summer months open door allows cooled conditioned air to escape and hot air to enter. The thermostat then senses a temperature decrease and automatically switches on cooling which may be unnecessary. The same happens with heated air in winter months. Ac Curtains or Air Cutters are to be used where it is non existing and are to be made functional where it is installed. Where possible 02 sets of doors are also useful.

- iii. Keep systems clear and unobstructed

Need to make sure that the conditioned air is not obstructed by furniture or equipment and also keep filters clean. This ensures better circulation of air into the space and reduces the energy required to meet the cooling and heating demand.

iv. Need to take advantage of natural ventilation , it may be possible to use windows and doors to provide good level of natural ventilation in some areas within a Hospital ; allowing mechanical ventilation to be switched off or turned down to save energy

v. Maintain system components

Energy consumption in HVAC systems may increase substantially if regular maintenance is not undertaken . Dirty or faulty fans, air filters, air ducts and components directly affects system efficiency, running costs and risk of breakdowns. The performance of the whole system should be reviewed annually ; better to engage a maintenance specialist . In general, a chiller loses 2% of the refrigerant charge per annum. With better maintenance, usage of refrigerant leaks can be stopped.

vi. BLDC Fans can be used with fixed rpm for maximum energy savings ; improved fans energy consumption will be around 30 W per fan in lieu of 70-80 W per fan (Fiber body) and 100 W(Metallic Body) of the traditional fans . Traditional fans use Induction motors but improved fans use Brushless DC Motor (BLDC Motor) the later generate same or more air delivery with less energy consumption. The Hospital is using around 10000 traditional fans. A small percentage are BEE star rated; except those fans all are candidate for replacement which should happen phase-wise.

vii. Building Energy Management System may be used for better control of the energy consumption parameters where possible

8. Water saving Devices and practices are to be followed

9. Lighting

a. There should be Switch Off Policy based on the urgency of usages

b. Switching in parallel is another concept needs to be followed for Day lighting and Wire Lighting usage together

c. Occupancy Sensors are to be used in appropriate places like bathroom lights, corridor lights, ventilation fans

10. Office and small power electrical equipment are to be turned off when not in use

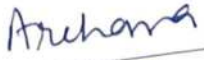
11. Renewable energy and clean energy options are to be used in kitchens

12. Laundry is an extremely energy intensive area; solar hot water/steam usages and other energy efficiency measures are to be incorporated based on possibilities

13. Sterilization and Disinfection, Renewable Energy can be used wherever possible

14. An Energy Manager is to be nominated within the Hospital for leading all the initiatives

15. Energy Management Program is to be defined, agreed internally and followed


Registrar
King George Medical University
Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

Action taken report on energy audit 2015 and 2022

S. No.	Recommendations of energy audit	Action taken
1.	To increase the number of solar panels in University campus	1. UPNEDA has been nominated as nodal agency for installation of new solar panels. 2. Installation of 201.82 kWp capacity solar panel installation is in progress. 3. Utilization of solar energy through solar parabolas for steam generation for preparing food in central kitchen.
2.	To ensure proper maintenance of solar installations, so that full capacity of solar panels can be utilized.	Maintenance will be outsourced on Capex model for 1370 KW capacity solar panel. The bid process has been started and will be finalized soon.
3.	To evaluate methods to fully utilize the steam generated from solar parabola.	Evaluation has been done and its found to be cost ineffective to further elaborate the utilization of solar parabolas.
4.	To timely replace the PVC fill and insulation of air conditioning system installed in the campus.	Bid process is undergoing for the same.
5.	To ensure 5 star ERR of air conditions, fans and lights.	Orders issued and complied to include only 5 star ERR equipment in all tenders.
6.	To install heat reflective coating/ white ceramic coating in all buildings.	In process
7.	To install occupancy sensor to conserve electricity.	Installation of occupancy sensor in board room is under process.
8.	To recalculate the electric load of entire campus, so that penalty can be avoided on overload.	Process is going on to increase the electric load of KGMU.
9.	To install energy expenditure monitoring system in the campus.	KGMU engineers and Ms Schneider had evaluated the electrical load had financial approval is awaited for the same.
10.	To repair and maintain APFC panel for power factor	Bid process is undergoing
11.	To nominate Energy Manager in KGMU.	Dr Manish Mannar, Additional Professor and Environment Engineer has been appointed as Energy Manager.

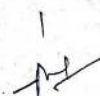

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Dept.
KGMU, UP, Lucknow

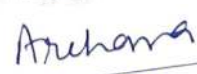

Registrar
King George Medical University
Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

S.No.		
1.	Approximate amount of electricity generated by solar panels (Monthly average)	127990 Units Approx.
2.	Photo of wheeling to Grid.	Photographs enclosed
3.	Sensor Based Energy Conservation	Installation of occupancy sensor is in process.
4.	Numbers of New LED Installation in last 3 years	2000 Approx.
5.	EER certificate orders and tender document showing purchase of such instruments.	enclosed


Junior Engineer (Electric)
King George's Medical University, U.P.
LUCKNOW.


Registrar
King George Medical University
Lucknow


(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

(ATR Compliance no.5- 5 star rating)

Contract अनुबंध						
Contract No अनुबंध क्रमांक: GEMC-511687740889863 Generated Date अनुबंध तिथि: 09-Aug-2023 Bid/RA/PBP No. बोली/आवृत्ति/पीबीपी संख्या: GEM/2023/B/3687542						
Organisation Details संगठन विवरण Type प्रकार: State Autonomous Ministry विभाग: Medical Education Department Uttar Pradesh Department विभाग: N/A Organisation Name संगठन का नाम: Lucknow Office Zone कार्यालय क्षेत्र: Lucknow	Buyer Details खरीदार विवरण Designation पद: Junior Engineer Electric Department Contact No. संपर्क नंबर: 0522-2258880- Email ID ईमेल आईडी: buycon116.medup.up@gembuyer.in GSTIN जीएसटीआईएन: - Address पता: King George Medical University, Shahmina Road, Chowk, Lucknow, LUCKNOW, UTTAR PRADESH-226003, India					
Financial Approval Detail वित्तीय स्वीकृति विवरण JFD Concurrence आईएफडी सहमति: No Designation of Administrative Approval Vice Chancellor Designation of Financial Approval Finance Officer वित्तीय अनुमोदन का पदनाम: -	Paying Authority Details भुगतान प्राधिकरण विवरण Role: PAO Payment Mode भुगतान का तरीका: Internet Banking Designation पद: FO Email ID ईमेल आईडी: vinal.77354@gov.in GSTIN जीएसटीआईएन: N Address पता: King George Medical University, Shahmina Road, Chowk, Lucknow, LUCKNOW, UTTAR PRADESH-226003, India					
Seller Details विक्रेता विवरण GEM Seller ID जीएम विक्रेता आईडी: 22C1180000519481 Company Name कंपनी का नाम: MDA YASH ENTERPRISES Contact No. संपर्क नंबर: 09140386646 Email ID ईमेल आईडी: mda.yash.ent@gmail.com Address पता: C-2119/3, INDIRA NAGAR, Lucknow, 09, Lucknow, UTTAR PRADESH-226016, - MSME Registration number एमएसएमई पंजीकरण संख्या: 09CFHP50787Q12D GSTIN जीएसटीआईएन: -						
*GST / Tax invoice to be raised in the name of जिसके नाम के पक्ष में GST/TAX इनवॉइस पेश किया जाएगा - Buyer						
Delivery Instructions वितरण निर्देश: NA						
Product Details उत्पाद विवरण						
#	Item Description आइटम विवरण	Ordered Quantity आइटम की मात्रा	Unit इकाई	Unit Price (INR) इकाई मूल्य (INR)	Tax Bifurcation (INR) कर विभाजन (INR)	Price (Inclusive of all Duties and Taxes in INR) मूल्य (INR में सभी शुल्क और कर सहित)
1	Product Name उत्पाद का नाम: Supply And Installation Of Split Type Air Conditioner 1.5 Ton 5 Star Rated Brand ब्रांड: Supply Installation Of Split AC 1.5 Ton 5 Brand Type ब्रांड प्रकार: Unbranded Catalogue Status कैटलॉग की स्थिति: Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है: Reseller not verified by OEM Category Name & Quadrant कैटीगरी का नाम और चतुर्धातु: Supply And Installation Of Split Type Air Conditioner 1.5 Ton 5 Star Rated (Q3) Model मॉडल: Supply And Installation Of Split Type Air Conditioner HSN Code एचएसएन कोड: HSN not specified by seller	2	pieces	51,233	NA	102,466
2	Product Name उत्पाद का नाम: Supply And Fixing Of Split Type Air Conditioner 2 Ton 5 Star Rated Brand ब्रांड: Split Type Air Conditioner 2 Ton 5 STAR Brand Type ब्रांड प्रकार: Unbranded Catalogue Status कैटलॉग की स्थिति: Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है: Reseller not verified by OEM Category Name & Quadrant कैटीगरी का नाम और चतुर्धातु: Supply And Fixing Of Split Type Air Conditioner 2 Ton 5 Star Rated (Q3) Model मॉडल: Supply And Fixing Of Split Type Air Conditioner 2 HSN Code एचएसएन कोड: HSN not specified by seller	6	pieces	57,419	NA	344,514
3	Product Name उत्पाद का नाम: Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer 150-270V Brand ब्रांड: Supply Fixing 5 KVA Automatic Voltage Stabilizer Brand Type ब्रांड प्रकार: Unbranded Catalogue Status कैटलॉग की स्थिति: Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है: Reseller not verified by OEM	8	pieces	7,425	NA	59,400

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

Registrar
King George Medical University
Lucknow



Minutes of matting of UPNEDA regarding solar parabola

(ATR Compliance no.1)

कार्यवृत्त

कुलसचिव महोदया के कार्यालय ज्ञाप संख्या 216/जी0ए0 अनुभाग/2024 दिनांक 04.10.2024 का संदर्भ ग्रहण करने का कष्ट करें, जिसके माध्यम से चिकित्सा विश्वविद्यालय में भर्ती सभी मरीजों के भोजन हेतु स्टीम तैयार करने के लिए यूपीनेडा द्वारा शताब्दी चिकित्सालय फेज-2 के rooftop पर सोलर स्टीम कुकिंग संयंत्र की स्थापना वर्ष 2016 में की गयी है इस संयंत्र की सी0ए0एम0सी0 प्रक्रिया हेतु निविदा किया जाना शीघ्रातिशीघ्र आवश्यक है इस संदर्भ में मा0 कुलपति महोदया के अनुमोदनोपरान्त Scope of work, terms and conditions and BOQ गठित कमेटी से तैयार कराने हेतु दिनांक 10.10.2024 समय अपराह्न 02:00 बजे अधिशासी अभियन्ता(विद्युत/यांत्रिक) के कक्ष में निम्नवत् सदस्यों की बैठक आहूत की गयी:-

1. कुलसचिव/नामित सदस्य, किंग जार्ज चिकित्सा विश्वविद्यालय उ0प्र0, लखनऊ। सदस्य
2. वित्त अधिकारी/नामित सदस्य, किंग जार्ज चिकित्सा विश्वविद्यालय उ0प्र0, लखनऊ। सदस्य
3. विभागाध्यक्ष, विश्वविद्यालय पर्यावरण विभाग, किंग जार्ज चिकित्सा विश्वविद्यालय उ0प्र0, लखनऊ। सदस्य
4. डॉ0 मनीष कुमार मनार, एस0पी0एम0 विभाग, किंग जार्ज चिकित्सा विश्वविद्यालय उ0प्र0, लखनऊ। सदस्य
5. श्री अजय कुमार, वरिष्ठ परियोजना अधिकारी-2, यूपीनेडा, विभूति खण्ड गोमतीनगर, लखनऊ। सदस्य
6. अधीक्षण अभियन्ता, निर्माण विभाग(सिविल), किंग जार्ज चिकित्सा विश्वविद्यालय उ0प्र0, लखनऊ। सदस्य
7. अधिशासी अभियन्ता(विद्युत/यांत्रिक), किंग जार्ज चिकित्सा विश्वविद्यालय उ0प्र0, लखनऊ। संयोजक

उपरोक्त बैठक में निम्नलिखित निर्णय लिया गया है:-

1. सम्बन्धित बैठक में यह निर्णय लिया गया है कि किंग जार्ज चिकित्सा विश्वविद्यालय के शताब्दी चिकित्सालय फेज-2 में स्थापित rooftop सोलर स्टीम कुकिंग संयंत्र को पूर्ण दक्षता/क्षमता के साथ क्रियाशील कराया जाये, तदोपरान्त सी0ए0एम0सी0 से सम्बन्धित कार्यवाही किया जाना उचित होगा।
2. इस सम्बन्ध में श्री अजय कुमार वरिष्ठ परियोजना अधिकारी-2, यूपीनेडा द्वारा सोलर स्टीम कुकिंग संयंत्र को स्थापित करने वाली फर्म M/S Taylormade Solar Solutions Pvt Ltd, 705, Shapath-II, Opp Rajpath Club, S.G Road, Bodakdev, Ahmedabad-380015. Gujarat, India के प्रतिनिधि से दूरभाष के माध्यम से वार्ता की गयी, परन्तु M/S Taylormade Solar Solutions Pvt Ltd के प्रतिनिधि द्वारा संयंत्र को क्रियाशील करने से इन्कार कर दिया है।
3. बैठक में समिति के सदस्यों द्वारा यह निर्णय लिया गया है कि श्री अजय कुमार, वरिष्ठ परियोजना अधिकारी-2, यूपीनेडा द्वारा सोलर स्टीम कुकिंग संयंत्र को पूर्ण दक्षता/क्षमता के साथ क्रियाशील किये जायें हेतु M/S Taylormade Solar Solutions Pvt Ltd से समन्वय स्थापित करते हुए आगे की कार्यवाही से अवगत करायेगे।

कुलसचिव/नामित सदस्य,
के0जी0एम0सी0 उ0प्र0,
लखनऊ।

वित्त अधिकारी/नामित सदस्य
के0जी0एम0सी0 उ0प्र0,
लखनऊ।

विभागाध्यक्ष, विश्वविद्यालय पर्यावरण विभाग
के0जी0एम0सी0 उ0प्र0,
लखनऊ।

डॉ0 मनीष कुमार मनार, एस0पी0एम0 विभाग,
के0जी0एम0सी0 उ0प्र0,
लखनऊ।

श्री अजय कुमार, वरिष्ठ परियोजना अधिकारी-2
यूपीनेडा, विभूति खण्ड, गोमती नगर,
लखनऊ।

अधीक्षण अभियन्ता, निर्माण विभाग(सिविल)
के0जी0एम0सी0 उ0प्र0
लखनऊ।

अधिशासी अभियन्ता(विद्युत/यांत्रिक)
के0जी0एम0सी0 उ0प्र0
लखनऊ।

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

Registrar
King George Medical University
Lucknow



ATR Compliance no.2

Installation of New Solar Panels

(ATR Compliance no.3)



किंग जार्ज चिकित्सा विश्वविद्यालय
(विद्युत/यांत्रिक) विभाग,
गांधी स्मारक एवं सम्बद्ध चिकित्सालय,
उ०प्र०, लखनऊ-226003

पत्रांक.....ई०ई०(ई०/एम०)/25 दिनांक...../...../2025

सेवा में,
कुलसचिव,
किंग जार्ज चिकित्सा विश्वविद्यालय,
उ०प्र०, लखनऊ।

महोदया,

कृपया कार्यालय पत्रांक 339/जी०ए० अनुभाग/2025 दिनांक 05.04.2025 का संदर्भ ग्रहण करने का कष्ट करें, जिसके माध्यम से (हेड) नैक, क्राइटेरिया 7 के०जी०एम०यू०, यू०पी०, लखनऊ के पत्र संख्या VED/145/25 दिनांक 04.04.2025 के द्वारा NAAC Criteria 7 के अन्तर्गत बिन्दु संख्या-1 के क्रम में चिकित्सा विश्वविद्यालय में वर्तमान में जिन बिल्डिंगों पर सोलर सिस्टम लगाया जाना सम्भव है, उनकी गणना की जानकारी चाही गयी है।

बिन्दु संख्या-1 के क्रम में अवगत कराना है कि वर्तमान में किंग जार्ज चिकित्सा विश्वविद्यालय निम्नलिखित भवनों/विभागों की छत पर सोलर सिस्टम लगाया जा सकता है:-

S.No	Building/Roof Name	Latitude	Longitude	Energy Location	Meter	No. of roof	Storey	Est. Solar Capacity(kWp)
1.	Pharmacology 1, 2	26.8665	80.9122	Panel Room		02	1,2	30.49
2.	Pharmacology 3	26.8665	80.9122	Panel Room		02	3	34.50
3.	Jagat Narayan Type 5	26.8642	80.9138	Panel Room		01	10	35.65
4.	Transist Nurses	26.8657	80.9233	Panel Room		01	11	45.43
5.	Nehru Hostel	26.8703	80.9152	Panel Room		02	4,5	55.75
Total(kWp)								201.82

सधन्यवाद।

भवदीय

अधिकासी अभियंता(विद्युत/यांत्रिक)
किंग जार्ज चिकित्सा विश्वविद्यालय

संख्या.....21861.....ई०ई०(ई०/एम०)/25 दिनांक.....08/04/25

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित:-

- (हेड) नैक, क्राइटेरिया 7, के०जी०एम०यू०, उ०प्र०, लखनऊ।
- मा० कुलपति जी के सहायक निजी सचिव को मा० कुलपति जी के अवलोकनार्थ प्रेषित।

अधिकासी अभियंता(विद्युत/यांत्रिक)

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

Registrar
King George Medical University
Lucknow



(ATR Compliance no 4)

N-3



King George's Medical University U.P., Lucknow.

Electric Department
NOTES AND ORDER

(37418-04/3/23)

कुलसचिव महो,

अवगत कराना है कि आप चिकित्सालय फेज-1 व 2 में स्थापित fillings के सम्बन्ध में मोंगी गयी वॉच

1. उपरोक्त भवनों में स्थापित वातानुकूलन संयंत्रों के सीओएओसीओ कार्य की श्रेणी से पृथक है। न्यू ओपीओडीओ भवन व न्यू डेन्टल भवन के अनुबन्ध के पृष्ठ सं- 5 पर अंकित Exclusions के बिन्दु-5 में उल्लेखित है। सुलभ सन्दर्भ हेतु अनुबन्ध की छायाप्रति संलग्न है। इमरजेंसी काम्प्लेक्स एवं दामा सेंटर के चतुर्थ एवं पंचम तल, शताब्दी चिकित्सालय फेज-1 व 2 का ड्राफ्ट अनुबन्ध अनुमोदित हो गया है तथा स्वीकृत ड्राफ्ट के पृष्ठ सं- 5 पर अंकित Exclusions के बिन्दु-5 में उल्लेखित है।

2. उपरोक्त भवनों में स्थापित वातानुकूलन संयंत्रों के सीओएओसीओ कार्य की श्रेणी से पृथक है। न्यू ओपीओडीओ भवन व न्यू डेन्टल भवन के अनुबन्ध के पृष्ठ सं- 5 पर अंकित Exclusions के बिन्दु-5 में उल्लेखित है। सुलभ सन्दर्भ हेतु अनुबन्ध की छायाप्रति संलग्न है। इमरजेंसी काम्प्लेक्स एवं दामा सेंटर के चतुर्थ एवं पंचम तल, शताब्दी चिकित्सालय फेज-1 व 2 का ड्राफ्ट अनुबन्ध अनुमोदित हो गया है तथा स्वीकृत ड्राफ्ट के पृष्ठ सं- 5 पर अंकित Exclusions के बिन्दु-5 में उल्लेखित है।

अतः संस्था व मरीजों के हित में उपरोक्त कार्य कराये जाने हेतु पृथक-पृथक भवनों की प्रशासकीय व वित्तीय स्वीकृति प्रदान करते हुए निविदा/जेम निविदा प्रक्रिया द्वारा कार्य कराये जाने की अनुमति प्रदान करना चाहें अथवा अन्य कोई अन्य दिशा निर्देश देना चाहें।

आदेशार्थ प्रस्तुत।

एस० पी० पाण्डेय
अवर अभियन्ता (वि०)
के०जी०एम०यू०, लखनऊ

विरेंद्र कुमार शर्मा
सहायक अभियन्ता (वि०/पा०)
के०जी०एम०यू०, लखनऊ

अभिषेक शर्मा
सहायक अभियन्ता (वि०/पा०)
के०जी०एम०यू०, लखनऊ

कुलसचिव,
EE (E/M) का कार्यालय द्वारा अवगत कराया गया है कि संकाय
नॉन CMC की श्रेणी से पृथक है। अतः अग्रिम होगा कि 'K' का लम्बा
(03) तीनों पुराने की पुरानी चिकित्सालय फेज-1 व 2 के बाहरी
से करा जाये, ताकि आगामी मरीजों को से करा जा सके।
तुम्हारे पुराने पुराने स्वीकृत लम्बा दिया जाना अग्रिम अग्रिम है।

Archana
Registrar
King George Medical University
Lucknow

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

Scanned with OKEN Scanner



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

(ATR Compliance no 5- 5 star rating)

किंग जार्ज चिकित्सा विश्वविद्यालय उ०प्र०, लखनऊ-226003
कार्यालय अधिशासी अभियंता (विद्युत/यॉत्रिक)

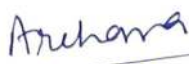
Bill of Quantity

Name of work: - S.I.T.C. of Split type A.C. 1.5 Ton for Bhabhatron 03 Nos., Theratron 03 Nos. & Conventional Simulator 02 Nos. at Department of Radiotherapy KGMU, Lucknow.

Sl. No.	Particulars of Work	Qty.	Rate	Amount in Rs.
1	Supply and Installation of Split type Air conditioner 1.5 Ton, 5 star rated Approved make like Voltas/LG/Hitachi/ equivalent make. (For Bhabhatron (03 Nos.), Theratron (03 Nos.) & (Conventional Simulator 02 Nos.)	08 Nos.		
2	Supply and fixing of 5 KVA Automatic voltage stabilizer 150-270V. Vguard & equivalent make.	08 Nos.		
3	Supply and fixing of Outdoor stand for 1.5 Ton split A.C.	08 Nos.		
4	Supply and laying of flexible copper wire lead 80/20.	30 Mtrs.		
5	Supply and fixing of 25Amp AC plug top.	08 Nos.		
6	Supply and fixing of extra copper pipe with tubular insulation complete in all respect.	26 Mtrs.		
7	Supply and lying of PVC Threaded drain pipe.	40 Mtrs.		
			Total	


Junior Engineer (Electrical)
K.G.M.U. U.P., Lucknow.


Executive Engineer (E./M)
K.G.M.U. U.P., Lucknow.


Registrar
King George Medical University
Lucknow


(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

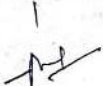


(ATR Compliance no 6)

Heat reflective Coating MR Dinesh Raj

(ATR Compliance no 7)

S.No.		
1.	Approximate amount of electricity generated by solar panels (Monthly average)	127990 Units Approx.
2.	Photo of wheeling to Grid.	Photographs enclosed
3.	Sensor Based Energy Conservation	Installation of occupancy sensor is in process.
4.	Numbers of New LED Installation in last 3 years	2000 Approx.
5.	EER certificate orders and tender document showing purchase of such instruments.	enclosed


Junior Engineer (Electric)
King George's Medical University, U.P.
LUCKNOW.


(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow


Registrar
King George Medical University
Lucknow



ATR Compliance no.8



King George's Medical University U.P., Lucknow.
Electric Department
NOTES AND ORDER

277HEL(GW) 2022
20/12/2022

विभागाध्यक्ष, पर्यावरण विभाग/कुलसचिव/वित्त अधिकारी/मा० कुलपति जी,

वि०वि०वि० की ऊजा आडिट रिपोर्ट 2022 के निष्कर्षों एवं वर्तमान देयकों से प्राप्त, ऐसे संयोजन जहाँ पर पावर फैक्टर 0.9 से कम हैं एवं स्थापित APFC पैनल अकियाशील तथा समुचित रूप से संयोजित नहीं हैं जिसपर वर्तमान भार संयोजनों पर PF कम होने के कारण KVAH (Reactive Energy) अधिक खपत हो रही है जो पूर्णतया अनावश्यक है। वर्तमान में स्थापित APFC पैनलों की मरम्मत एवं रिले, कैपिटिव बैंक, स्विच एवं अन्य उपकरण आदि को बदलने एवं आवश्यक रेटिंग के अनुसार Recalibration प्राविधानित कर उक्त संयोजनों पर पावर फैक्टर उच्चिकृत कर Reactive Energy (KVAH) ऊर्जा को कम किया जा सकता है। जिससे बहुमूल्य संसाधनों की बचत की जा सकती है, साथ ही कार्बन फुट प्रिंट भी कम किया जा सकता है। विषयक कार्य कराये जाने से विद्युत ऊर्जा मद में लगभग 20 लाख रुपये की बचत किया जाना सम्भव होगा। अतः इस कार्य को कारया जाना आवश्यक है।

कार्य को कराया जाना आवश्यक है।
 उक्त ऊर्जा ऑडिट रिपोर्ट 2022 के निष्कर्षों के अनुपालन में (प्रथम चरण में 06 संयोजनों) कार्य करवाने सम्बन्धी आगणन तैयार किया गया है जिसमें प्रस्तावित लागत ₹0 2,60,048 /- जीएसटी0 सहित व्यय होना प्रस्तावित है। आगणन में ली गयी दरें न्यूनतम प्रतिस्पर्धी मूल्यों पर आधारित हैं। बैंक आगणन रूपया एक लाख से अधिक एवं दस लाख से कम है। अतः उक्त कार्य कराये जाने की प्रशासकीय व वित्तीय स्वीकृति प्रदान करते हुए अल्पकालीन निविदा प्रक्रिया किए जाने की अनुमति प्रदान करना चाहें।

स्वीकृतार्थ एवं अनुमोदनार्थ सादर प्रेषित ।

संलग्नक— उपरोक्तानुसार ।

एस० पी० पाण्डेय
अवर अधिवक्ता (वि०)
छ०जी०एस०यू०, लखनऊ

विरेन्द्र कुमार यादव
सहायक अभियन्ता (चि०/यां०)
के०जी०एम०यू०, लखनऊ

(डी० डी० सिंह)
अध्यापक अभियन्ता (वि०/वी)
के०जी० पिकित्ता विश्वविद्यालय उ०प्र०
लखनऊ

(Head)

University Environment

Recommended for
approval of Rs 960048/-

I/CHASee
Form 9

2779
211222

19/12/22

21/12/22

Archana
Registrar
King George Medical University
Lucknow

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



ATR Compliance no.10

ATR Compliance no.11



किंग जॉर्ज चिकित्सा विश्वविद्यालय उ०प्र०, लखनऊ-226003

फोन : 91-0522-2258365 फैक्स : 91-0522-2257539 वेबसाईट: www.kgmcindia.edu

पत्रांक संख्या: 1290 / जी०एम० अनुभाग/2023 दिनांक:- 20/09/23

कार्यालय आदेश

मा० कुलपति जी द्वारा निर्गत निर्देश/अनुमोदन के क्रम में पूर्व में निर्गत कार्यालय आदेश संख्या: 20/जी०एम० अनुभाग/2023 दिनांक 10.04.2023 को अतिक्रमित करते हुए डा० अमीय अग्रवाल, ओरल मैक्सोफेसिएल सर्जरी विभाग के स्थान पर डा० मनीष कुमार मनार, एस०पी०एम० विभाग, के०जी०एम०यू०, लखनऊ को विद्युत/यांत्रिक विभाग से आने वाली कोटेशन/आगमन/निविदा/ए०एम०सी०/सी०एम०सी० आदि से सम्बन्धित पत्रावलियों तथा कार्य की समीक्षा हेतु विद्युत/यांत्रिक विभाग का फैकल्टी ईंचार्ज नियुक्त किया जाता है।

(रिखा एस० चौहान)
कुलसचिव

पृष्ठांकन संख्या: 6641 / जी०एम० अनुभाग/ 2023 तद्दिनांक

प्रतिलिपि: निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित-

1. वित्त अधिकारी, के०जी०एम०यू०, उ०प्र०, लखनऊ।
2. अधिष्ठाता (चिकित्सा संकाय, दंत संकाय, पैरामेडिकल, नर्सिंग, क्वालिटी एण्ड कंट्रोल, छात्र कल्याण), केजीएमयू, लखनऊ।
3. समस्त विभागाध्यक्ष, चिकित्सा/दंत संकाय, के०जी०एम०यू०, लखनऊ।
4. मुख्य चिकित्सा अधीक्षक, जी०एम० एण्ड ए०एच०, के०जी०एम०यू०, लखनऊ।
5. चिकित्सा अधीक्षक, जी०एम० एण्ड ए०एच०, के०जी०एम०यू०, लखनऊ।
6. कुलानुशासक, के०जी०एम०यू०, लखनऊ।
7. मुख्य चिकित्सा अधीक्षक, ट्रामा सेन्टर, के०जी०एम०यू०, लखनऊ।
8. चिकित्सा अधीक्षक, प्रसूति एवं स्त्री रोग विभाग/आर०ए०एल०सी० परिसर, के०जी०एम०यू०, लखनऊ।
9. परीक्षा नियंत्रक, के०जी०एम०यू०, लखनऊ।
10. समस्त प्रवोस्ट, समस्त छात्रावास, के०जी०एम०यू०, लखनऊ।
11. समस्त फैकल्टी ईंचार्ज, के०जी०एम०यू०, लखनऊ।
12. डा० मनीष कुमार मनार, एस०पी०एम० विभाग, के०जी०एम०यू०, लखनऊ।
13. समस्त अधिशासी अभियन्ता, निर्माण विभाग, के०जी०एम०यू०, लखनऊ।
14. डा० अमीय अग्रवाल, ओरल मैक्सोफेसिएल सर्जरी विभाग, के०जी०एम०यू०, लखनऊ।
15. अधिशासी अभियन्ता (वि/यां), के०जी०एम०यू०, लखनऊ को इस निर्देश के साथ प्रेषित कि विद्युत/यांत्रिक विभाग से निकलने वाली कोटेशन/आगमन/निविदा/ए०एम०सी०/सी०एम०सी० आदि से सम्बन्धित पत्रावलियों तथा कार्य की समीक्षा डा० मनीष कुमार मनार, एस०पी०एम० विभाग से कराने के उपरान्त ही प्रस्ताव वित्तीय एवं प्रशासनिक स्वीकृति हेतु कार्यालय में प्रेषित करें।
16. समस्त अनुभाग प्रभारी, कुलसचिव कार्यालय, के०जी०एम०यू०, लखनऊ।
17. मा० कुलपति जी के निजी सचिव को मा० कुलपति जी के अवलोकनार्थ।
18. आदेश पत्रावली।
19. नोटिस बोर्ड।

(रिखा एस० चौहान)
कुलसचिव

Archan
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

Product Name & Quadrant बेसी का नाम और चतुर्थांश : Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer (Q3) Model मॉडल : Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer HSN Code एचएसएन कोड : HSN not specified by seller					
Product Name उत्पाद का नाम : Supply And Fixing Of Outdoor Stand For 1.5 Ton Split AC Brand ब्रांड : Supply Outdoor Stand For 1.5 Ton Split AC Brand Type ब्रांड प्रकार : Unbranded Catalogue Status कैटलॉग की स्थिति : Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है : Reseller not verified by OEM Category Name & Quadrant बेसी का नाम और चतुर्थांश : Supply And Fixing Of Outdoor Stand For 1.5 Ton Split AC (Q3) Model मॉडल : Supply And Fixing Of Outdoor Stand For 1.5 Ton Split AC HSN Code एचएसएन कोड : HSN not specified by seller					
5	8	pieces	1,752	NA	14,016
Product Name उत्पाद का नाम : Supply And Fixing Of Extra Copper Pipe With Tubular Insulation Complete In All Respect Brand ब्रांड : extra copper pipe with tubular insulation Brand Type ब्रांड प्रकार : Unbranded Catalogue Status कैटलॉग की स्थिति : Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है : Reseller not verified by OEM Category Name & Quadrant बेसी का नाम और चतुर्थांश : Supply And Fixing Of Extra Copper Pipe With Tubular Insulation Complete In All Respect (Q3) Model मॉडल : Supply And Fixing Of Extra Copper Pipe With Tubular Insulation Complete In All Respect (Q3) HSN Code एचएसएन कोड : HSN not specified by seller					
6	10	pieces	304	NA	3,040
Product Name उत्पाद का नाम : Supply And Lying Of Flexible Copper Wire Lead 80/20 Brand ब्रांड : Supply And Lying Of Flexible Copper Wire Lead Brand Type ब्रांड प्रकार : Unbranded Catalogue Status कैटलॉग की स्थिति : Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है : Reseller not verified by OEM Category Name & Quadrant बेसी का नाम और चतुर्थांश : Supply And Lying Of Flexible Copper Wire Lead 80/20 (Q3) Model मॉडल : Supply And Lying Of Flexible Copper Wire Lead 80/20 (Q3) HSN Code एचएसएन कोड : HSN not specified by seller					
7	135	meter	193	NA	26,055
Product Name उत्पाद का नाम : S/F Of 63 Amp DP MCB Brand ब्रांड : S/F Of 63 Amp DP MCB Brand Type ब्रांड प्रकार : Unbranded Catalogue Status कैटलॉग की स्थिति : Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है : Reseller not verified by OEM Category Name & Quadrant बेसी का नाम और चतुर्थांश : S/F Of 63 Amp DP MCB (Q3) Model मॉडल : S/F Of 63 Amp DP MCB HSN Code एचएसएन कोड : HSN not specified by seller					
8	1	pieces	1,378	NA	1,378
Product Name उत्पाद का नाम : Supply And Lying Of PVC Threaded Drain Pipe Brand ब्रांड : Supply And Lying Of PVC Threaded Drain Pipe Brand Type ब्रांड प्रकार : Unbranded Catalogue Status कैटलॉग की स्थिति : Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है : Reseller not verified by OEM Category Name & Quadrant बेसी का नाम और चतुर्थांश : Supply And Lying Of PVC Threaded Drain Pipe (Q3) Model मॉडल : Supply And Lying Of PVC Threaded Drain Pipe HSN Code एचएसएन कोड : HSN not specified by seller					
9	17	meter	129	NA	2,193
Product Name उत्पाद का नाम : S/F Of 12 Way SPN DB Brand ब्रांड : S/F Of 12 Way SPN DB Brand Type ब्रांड प्रकार : Unbranded Catalogue Status कैटलॉग की स्थिति : Catalogue not verified by OEM Selling As कैसे बेचा जा रहा है : Reseller not verified by OEM Category Name & Quadrant बेसी का नाम और चतुर्थांश : S/F Of 12 Way SPN DB (Q3) Model मॉडल : S/F Of 12 Way SPN DB HSN Code एचएसएन कोड : HSN not specified by seller					
10	1	pieces	2,628	NA	2,628
Total Order Value कुल ऑर्डर मूल्य (in INR)					709,065
Consignee Detail पर्यवेक्षी विवरण					
S.No क्र.सं.	Consignee पर्यवेक्षी	Item वस्तु	Lot No. लॉट नंबर	Quantity मात्रा	Delivery Start After दिनांक के बाद डिलीवरी शुरू Delivery To Be Completed By वितरण पूरा कर

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

Arshana
Registrar
King George Medical University
Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

Designation पद : Email ID ईमेल आईडी : buycon116.medup.up@gembuyer.in Contact संपर्क : 0522-2258880- GSTIN जीएसटीआईएन : Address पता : King George Medical University, Shahmina Road, Chowk, Lucknow, UTTAR PRADESH-226003, India	Supply And Fixing Of Split Type Air Conditioner 2 Ton 5 Star Rated	-	6	09-Aug-2023	08-Sep-2023
	Supply And Fixing Of Outdoor Stand For 1.5 Ton Split AC	-	8	09-Aug-2023	08-Sep-2023
	S/F Of SP MCB 6-32A	-	10	09-Aug-2023	08-Sep-2023
	S/F Of 63 Amp DP MCB	-	1	09-Aug-2023	08-Sep-2023
	S/F Of 12 Way SPN DB	-	1	09-Aug-2023	08-Sep-2023
	Supply And Installation Of Split Type Air Conditioner 1.5 Ton 5 Star Rated	-	2	09-Aug-2023	08-Sep-2023
	Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer 150-270V	-	8	09-Aug-2023	08-Sep-2023
	Supply And Fixing Of Extra Copper Pipe With Tubular Insulation Complete In All Respect	-	125	09-Aug-2023	08-Sep-2023
	Supply And Lying Of Flexible Copper Wire Lead 80/20	-	135	09-Aug-2023	08-Sep-2023
Supply And Lying Of PVC Threaded Drain Pipe	-	17	09-Aug-2023	08-Sep-2023	
Product Specification for Supply And Installation Of Split Type Air Conditioner 1.5 Ton 5 Star Rated					
Specification विनिर्देश	Sub-Spec उप-विनिर्देश			Value मूल्य	
Custom Specification	Custom Specification			Yes	
Seller Specification Document विक्रेता विधिदता दस्तावेज़:					
1. Specification Document 1	mkp.gem.gov.in/catalog_data/catalog_support_document/58/18/450/CatalogAttrs/SpecificationDocument/2023/6/21/2023_06_21_23_47_33_buy_volts_1-5_ton_5_star_ac_2023-06-21-23-47-36_fcfa22c28e64e7bef3913189421248e3.pdf				
Buyer Specification Document खरीदार विधिदता दस्तावेज़:					
1. Specification Document	mkp.gem.gov.in/catalog_data/catalog_support_document/buyer_documents/3905442/54/78/703/CatalogAttrs/SpecificationDocument/2023/7/12/buy_volts_1-5_ton_5_star_ac_online_gem_2023-06-2023-12-12-20-46_dcf608b6f42eab8c422440646b20ed2d.pdf				
Product Specification for Supply And Fixing Of Split Type Air Conditioner 2 Ton 5 Star Rated					
Specification विनिर्देश	Sub-Spec उप-विनिर्देश			Value मूल्य	
Custom Specification	Custom Specification			Yes	
Seller Specification Document विक्रेता विधिदता दस्तावेज़:					
1. Specification Document 1	mkp.gem.gov.in/catalog_data/catalog_support_document/58/18/450/CatalogAttrs/SpecificationDocument/2023/8/2/2023_08_02_14_33_09_2_ton_ac_specificationf_2023-08-02-14-33-12_fc30e8f15c6e691669d280605f39a484.pdf				
Buyer Specification Document खरीदार विधिदता दस्तावेज़:					
1. Specification Document	mkp.gem.gov.in/catalog_data/catalog_support_document/buyer_documents/3905442/54/78/703/CatalogAttrs/SpecificationDocument/2023/6/27/boq_2023-06-27-12-14-52_d4d98ab5651bc6dfdf3691f106abf13f.pdf				
Product Specification for Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer 150-270V					
Specification विनिर्देश	Sub-Spec उप-विनिर्देश			Value मूल्य	
Custom Specification	Custom Specification			Yes	

Archan
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

Description	Model	Ordered Quantity	Unit	Price per Unit Inclusive of all Duties and Taxes (in INR)	Total Price (Inclusive of all Duties and Taxes (in INR))
Supply And Fixing Of Outdoor Stand For 1.5 Ton Split AC	Supply And Fixing Of Outdoor Stand For 1.5 Ton Spl	8	pieces	1600.0	12800.0
2 Supply And Lying Of PVC Threaded Drain Pipe	Supply And Lying Of PVC Threaded Drain Pipe	40	meter	128.0	5120.0
3 Supply And Lying Of Flexible Copper Wire Lead 80/20	Supply And Lying Of Flexible Copper Wire Lead 80/2	30	meter	160.0	4800.0
4 Supply And Fixing Of Extra Copper Pipe With Tubular Insulation Complete In All Respect	Supply And Fixing Of Extra Copper Pipe With Tubula	26	meter	1200.0	31200.0
5 Supply And Fixing Of 25 AMP AC Plug Top	Supply And Fixing Of 25 AMP AC Plug Top	8	pieces	120.0	960.0
6 Supply And Installation Of Split Type Air Conditioner 1.5 Ton 5 Star Rated	Supply And Installation Of Split Type Air Conditio	8	pieces	56200.0	449600.0
7 Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer 150-270V	Supply And Fixing Of 5 KVA Automatic Voltage Stabi	8	pieces	7400.0	59200.0
Total Order Value (in INR)					563680.0

Consignee Details						
S.No	Consignee	Item	Lot No.	Quantity	Delivery Start After	Delivery To Be Completed By
1	Ashutosh Bharti buycon116.medup.up@gembuyer.in King George Medical University, Shahmina Road, Chowk, Lucknow LUCKNOW UTTAR PRADESH - 226003	Supply And Lying Of PVC Threaded Drain Pipe	-	40	05-Aug-2023	04-Sep-2023
		Supply And Fixing Of Extra Copper Pipe With Tubular Insulation Complete In All Respect	-	26	05-Aug-2023	04-Sep-2023
		Supply And Fixing Of 25 AMP AC Plug Top	-	8	05-Aug-2023	04-Sep-2023
		Supply And Installation Of Split Type Air Conditioner 1.5 Ton 5 Star Rated	-	8	05-Aug-2023	04-Sep-2023
		Supply And Fixing Of 5 KVA Automatic Voltage Stabilizer 150-270V	-	8	05-Aug-2023	04-Sep-2023
		Supply And Fixing Of Outdoor Stand For 1.5 Ton Split AC	-	8	05-Aug-2023	04-Sep-2023
		Supply And Lying Of Flexible Copper Wire Lead 80/20	-	30	05-Aug-2023	04-Sep-2023

Terms & Conditions

Aruhana
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

ATR Compliance no

INDIA NON JUDICIAL Government of Uttar Pradesh e-Stamp	
Certificate No.	IN-UP34745902569308V
Certificate Issued Date	14-Feb-2023 03:01 PM
Account Reference	NEWIMPACC (SV)/ up14176204/ LUCKNOW SADAR/ UP-LKN
Unique Doc. Reference	SUBIN-UPUP1417620463432003550082V
Purchased by	OMC POWER PRIVATE LIMITED
Description of Document	Article 5 Agreement or Memorandum of an agreement
Property Description	Not Applicable
Consideration Price (Rs.)	100
First Party	OMC POWER PRIVATE LIMITED
Second Party	KING GEORGES MEDICAL UNIVERSITY LUCKNOW
Stamp Duty Paid By	OMC POWER PRIVATE LIMITED
Stamp Duty Amount(Rs.)	100 (One Hundred only)

Please write or type below this line:

This non-judicial stamp paper of INR 100 is an integral part of the Power Purchase Agreement Dated: 16th February'2023 executed between OMC Power Private Limited ("Solar Power Developer") and King George's Medical University Lucknow ("Procurer").

Statutory Alert:

1. The authenticity of this Stamp certificate should be verified at www.stampcert.org or using e-Stamp Mobile App of Stock Holding.
2. Any discrepancy in the details on this Certificate and as available on the website / Mobile App renders it invalid.
3. The onus of checking the legitimacy is on the users of the certificate.
4. In case of any discrepancy please inform the Competent Authority.

Archan
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



Power Purchase Agreement

1.105 TAXES AND DUTIES

- 1.105.1 The SPD shall bear and promptly pay all statutory taxes, duties, levies and cess, assessed/ levied on the SPD, contractors or their employees, which are required to be paid by the SPD as per the Law in relation to the execution of the PPA or/ and RFS and for generation/ supply/ sale of solar energy as per the terms of this PPA or/ and RFS.
- 1.105.2 Procurer shall be indemnified and held harmless by the SPD against any claims that may be made against Procurer in relation to the matters set out in Article 1.105.1. Procurer shall not be liable for any payment of, taxes, duties, levies, cess whatsoever for discharging any obligation of the SPD by Procurer on behalf of SPD.
- 1.105.3 The financial bid should include all taxes and duties etc., if any. SPD shall be entirely responsible for all taxes, duties, license fees, etc. However, if any new change in tax/duty and cess is effected in the period after the Bid Deadline as per the RFS and any time during the period of Agreement, the same will be passed on by the SPD to the Procurer as determined by the Nodal Agency/ Competent Authority.

1.106 COMPLIANCE WITH LAW

- 1.106.1 Despite anything contained in this PPA but without prejudice to this Article, if any provision of this PPA shall be in deviation or inconsistent with or repugnant to the provisions contained in the Electricity Act, 2003, or any rules and regulations made there under, such provision of this PPA shall be deemed to be amended to the extent required to bring it into compliance with the aforesaid relevant provisions as amended from time to time.

IN WITNESS WHEREOF the Parties have caused the PPA to be executed through their duly authorized representatives as of the date and place set forth above.

For and on behalf of [Procurer]

Name:

Designation:

Address: 16-2-23

वित्त अधिकारी
किंग जॉर्ज मेडिकल विश्वविद्यालय
उत्तर प्रदेश सरकार

Signature with seal

Witness:

1. विरेंद्र कुमार यादव

2. B.K. Yadav

KGMU



For and on behalf of [Solar Power Developer]

Name:

Designation: CHIEF EXECUTIVE OFFICER (VP)

Address:

603, Tower B, Unitech Business Zone, South City 2,
Sector 50, Gurgaon, Haryana - 122018, India

Signature with seal

Witness:

1.

2.



Archan
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

Solar Roof Top Installed at KGMU UP, Lucknow

कालेज का नाम (जनपद सहित)	भवन का नाम एवं पता	यदि भवन पूर्व से सोलराइज है तो			यदि सोलराइज शेष है		
		स्थापित संयंत्र की क्षमता (KW)	सम्बन्धित सेवा प्रदाता संस्था का नाम	सम्बन्धित सेवा प्रदाता से निस्पादित अनुबन्ध का दिनांक (अनुबन्ध का पठनीय प्रतिसंलग्न करें)	उपलब्ध फिजिबल रूफ टॉप (छत/रेज्ड स्ट्रैचर) एरिया (वर्ग मीटर)	स्थापित किये जाने वाले सोलर रूफ टॉप की क्षमता(KW)	अ
1	2	4	5	6	7	8	
KGMU, Lucknow	C.V. Hall	74.34 KW	M/s OMC Power Pvt. Ltd.	सौर ऊर्जा संयंत्र का पावर पच्चेच एयीमेन्ट 01/UPNEDA/SPV/GCRT-Govt-Bldg/RESCO/OMC/2022-23 के 0जी0एम0यू0 एवं M/s OMC Power Private Limited			
"	Pathology Deptt.	50.92 KW	"	"			
"	S.P. Hostel	210.70 KW	"	"			
"	Old Admin.	41.88 KW	"	"			
"	New Admin.	30.15 KW	"	"			
"	Library	24.79 KW	"	"			
"	Anatomy Deptt.	59.63 KW	"	"			
"	R.H. Hostel	43.55 KW	"	"			
"	Maha Maya & New V.L. Hall	76.43 KW	"	"			
"	Old V.L. & D.K. Hall	67.00 KW	"	"			
"	Cardiology Deptt.	58.96 KW	"	"			
"	C.V.T.S. Deptt.	99.83 KW	"	"			
"	Ortho/Artificial Limb Centre	90.78 KW	"	"			
"	Midwifery	25.46 KW	"	"			
"	P.R.O.	45.56 KW	"	"			

Aruchana
Registrar
King George Medical University
Lucknow

Parvez
(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow



KING GEORGE'S MEDICAL UNIVERSITY U.P., LUCKNOW

कंग जार्ज चिकित्सा
विश्वविद्यालय सं० प्र०,
लखनऊ।

कार्यालय टिप्पणी तथा आदेश फाइल सं० 1447/EE(E/M) दि० 28.10.2024

कुलसचिव / वित्त अधिकारी / मा० कुलपति महोदय

कृपया कार्यालय अधिशासी अभियन्ता, विद्युत नगरीय वितरण खण्ड चौक, लेसा लखनऊ क पत्र संख्या 2112 वि०न०वि०खण्ड (चौ०) दिनांक 07.09.2024, 2114 वि०न०वि०खण्ड (चौ०) दिनांक 07.09.2024, 2115 वि०न०वि०खण्ड (चौ०) दिनांक 07.09.2024, 2111 वि०न०वि०खण्ड (चौ०) दिनांक 07.09.2024 तथा 2113 वि०न०वि०खण्ड (चौ०) दिनांक 07.09.2024 (पत्रावली में रक्षित) का संदर्भ ग्रहण करने का कष्ट करें, जिनके द्वारा के०जी०एम०यू के कतिपय संयोजनों पर अधिकतम मांग में वृद्धि पाये जाने के कारण उ०प्र० विद्युत प्रदाय संहिता 2005 में निहित प्रावधानों के अनुसार विद्युत भार बढ़ाये जाने हेतु सूचित किया गया है।

भार बढ़ाये जाने योग्य संयोजनों का विवरण निम्नवत है:-

क०स०	संयोजन संख्या एवं स्थान का नाम	स्वीकृत भार (के०वी०ए०)	अधिकतम मांग (के०वी०ए०)	अनुशंसित भार (के०वी०ए०)
1.	मानसिक हास्पिटल, संयोजन सं० 1747488000	158 ✓	331.84	350
2.	संयोजन सं० 1214770000 पी०एच०आई० भवन (डेंटल साइंस यूनिवर्सिटी)	45	78	85
3.	संयोजन सं० 9753334424 टीचिंग ब्लाक (कलाम सेंटर)	2632	2928	3000
4.	संयोजन सं० 3747481000 न्यू मर्चरी सबस्टेशन	223	1176.36	1200
5.	5747481000 ट्रामा सेंटर	540	640	700

उपरोक्त तालिका के अन्तिम स्तम्भ में अनुशंसित विद्युत भार अंकित किया गया है। यदि आदेश हो अधिशासी अभियन्ता वि०न०वि० खण्ड चौक को उपरोक्त संयोजनों को उनकी अधिकतम मांग के अनुसार वृद्धि किये जाने एवं भार वृद्धि किये जाने के कारण आने वाले व्यय का आंकलन प्रेषित किये जाने हेतु सूचित/अनुरोध किया जाये।

अनुमोदनार्थ प्रेषित।

वीरेन्द्र कुमार दूबे
अध्यक्ष अभियन्ता (वि०)
क०जी०एम०यू लखनऊ

(डी० डी० सिंह)
अधिशासी अभियन्ता (वि०/पी)
के०जी०एम०यू विद्युत वितरण विभाग उ०प्र०
लखनऊ

Dr. M. K. MANAR
Faculty Incharge (Electric Deptt.)
K.G.M.U. Lucknow

REGISTRAR
King George's Medical University, Uttar Pradesh
LUCKNOW

Dr. Manan
to discuss
13.01.2025

Registrar
King George Medical University
Lucknow

Scanned with OKEN Scanner

(Prof. Mohd. Parvez Khan)
Core Committee Member
University Environment Department
K.G.M.U. U.P., Lucknow

