USTM

Unveiling Excellence

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ENERGY & ELECTRICITY AUDIT REPORT
2018-19

UNIVERSITY OF SCIENCE & TECHNOLOGY MEGHALAYA

PREFACE

University of Science & Technology Meghalaya is always concerned with the environmental issues to receive the best of attention. Improvement of environmental quality is one of the primary objectives of the University and towards achieving a better environmental health, a self-enquiry on the environmental quality in the campus has been made. This status report is second of its kind and expects that subsequent enquiry will be made on a periodic interval to keep us aware of the environmental status. The Energy and Electricity Audit Committee constituted by USTM for the year 2018-2019 deliberated on various environmental issues, identified gaps and suggested measures for improvement. It is always heartening to see incremental progress shown due to efforts of University authority. Documentation of the status of environment is an essential component for developing a holistic concept of a University. This report is a compilation of records available as well as new data/information generated as a part of audit.

It is to be admitted that there are limitation in compilation because concept of Energy and Electricity audit had late entry into the University system. However this compilation provides an overall insight into the status of campus.

The effort of the committee is commendable in arriving at some important observations which will have definite contribution in our effort for a better environment.

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Energy and Electricity Audit

Energy and electricity audit covers the aggregate consumption of power on the campus. It covers consumption of natural gas and fuels (diesel) in the different academic and administrative blocks, shopping complex, hostels and auditorium. It tries to decipher if renewable energy sources like solar energy facilities are available on the campus. Moreover, since LED lights are more environmentally sustainable than CFLs and fluorescent bulbs, the audit evaluates the percentages of CFL, LED (bulb and tube light) and fluorescent (bulb and tube light) used on the campus.

In the words of Energy Conservation Act, 2001, Energy Audit is "the verification, monitoring and analysis of the 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".

The month wise unit consumption in the campus during 2018 and 2019 is shown in

Figure 1; In aggregate, the average monthly power consumption in the campus in **2018** was **52899 KVAH** while in **2019** it is found to be **46172 KVAH.**

Figure 2; implying that there is a reduction in average monthly power consumption by **23 %.**

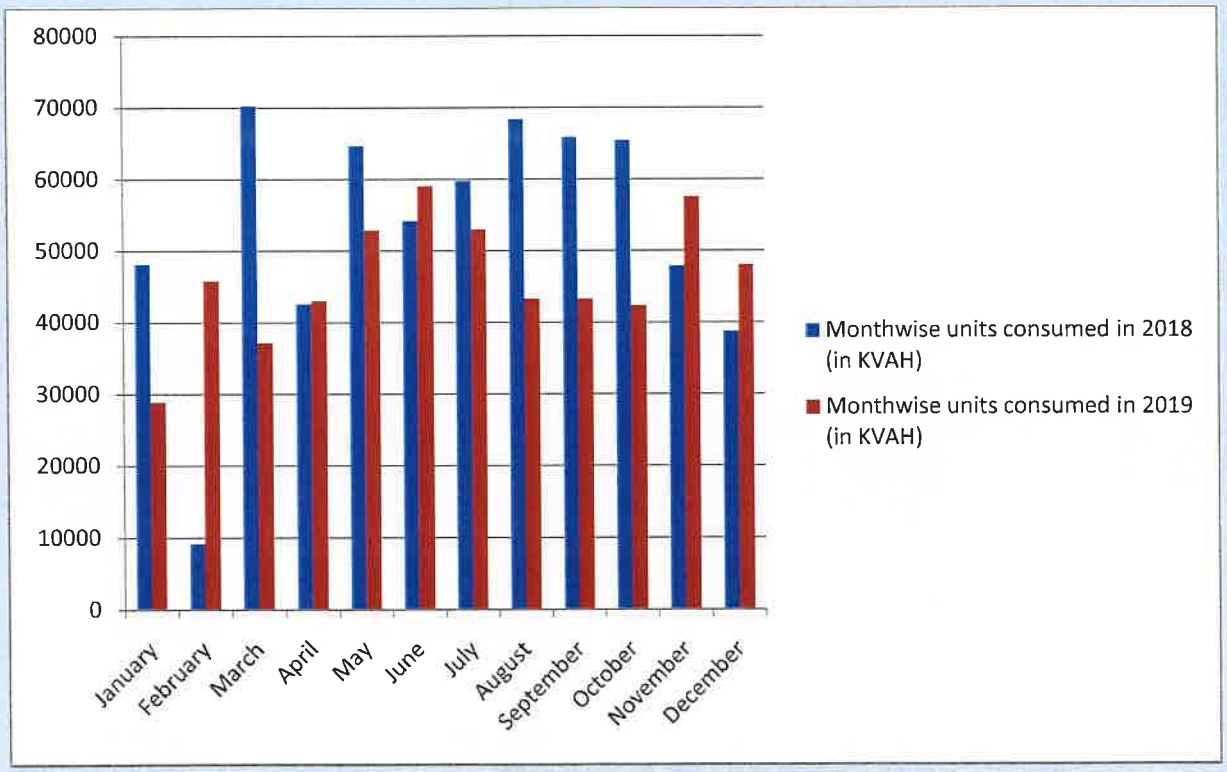

Figure 1: Month wise unit consumption in 2018 & 2019

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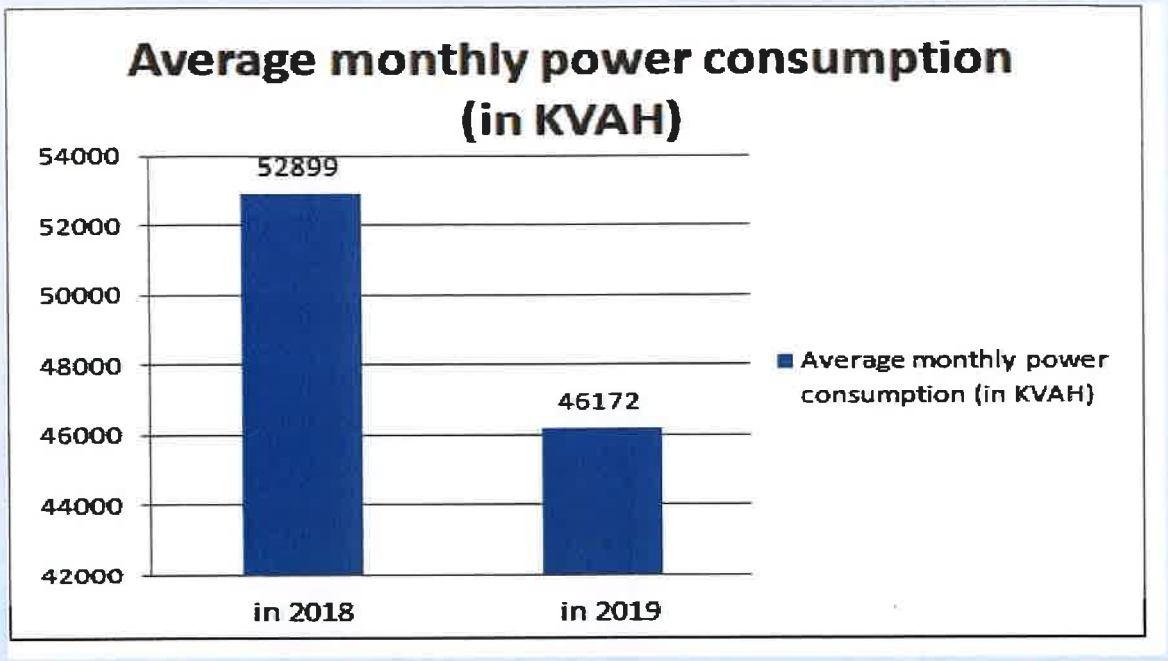

Figure 2: Average monthly power consumption in 2018 & 2019

The survey finds that:

- On average, the Administration block of the University has **15 % LED** Tube light & Bulb, **74% of CFL light, 11% of fluorescent tube** light.
- On average, the Academic blocks of the University has **32 % LED tube light, 11% of LED bulb, 44% of CFL light, 13% of fluorescent tube** light and no incandescent& fluorescent bulb.

Solar Lighting:

The University also has standalone solar street light facility. It has 50 nos. of 12 Watt, 10 nos. of 15 Watt and 6 nos. of 30 Watt solar street lights. Recently, the University has also installed its own solar generating plant in the campus with a generation capacity of 5.2 kW of power. The University has also future plans of expanding this generation capacity by installing more solar plants.

An energy saving potential of **0.802 MU** per annum was observed, which is summarized as below. **It has been found an energy saving potential of about 23%.**

1. Retrofitting of 40W fluorescent tube lights with conventional ballast with 18W LED tubes can save **12878.4 kWh** per year and financial saving of **Rs. 1,21,057.**

2. 60W fan regulator can be replaced with new and energy saving efficient electric regulator which saves **7770 kWh** per year and financial saving of **Rs. 73,038.**

3. Retrofitting old & inefficient split type AC with 5 star AC. The expected energy saving potential is **10754 kWh** per year and financial saving of **Rs. 1,01,088**

4. The monthly maximum (MD) recorded during January 2019 to December 2019, ranges from 139 kVA to 168 kVA. But, the contract demand is 130 kVA. As per the tariff regulation, the consumer has to pay the extra demand charges of more than Rs. 150 per kVA.

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RECOMMENDATIONS

The following recommendations are made for short and medium term implementations.

1. Replacement of CFL and other fluorescent lights with LED during next one year.
2. Expansion of generation of solar power should be up to 250 kW in next three years.
3. Retrofit the existing inefficient/old/obsolete appliances/equipments, with energy efficient and environment friendly appliances/equipments (such as LED bulbs/Tubes, Star rated Fan, Inverter Air Conditioners, water pumps etc.)
4. Balance loads in feeders and maintain Harmonic Distortion Level, within limit.
5. Maintain standard lux levels at the different Areas /Class rooms/Departments of the campus.
6. Ensure DG maintenance, as per the periodic maintenance check list. It should be dust free air intake to the engine, improve air filtration, calibration of Fuel injection pump. Carryout regular field trails to monitor DG Set performance and maintenance plan as per requirement.
7. Apply sun films/curtains on the window panes of air conditioned rooms and avoid heat leakage of the set the thermostat temperature range 25-26 degree Celsius.
8. Conduct Energy Conservation Awareness Campaign among the staff for reducing Energy Consumption and display posters/slogans of Energy Conservation, Electrical Safety etc. at conspicuous places.
9. Update Single Line Diagram (SLD), regularly.
10. Plant trees and plants, which is very desirable for ambient temperature campus atmosphere and energy saving.
11. Establish a Facility Management System, exclusively for energy efficiency activities.

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Energy Saving Potential of the University of Science & Technology, Meghalaya (Consolidated):

A. Retrofitting Lights, Fans and Air Conditioners with Energy efficient appliances						
Sl No	Name of Building (Location)	No. of Equipment Retrofitted	Annual Energy Saving (kWh)	Annual Energy Financial Savings Rs.	Investment Required (In Rupees)	Pay Back Period (Years)
1	Administrative Building , Block-A	235	13299.52	125015.5	368870	4.4
2	Building, Block-B	143	5929.84	55740.5	124240	5.3
3	Building, Block-C with Central Library	282	9605.88	90295.27	217200	2.8
4	Building, Block-D & Computer Lab:	347	16339.66	153592.1	234780	3.0
5	Building, Block-E (Dept of Biological Science)	115	4851.06	45599.96	107680	2.7
6	Building, Block-F (Dept of Botany)	37	921	8657.4	22080	2.3
7	Dept. of Sociology Building, Block-G	248	8051.3	75682.22	137290	2.7
8	Dept.of Chemistry, Env. Science & Geography Building, Block-H	226	6295.5	59177.7	163060	3.1
9	Boy's Hostel Building	139	2119.2	19920.48	82820	6.5
10	Girl's Hostel Building	45	675	6345	51750	8.1
11	Street Lighting	38	12171.6	114413	383875	5.8
TOTAL			80260	7.5 Lakh	19 Lakh	4.3 Years

Annual Energy saving potential at USTM of approximately **80259.56 kWh** and a financial savings of about **Rs. 7.5 lakh** with an effective payback period of **4.3 years**.

An investment of approximately **Rs. 19 Lakh** is required for the implementation of energy savings recommendations.

(Payback period is higher for the buildings where energy savings is less which is due to the fact that comparatively less usage of appliances and also the appliances used are comparatively energy efficient. It also depends on the cost of the appliances/equipments.)

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Executive Summary of the Buildings/ Areas

1. Administrative Building , Block-A

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	32	1536	14438.4	7680	0.53
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	10	43.20	406.08	2400	5.9
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	0	0	0	0	0
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	111	1056.6	9932.04	8880	0.89
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	35	525.0	4935	40250	8.15
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	10	4864	45721.6	309660	6.77
7.	Operation of Computer in sleep/ shut down mode, when not in use.	37	5274.72	49582.36	No investment	-

An investment of approximately Rs.3.68 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 13299.62 units and financial saving of Rs.1,25,015.50 with simple payback period of 4.4 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 1728 Units (Rs.16,243) for Block-A.

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2. Building, Block-B

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	40	1920	18048	9600	0.53
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	5	216	2030.4	1200	0.59
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	37	888	8347.2	7770	0.93
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	10	96.4	906.16	1200	1.32
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	37	810	7614	42550	5.58
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	2	285.12	2680.13	61920	23.1
7.	Operation of Computer in sleep/ shut down mode, when not in use.	12	1714.32	16114.61	No investment	-

An investment of approximately Rs.1.24 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 5929.84 units and financial saving of Rs.55,740.50 with simple payback period of 5.3 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 1440 Units (Rs.13536)for Block-B.

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3. Building, Block-C with Central Library

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	57	2736	25718.40	14820	0.6
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	5	216	2030.4	1200	0.6
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	42	1008.0	9475.2	8820	0.9
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	52	499.2	4692.48	6240	1.3
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	108	1620	15228	124200	8.1
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	2	1245.72	11709.77	61920	5.3
7.	Operation of Computer in sleep/ shut down mode, when not in use.	16	2280.96	21441.02	No investment	-

An investment of approximately Rs.2.17 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 9605.88 units and financial saving of Rs.90295.27 with simple payback period of 2.8 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 1340 Units (Rs.12,596) for Block-C.

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4. Building, Block-D & Computer Lab:

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	24	1152	10828.8	5760	0.5
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	6	228	2143.2	1440	0.7
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	24	576	5414.4	13440	2.5
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	64	614.40	5775.36	7680	1.3
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	18	270	2538	20700	8.1
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	6	3737.16	35129.30	185760	5.3
7.	Operation of Computer in sleep/ shut down mode, when not in use.	205	9762.1	91763	No investment	-

An investment of approximately Rs.2.34 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 16339.66 units and financial saving of Rs.16,339.66 with simple payback period of 3.0 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 9744 Units (Rs.91,593) for Block-D.

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5. Building, Block-E (Dept of Biological Science)

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	25	1200	11280	6000	0.5
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	5	432	4060.8	1200	0.3
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	10	240	2256	2100	0.9
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	6	57.6	541.44	720	1.3
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	58	870	8178	66700	8.1
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	1	622.86	5854.88	30960	5.3
7.	Operation of Computer in sleep/ shut down mode, when not in use.	10	1428.6	13428.84	No investment	-

An investment of approximately Rs.2.34 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 16339.66 units and financial saving of Rs.16,339.66 with simple payback period of 2.7 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 6724 Units (Rs.63,205)for Block-E.

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6. Building, Block-F (Dept of Botany)

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	7	336	3158.4	1680	0.5
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	0	0	0	0	0
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	15	360	3384	3150	0.9
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	0	0	0	0	0
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	15	225	2115	17250	8.1

An investment of approximately Rs.0.22 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 921 units and financial saving of Rs.8657.40 with simple payback period of 2.3 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 1200 Units (Rs.11,280) for Block-F.

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7. Dept. of Sociology Building, Block-G

Sl No	Description of Work	No of Equip ments	Annual Energy Saving Potential (kWh)	Annual Energy Financi al Saving s Rs	Investme nt Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	40	1920	18048	9600	0.53
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	0	0	0	0	0
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	57	1368	12859. 2	11970	0.9
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	6	57.6	541.44	720	1.3
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	100	1500	14100	115000	8.1
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	0	0	0	0	0
7.	Operation of Computer in sleep/ shut down mode, when not in use.	45	3205.7	30133. 58	No investmen t	-

An investment of approximately Rs.1.37 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 8051.3 units and financial saving of Rs.75682.22 with simple payback period of 2.7 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 6230 Units (Rs.58,562)for Block-G.

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8. Dept. of Chemistry, Env. Science & Geography Building, Block-H

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	18	864	8121.6	4320	0.5
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	0	0	0	0	0
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	44	1056	9926.4	9240	0.9
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	0	0	0	0	0
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	130	1950	18330	149500	8.1
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	0	0	0	0	0
7.	Operation of Computer in sleep/ shut down mode, when not in use.	34	2425.5	22799.7	No investment	-

An investment of approximately Rs.1.63 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 6295.5 units and financial saving of Rs.59177.7 with simple payback period of 3.1 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 5210 Units (Rs.48,974) for Block-H.

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9. Boy's Hostel Building

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes	33	79.2	744.48	7920	10.6
2.	Retrofitting of existing 36W Ordinary Tube lights with 18 W LED Tubes	0	0	0	0	0
3.	Retrofitting of Existing 20W Ordinary Tube lights with 10 W LED Tubes	50	1200	11280	10500	0.9
4.	Retrofitting of Existing 11W CFL with 7 W LED Lamps	0	0	0	0	0
5.	Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.	56	840	7896	64400	8.1
6.	Retrofitting of Existing inefficient and old Air Conditioners with Inverter Air Conditioner	0	0	0	0	0
7.	Operation of Computer in sleep/ shut down mode, when not in use.	0	0	0	0	0

An investment of approximately Rs.0.82 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 2119.2 units and financial saving of Rs.19920.48 with simple payback period of 6.5 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 4800 Units (Rs.45,120)for Boy's Hostel.

10. Girl's Hostel Building

Sl No	Description of Work	No of Equip ments	Annual Energy Saving Potentia l (kWh)	Annual Energy Financi al Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	**Retrofitting of existing 40W Ordinary Tube lights with 20 W LED Tubes**	0	0	0	0	0
2.	**Retrofitting of Existing inefficient and old Fan with 5 Star Rated Fans.**	45	675	6345	51750	8.15

An investment of approximately Rs.0.51 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 675 units and financial saving of Rs. 6345 with simple payback period of 8.1 years.

USTM has already invested for 29.71% LED tube light, 9.79% of LED bulb, 23.34% of CFL light 6.7% for LED Lighting and energy saved 6230 Units (Rs.58,562) for Girl's Hostel.

11. Auditorium

1. Stage Lightings are consuming total of 87 KW and power consumption can be controlled in operation of lights by using as and when it requires.

2. Air Conditioning of the Auditorium consuming 42 KW and Power Consumption can be controlled by adjustments of the required temperature.

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12. Street Lights

Sl No	Description of Work	No of Equipments	Annual Energy Saving Potential (kWh)	Annual Energy Financial Savings Rs	Investment Required (In Rupees)	Payback Period in Years
1.	Retrofitting of existing 56 W Ordinary lights with 30 W LED Light	6	561.6	5279.04	11100	2.1
2.	Retrofitting of existing 45W Street lights with 30 W LED Lights	17	9180	86292	31450	0.4
Retrofitted of Solar Light for Street Lighting at Auditorium and at Block-A Areas:						
Sl No	**Description of Work**	**No of Equipments**	**Annual Energy Saved (kWh)**	**Annual Energy Financial Savings Rs**	**Investment done (In Rupees)**	**Payback Period in Years**
1.	Newly installed of Solar Street Light of 20W	15	3240	30456	341325	11
2.	Newly installed of Solar Street Light of 12W	47	2592	95428	1059750	11
3.	Power of 5.2KW Roof Top off-Grid Solar PV Panel with Battery	1 Set	14976	140774	722500	5.1
Total Energy Saved			20808	266658	21,23,575	8

An investment of approximately Rs.042 Lakh is required for the implementation of above recommendations. This would be results an annual energy saving of 9741 units and financial saving of Rs. 91565 with simple payback period of 2 years.

USTM has already invested for 40 % Solar LED Solar Street Lighting and energy saved 20808 Units financial saving done of Rs.2,66,658 and Investment done Rs. 21,23,575 with simple payback period of 8 years.

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13. Water Pumps :

Sl No	Location	Capacity of Water Pumps	Type of Pump	No of Working Hrs per Day	Consumption in kWH
1	Admin Bdg-Block –A	5 HP	Submersible	6	22.4
2	Block -E	7.5 HP	Monoblock	7	39.2
3	Boy's Hostel -A	5 HP	Submersible	8	29.6
4	Garden Area (Near J Block)	5 HP	Submersible	8	29.6
5	Block -G	5 HP	Submersible	6	22.2
6	Boy's Hostel -B	5 HP	Submersible	10	37.0
7	Kasturi Girl's Hostel	5 HP	Submersible	6	22.2

Ordinary submersible pumps are filled with radial flow impeller having efficiency range 35 to 50%. Whereas submersible mixed flow impeller pumps have efficiency up to 80%. (Bronze / stainless steel impeller).
Existing radial flow impeller submersible pumps has replaced with mixed flow stainless steel impeller.

Maintain the water tanks, pipe lines and taps are in the leak proof condition. Install water meter in each building water line and monitor the consumption every month. If any abnormal water consumption seen, find the reason and control it.

Energy Conservation Opportunities in Pumping Systems:

1. Ensure availability of basic instruments at pumps like pressure gauges, flow meters.
2. Operate pumps near best efficiency point.
3. Modify pumping system and pumps losses to minimize throttling.
4. Adapt to wide load variation with variable speed drives or sequenced control of multiple units.
5. Stop running multiple pumps - add an auto-start for an on-line spare or add a booster pump in the problem area.
6. Use booster pumps for small loads requiring higher pressures.

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14. Rain Water harvesting & Bio-gas plant:

USTM has installed a Rain Water Harvesting Plant at Boy's Hostel-B, having Capacity of 15000 Liters during rainy season and it will save the water pump Consumption of 61.6 kWH and Energy Financial saving of Rs.580 per day.

15. Motion Sensor for Illumination & Day Light:

- USTM has installed the Motion sensors for the Illuminations at the Area of\ Hostel Toilets and Administrative Block and it saving the energy consumption
  in illuminations.

- At the Buildings of Block-G & Block-H has architectural designed for the coming of day light at the Class Rooms and it saving the illumination consumption during
  day time.

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Energy Conservation Initiatives

Use of LED Lights in Central Auditorium

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Solar Plant

High Mast LED Lights

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Sensor based Energy Conservation

Motion Sensor Door

Sensor for Light

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