

## **Energy Audit**

The institute takes up the energy audit once in every three years. Recently East Coast sustainable (P). Ltd has been entrusted for carrying out “Detailed Energy Audit” in M/s Gayatri Vidya Parishad College of Engineering (Autonomous), Madhurawada, Visakhapatnam.

The audit aimed to optimize the energy consumption and to identify the energy saving opportunities in the facility.

East Coast has conducted field measurements at the facility during September 2022 for collection of data and measuring various energy consumption parameters to analyse and find energy saving opportunities.

In similar lines it has been resolved by the Management of the Institute to conduct Energy Audit once in every three years.

The details of the audit report are attached with this file.

Date: 21-10-2022

## **CERTIFICATE**

M/s East Coast Sustainable Private Ltd (Accredited Energy Auditing firm by Bureau of Energy Efficiency, Government of India) has conducted Energy Audit for AY 2021-2022 during September 2022 for M/s Gayatri Vidya Parishad College of Engineering (Autonomous), Gandhi Nagar, Madhurawada, Visakhapatnam, Andhra Pradesh - 530048.

Name: **G Srinivasa Rao**Designation: **Accredited Energy Auditor**

SEAL:

G. Srinivasa Rao, MIE  
Accredited Energy Auditor (BEE)  
CEA-1574, AEA-0251



# REPORT

## ON

# DETAILED ENERGY AUDIT

Conducted at



**M/s Gayatri Vidya Parishad College of Engineering  
(Autonomous) (GVPCE)**

Gandhi Nagar, Madhurawada,  
Visakhapatnam, Andhra Pradesh - 530048

Conducted by



**EAST COAST SUSTAINABLE PRIVATE LIMITED**

6-80/1, Priya Gardens, P.O Simhachalam,  
Visakhapatnam, Andhra Pradesh – 530028  
CIN: U74999AP2018PTC108807

[www.eastcoast.net.in](http://www.eastcoast.net.in)

**Septmenber-2022**

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## I. ACKNOWLEDGEMENT

**THE ENERGY AUDIT TEAM** appreciates the keen interest shown by the management of **Gayatri Vidya Parishad College of Engineering (Autonomous), Visakhapatnam** in getting Energy Audit done for conservation of energy.

**THE ENERGY AUDIT TEAM** expresses its sincere thanks to the management of “**Gayatri Vidya Parishad College of Engineering (Autonomous), Visakhapatnam**” for their trust and entrusting the assignment of Energy Audit of **Gayatri Vidya Parishad College of Engineering (Autonomous), Visakhapatnam**.

**THE ENERGY AUDIT TEAM is grateful to Dr. C.V.K Bhanu**, Dean of college, for his initiative and confidence in **THE ENERGY AUDIT TEAM** in awarding the mandatory energy audit study.

**THE ENERGY AUDIT TEAM is grateful to Dr. A. B. Koteswara Rao**, Principal of college, for his initiative and confidence in **THE ENERGY AUDIT TEAM** in awarding the mandatory energy audit study.

We are thankful to the **Gayatri Vidya Parishad College of Engineering (Autonomous)** management for giving us the opportunity to be involved in this interesting and challenging project.

We are also extremely thankful to the below management team for their hospitality, support and guidance and co-operation in undertaking this energy audit assignment.

**Mr. V.G.K. Satyannarayana - Department of maintenance.**

and all other supporting staff who have given full co-operation and support. They took keen interest and gave valuable inputs during the course of study. We would be happy to provide any further clarifications, if required, to facilitate implementation of the recommendations.

The arrangements and support during the energy audit were excellent. We deeply appreciate the interest, enthusiasm, and commitment of **Gayatri Vidya Parishad College of Engineering (Autonomous), Visakhapatnam**. towards the energy conservation.

For

The Energy Audit Team

## II. ENERGY AUDIT TEAM

Name of the Member	Role in the Project
Mr. G Srinivasa Rao	Team Leader - Accredited Energy Auditor
Mr. Azmal Basha	Team Member - Energy Auditor

*The report is made as per the Bureau of Energy Efficiency (BEE), Ministry of Power, and Govt. of India format.*

### **III. EXECUTIVE SUMMARY**

East Coast sustainable (P). Ltd has been entrusted with carrying out “Detailed Energy Audit” in Head-Office of M/s Gayatri Vidya Parishad College of Engineering (Autonomous), Visakhapatnam. optimize the energy consumption and to identify the energy saving opportunities in the facility. In this connection, East Coast has conducted field measurements at the facility during September 2022 for collection of data and measuring various energy consumption parameters to analyse and find energy saving opportunities.

The major energy inputs for the facility are Electricity, Diesel, and Water. Electricity is used for Package Air Conditioners, Severs, PCs, ACs, Fans, lighting appliances and other loads. Diesel oil is being used in the DG set to generate electricity during power failure. A detailed study was carried out with an objective to identify and prioritize the cost-effective energy conservation recommendations to decrease the energy consumption and energy costs in the facility.

GVP Institute of Technology Installed 100 kW grid-connected solar PV & 100 KW Solar and Wind system available for the benefit of campus

Grid-connected solar PV systems & Wind energy directly into the building loads without battery storage. Surplus energy, if any, is exported to the APEPDCL grid and shortfall, if any, is imported from the grid.

#### IV. LIST OF ENERGY CONSERVATION RECOMMENDATIONS

The following are the energy conservation recommendations identified in the facility.

**Table 1: List of Energy Saving Recommendations**

S. No	Name of the recommendation	Savings (kWh/year)	Monetary Savings (Rs. /year)	Investment (Rs.)	Payback period (Months)	Remarks
1	Retrofit FTL to LED	74649	567336	972000	20	
2	Retrofit Ceiling Fan to BLDC Fan	44928	342351	4212000	147	

## V. IMPORTANT INFORMATION

- a) Name and Address of the plant : M/s Gayatri Vidya Parishad  
College of Engineering  
Visakhapatnam,  
Andhra Pradesh - 530048  
India
- b) Line of Activity : Educational Institutional
- c) Contact Person and Details : Mr. V.G.K. Satyannarayana  
Phone: +91- 9550107792  
E-mail: [gmtse@gvpce.ac.in](mailto:gmtse@gvpce.ac.in)
- d) Period of Audit : September- 2022
- e) Contracted Maximum Demand (CMD) : 450 kVA
- f) Maximum Recorded Demand (M.D) : 423 kVA (Apr-2022)
- g) Minimum Recorded Demand (M.D) : 80 kVA (May-2021)
- h) Power factor (PF) : 0.97 (Avg.)
- i) Energy Consumption & their cost details :

**Table 2: List of Electricity Consumption details**

<b>Electricity Consumption details for April 2021- March 2022</b>			
Cost of Electricity		: Rs. 7.65/Unit Kvah	
Demand Charges		: Rs. 475/kVA	
<b>S. No</b>	<b>Particulars</b>	<b>Unit</b>	<b>Value</b>
1	Monthly Avg. Consumption of Electricity	kwh/Month	73241
2	Monthly Avg. Bill of Electricity	Rs./ Month	765378
3	Yearly Consumption of Electricity	Kwh/Year	878895
4	Yearly Bill of Electricity	Rs./ Year	9184541
5	Maximum Electricity Consumption (April-2022)	kwh/Month	1249789
6	Minimum Electricity Consumption (May- 2021)	kwh/Month	326020

**Table 3: Water Consumption details**

<b>Water Consumption Details for May 2021- April 2022</b>			
<b>S. No</b>	<b>Particulars</b>	<b>Unit</b>	<b>Value</b>
			<b>Water</b>
1	Yearly Water Consumption	KL/year	85440
2	Monthly Water Consumption	KL/Month	8544
3	Daily Water Consumption	KL/Day	356

<b>Drinking Water Consumption Details for May 2021- April 2022</b>			
<b>S. No</b>	<b>Particulars</b>	<b>Unit</b>	<b>Value</b>
			<b>Water</b>
1	Yearly Water. Consumption	KL/year	1200
2	Monthly Water. Consumption	KL/Month	120
3	Daily Water Consumption	KL/Day	5

**Table 4: Electrical & Solar Consumption details**

<b>Solar &amp; Energy Consumption Details for August 2021- August 2022</b>			
<b>Month</b>	<b>EB Power Bill Energy</b>	<b>Solar Power Bill Energy</b>	<b>Consumed Units</b>
Aug-21	79698	8744	88442
Sep-21	78036	6482	84518
Oct-21	61149	8063	69212
Nov-21	101736	5793	107529
Dec-21	94265	8248	102513
Jan-22	61007	8479	69486
Feb-22	73442	9709	83151
Mar-22	120908	10490	131398
Apr-22	122114	10799	132913
May-22	124881	10717	135598
Jun-22	100631	9017	109648
Jul-22	123533	7079	130612
Aug-22	108876	8711	117587

# 1 INTRODUCTION

## 1.1 GENERAL DETAILS

The Gayatri Vidya Parishad College of Engineering (Autonomous) (GVPCE) is a private college that was established in the year 1996. The educational trust, Gayatri Vidya Parishad (GVP) is formed, managed and promoted by academicians and technocrats in Visakhapatnam, India. The college offers instruction to 1200 undergraduate students in seven branches of engineering. The institution also offers Master of Computer Applications program affiliated to Jawaharlal Nehru Technological University, Kakinada. All the under-graduation programs are accredited by NBA in 2006. The Institute encourages collaborative learning between industry and academia as a means of reinforcing its curriculum with practical and real-world experiences.

The institute was approved by AICTE and got the status of Autonomous college under JNTU and has got accreditation by NAAC of UGC with “A” grade, NBA accreditation for all the UG courses being offered.

GVP research potential spans over diverse disciplines like CAD/CAM, Signal Processing, Time Frequency Transform application to non-Stationary signal Analysis, System modelling and Identification, Adaptive Filtering, Machine Intelligence, Manufacturing, Product Design, Energy, Information Technology and Structural Engineering. It encourages its researchers to participate in a wide range of research collaborations in the premier Institutes of India. GVP organizes various International/ National conferences and Workshops in different thrust areas to discuss and disseminate latest research findings in many burning issues to enable technology for mankind.

GVP group is very active in promoting renewable energy and energy conservation. Solar PV power plant of 200 kWp was installed at the facility.

The audit covered an in study of the distribution transformers, pumps, Blowers, Air conditioning system, DG set and lighting system. The energy audit covered study of all the major energy consuming equipment.

## 1.2 SCOPE OF THE STUDY:

The major energy consuming loads of the facility are

- HVAC (Package AC units, Split AC units, Window AC units)
- Lights and Fans
- Water Pumps and Fire Water pumps
- PCs, Servers (UPS load)

## **2 DESCRIPTION OF ENERGY SYSTEMS**

### **2.1 ENERGY SYSTEMS DESCRIPTION**

The major inputs for the facility are

- i. Electricity from APEPDCL,
  - ii. Diesel oil for DG sets as a backup for power and
  - iii. Water for domestic use and fire fighting
- 
- Electricity is the major input energy and used for HVAC, Lighting, Pumping and running the office equipment like Servers, Computers, Printers, etc.
  - Diesel oil is used in DG sets to generate power in case of power failure.
  - Water is being used for drinking, cooking, washrooms, and firefighting.

### **2.2 ELECTRICAL ENERGY ANALYSIS**

The electricity is sourced from APEPDCL. The following are the details of the electrical supply.

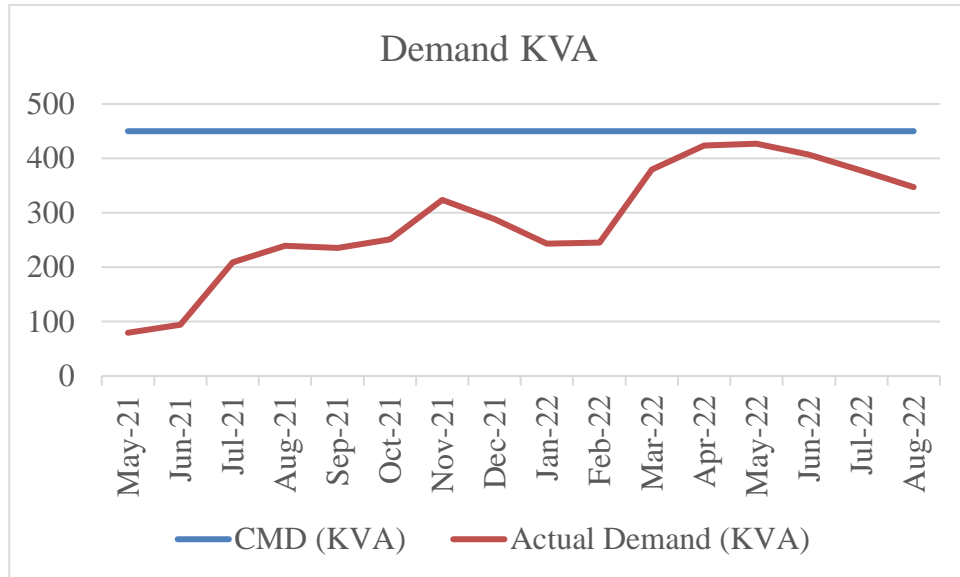
- The facility has a Maximum Contract Demand (CMD) of 450 kVA.
- The facility has installed 1 No of Transformer of capacity 630 kVA
- The plant has 2 DG sets of 2x250 kVA each capacity and is used in the event of power failure.
- Grid supply is available at 11 kV and is stepped down to 415 Volts. The average power factor is maintained at 0.9 (avg.)
- The annual electricity consumption of plant is 878895 kwh (Units) from August-2021 to August-2022. The electricity consumption is varied from 326020 kwh to 1249789 kwh and the average monthly electricity consumption is 73241 kwh

**Table 5: Month wise electricity consumption May 2021 – August 2022**

<b>Electricity Bill</b>									
<b>Month &amp; Year</b>	<b>CMD (KVA)</b>	<b>Actual Demand (KVA)</b>	<b>Billing Demand (kVa)</b>	<b>Consumed Units (kWh)</b>	<b>Demand Charges Rs.475/- per kVa</b>	<b>Energy Charges Rs.7.65 per unit</b>	<b>Electricity Duty Re.0.06 per unit</b>	<b>TOD Charges if any</b>	<b>Total amount paid so far</b>
May-21	450	79.56	360	19280	171000	147492	1264	4858	326020.00
Jun-21	450	94.14	360	21705	171000	166043	1360	4575	344384.25
Jul-21	450	209.46	360	45555	171000	348496	2736	7069	530706.75
Aug-21	450	239.4	360	79698	171000	609690	4781	12378	834321.70
Sep-21	450	235.14	360	78036	171000	596975	4682	12660	819498.40
Oct-21	450	250.68	360	61149	171000	467790	3671	9014	652880.85
Nov-21	450	323.7	360	101736	171000	778280	6104	14876	971666.40
Dec-21	450	288.06	360	94265	171000	721127	5655	16749	915937.25
Jan-22	450	243.48	360	61007	171000	466704	3662	11258	654029.55
Feb-22	450	245.28	360	73442	171000	561831	4406	13224	751867.30
Mar-22	450	379.26	379.26	120908	180149	924946	7254	19686	1133440.70
Apr-22	450	423.3	423.3	122114	201068	934172	95330	17813	1249788.60
May-22	450	427.02	427.02	124881	202835	955340	124886	17622	1302088.15
Jun-22	450	407.34	407.34	100631	193487	769827	100631	13797	1079147.65
Jul-22	450	378.06	378.06	123533	179579	945027	123533	18016	1288552.12
Aug-22	450	347.46	360	108876	171000	832901	108876	16215	1151389.57
<b>Total</b>			<b>4830</b>	<b>1003776</b>	<b>2294051</b>	<b>7678886</b>	<b>265791</b>	<b>161782</b>	<b>6801312.45</b>
<b>Maximum</b>		<b>423</b>	<b>423</b>	<b>122114</b>	<b>201068</b>	<b>934172</b>	<b>95330</b>	<b>19686</b>	<b>1249789</b>
<b>Minimum</b>		<b>80</b>	<b>360</b>	<b>19280</b>	<b>171000</b>	<b>147492</b>	<b>1264</b>	<b>4575</b>	<b>326020</b>

### 2.2.1 RECORDED MAXIMUM DEMAND PATTERN

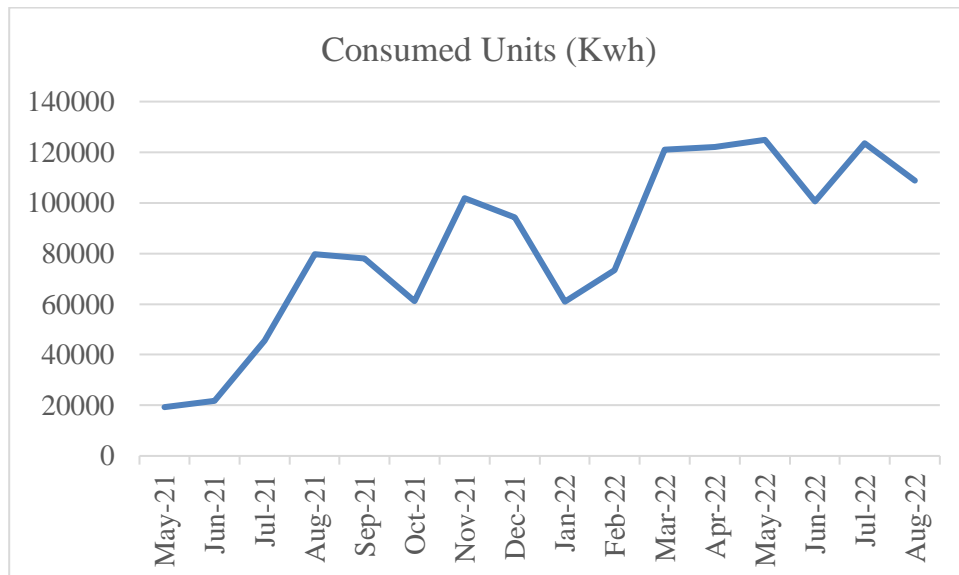
The below is the recorded demand pattern of the facility from May- 2021 to August -2022.



**Figure 1:Recorded Maximum Demand Pattern**

### 2.2.2 ELECTRICITY CONSUMPTION PATTERN

The following is the electricity consumption pattern for the facility from May-2021 to August-2022. The electricity consumption is high during the August- 2021 and consumption is low in the month of May-2021.



**Figure 2: Month wise electrical consumption pattern****2.3 WATER SYSTEM**

Majority of water source for GVP campus facility is met with from their internal open wells and borewells. Apart from that, management has also made arrangement for tankers and municipal water supply board for meeting the deficit demand of entire campus. Multiple pumps of various types and capacities have installed across the different location of campus for water transportation. Further from the overhead tank, water pipe lines of different size (1.5”, 2” and 3”) are drawn for gravity distribution to different blocks of hostelsetc. Several tanks are installed at individual building blocks of campus for water storage and regulated utilization. Location of the GVP pumps along with their sources are given.

**Table 6: Water Storage Details**

Pump Identification	Type	Capacity HP	Total Numbers
Main Campus	Submersible	5	3
Boys Hostel	Submersible	5	1
Girls Hostel	Submersible	5	2

**2.4 CAPACTOR DETAILS**

The plant has installed a total capacitor banks of 120 KVAR mainly to reduce the kVA demand of the facility. The capacity breakup details are provided below:

- SS-1:  $2 \times 25 + 2 \times 20 + 3 \times 10 = 120 \text{ kVAR}$

**2.5 TRANSFORMER LOAD MANAGEMENT**

Based on the loading pattern of the main transformers, the following parameters like percentage loading, best efficiency point and all day efficiency are calculated and the details are given in the table 4.13. Table 4.13 Transformer performance parameters Parameters Transformer rating (kVA) 630. Best Efficiency point (40.1 %) Loading (32.4 %) it is seen that the load on the transformer is operating less than its ‘Best operating point ‘or ‘Optimal loading point’ and transformer operating losses are on minimum side. The annual transformer losses accounts to 1.5% of the total facility annual energy consumption.

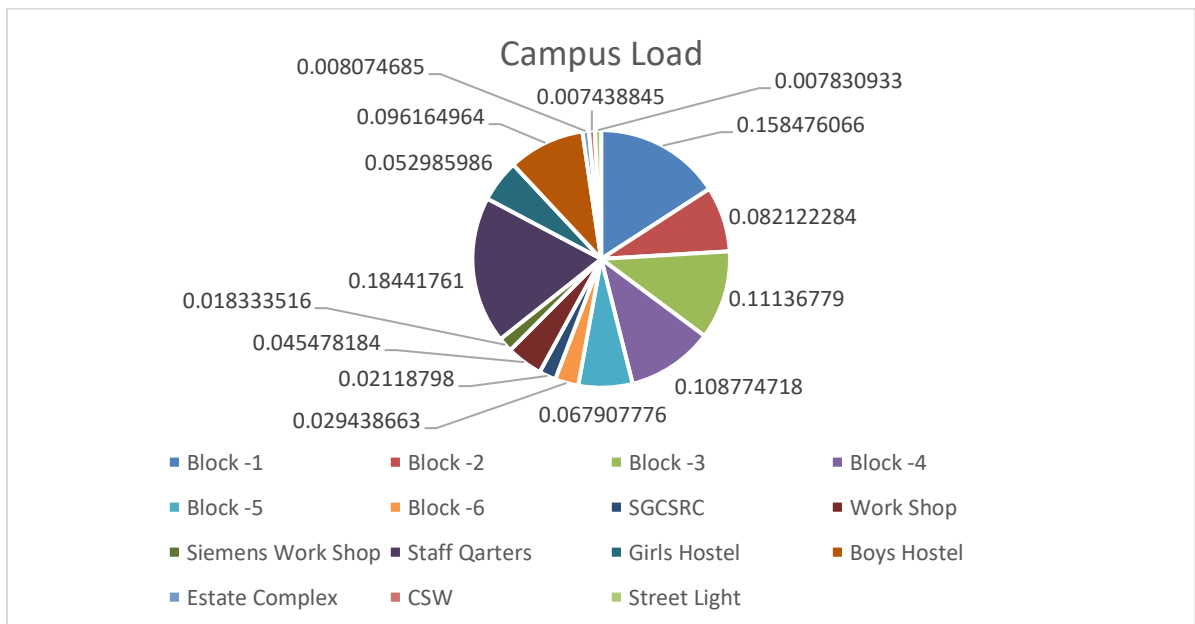
## 2.6 ENERGY DISTRIBUTION

The distribution of electricity is presented in the following pie-chart.

The % of energy share pattern is as given below:

**Table 7: Energy share pattern**

Sl.No	Block Name	Power (KW)	% Of Energy Share
1	Block-B8	15.5	2%
2	Block-B7	13.1	1%
3	Block-B6	16.0	2%
4	Block-B5	39.3	4%
5	Block-B4	13.4	1%
6	Block-B3	38.8	4%
7	Block-B2	82.2	9%
8	Block-B1	20.8	2%
9	Block-B10	14.9	2%
10	Block-B11	83.5	9%
11	Block - B12	8.3	1%
12	Work Shop	113.4	13%
13	Siemens Work Shop	45.7	5%
15	Girls Hostel	132.2	15%
16	Boys Hostel	239.9	27%
19	Street Light	19.5	2%
20	Total	896.4	100%



**Figure 3: % of Energy share pattern**

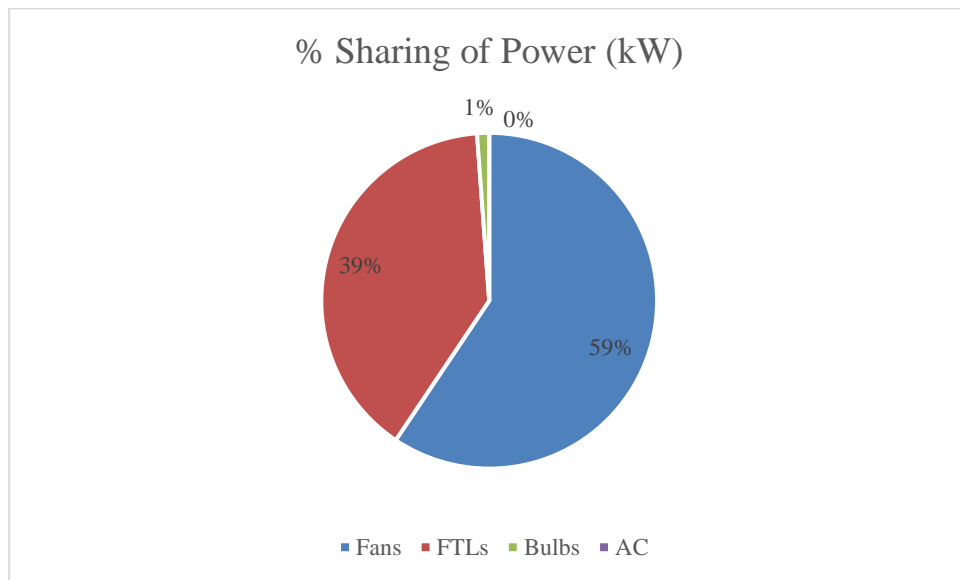
## 2.7 ENERGY DISTRIBUTION OF DIFFERENT BLOCKS

The distribution of electricity is presented in the following pie-chart.

The % of energy share pattern is as given below:

**Table 8: Block-8 Energy share pattern**

Block-B8				
S.No	Appliance	Nos	Power (kW)	% Sharing of Power (kW)
1	Fans	115	9.2	59%
2	FTLs	197	6.108	39%
3	Bulbs	10	0.18	1%
4	AC	0	0	0%
	Total	322	15.488	100%

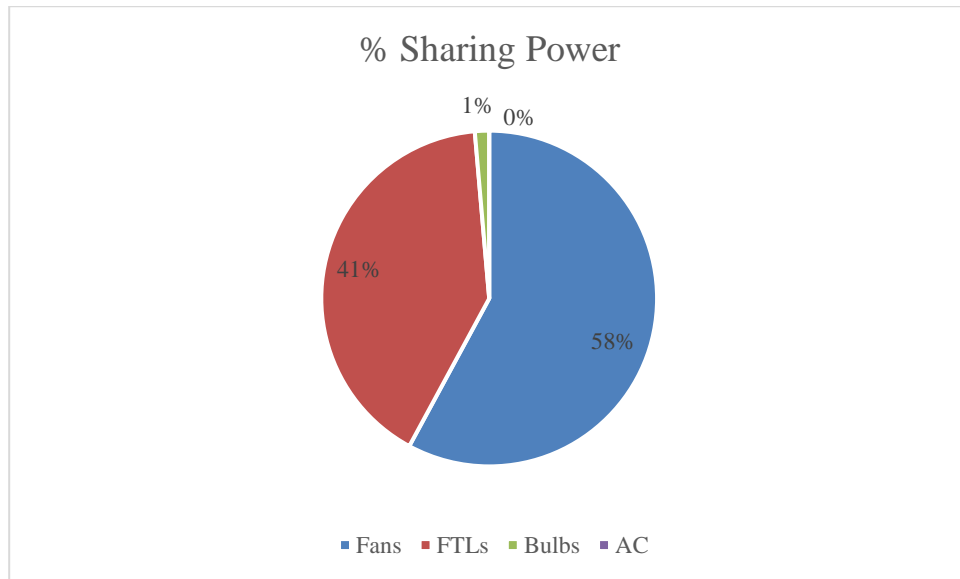


**Figure 4: Block-8 % of Energy share pattern**

**Table 9: Block-7 Energy share pattern**

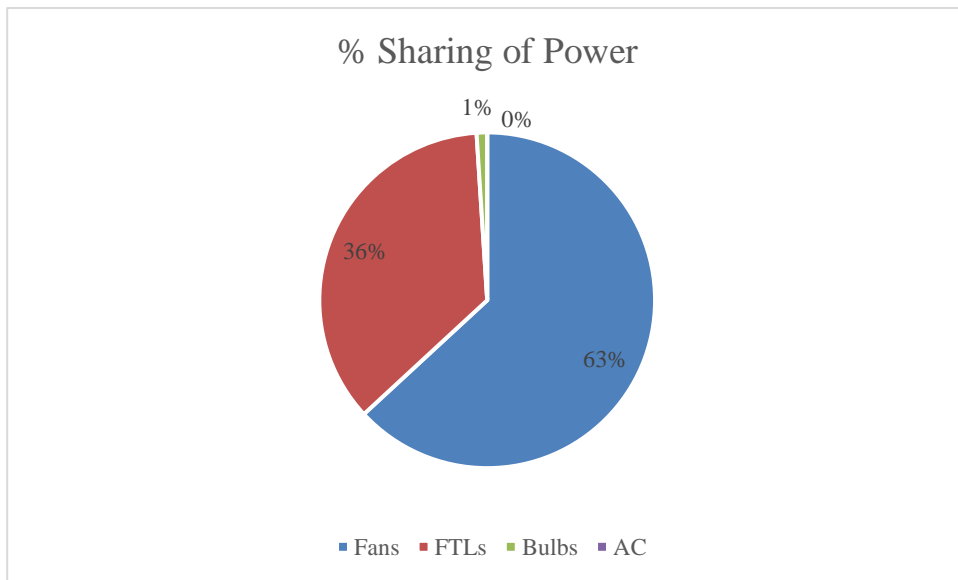
<b>Block-B7</b>				
<b>S.No</b>	<b>Appliance</b>	<b>Nos</b>	<b>Power (kW)</b>	<b>% Sharing of Power (kW)</b>
1	Fans	95	7.6	58%
2	FTLs	174	5.346	41%
3	Bulbs	20	0.18	1%
4	AC	0	0	0%
	Total	289	13.126	100%

**Figure 5: Block-7 % of Energy share pattern**



**Table 10: Block-6 Energy share pattern**

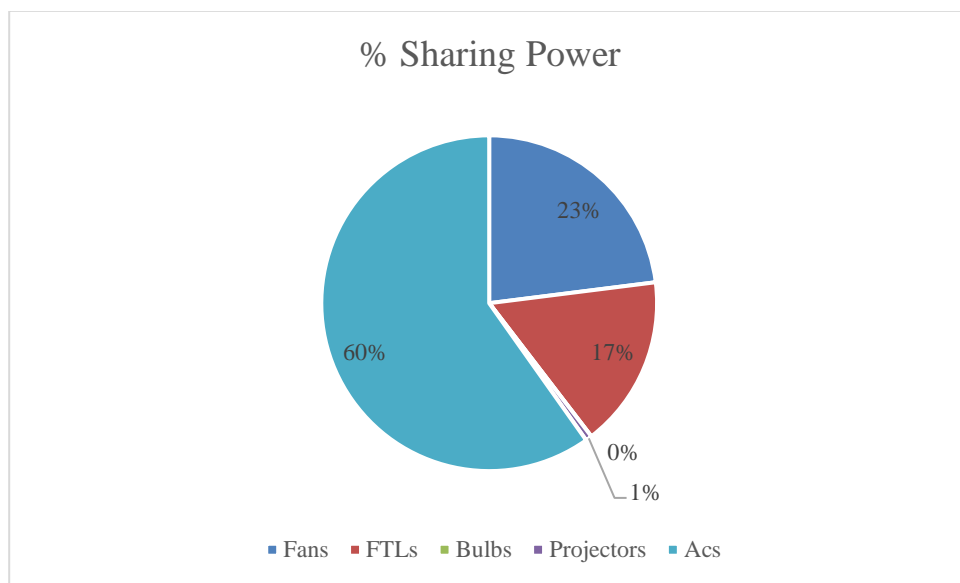
<b>Block -B6</b>				
<b>S.No</b>	<b>Appliance</b>	<b>Nos</b>	<b>Power (kW)</b>	<b>% Sharing of Power (kW)</b>
1	Fans	126	10.08	63%
2	FTLs	159	5.724	36%
3	Bulbs	19	0.162	1%
4	AC	0	0	0%
	<b>Total</b>	<b>304</b>	<b>15.966</b>	<b>100%</b>



**Figure 6: Block-6 % of Energy share pattern**

**Table 11: Block-5 Energy share pattern**

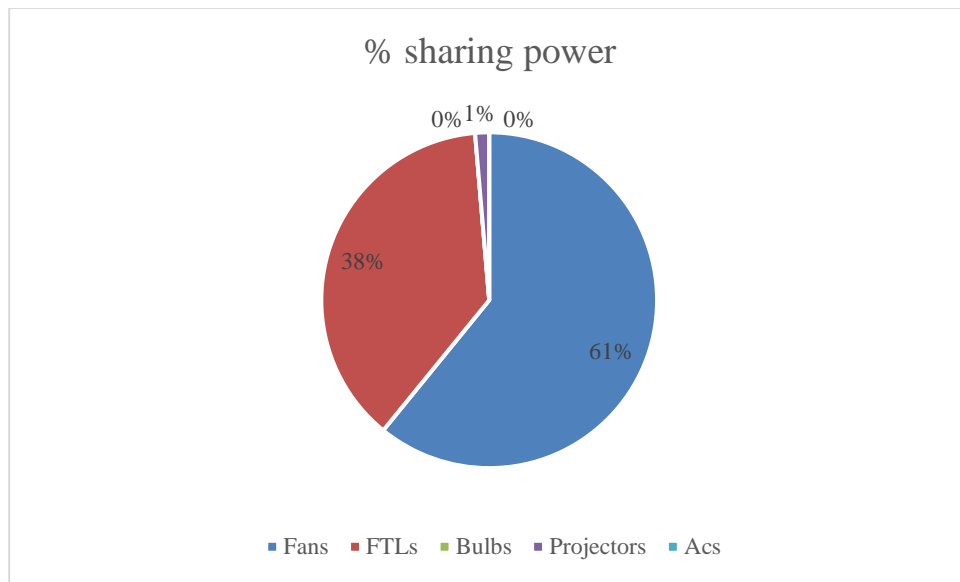
Block-B5				
S.No	Appliance	Nos	Power (kW)	% Sharing of Power (kW)
1	Fans	113	9.04	23%
2	FTLs	197	6.516	17%
3	Bulbs	0	0	0%
4	Projectors	2	0.24	1%
5	AC's	18	23.5	60%
	Total	330	39.296	100%



**Figure 7: Block-5 % of Energy share pattern**

**Table 12: Block-4 Energy share pattern**

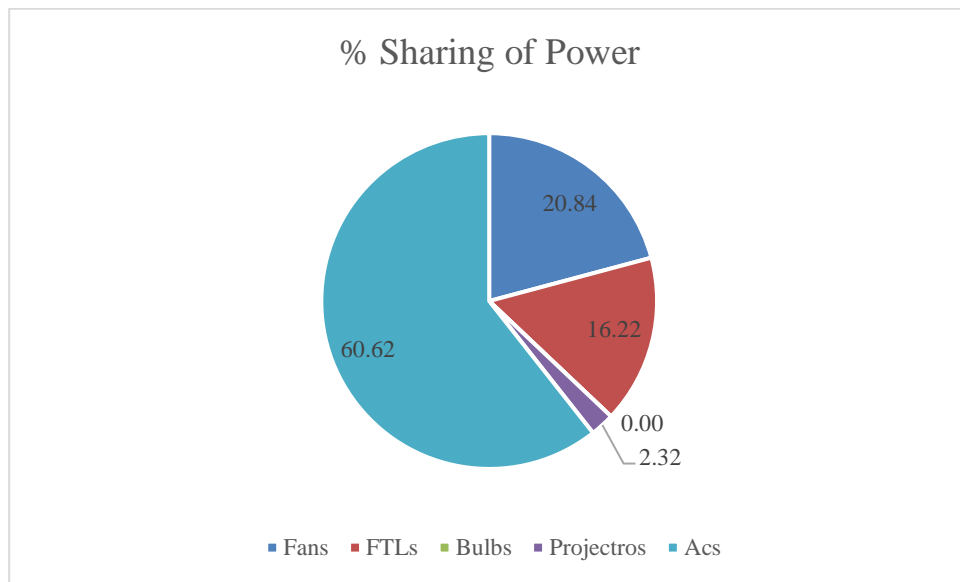
Block-B4				
S.No	Appliance	Nos	Power (kW)	% Sharing of Power (kW)
1	Fans	113	8.16	61%
2	FTLs	155	5.064	38%
3	Bulbs	0	0	0%
4	Projectors	3	0.18	1%
5	AC's	0	0	0%
	Total	271	13.404	100%



**Figure 8: Block-4 % of Energy share pattern**

**Table 13: Block-3 Energy share pattern**

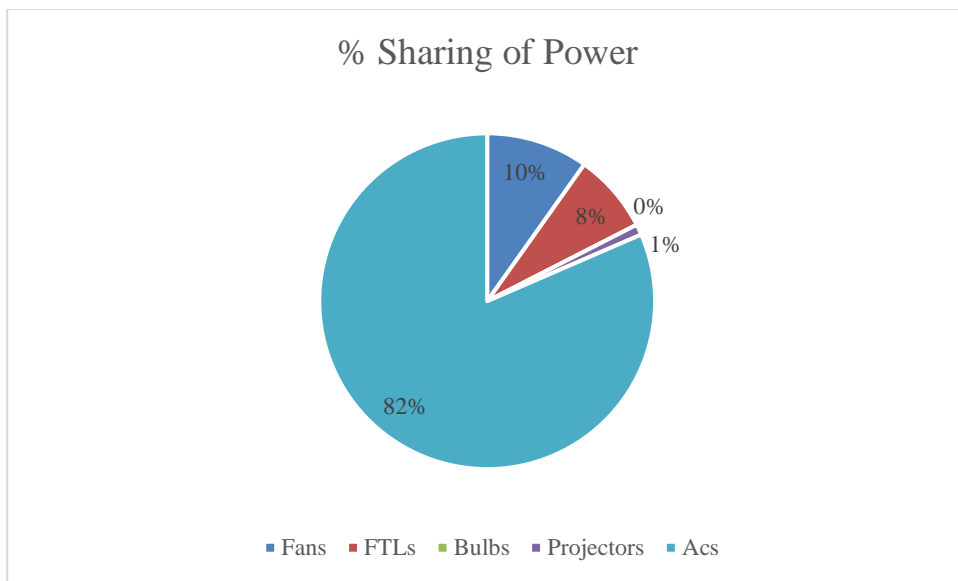
Block-B3				
S.No	Appliance	Nos	Power (kW)	% Sharing of Power (kW)
1	Fans	101	8.08	20.84
2	FTLs	180	6.288	16.22
3	Bulbs	0	0	0.00
4	Projectors	9	0.9	2.32
5	AC's	22	23.5	60.62
	Total	312	38.768	100.00



**Figure 9: Block-3 % of Energy share pattern**

**Table 14: Block-2 Energy share pattern**

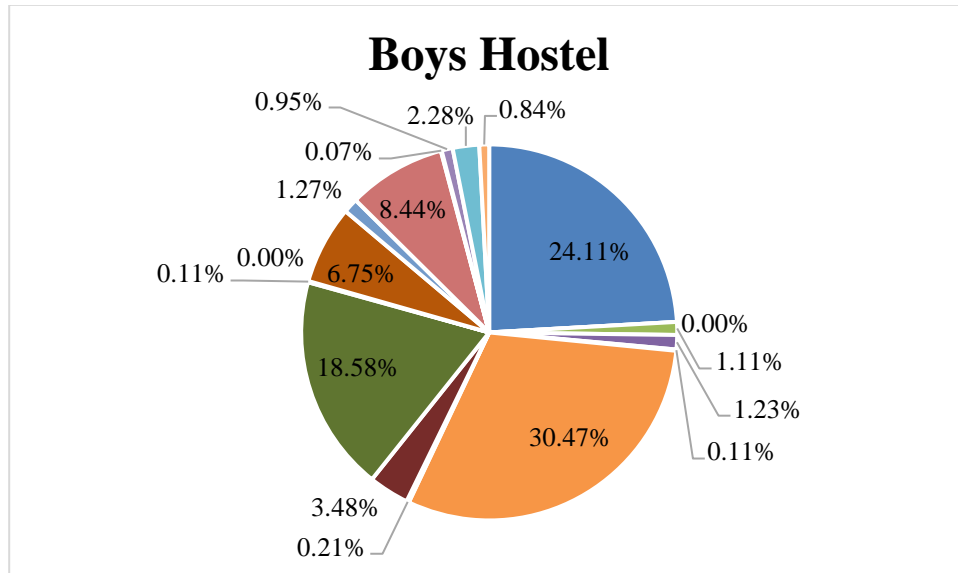
Block-B2				
S.No	Appliance	Nos	Power (kW)	% Sharing of Power (kW)
1	Fans	120	8.08	10%
2	FTLs	226	6.288	8%
3	Bulbs	0	0	0%
4	Projectors	8	0.84	1%
5	AC's	39	67	82%
	Total	393	82.208	100%



**Figure 10: Block-2 % of Energy share pattern**

**Table 15: Boys Hostel Energy share pattern**

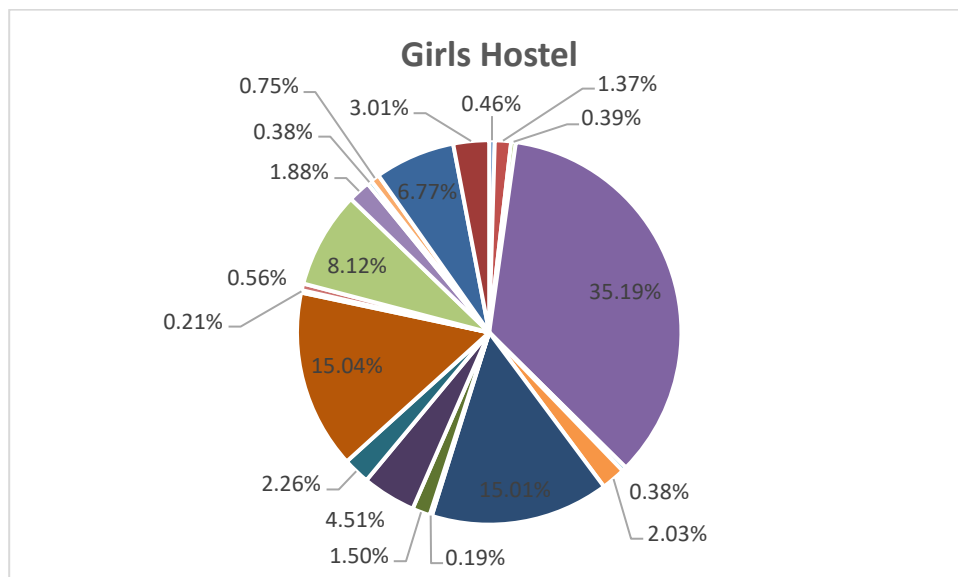
Sl.No	Appliance	Nos	Power (W)	Power (KW)	% Sharing of Power
1	C Fans	762	75	57.15	24.11%
2	AC	0	0	0	0.00%
3	CFL	239	11	2.629	1.11%
4	Ex Fans	45	65	2.925	1.23%
5	W Fan	4	65	0.26	0.11%
6	P. Point	1204	60	72.24	30.47%
7	Cooler	1	500	0.5	0.21%
8	Lamp	458	18	8.244	3.48%
9	T Lights	801	55	44.055	18.58%
10	TV	1	250	0.25	0.11%
11	Cold Storage	0	2000	0	0.00%
12	Greaser	8	2000	16	6.75%
13	Grinders	4	750	3	1.27%
14	Heating Elements	10	2000	20	8.44%
15	Pesto	3	55	0.165	0.07%
16	Potato Piller	3	750	2.25	0.95%
17	Stablizer	1	5400	5.4	2.28%
18	SV lamps	8	250	2	0.84%
	<b>Total</b>			<b>237</b>	<b>100%</b>



**Figure 11: Boys Hostel % of Energy share pattern**

**Table 16: Girls Hostel Energy share pattern**

Sl.No	Appliance	Power (KW)	% Sharing of Power
1	CFL	0.616	0.46%
2	Ex Fans	1.82	1.37%
3	W Fan	0.52	0.39%
4	P. Point	46.8	35.19%
5	Cooler	0.5	0.38%
6	Lamp	2.7	2.03%
7	T Lights	19.965	15.01%
8	TV	0.25	0.19%
9	Cold Storage	2	1.50%
10	Greaser	6	4.51%
11	Grinders	3	2.26%
12	Heating Elements	20	15.04%
13	Pesto	0.275	0.21%
14	Potato Piller	0.75	0.56%
15	Stabilizer	10.8	8.12%
16	SV lamps	2.5	1.88%
17	Oven	0.5	0.38%
18	UPS	1	0.75%
19	UPS	9	6.77%
20	Water Cooler	4	3.01%
	<b>Total</b>	<b>132.996</b>	<b>100%</b>



**Figure 12: Girls Hostel % of Energy share pattern**

## 2.8 PUMPS

During the audit it was observed that, 8 pumps are installed in the Campus. 8 pumps are Submersible is in operation. The details of the pumps are presented below:

Pump Identification	Type	Capacity HP	Total Numbers
Main Campus	Submersible	5	3
Boys Hostel	Submersible	5	1
Girls Hostel	Submersible	5	2

**Main Campus:** Five submersible pump (5 HP) is installed. Normally operates continuously 6 hours in a day for supplying water at central locality of campus. Estimated efficiency was found to be very low mainly due to ageing of pump and suspected silt accumulation near the foot valves leading restricted flow.

**Boys Hostel:** One submersible pump (5HP) is installed. Normally operates 8-12 hours in a day for supplying water to Tank filling operations. Estimated efficiency was found to be low due to higher velocity as the installed pipeline is found to be very small.

**Girls Hostel:** Two submersible pump (5HP) is installed. Normally operates 18-12 hours in a day for supplying water to Tank filling operations. Estimated efficiency was found to be low due to ageing and performance deterioration after re-wounded motor twice in the past.

## 2.9 10.4 Canteen

During the canteen (boys & girls' hostel) study, we came across the following observations

- LPG is the main source of energy for cooking and hot water generation, with monthly consumption of total 160-180 cylinders (Boys – 70, Girls -70 and canteen-12) in a month.
- Apart from that significant organic solid waste generated as mentioned below: → Wet waste - 290 kg / day → Dry (vegetable waste) - 40 kg /day → Cooked Food - 110 kg / day → Garden Waste (Plantation) - 500 kg /day

**RECOMMENDATION: 1**

<b>A: Title of Recommendation</b>	:	<b>Retrofit Ceiling Fan with BLDC Fans</b>
<b>B: Description of Existing System and its operation</b>	:	Existing luminaries for Office are Ceiling Fans which consumes 80 W
<b>C: Description of Proposed system and its operation</b>	:	Retrofit Ceiling Fan with energy efficient BLDC fan to reduce the energy consumption. The BLDC Fan will consume 40 W.
<b>D: Energy Saving Calculations</b>		
Present No. of Ceiling Fans		1404
Present Ceiling Fan Consumption W	:	80
Proposed Consumption of BLDC Fan	:	40
Achievable power savings(W)	:	40
Operating Hours (@ 4 hrs./day & 200 D/Y)	:	800
Total Energy Savings kWh/year	:	44928
<b>E: Cost Benefits</b>		
Energy Saving Potential / year	=	44928
Cost Savings / year@ unit cost Rs. 7.60/ unit	=	3,42,351
Investment (@ Rs. 3000/Fan)	=	4212000
Payback Period in months	=	147

**RECOMMENDATION: 2**

<b>A: Title of Recommendation</b>	:	<b>Retrofit FTL with LED Light Lamps</b>
<b>B: Description of Existing System and its operation</b>	:	Existing luminarie lighting are FTL Lamps which consumes 36 W
<b>C: Description of Proposed system and its operation</b>	:	Retrofit FTL Light's with energy efficient LED Lights to reduce the energy consumption. The LED Lights will consume 20 W without compromising on the illumination levels.
<b>D: Energy Saving Calculations</b>		
Present No. of FTLs		1944
Present Fixture Consumption of (W)	:	36
Proposed Consumption of LED Tube Light(W)	:	20
Achievable power savings(W)	:	16
Operating Hours (@ 12 hrs./day & 260 D/Y)	:	2400
Total Energy Savings kWh/year	:	74649
<b>E: Cost Benefits</b>		
Energy Saving Potential / year	=	74649
Cost Savings / year@ unit cost Rs. 7.60/ unit	=	567336
Investment (@ Rs. 500/LED)	=	972000
Payback Period in months	=	20