ENERGY AUDIT REPORT

NEHRU MEMORIAL COLLEGE

(AUTONOMOUS)

Puthanampatti -621007

2018 – 2019

CONDUCTED BY

DEPARTMENT OF ENVIRONMENTAL SCIENCES

Bishop Heber College (Autonomous)

Tiruchirappalli, Tamilnadu – 620 017

CERTIFICATE

This is to certify that **Nehru Memorial College, (Autonomous), Puthanampatty, Tamilnadu** has conducted detailed ENERGY AUDIT for the period 2019 – 2020 based on the data and credentials for submitted scrutiny. The activities and measures carried out by the College have been verified based on the reports submitted and was found to be satisfactory. The College has evolved policies on Environment, Water, Waste and Sanitation in line with the Sustainable Development Goals. The efforts taken by the members of the faculty, students, support staff and the Management towards creating a strategic change in attaining holistic environmental sustainability is highly appreciated and commended.

D.J.S. Anand Karunakaran
Asst. Professor
P.G & Research Department of Physics
Bishop Heber College, (Autonomous)
Tiruchirappalli - 620 017.

Dept. of Environmental Sciences
Bishop Heber College (Autonomous)

Prof. A. ALAGAPPA MOSES
Associate Professor & Head
Department of Environmental Sciences
BISHOP HEBER COLLEGE (Autonomous).
Tiruchirappalli - 620 017.

Dr. D.J. S. Anand Karunakaran
Energy Auditor
Associate Professor
Department of Physics
Bishop Heber College (Autonomous)

Email: anandkkaruna@gmail.com
Mobile: +919865947332 / 6381773190

Prof. A. Alagappa Moses
Functional Area Expert – Ecology & Biodiversity
(Accredited by Quality Council of India - NABET)
Category A Projects *(vide AC MOM III, 2010 New Delhi)*
Associate Professor & Head,
Department of Environmental Sciences

Email: aalagappamoses@gmail.com
Mobile: +91 98424 90051

Department of Environmental Sciences 35th ANNIVERSARY 1984 - 2019

CAMPUS ENERGY AUDIT

NEHRU MEMORIAL COLLEGE
(Autonomous)
Puthanampatti -621007

CONTENTS

ELECTRICAL AND FUEL ENERGY AUDIT

NEHRU MEMORIAL COLLEGE

(Autonomous)
(ACCREDITED WITH "A" GRADE BY NAAC)
Puthanampatti - 621 007
TRICHIRAPALLI DISTRICT, TAMILNADU
Website: www.nmc.ac.in

Green Audit Assessment Team (Internal)

Sl. No	Campus Green Audit over all Team	Designation
1	Dr. A. R. Ponperiasamy Principal, NMC	Chairman
2	Dr. C. Sasikumar, Dean, Research and Development	Member Secretary
3	Dr. S. Kumararaman, Vice - Pricnipal	Member
4	Dr. K. T. Tamilmani, Dean, Academic Affairs	Member
5	Dr. Viji Saral Elizabeth, Dean, Placement and Training.	Member
6	Mr. Rathakrishnanan, Estate Manager, NMC	Member
7	Er. Vijayakumar, Engineer, NMC	Member

NEHRU MEMORIAL COLLEGE

(Autonomous)
(ACCREDITED WITH "A" GRADE BY NAAC)
Puthanampatti - 621 007
TRICHIRAPALLI DISTRICT, TAMILNADU
Website: www.nmc.ac.in

CAMPUS GREEN AUDIT TEAM COORDINATORS

SL. NO	AUDIT TEAM	COORDINATORS
1	ENVIRONMENTAL MANAGEMENT TEAM	Dr. M.Meenakshisundaram, Co-ordinator, Assistant Professor Department of Botany
2	WATER MANAGEMENT TEAM	Dr.K.Saravanan, Co-ordinator Assistant Professor Department of Zoology
3	WASTE MANAGEMENT TEAM	Dr.N.Ramesh, Co-ordinator , Assistant Professor Department of Zoology
4	SANITATION MANAGEMENT TEAM	Dr.V.Ramesh, Co-ordinator Assistant Professor Department of Zoology
5	AIR , NOISE MANAGEMENT TEAM	Dr.M.Ramesh, Co-ordinator, Assistant Professor Department of Chemistry

NEHRU MEMORIAL COLLEGE

(Autonomous)
(ACCREDITED WITH "A" GRADE BY NAAC)
Puthanampatti - 621 007
TRICHIRAPALLI DISTRICT, TAMILNADU
Website: www.nmc.ac.in

ENVIRONMENTAL MANAGEMENT POLICY

- The NMC always aims to eliminate or reduce all forms of environmental pollution and encourages all faculty members, staff, students and others to practice the same.
- The College always raises awareness of environmental issues among its staff/students/visitors and encourages initiatives leading towards a clean and green environment.
- The College promote the 5 R's for waste management in the order of **Reduce, Reuse, Recycle, Refuse, Recover and provide** convenient waste segregation, collection and guidance for the disposal of paper, cardboard, glass, plastic, electrical and white goods, hazardous waste and e-waste.
- The College minimizes the consumption of water and enhances groundwater level by establishing campus catchment area and rainwater harvesting schemes in all buildings of the campus, encouraging to report leaks and rectifying them promptly, progressively replacing faulty taps and fittings, exploring options for using waste roof runoff water wherever possible.

- The College minimizes the consumption of electricity where opportunity arise by progressive replacement of light bulbs with energy efficient ones. (LED) Inculcating the practice among staff and residents to turn off electrical appliances when not in use. Installation of a Hybrid solar power system in the campus.
- The College adapts health, safety and environmental codes of practice and relevant rules and regulations and complies with legislation relating to use of chemical products.
- The College is completely free from plastics and discourages burning of waste materials in any form.

ENVIRONMENTAL MANAGEMENT TEAM		
1	Staff in-charge	Dr. M.Meenakshisundaram, Co-ordinator
Student Volunteers		
2	M.Sridevi,	2K17BT32, III B.Sc., Botany
3	S.Pramila	2K17BT39, III B.Sc., Botany
4	S.Vignesh	2K17BT48, III B.Sc., Botany
5	K.Subashree	2K17BT33, III B.Sc., Botany

NEHRU MEMORIAL COLLEGE
(AUTONOMOUS)

PUTHANAMAPATTI - 621007

ENERGY MANAGEMENT AUDIT

ENERGY AUDIT

1.1 Introduction

Energy audit has a vital role in the implementation of energy conservation measures. The energy audit enables the institution to meet the Energy efficiency Standards and to reduce carbon foot print. There are several types of energy audits that are commonly performed by energy service personnel or engineers with various degrees of complexity.

1.2 Need for Energy Audit

The energy crisis in the present day world has led us to the design of new energy efficient buildings. An energy audit establishes both where and how energy is being used, and the potential for energy savings. It includes a walk-through survey, a review of energy using systems, analysis of energy use and the preparation of an energy budget, and provides a baseline from which energy consumption can be compared over time. An audit can be conducted by an employee of the organization who has appropriate expertise, or by a specialist energy-auditing firm. An energy audit report also includes recommendations for actions, which will result in energy and cost savings. It should also indicate the costs and savings for each recommended action, and a priority order for implementation. As per the Energy Conservation Act, 2001, Energy Audit is defined 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. (Chandra Prakash et al, 2017).

1.3 Electrical Energy Audit

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power.

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore

essential that any environmentally responsible institution examine its energy use practices.

1.4 Energy-saving measures and Carbon Footprint Reduction

A carbon footprint is historically the total set of greenhouse emissions caused by an individual event organization or product. It is expressed as CO_2e (Carbon dioxide equivalent) which can broadly be defined as a measure of the greenhouse gas emission that are directly and indirectly caused by an activity or are accumulated over the life stages of a product or service (Wiedman and Minx, 2008; Igbokwe et al 2018)

Intergovernmental Panel on Climate (IPCC) reviewed 18 greenhouse gases with different global warming potential. According to United Nation Framework Convention on carbon dioxide (UNFCCC) and its Kyoto protocol, only Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) are considered for the purpose of carbon accounting, with others being regulated elsewhere (Hall and Murray, 2008).

The main elements that generates large amounts of carbon dioxide are fossil fuels (especially oil and coal), through burning them for obtaining energy. Of all greenhouse gases, CO_2 has the largest share. Thus, emissions of other greenhouse gases as stated earlier are converted into units of CO_2 equivalents (CO_2e) using the warming potential related to each gas.

1.5 Electrical Energy Audit

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

Table 1.1 Power Grid Specifications

	Power : Maximum Demand (MD)	:	250 KVA
	Transformer	:	500 KVA
	No. of Diesel Generator sets & Capacity	:	2 No (200KVA & 250KVA)
	Solar energy utilization (Yes / No)	:	Yes (310 KVA)
	Fuel used for cooking in hostels	:	Yes (Gas)

Table 1.2 Electricity Consumption for 5 months Details

Month	Service No.	EB Load (Unit)	Amount Paid (Rs.)	Units consumed KVA
Dec 19	172	50724	469001	80761
Nov 19	172	62590	547322	74918
Oct 19	172	60148	528343	90449
Sep19	172	71316	605213	82841
Aug 19	172	70944	621496	90964
	Total	315722		491133
	Month Average	63,145		98,225

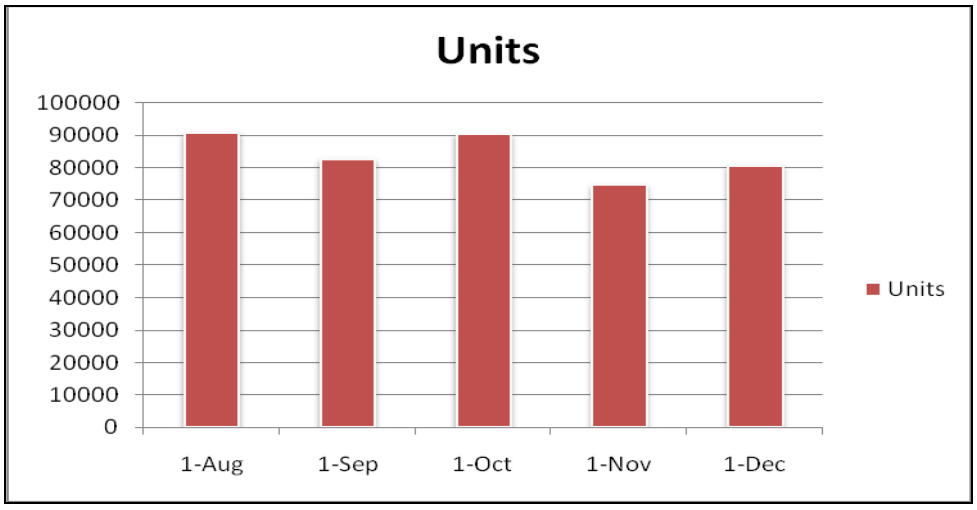


Fig. 1.1 Consumption electricity in electrical units for 5 months

1.6 Solar Power Generation in the Campus

The Local power generation of every month by roof top solar installed is 35,808 KWh (Approx) or 1000 KWhper Day.

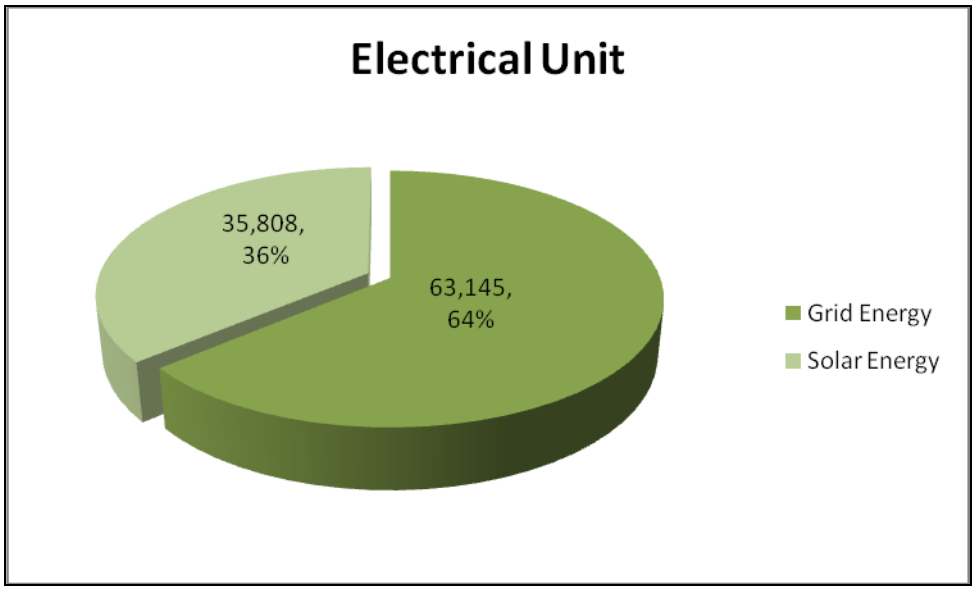


Fig.1.2 Comparative power consumption by the Institution

Table 1.3 Total Electricity consumption in the 5 year

Year	Units consumed (KVA)	Amount Paid in Rs.
2014 – 2015	754058	6786522
2015 – 2016	616452	5548065
2016 – 2017	626818	5641365
2017 – 2018	575047	5750470
2018 – 2019	611851	6118510

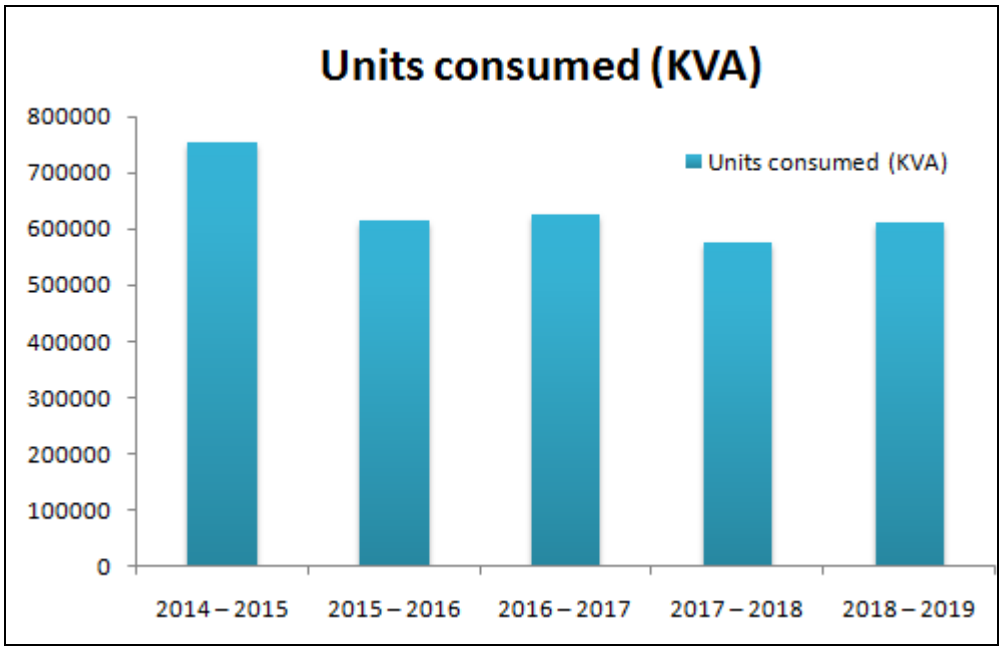


Fig. 1.3 Total Electrical Units consumed fo the 5 years

Fig 1.4 NMC Campus Power Grid Supply 500KVA Transformer

1.7 Electricl Unit Calculation

- voltage X ampere = Power (V X I = P)
- Unit: (volt X ampere = watt)
- Tariff Structure and Power cost
- One electrical Unit = 1000W/hour
- *(1000 watt bulb glows for an hour or 100 watt bulb glows for 10 hours)*
- Power factor(pf)= Actual power/ apparent power

Table 1.4 Details of UPS and BATTERY

UPS And Battery Details										
Place	**Date Of Install**	**Capacity**	**Type**	**Brand**	**Batt. Brand**	**Battery Nos**	**Batt Capacity**	**Batt Replaced**	**UPS Life in Year**	**Batt Life in Year**
Power Room	28/02/2017	120KVA/ 384V	UPS	POWER ONE	Exide	32	200AH	24/09.18 32 Nos	10	2

1.8 Images Local Roof top Solar Power generation

2. Fuel Consumption Audit

2.1 Diesel Consumption

The total consumption of diesel towards generators and transportation per month is 13,150 liter.

1 liter of diesel weighs 835 gram. Diesel consists for 86.2% of carbon, or 720 gram of carbon per liter diesel. In order to combust this carbon to CO_2, 1920 gram of oxygen is needed. The sum is then 720 + 1920 = 2640 gram or 2.7 kg of CO_2/liter diesel.

2.2 Generators and Transportation

Generators

Emergency power requirement in Nehru Memorial College is met by 2 diesel generators of varying capacities. (Table 2.1).

Table 2.1 Details of Generators

S. No.	Department	Capacity in KVA	MF Date	Make
1.	General /Comman	200 KVA	2007	Kirloskar
2.	General /Comman	250 KVA	20014	Kirloskar

Transportation

Daily operating logistics of the college given below in Table 2.2

Table 2.2 Details of Logistics

S. No.	Vehicle Type	No's	Capacity	Make
1.	College Bus	13	58 persons	
2.	Water Tanker	-	-	-
3.	Other Logistics- Cars	4	6 persons 4 persons	Innova Maruthi Susuki
4.	Official Vehicle – Passenger Van	1	16 Persons	Mahindra

13,150 liter of diesel will produce (13,150 X 2.7 kg) = 35,505 Kg of CO2 emission from the fuel consumption per month.

Total emission of CO_2 per year (35,505 X 12) = 4,26,060 Kg or **426 ton /year.**

2.3 LPG Consumption

1 liter of LPG weighs 550 gram. LPG consists for 82,5% of carbon, or 454 gram of carbon per liter of LPG. In order to combust this carbon to CO2, 1211 gram of oxygen is needed. The sum is then 454 + 1211 = 1665 gram of CO2/liter of LPG. 1 Kg of LPG = 1.94 liter

Total No. of cylinders consumable per month in the campus is given Table 2.3

Table 2.3 Details of LPG cylinders

S.No	Location	Consumption	
		Daily	Monthly
1	MGC	2	55 (ave)
2	CVR	3	80 (ave)
TOTAL			135

The average total of commercial (19 Kg) 135 cylinders (135 X 19Kg) = 1140 Kg (1140 Kg X 1.94) or 4976 liter

Total consumption of LPG per month = **4976** liter

Emission of CO_2 per month of the institution = (4976 X 1.67kg)

= **8,310** Kg of CO_2

Therefore Emission of CO_2 per year (8,310 X 12) = **99721 Kg**

or 99.7 ton/ year

The total carbon foot print per year is 426 + 99.7 = 525.7 ton of CO_2 emission in to atmosphere by fuel Consumption in the institution.

3. Carbon offset

3.1 Power Ration Measures

The campus replaces light fittings with energy efficient LED lighting to reduce the cost and carbon emission indirectly. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W.

Table 3.1 LED Lights Details

S.No.	LED / CFL lights	Power in watt	Qty	Duration In hour	Total Consumption in Kwh /day
01	LED	12 Watt	419	6	30.17
02	CFL	18 Watt	120	6	12.96
03	LED Street Lights	35 Watt	33	8	9.24
Total					52.37

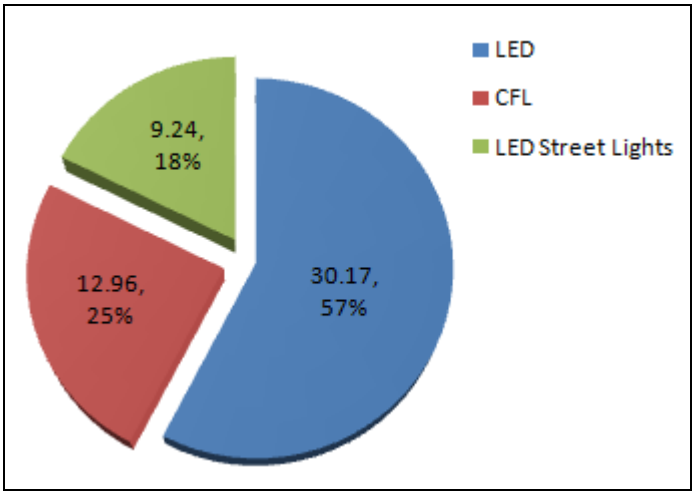


Fig. 3.1 Carbon Offset by LED Lights in the Campus

The total quantity of coal required to produce 52.37 X 30 X 12 = 18,853 units of electricity /year (18,853 × 0.538 kg coal) = 10,143 kg emission by coal One kilogram of coal emits 10,143 X 2.86 = 29,009 kg of CO_2, or 29 ton only per year against (25W[average of LED]/60W[R]) X 100 = 41.66 % of offset by regular emission of CO_2 in to the atmosphere.

3.2 Carbon offset suggestions

The management of **Nehru Memorial College** is conscious of this damage to the environment and has been implementing various programs/activities to reduce energy consumption on the one hand and increase green energy sources on the other. They are:

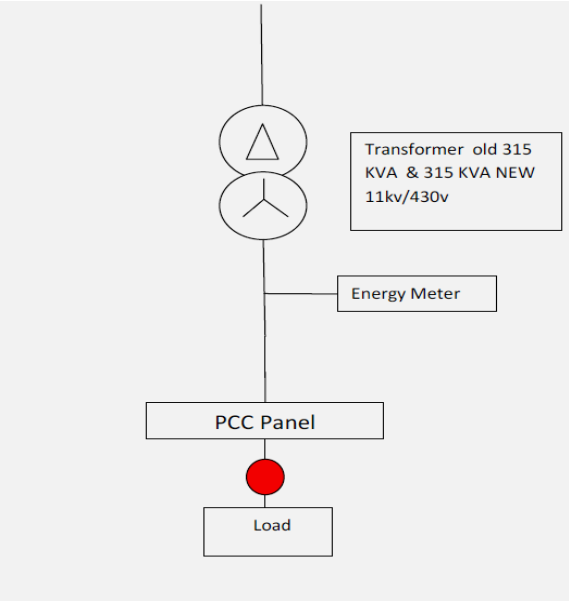
a) Replacing high energy-consuming lighting system with energy-efficient lighting systems.

b) Installing energy-efficient lighting system Based on the recommendations of the Energy Audit conducted this year, the Institution has reduced CO_2 emissions indirectly by replacing high energy-consuming electric bulbs with energy-efficient LED lighting systems by 41.66% is reduced can be enhanced to 80 – 100 %.

4. Power Quality Observations & Remedies

4.1 Site Description

The detailed Single Line Diagram is not available with Nehru Memorial College. The basic site survey was conducted as per following Single Line Diagram.



4.2 Existing Scenario with the Installation under survey

Table 4.1 Main Transformer details

Transformer	550 KVA
Voltage on LV side	433 V
Voltage on HV side	235 KV

4.3 IEEE-519-1992 Consideration and Value for Plant under survey

The said standard id applicable at the PCC (Point of Common Coupling). In above mentioned SLD at Survey Point no.1 is the point of coupling. As per the standards; the harmonic limits are to be considered at PCC Recommended Limits for these ratios as per IEEE-519-2014 are as here under.

Table 4.2 Current Distortion Limits for General Distribution Systems (120 V through 69 KV)

Maximum Harmonic Current Distortion in Percent of IL					
Individual Harmonic Order (Odd Harmonic)					
Isc//L TDD	<11	11<h<17	17<h<23	23<h<35	35<h
<20* 5.0	4.0	2.0	1.5	0.6	0.3
20<50 8.0	7.0	3.5	2.5	1.0	0.5
50<100 12.0	10.0	4.5	4.0	1.5	0.7
100<1000 15.0	12.0	5.5	5.0	2.0	1.0
>1000 20.0	15.0	7.0	6.0	2.5	1.4
Even harmonic are limited to 25% the odd harmonic limits above					
Current distortions that result in a offset, e.g. half –wave convertes are not allowed					
*All power generation equipment is Limited to these values of current distortion. regardless of actual/sc//L					
Where /sc =maximum short-circuit current at PCC /L =maximum demand load current (fundamental frequency component) at PCC. TDD =Total demand distortion (RSS).harmonic current distortion in% of maximum demand load current (15 or 30 min demand). PCC =Point of common coupling.					

Voltage Distortion Limits

Bus Voltage at PCC Voltage THD (%)	**Individual Voltage Distortion (%)**	**Total Distortion**
69 kv and below	3.0	5.0
69.000 kV through 161kv	1.5	2.5
161.001 kV and above	1.0	1.5
Note: High-voltage systems can have up to 2.0% THD where the cause is an HADC terminal that will attenuate by the time it is tapped for a user.		

Table 4.3 Voltage Current and Harmonic Values

RMS Voltage Values							
	Phase R-Y	Phase Y-B	Phase R-B	Phase R-N	Phase Y-N	Phase B-N	Ph N-G
Min Value	464.66	468.49	468.61	268.93	269.07	271.30	0.24
Ave Value	464.77	468.61	468.70	268.97	269.13	271.37	0.25
Max Value	464.82	468.73	468.77	269.01	269.18	2671.42	0.27

RMS Current Values				
	Phase R	Phase Y	Phase B	Neutral
Min Value	10.05	6.79	4.73	7.90
Ave Value	10.25	6.97	4.98	7.99
Max Value	10.45	7.15	5.22	8.09

PEAK Current Values				
	Phase R	Phase Y	Phase B	Neutral
Min Value	25.03	19.32	16	23.54
Ave Value	25.81	20.45	17.23	24.48
Max Value	26.68	21.83	18.67	25.55

	HARMONIC LEVEL IN %					
	Phase R	Phase Y	Phase B	Phase N	As per IEEE in %	As per MSEDCL in %
Voltage	0.85	0.90	1.1	230	Up to 5%	Up to 5 %
Current	40	45	75	105	Up to 10 %	Up to 10 %

Frequency	
Max	50.02
Avg	50.02
Min	50.02

4.4 Observations

4.4.1 500 KVA Transformer

1. Due to unbalanced and non linear load condition in each phase, harmonics in neutral is 230% and 105% in voltage and current respectively.
2. 3rd and 7th harmonic is present in the system. This is observed due to SMPS ie computer load & electronic ballasts.
3. Current in Neutral is 14.5 amp and 80 amp to maximum level.
4. Voltage harmonics are under permissible limits of MSEDCL and IEEE norm, while the Current harmonics are above the ideal values and these harmonics were induced through machinery.
5. Spikes are observed, no spike protection is provided to the system.
6. Overall Voltage supplied by grid is on HIGHER SIDE.

4.4.2 Current, Voltage and Harmonics

1. For Harmonics of 7th order the APFC panel (automatic power factor control) of 50 KVA with 7.68% detuned reactors and 525v capacitors with thyristerised switching are to be installed.
2. For harmonics of 3rd and 9th order the earthing is to be done .The detailed specification is given below.

- Make proper earthing as per IEC 60364-5-54 to meter as well as control panels.
- It is suggested to install new earthing system the details are as below:

Make OBO Betterman, Germany

- Length of Earth electrode: 1250 mm, Diameter of earth electrode: 14.2mm. Tested as per IEC 60364-5-54.
- Earth conductivity enhancing mineral compound of 5KG
- Total quantity required = 05 no. set (for 250 KVA) .

3. Install a Spike Protection Device, for protection from sudden high current spike which occurs due to high voltage. This is to be installed next to Energy Meter; also in each control panel.

4.5 The Specification for SPD is as follows

I. For protection against the Lightening surge and Surge through power lines (HT),

- Combi controller = 1 nos. to be connected to transformer LT side. Technology : MOV for L to N and SG for N to PE, Normal line voltage 230/ 400 v, 50Hz.
- Impulse current (10/350 micro sec), 7 KA and 25 KA.
- Response time < 25 nano seconds.
- Voltage protection level 900 volts & 1200 volts.

II. For protection against internal surges.

- Surge Controller = 4 nos. to be installed at each floor east and west side.
- Technology : MOV for L to N and SG for N to PE, Normal line voltage 230/ 400 v, 50Hz.
- Nominal discharge current 8/20 micro sec. = 20 KA & 50 KA.

- Voltage protection level = 1300v and 1200 volt.
- Response time less than 20 nano sec.

4.6 Effect on system

1. Circuit will be free from harmonic current.

2. The voltage regulation will be good, which results in low maintenance and saving in units also.

3. Neutral Current will be minimizing so very negligible amount of current will be there.

5. Energy Audit Methodology

5.1 Electrical Distribution System:

Scope of Work:

- To study existing electrical distribution system
- Measure/ Record the 12 hrs Load distribution
- To suggest various energy efficient measures with first order cost benefit analysis.

5.2 Methodology 1

A. Census :

1) Find out the electrical normal & emergency loading.

Type of tariff

- Rating of installed transformer
- General hygiene as per standard maintenance practices
- Operating hrs data were collected from respective person

B. Indoor Lighting

Scope of work

- To study the existing lighting scenario of facility & verify the building data
- To find out the performance of lighting fixture
- To calculate the ILER (Lux/ watt/ m2) & compare lux with the bench mark /prevailing std in the facility.
- To suggest various energy efficient measures with first order cost benefit analysis

Censes

- Upto 80% of the lighting fixture were inspected for following
- No.of light installed & no of light working.

- Type of lights, General hygiene as per std maintenance practices
- Operating hrs data were collected from respective person.

5.3 Computer

Scope of work :

- To study existing computer at facility and verify the billing data.
- To Find out the power drawn.
- To compare the power drawn with the bench mark or prevailing standard in the facility.
- To identify the causes of deviation in the performance & suggest recommendation for corrective actions.
- To suggest various energy efficient measures with the first order cost benefit analysis.

5.4 Methodology 2

Census:

- Up to 80% of the computers printers & faxes were inspected for following.
- No of computers printers & faxes installed.

5.5 Diesel Generators (D.G. sets)

The facility is not having D.G. 250 KVA set

5.6 Pumps

Scope of work:

- To study existing pumping system at facility and verify the billing data.
- To carry out analysis.
- To Find out the performance of the pumping system.
- To compare the operating efficiency with the bench mark or prevailing standard in the facility.
- To identify the causes of deviation in the performance & suggest recommendation for corrective actions.
- To suggest various energy efficient measures with the first order cost benefit analysis.

5.7 Methodology 3

Census:

- All water pumps were audited for following.
- Total no of pumps installed.

5.8 Report Writing

A detailed report of all the outcomes

i. Observations
ii. Remedies
iii. Census
iv. Data Collections
v. Data Processing
vi. Data Analysis
vii. Results
viii. Summery
ix. Suggestions Suggestions and
x. Conclusions are repotted in defined format for documentation and further references

Annexure

Electrical Audit (Prepare the details for each building – Model is given in the next table)

Prepare for all the buildings								
Sl. no	**Name of the Article**	**Quantity**	**Power in Watt**	**Duration in Hours/ Day**	**Total Power consumed**	**Total Electrical Unit/day**	**Total electrical/ Two months**	**Total**
1	**AIDED BUILDING DETAILS OF FLOOR AREA**							
	GROUND FLOOR - Rc Roof first floor (Room details)							
	Ceiling fan	133	70	6	55860	55.86	2234.4	
	Tube Light	130	36	6	28080	28.08	1123.2	
	LED light	21	22	6	2772	2.772	110.88	
	LED light	12	20	6	1440	1.44	57.6	
	CFL	36	36	6	7776	7.776	311.04	
	CFL	10	11	6	660	0.66	26.4	
	AC	8	2000	6	96000	96	3840	
	Wall mount fan	11	70	6	4620	4.62	184.8	
	Excessd Fan	7	70	6	2940	2.94	117.6	
	Projector	10	280	6	16800	16.8	672	
							8677.92	
2	**RADHAKRISHANAN BLOCK**							
	IT Block (Room details)							
	GROUND FLOOR - RC Roof							
	Ceiling fan	29	70	6	12180	12.18	487.2	
	Tube Light	36	36	6	7776	7.776	311.04	
	LED light	5	9	6	270	0.27	10.8	
	LED light	1	11	6	66	0.066	2.64	
	LED light	1	22	6	132	0.132	5.28	
	CFL	2	36	6	432	0.432	17.28	
	CFL	4	11	6	264	0.264	10.56	
	AC	3	2000	6	36000	36	1440	
	Wall mount fan	3	70	6	1260	1.26	50.4	
	Projector	2	280	6	3360	3.36	134.4	
							2469.6	

	FIRST FLOOR - RC Roof							
3	Ceiling fan	24	70	6	10080	10.08	403.2	
	Tube Light	51	36	6	11016	11.016	440.64	
	LED light	1	22	6	132	0.132	5.28	
	AC	2	4000	6	48000	48	1920	
	Projector	4	280	6	6720	6.72	268.8	
							3037.92	
	SECOND FLOOR - RC Roof							
4	Ceiling fan	37	70	6	15540	15.54	621.6	
	Tube Light	36	36	6	7776	7.776	311.04	
	Projector	3	280	6	5040	5.04	201.6	
							1134.24	
	Third Floor - RC Roof							
	Ceiling fan	25	70	6	10500	10.5	420	
	Tube Light	23	36	6	4968	4.968	198.72	
	CFL	2	30	6	360	0.36	14.4	
	CFL	8	36	6	1728	1.728	69.12	
	AC	2	2000	6	24000	24	960	
	Projector	2	280	6	3360	3.36	134.4	
5							**1796.64**	
	ZOOLOGY BLOCK							
	Ground Floor							
	Ceiling fan	13	70	6	5460	5.46	218.4	
	Tube Light	11	36	6	2376	2.376	95.04	
	LED light	2	22	6	264	0.264	10.56	
	AC	1	2000	6	12000	12	480	
	Projector	2	280	6	3360	3.36	134.4	
							938.4	

6	**First Floor**							
	Ceiling fan	19	70	6	7980	7.98	319.2	
	Tube Light	19	36	6	4104	4.104	164.16	
	Projector	2	280	6	3360	3.36	134.4	
							617.76	
7	**Store Room**							
8	Tube Light	1	36	6	216	0.216	8.64	
9	**Work shop**							
10	Ceiling fan	1	70	6	420	0.42	16.8	
11	Tube Light	2	36	6	432	0.432	17.28	
								42.72
	SELLAMMAL MOOKKAPILLAI BLOCK (Room details)							
	GROUND FLOOR							
	Ceiling fan	25	70	6	10500	10.5	420	
	Tube Light	51	36	6	11016	11.016	440.64	
	LED light	24	22	6	3168	3.168	126.72	
	LED light	16	15	6	1440	1.44	57.6	
	LED light	3	9	6	162	0.162	6.48	
	CFL	36	36	6	7776	7.776	311.04	
	CFL	5	11	6	330	0.33	13.2	
	AC	12	2000	6	144000	144	5760	
	Wall mount fan	15	70	6	6300	6.3	252	
	Excessd Fan	7	70	6	2940	2.94	117.6	
							7505.28	

	FIRST FLOOR -							
	Ceiling fan	36	70	6	15120	15.12	604.8	
	Tube Light	104	36	6	22464	22.464	898.56	
	CFL	38	36	6	8208	8.208	328.32	
	AC	11	2000	6	132000	132	5280	
	Excessd Fan	3	70	6	1260	1.26	50.4	

	Projector	3	280	6	5040	5.04	201.6	
							7363.68	
	SECOND FLOOR -							
	Ceiling fan	47	70	6	19740	19.74	789.6	
	Tube Light	33	36	6	7128	7.128	285.12	
	Projector	7	280	6	11760	11.76	470.4	
							1545.12	
	Third Floor - RC Roof							
	Ceiling fan	21	70	6	8820	8.82	352.8	
	Tube Light	14	36	6	3024	3.024	120.96	
	Projector	3	280	6	5040	5.04	201.6	
							675.36	
	LIBRARY BUILDING DETAILS							
	GROUND FLOOR AREA - RC Roof							
	Ceiling fan	19	70	6	7980	7.98	319.2	
	Tube Light	31	36	6	6696	6.696	267.84	
	LED light	1	9	6	54	0.054	2.16	
	AC	1	2000	6	12000	12	480	
	Wall mount fan	3	70	6	1260	1.26	50.4	
							1119.6	

	FIRST FLOOR - RC Roof							
	Ceiling fan	3	70	6	1260	1.26	50.4	
	Tube Light	13	36	6	2808	2.808	112.32	
	LED light	1	9	6	54	0.054	2.16	
	Wall mount fan	2	70	6	840	0.84	33.6	
							198.48	
	SECOND FLOOR - RC Roof							
	Tube Light	8	70	6	3360	3.36	134.4	
	Wall mount fan	2	70	6	840	0.84	33.6	
							168	

	ER.SUJATHA BLOCK (CS)							
	GROUND FLOOR - RC Roof							
	Ceiling fan	5	70	6	2100	2.1	84	
	Tube Light	5	36	6	1080	1.08	43.2	
	LED light	3	15	6	270	0.27	10.8	
	LED light	6	20	6	720	0.72	28.8	
	LED light	40	22	6	5280	5.28	211.2	
	AC	10	2000	6	120000	120	4800	
	Projector	2	280	6	3360	3.36	134.4	
							5312.4	
	FIRST FLOOR - RC Roof							
	Ceiling fan	5	70	6	2100	2.1	84	
	Tube Light	8	36	6	1728	1.728	69.12	
	LED light	5	20	6	600	0.6	24	
	LED light	1	15	6	90	0.09	3.6	
	LED light	20	22	6	2640	2.64	105.6	
	AC	10	2000	6	120000	120	4800	
	Projector	2	280	6	3360	3.36	134.4	
							5220.72	
	SECOND FLOOR - RC Roof							
	Ceiling fan	19	70	6	7980	7.98	319.2	
	Tube Light	23	36	6	4968	4.968	198.72	
	Wall mount fan	1	70	6	420	0.42	16.8	
	Projector	2	280	6	3360	3.36	134.4	
							669.12	
	TILED BUILDING							
	Ceiling fan	64	70	6	26880	26.88	1075.2	
	Tube Light	37	36	6	7992	7.992	319.68	
							1394.88	

AUDITORIUM - Light Roof							
Ceiling fan	10	70	6	4200	4.2	168	
Tube Light	39	36	6	8424	8.424	336.96	
LED light	2	20	6	240	0.24	9.6	
CFL	5	80	6	2400	2.4	96	
AC	2	2000	6	24000	24	960	
Wall mount fan	31	180	6	33480	33.48	1339.2	
Metal halogen (250watts)	24	250	6	36000	36	1440	
Metal halogen (500 watts)	4	500	6	12000	12	480	
						4829.76	
VIVEKANANDHA BLOCK							
Ground Floor							
Ceiling fan	13	70	6	5460	5.46	218.4	
Tube Light	18	36	6	3888	3.888	155.52	
Projector	1	280	6	1680	1.68	67.2	
						441.12	
First Floor - RC Roof							
Ceiling fan	15	70	6	6300	6.3	252	
Tube Light	14	36	6	3024	3.024	120.96	
Projector	3	280	6	5040	5.04	201.6	
						574.56	
Second Floor - Light Roof							
Ceiling fan	15	70	6	6300	6.3	252	
Tube Light	12	36	6	2592	2.592	103.68	
						355.68	

	RESEARCH BLOCK							
	Ground Floor							
	Ceiling fan	13	70	6	5460	5.46	218.4	
	LED light	7	18	6	756	0.756	30.24	
	LED light	8	20	6	960	0.96	38.4	
	LED light	3	11	6	198	0.198	7.92	
							294.96	
	First Floor - RC Roof							
	Ceiling fan	17	70	6	7140	7.14	285.6	
	LED Light	21	20	6	2520	2.52	100.8	
	LED light	1	18	6	108	0.108	4.32	
	LED light	6	11	6	396	0.396	15.84	
	AC	15	2000	6	180000	180	7200	
	Projector	1	280	6	1680	1.68	67.2	
							7673.76	
	Second Floor - Rc Roof							
	Ceiling fan	17	70	6	7140	7.14	285.6	
	LED light	17	20	6	2040	2.04	81.6	
	LED light	10	11	6	660	0.66	26.4	
	LED light	1	18	6	108	0.108	4.32	
	AC	16	32000	6	3072000	3072	122880	
							123278	
	Third Floor - Light Roof							
	LED light	13	22	6	1716	1.716	68.64	
	LED light	4	6	6	144	0.144	5.76	
	LED light	4	8	6	192	0.192	7.68	
	LED light	35	15	6	3150	3.15	126	
							208.08	

	HOTEL MANAGEMENT							
	Ground Floor - RC ROOF							
	Ceiling fan	9	17	6	918	0.918	36.72	
	Tube Light	13	36	6	2808	2.808	112.32	
	light	3	3	6	54	0.054	2.16	
							151.2	
	First Floor - RC Roof							
	Ceiling fan	1	70	6	420	0.42	16.8	
	Tube Light	8	36	6	1728	1.728	69.12	
	Light	12	25	6	1800	1.8	72	
	Light	2	3	6	36	0.036	1.44	
	LED light	7	18	6	756	0.756	30.24	
	LED light	18	6	6	648	0.648	25.92	
	CFL	10	18	6	1080	1.08	43.2	
	AC	1	2000	6	12000	12	480	
	Wall mount fan	3	70	6	1260	1.26	50.4	
	Excessd Fan	3	70	6	1260	1.26	50.4	
							839.52	
	Second Floor - RC Roof							
	Ceiling fan	8	70	6	3360	3.36	134.4	
	Tube Light	12	36	6	2592	2.592	103.68	
	Tube Light	3	3	6	54	0.054	2.16	
	LED light	2	12	6	144	0.144	5.76	
	LED light	2	6	6	72	0.072	2.88	
	LED light	2	18	6	216	0.216	8.64	
	AC	1	2000	6	12000	12	480	
	Wall mount fan	1	70	6	420	0.42	16.8	
							754.32	
	Third Floor - RC Roof							
	Ceiling fan	12	70	6	5040	5.04	201.6	
	LED light	9	20	6	1080	1.08	43.2	
							244.8	

	ATM ROOM - Rc Roof							
	Tube Light	4	36	6	864	0.864	34.56	
	LED light	3	3	6	54	0.054	2.16	
	CFL	3	11	6	198	0.198	7.92	
	AC	2	2000	6	24000	24	960	
								1004.64
	Security Room							
	Ceiling fan	2	70	6	840	0.84	33.6	
	LED light	2	20	6	240	0.24	9.6	
	LED light	3	11	6	198	0.198	7.92	
	LED light	2	18	6	216	0.216	8.64	
	Main Gate							
	LED light	6	30	6	1080	1.08	43.2	
	LED light	6	3	6	108	0.108	4.32	
								107.28
	RO PLANT (Minaral water)							
	Ceiling fan	1	70	6	420	0.42	16.8	
	light	4	36	6	864	0.864	34.56	
								51.36

	CVR HOSTEL							
	MOTHER TERESA BLOCK – A							
	Ground Floor - RC ROOF							
	Ceiling fan	12	70	15	12600	12.6	504	
	Tube Light	22	36	15	11880	11.88	475.2	
	First Flooor - RC Roof							
	Ceiling fan	12	70	15	12600	12.6	504	
	Tube Light	21	36	15	11340	11.34	453.6	
	Second Floor - Rc Roof							
	Ceiling fan	12	70	15	12600	12.6	504	
	Tube Light	21	36	15	11340	11.34	453.6	
	Third Floor - Asbestos sheet							
	Light	27	3	15	1215	1.215	48.6	
								2943

	INDIRA GANDHI BLOCK – B							
	Ground Floor - Rc Roof							
	Ceiling fan	34	70	15	35700	35.7	1428	
	Tube Light	29	36	15	15660	15.66	626.4	
	First Floor - Rc Roof							
	Ceiling fan	34	70	15	35700	35.7	1428	
	Tube Light	29	36	15	15660	15.66	626.4	
	Second Floor - Rc Roof							
	Ceiling fan	34	70	15	35700	35.7	1428	
	Tube Light	29	36	15	15660	15.66	626.4	

	Third Floor - Rc Roof							
	Tube Light	16	36	15	8640	8.64	345.6	
	light	41	3	15	1845	1.845	73.8	
	Wall mount fan	12	70	15	12600	12.6	504	
							7086.6	
	JANSIRANI BLOCK – C							
	Ground Floor - RC ROOF							
	Ceiling fan	9	70	15	9450	9.45	378	
	Tube Light	12	36	15	6480	6.48	259.2	
	Open Air Audiorium							
	Ceiling fan	3	70	15	3150	3.15	126	
	Tube Light	4	36	15	2160	2.16	86.4	
	First Floor - Rc Roof							
	Ceiling fan	9	70	15	9450	9.45	378	
	Tube Light	12	36	15	6480	6.48	259.2	
	Second Floor - Rc Roof							
	Ceiling fan	9	70	15	9450	9.45	378	
	Tube Light	12	36	15	6480	6.48	259.2	
	Third Floor - Rc Roof							
	Ceiling fan	9	70	15	9450	9.45	378	
	Tube Light	12	36	15	6480	6.48	259.2	
							2761.2	
	SAROJINAIDU BLOCK - D							
	Ground Floor - Rc Roof							

	Ceiling fan	42	70	15	44100	44.1	1764	
	Tube Light	48	36	15	25920	25.92	1036.8	
	First Floor - Rc Floor							
	Ceiling fan	42	70	15	44100	44.1	1764	
	Tube Light	48	36	15	25920	25.92	1036.8	
	Second Floor - Rc Roof							
	Ceiling fan	42	70	15	44100	44.1	1764	
	Tube Light	48	36	15	25920	25.92	1036.8	

	Third Floor - Rc Roof							
	Ceiling fan	42	70	15	44100	44.1	1764	
	Tube Light	48	36	15	25920	25.92	1036.8	
							11203.2	
	CVR							
	CVR Office							
	Ceiling fan	16	70	15	16800	16.8	672	
	Tube Light	20	36	15	10800	10.8	432	
	LED light	4	20	15	1200	1.2	48	
	CVR, Washyard & Comman Toilet							
	Tube Light	15	36	15	8100	8.1	324	
							1476	
	CVR Dinning Hall							
	Ceiling fan	38	70	6	15960	15.96	638.4	
	Tube Light	41	36	6	8856	8.856	354.24	
	Security Room							
	Tube Light	2	36	15	1080	1.08	43.2	
							1035.84	
	MEERABAI BLOCK - E							
	Ground Floor - Rc Roof							
	Ceiling fan	29	70	15	30450	30.45	1218	
	Tube Light	35	36	15	18900	18.9	756	
	First Flooor - Rc Roof							
	Ceiling fan	29	70	15	30450	30.45	1218	

	Tube Light	39	36	15	21060	21.06	842.4	
	Second Flooor - Rc Roof							
	Ceiling fan	29	70	15	30450	30.45	1218	
	Tube Light	39	36	15	21060	21.06	842.4	
	Third Floor - Rc Roof							
	Ceiling fan	29	70	15	30450	30.45	1218	
	Tube Light	41	36	15	22140	22.14	885.6	
	CFL	2	9	15	270	0.27	10.8	
								8209.2
	LAKSMIBAI BLOCK - E							
	Ground Floor - Rc Roof							
	Ceiling fan	17	70	15	17850	17.85	714	
	Tube Light	28	36	15	15120	15.12	604.8	
	Excessd Fan	2	120	15	3600	3.6	144	
	First Floor - Rc Roof							
	Ceiling fan	20	70	15	21000	21	840	
	Tube Light	25	36	15	13500	13.5	540	
	Second Floor - Rc Roof							
	Ceiling fan	18	70	15	18900	18.9	756	
	Tube Light	21	36	15	11340	11.34	453.6	
	Third Floor - Rc Roof							
	Ceiling fan	18	70	15	18900	18.9	756	
	Tube Light	22	36	15	11880	11.88	475.2	
								5283.6
	HIGHLAND HOSTEL							
	Ground Floor - Rc Roof							
	Ceiling fan	28	70	15	29400	29.4	1176	
	Tube Light	38	36	15	20520	20.52	820.8	
	First Floor - Rc Roof							
	Ceiling fan	28	70	15	29400	29.4	1176	
	Tube Light	37	36	15	19980	19.98	799.2	

	Second Floor - Rc Roof							
	Ceiling fan	28	70	15	29400	29.4	1176	
	Tube Light	37	36	15	19980	19.98	799.2	
								5947.2
	MGC HOSTEL							
1	**Bharathiyar Block**							
	Ground Floor - RC Roof							
	Ceiling fan	4	70	15	4200	4.2	168	
	Tube Light	6	36	15	3240	3.24	129.6	
	First Floor							
	Ceiling fan	5	70	15	5250	5.25	210	
	Tube Light	7	36	15	3780	3.78	151.2	
								658.8
2	**Kodikatha kumaran Block**							
	Ground Floor - RC Roof							
	Ceiling fan	8	70	15	8400	8.4	336	
	Tube Light	11	36	15	5940	5.94	237.6	
	First Floor - Rc Roof							
	Ceiling fan	7	70	15	7350	7.35	294	
	Tube Light	10	36	15	5400	5.4	216	
								1083.6
3	**V.O.C Block - Rc Roof**							
	Ground Floor - RC Roof							
	Ceiling fan	4	70	15	4200	4.2	168	
	Tube Light	6	36	15	3240	3.24	129.6	
	First Floor - Rc Roof							
	Ceiling fan	6	70	15	6300	6.3	252	
	Tube Light	8	36	15	4320	4.32	172.8	
								722.4

4	**Kamaraj Block**							
	Ground Floor - RC Roof							
	Ceiling fan	6	70	15	6300	6.3	252	
	Tube Light	13	36	15	7020	7.02	280.8	
	First Floor - Rc Roof							
	Ceiling fan	6	70	15	6300	6.3	252	
	Tube Light	8	36	15	4320	4.32	172.8	
							957.6	
5	**Bhagatshing Block**							
	Ground Floor - RC Roof							
	Ceiling fan	7	70	15	7350	7.35	294	
	Tube Light	11	36	15	5940	5.94	237.6	
	First Floor - Rc Roof							
	Ceiling fan	10	70	15	10500	10.5	420	
	Tube Light	10	36	15	5400	5.4	216	
	Second Floor - Rc Roof							
	Ceiling fan	2	70	15	2100	2.1	84	
	Tube Light	2	36	15	1080	1.08	43.2	
							1294.8	
	Kitchen, Store Room, Dinning Room I & II							
	Ceiling fan	30	70	8	16800	16.8	672	
	Tube Light	38	36	8	10944	10.944	437.76	
	LED light	13	20	8	2080	2.08	83.2	
	LED Street Light	3	30	8	720	0.72	28.8	
							1221.8	

	Gem Room - Rc Roof						
	Ceiling fan	5	70	6	2100	2.1	84	
	Tube Light	12	36	6	2592	2.592	103.68	
							187.68
	Canteen						
	Ceiling fan	7	35	6	1470	1.47	58.8	

	Ceiling fan	11	70	6	4620	4.62	184.8	
	Tube Light	5	36	6	1080	1.08	43.2	
	LED light	9	20	6	1080	1.08	43.2	
								330
	Street Light (Lights only)							
1	**Chellammal Block**	3	35	10	1050	1.05	42	
2	**Rathakrishnan Block**	1	35	10	350	0.35	14	
3	**Er.Sujatha**	1	35	10	350	0.35	14	
4	**Main Block**	3	35	10	1050	1.05	42	
5	**Audiotorium**	8	35	10	2800	2.8	112	
6	**Chemistry Lab Near Gate**	1	35	10	350	0.35	14	
7	**Main Gate**	1	35	10	350	0.35	14	
8	**Canteen**	2	35	10	700	0.7	28	
9	**Power House**	3	35	10	1050	1.05	42	
10	**Zoology Lab Staircase near**	1	35	10	350	0.35	14	
11	**Library Backside Corner**	1	35	10	350	0.35	14	
12	**Tiled Building**	4	35	10	1400	1.4	56	
13	**Temple**	1	35	10	350	0.35	14	
14	**HMCS**	1	35	10	350	0.35	14	
15	**R/O Plant**	1	35	10	350	0.35	14	
								448