Energy Audit Report

of

Smt. Meenalben Mehta College, Panchgani, 412805 Year 2017-18

Submitted to

The Principal,

Smt. Meenalben Mehta College, Pachgani, 412805

BY

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Preface

Electrical Energy conservation/Audit is the effort made to reduce the consumption of energy by using less energy consuming devices and services. This can be achieved either by using efficient and Non dissipative electrical and electronics devices more efficiently or by suggesting or imposing restrictions on time duration of amount of service used. The actual consumption of energy computed considering, how much tubes, fan, A.Cs, electronic instruments, etc in each room. The necessary data required for the audit was collected using the energy consumption Bills of Maharashtra State Electricity Distribution Company (MSDCL), Wattage /consumption from each block/Room, Science laboratory, Use of energy in Different time slots, Voltages and Currents measurement's at different period Zone etc. The main aim of this audit to recognize energy proficient appliances such as LED tubes, LEDs Bulbs, use of Invertor based fans/ Motars pumps. The Students, faculty of Physics Department and members of the criterion-VII helped for collecting the data and Survey.

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ABBREVIATIONS

- CFL: Compact Fluorescent LampFTL: Fluorescent Tube Lamp
- kVA : kilo Volt Ampere
- kVAr : kilo Volt Ampere reactive
- kW : kilo Watt
- kWp :kilo Watt peak
- kWh : kilo Watt hour (Unit of Electricity)
- LED : Light Emitting Diode
- LT : Low Tension
- PF : Power Factor
- MEDA : Maharashtra Energy Development Agency
- MSEDCL : Maharashtra State Electricity Distribution Company
- Solar PV : Solar Photo Voltaic

ACKNOWLEDGEMENT

The Audit team of Department of Physics thanks, Principal Dr. Arun Gade for assigning Energy Audit Survey of the institution to us.

The Audit team sincerely acknowledges the co-operation and kind support by staff members of the institution for extending their help throughout the study.

We also thank Maharashtra Energy Development Agency for facilitating this study.

Team: Dr. Milind M. Sutar, Energy Auditor & Department of Physics

EXECUTIVE SUMMARY

Bill Analysis from the monthly electricity, the total yearly average electricity consumption was **6090** kWH per year amounting to nearly Rs.78,000/. Now Here the Institute uses hybrid devices like filament lamp, CFL lamps for lighting purpose.

For improving energy efficiency and reducing energy bill following suggestions and observations are made:

| Sr. | Recommendations | Savir | ngs | Investment |
|-----|---|----------|----------|------------|
| No. | | kWh/year | Rs/year | Rs. |
| 1 | Installing LED tube lights and Bulbs | 1100 | 14,414/- | 10,000/- |

Apart from the above suggestions, as a renewable energy and sustainability initiative, it is recommended to install 3kW roof top solar PV power plant which can save the 25% of annual electricity consumption of the college.

Also, following suggestions are made for energy saving purpose:

- All computers have to be set for power save mode for switching off screen if not used for 05 minutes and hibernate if not used for more than 60 minute.
- Students may be educated towards saving of electricity by displaying messages in the classroom and common public area for switching off lights, fans and computers when not required.
- Fans should be used only in the hot summer climate and has to be replaced by 5 STAR rated energy efficient fans to reduce consumption

1. INTRODUCTION

Smt. Meenalben Mehta College of was previously have only two faculties viz. Arts and Commerce. From June 2014-15 with reference to special case and demand of 12th Science students in the Hilly region the faculty Programme extended by starting Science wing. The college is affiliated to Shivaji University, Kolhapur. The college offers undergraduate courses namely, B.A., B.Com, and B. Sc. through Marathi /English medium and other certificate courses to B.A., B.Com, and B. Sc. Students.

Methodology Adopted

The Audit is conducted as per the guidelines given by State Electricity Board:

- 1. Relevant Data Collection like list of lighting fixtures, pumps, etc.
- 2. Measurement of main supply Voltage, Current, kW, kVA and kVA are done and the trend is recorded.
- 3. Analysis of the past data for understanding the consumption patterns.
- 4. Recommendation of energy efficiency improvement projects and methods to reduce the energy cost.
- 5. Analysis of Techno-economic feasibility of the projects with Simple payback.

Instruments Used

Following instruments are used for the study:

- a. Single Phase Power meter.
- b. Three phase Power meter
- c. Lux Meter for light level measurements

1 PAST ELECTRICITY BILLS ANALYSIS

Electricity Consumption (2017-18)

1.1 Monthly electricity consumption analysis

- The College has one single Phase connection. Following table gives the detail of bills:
- Load Allowed:5KW
- Meter No. 6107177501

Following table showing the electricity consumption in Units and amounting Rupees.

| 2017-18 | | | | | |
|---------|-------|-----------------------|-------------|--|--|
| Month | Unit | KWH | Amt. Rs. | | |
| Feb-17 | 463 | 463 | 5900 | | |
| Mar-17 | 678 | 678 | 8823 | | |
| Apr-17 | 514 | 514 | 6593 | | |
| May-17 | 398 | 398 | 5016 | | |
| Jun-17 | 290 | 290 | 3548 | | |
| Jul-17 | 387 | 387 | 4472 | | |
| Aug-17 | 358 | 358 | 4472 | | |
| Sep-17 | 1002 | 1002 | 13228 | | |
| Oct-17 | 455 | 455 | 5791 | | |
| Nov-17 | 486 | 486 | 6213 | | |
| Dec-17 | 455 | 455 | 5791 | | |
| Jan-18 | 604 | 604 | 7817 | | |
| Total | 6090 | 6090 | 77664 | | |
| Avg. | 507.5 | 507.5 | 6472 | | |
| | | Average Cost Per Unit | 12.75270936 | | |

 Table 1-1: Electricity Consumption Analysis (Feb2017 to Jan2018)

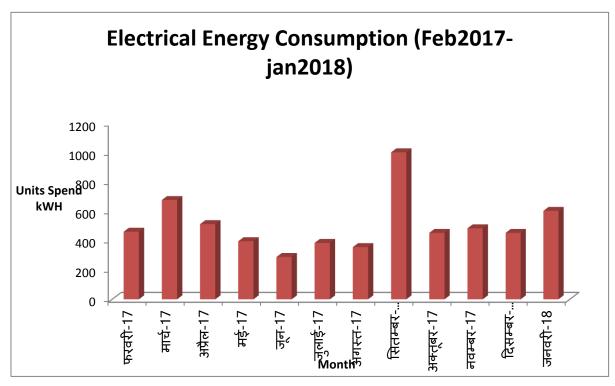


Figure 1-1: Electricity Consumption pattern(2017-18)

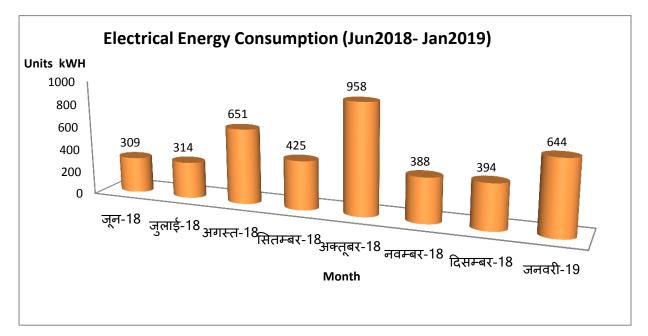
- The average Electrical Energy Consumption per day in Academic year 2017-18 is **17** Units.
- Highest Electrical Energy consumption was recorded in the month of September 2017.
- The average Electrical Energy Consumption per day cost works out to be □.221/-.
- Monthly average consumption is 507.5 kWH amounting to □
 6472/-.
- The yearly average electricity Units consumption is 6090 kWH amounting to \Box 77,664/- per year.
- The consumption pattern is shown above.

Electricity Consumption (2018-19)

| Month | Unit | Amt Rs. | |
|--------------------|-------|----------|--|
| | | | |
| Jun-18 | 309 | 7,310.00 | |
| Jul-18 | 314 | 5,860.00 | |
| Aug-18 | 651 | 5,850.00 | |
| Sep-18 | 425 | 9,840.00 | |
| Oct-18 | 958 | 5,450.00 | |
| Nov-18 | 388 | 4,110.00 | |
| Dec-18 | 394 | 3,880.00 | |
| Jan-19 | 644 | 6,480.00 | |
| Tot | 4083 | 48780 | |
| Avg. Unit | 510.2 | (007.00 | |
| Consumption /month | 510.3 | 6097.00 | |
| Avg. Unit | 17 | 203.00 | |
| Consumption /day | - / | 200.00 | |

Table 1-2: Electricity Consumption Analysis (Jun2018 to Jan2019)

Figure 1-2: Electricity Consumption pattern (2018-19)



- The average Electrical Energy Consumption per day in Academic year 2018-19 is **17** Units.
- The average Electrical Energy Consumption per day is 17 Units
- Highest Electrical Energy consumption was recorded in the month of October 2018.
- The average Electrical Energy Consumption per day is **cost works out to be Rs. 11/-.**
- The yearly average electricity Units consumption is 6090 kWH amounting to **Rs.73,000/-** per year.
- The consumption pattern is shown above.
- Conclusion:

From above Electrical Energy Consumption Analysis, it is observed that after following the suggestions of Energy saving options of low energy consuming devices, the comparative analysis study shows that this initiative has saved power consumption.



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