# Energy Audit Report

# (2020 – 21)

For

**Dhamangaon Education Society's**

## Adarsha Science, J. B. Arts and Birla Commerce Mahavidyalaya,

**Dhamangaon Railway, Dist: Amravati**


**Prepared by**

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# Preface

Data collection for energy audit of the Adarsha Science, J. B. Arts and Birla Commerce Mahavidyalaya, Dhamangaon Rly was conceded by the team for the period of April 2019 to March 2020.

This audit was over sighted to inquire about convenience to progress the energy competence of the campus. All data collected from each classroom, laboratory etc. The work is completed by considering how many tubes, fans, A. Cc., electronic instruments, etc. in each room and their participation in total electricity consumption.

The objective of the audit was to study the energy consumption pattern of the facility, identify the areas where potential for energy saving exists and prepare proposals for energy saving along with investment with payback periods.

# Acknowledgement

We are very much thankful to principal, Dr. Y. B. Gandole and IQAC coordinator, Dr. A. G. Naranje for motivating us and giving us the opportunity for energy audit. We would like to express our sincere thanks to all the faculties and staff members from each department for providing us necessary information and data for this audit survey.

# Introduction

The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream. It may include a process or system to reduce the amount of energy input into the system without negatively affecting the output.

The energy demand in every institution is growing day by day for to meet the international level comfort. This is challenge for every institution to ensure that energy growth in institute does not become unmanageable. As natural resources are limited and energy uses are increasing very sharply so it is very necessary to save natural resources by reducing energy consumption which can be achieved by using energy efficient equipment's and also by awareness of peoples about energy conservation.

In this energy audit survey, we collected data from every department and then find out the energy consumption in each department. The power consumption is calculated by considering the consumption of various devices such as tube lights, CFL bulbs, LED bulbs, fans, A. Cs. practical laboratory equipment's etc. from each department. The scope for energy conservation is found out by replacing the equipment's with equivalent energy efficient equipment's. The data generated in energy audit are useful for to understand the energy distribution and utilization of the college.

# Department wise Energy Requirement:

## 1) Department of Physics

| Sr. No. | Name of the Appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light (F) | 40 | 9 | 4 | 1440 |
| 2 | CFL bulb | 24 | 2 | 5 | 240 |
| 3 | Ceiling Fans | 80 | 6 | 6 | 2880 |
| 4 | Cooler | 300 | 1 | 0.5 | 150 |
| 5 | PC (LED monitor) | 60 | 3 | 3 | 540 |
| 6 | Printer | 500 | 2 | 0.2 | 200 |
| 7 | Scanner | 12 | 1 | 0.5 | 6 |
| 8 | LCD Projector | 300 | 1 | 0.5 | 150 |
| 9 | Refrigerator (185 L) | 1.5KWHr/day | 1 | 1 | 1500 |
| 10 | Lab equipment's for practical | 300 | 10 | 2 | 6000 |
| 11 | Microwave Oven | 1400 | 1 | 0.1 | 140 |
| 12 | Muffle Furnace | 5000 | 2 | 0.1 | 1000 |
| 13 | Water Distillation Plant | 5000 | 1 | 0.1 | 500 |
| | Total | | | | 14746 |
| | Power Requirements in one day | | | | 14.746 unit |
| | Average Power requirement in one year | | | | 5382.29 units |
| | Average power requirement in one month | | | | 448.52 units |
| | **Remarks:** | | | | |
| 1. | Replacement of Old electric fittings. | | | | |
| 2. | 3 -phase connection for furnace and water distillation plant is taken from microbiology lab. Separate 3-phase connection should be provided to avoid power load | | | | |

## 2) Department of Computer Science

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light (F) | 40 | 11 | 6 | 2640 |
| 2 | Exhaust Fan | 60 | 3 | 2 | 360 |
| 3 | Ceiling Fans | 80 | 8 | 6 | 3840 |
| 4 | PC (LED monitor) | 60 | 12 | 3 | 2160 |
| 5 | Laptop | 50 | 1 | 2 | 100 |
| 6 | Printer | 500 | 3 | 0.5 | 750 |
| 7 | LCD Projector | 300 | 2 | 2 | 1200 |
| | Total | | | | 11050 |
| | Power Requirements in one day | | | | 11.05 unit |
| | Average Power requirement in one year | | | | 4033.25 unit |
| | Average power requirement in one month | | | | 336.1 unit |

## 3) Department of Chemistry

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| **A** | **B** | **C** | **D** | **E** | **F = C × D × E** |
| 1 | Tube light (F) | 40 | 11 | 6 | 2640 |
| 2 | CFL light | 22 | 1 | 6 | 132 |
| 3 | Exhaust Fan | 60 | 2 | 0.5 | 60 |
| 4 | Ceiling Fans | 80 | 6 | 4 | 1920 |
| 5 | Wall Fan | 40 | 2 | 4 | 320 |
| 6 | PC (LED monitor) | 60 | 4 | 2 | 480 |
| 7 | Scanner | 12 | 1 | 1 | 12 |
| 8 | Printer | 500 | 1 | 0.5 | 250 |
| 9 | LCD Projector | 300 | 1 | 0.5 | 150 |
| 10 | Refrigerator | 2 KWHr/Day | 1 | 1 | 2000 |
| 11 | Electric Ovens | 1000 | 2 | 0.25 | 500 |
| 12 | Practical Instruments | 100 | 12 | 0.5 | 600 |
| | Total | | | | 9064 |
| | Power Requirements in one day | | | | 9.06 unit |
| | Average Power requirement in one year | | | | 3306.9 unit |
| | Average power requirement in one month | | | | 275.58 unit |
| | **Remarks:** | | | | |
| 1 | Replacement of electric wiring. | | | | |

## 4) Department of Electronics

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| **A** | **B** | **C** | **D** | **E** | **F = C × D × E** |
| 1 | Tube light (F) | 40 | 4 | 1 | 160 |
| 2 | CFL bulb | 24 | 1 | 1 | 24 |
| 3 | Ceiling Fans | 80 | 2 | 1 | 160 |
| 4 | Tabel Fan | 40 | 1 | 1 | 40 |
| 5 | PC (LED monitor) | 60 | 3 | 2 | 360 |
| 6 | Laptop | 50 | 2 | 1 | 100 |
| 7 | Printer | 500 | 1 | 0.25 | 125 |
| 8 | LCD Projector | 300 | 1 | 0.5 | 150 |
| | Total | | | | 1119 |
| | Power Requirements in one day | | | | 1.119 unit |
| | Average Power requirement in one year | | | | 408.44 unit |
| | Average power requirement in one month | | | | 34.04 unit |
| | **Remarks:** | | | | |
| 1. | Replacement of Old electric filltings. | | | | |

## 5) Department of Microbiology

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light (F) | 40 | 11 | 5 | 2200 |
| 2 | Ceiling Fans | 80 | 6 | 5 | 2400 |
| 3 | Wall Fan | 40 | 2 | 4 | 320 |
| 4 | Exhaust Fan | 60 | 2 | 5 | 600 |
| 5 | Cooler | 300 | 1 | 0.5 | 150 |
| 6 | PC (LED monitor) | 60 | 3 | 1 | 180 |
| 7 | Scanner | 12 | 1 | 1 | 12 |
| 8 | Printer | 500 | 1 | 0.5 | 250 |
| 9 | LCD Projector | 300 | 2 | 2 | 1200 |
| 10 | Refrigerator | 2 KWHr/Day | 4 | 24 | 8000 |
| 11 | Electric Ovens | 1750 | 2 | 1 | 3500 |
| 12 | Incubator | 0.25 KW/Hr | 4 | 24 | 24000 |
| 13 | BOD Incubator | 0.25 KW/Hr | 1 | 24 | 6000 |
| 14 | Autoclave | 2500 | 3 | 2 | 15000 |
| 15 | Laminar Air flow | 1000 | 1 | 0.02 | 20 |
| | Total | | | | 63832 |
| | Power Requirements in one day | | | | 63.83 unit |
| | Average Power requirement in one year | | | | 23297.95 unit |
| | Average power requirement in one month | | | | 1941.5 unit |

## 6) Department of Zoology

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light (F) | 40 | 10 | 3 | 1200 |
| 2 | Ceiling Fans | 80 | 7 | 3 | 1680 |
| 3 | PC (LED monitor) | 60 | 1 | 1 | 60 |
| 4 | Printer | 500 | 1 | 0.1 | 50 |
| 5 | LCD Projector | 300 | 1 | 0.2 | 60 |
| 6 | Refrigerator | 2 KWHr/Day | 1 | 24 | 2000 |
| 7 | Electric Ovens | 1000 | 2 | 0.1 | 200 |
| 8 | Autoclave | 3000 | 1 | 0.05 | 150 |
| 9 | Laminar flow hood | 500 | 1 | 0.05 | 25 |
| 10 | Centrifuge | 150 | 1 | 0.05 | 7.5 |
| | Total | | | | 5432.5 |
| | Power Requirements in one day | | | | 5.43 unit |
| | Average Power requirement in one year | | | | 1981.95unit |
| | Average power requirement in one month | | | | 165.16unit |

## 7) Department of Mathematics

| Sr. No. | Name of the Appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light (F) | 40 | 1 | 4 | 160 |
| 2 | CFL bulb | 24 | 1 | 2 | 48 |
| 3 | Ceiling Fans | 80 | 1 | 4 | 320 |
| 4 | OHP | 300 | 1 | 0.5 | 150 |
| 5 | PC (LED monitor) | 60 | 1 | 2 | 120 |
| 6 | Laptop | 50 | 1 | 2 | 100 |
| 7 | Printer | 500 | 1 | 0.5 | 250 |
| 8 | LCD Projector | 300 | 1 | 1 | 300 |
| | Total | | | | 1448 |
| | Power Requirements in one day | | | | 1.448 unit |
| | Average Power requirement in one year | | | | 528.52 unit |
| | Average power requirement in one month | | | | 44.04 unit |

## 8) Department of Botany

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light (F) | 40 | 8 | 6 | 1920 |
| 2 | Ceiling Fans | 80 | 5 | 5 | 2000 |
| 3 | PC (LCD monitor) | 60 | 1 | 0.5 | 30 |
| 4 | PC (CRT monitor) | 100 | 1 | 1 | 100 |
| 5 | Laptop | 50 | 1 | 3 | 150 |
| 6 | Printer | 500 | 1 | 0.5 | 250 |
| 7 | LCD Projector | 300 | 1 | 1 | 300 |
| 8 | Refrigerator | 1.5KWHr/Day | 1 | 24 | 1500 |
| 9 | Electric Ovens | 1000 | 1 | 0.1 | 100 |
| 10 | Autoclave | 1000 | 1 | 0.1 | 100 |
| 11 | Electric Heater | 1000 | 1 | 0 | 0 |
| 12 | Spectrophotometer | 500 | 1 | 0.1 | 50 |
| 13 | Inverter | 1000 | 1 | 0.5 | 500 |
| | Total | | | | 7000 |
| | Power Requirements in one day | | | | 7 unit |
| | Average Power requirement in one year | | | | 2555 unit |
| | Average power requirement in one month | | | | 212.92 unit |
| | **Remarks:** | | | | |
| 1 | Electric feeting repairing is urgent requirement | | | | |
| 2 | Proper earthing is not present | | | | |
| 3 | Two more ceiling fans are required | | | | |
| 4 | Three more electric boards are required | | | | |
| 5 | One desktop PC is required to replace CRT | | | | |

## 9) Department of Commerce

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | CFL light | 24 | 4 | 3 | 288 |
| 2 | LED light | 20 | 1 | 1 | 20 |
| 3 | Ceiling Fans | 80 | 5 | 4 | 1600 |
| 4 | PC (LED monitor) | 60 | 19 | 3 | 3420 |
| 5 | Laptop | 50 | 1 | 4 | 200 |
| 6 | Printer | 500 | 2 | 0.5 | 500 |
| 7 | LCD Projector | 300 | 2 | 1 | 600 |
| | Total | | | | 6628 |
| | Power Requirements in one day | | | | 6.63 unit |
| | Average Power requirement in one year | | | | 2419.95unit |
| | Average power requirement in one month | | | | 201.66 unit |

## 10) Department of English

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 4 | 1 | 160 |
| 2 | Ceiling Fans | 80 | 4 | 1 | 320 |
| 3 | PC (LED monitor) | 60 | 10 | 2 | 1200 |
| 4 | Printer | 500 | 2 | 0.25 | 250 |
| | Total | | | | 1930 |
| | Power Requirements in one day | | | | 1.93 unit |
| | Average Power requirement in one year | | | | 704.45 unit |
| | Average power requirement in one month | | | | 58.7 unit |

## 11) Department of social sciences and Humanities

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | CFL bulb | 24 | 1 | 5 | 120 |
| 2 | Ceiling Fans | 80 | 1 | 5 | 400 |
| | Total | | | | 520 |
| | Power Requirements in one day | | | | 0.52 unit |
| | Average Power requirement in one year | | | | 189.8 unit |
| | Average power requirement in one month | | | | 15.82 unit |
| | **Remarks:** | | | | |
| 1 | Required two more lights and fans. | | | | |

## 12) Library

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 26 | 3 | 3120 |
| 2 | CFL light | 24 | 4 | 2 | 192 |
| 3 | LED light | 20 | 4 | 3 | 240 |
| 4 | Ceiling Fans | 80 | 19 | 2 | 3040 |
| 5 | Exhaust Fan | 60 | 1 | 5 | 300 |
| 6 | PC (LED monitor) | 60 | 8 | 4 | 1920 |
| 7 | Printer | 500 | 2 | 0.5 | 500 |
| 8 | Xerox machine | 1200 | 1 | 4 | 4800 |
| 9 | Coolers | 300 | 2 | 1 | 600 |
| 10 | Water cooler | 575 | 1 | 0 | 0 |
| | Total | | | | 14712 |
| | Power Requirements in one day | | | | 14.71 unit |
| | Average Power requirement in one year | | | | 5369.15 unit |
| | Average power requirement in one month | | | | 447.43 unit |

## 13) Department of Physical Education, Indoor stadium, NSS office

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | CFL light | 24 | 4 | 5 | 480 |
| 2 | Ceiling Fans | 80 | 4 | 3 | 960 |
| 3 | PC (LED monitor) | 60 | 1 | 1 | 60 |
| 4 | Printer | 500 | 1 | 0.5 | 250 |
| | Total | | | | 1750 |
| | Power Requirements in one day | | | | 1.75 unit |
| | Average Power requirement in one year | | | | 638.75 unit |
| | Average power requirement in one month | | | | 53.23 unit |

## 14) Health Center, NCC office

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 9 | 5 | 1800 |
| 2 | Ceiling Fans | 80 | 6 | 5 | 2400 |
| | Total | | | | 4200 |
| | Power Requirements in one day | | | | 4.2 unit |
| | Average Power requirement in one year | | | | 1533 unit |
| | Average power requirement in one month | | | | 127.75 unit |

## 15) Administration office, Cabin

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 7 | 6 | 1680 |
| 2 | LED light | 20 | 4 | 6 | 480 |
| 3 | Ceiling Fans | 80 | 7 | 5 | 2800 |
| 4 | Wall Fan | 40 | 1 | 5 | 200 |
| 5 | PC (LED monitor) | 60 | 8 | 3 | 1440 |
| 6 | Printer | 500 | 4 | 0.5 | 1000 |
| 7 | A.C. | 1000 | 1 | 5 | 5000 |
| 8 | Coolers | 300 | 1 | 1 | 300 |
| | Total | | | | 12900 |
| | Power Requirements in one day | | | | 12.9 unit |
| | Average Power requirement in one year | | | | 4708.5 unit |
| | Average power requirement in one month | | | | 392.38 unit |

## 16) IQAC

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 3 | 3 | 360 |
| 2 | Ceiling Fans | 80 | 3 | 3 | 720 |
| 3 | PC (LED monitor) | 60 | 1 | 1 | 60 |
| 4 | Printer | 500 | 1 | 0.25 | 125 |
| 5 | Cooler | 300 | 1 | 0.5 | 150 |
| | Total | | | | 1415 |
| | Power Requirements in one day | | | | 1.42 unit |
| | Average Power requirement in one year | | | | 518.3 unit |
| | Average power requirement in one month | | | | 43.19 unit |

## 17) Seminar Hall

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 10 | 1 | 400 |
| 2 | Ceiling Fans | 80 | 7 | 1 | 560 |
| 3 | Laptop | 50 | 1 | 0.5 | 25 |
| 4 | LCD Projector | 300 | 1 | 0.5 | 150 |
| 5 | Sound system | 200 | 1 | 0.5 | 100 |
| | Total | | | | 1235 |
| | Power Requirements in one day | | | | 1.24 unit |
| | Average Power requirement in one year | | | | 452.6 unit |
| | Average power requirement in one month | | | | 37.72 unit |

## 18) Staff room

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 2 | 6 | 480 |
| 2 | Ceiling Fans | 80 | 2 | 6 | 960 |
| 3 | Cooler | 300 | 1 | 1 | 300 |
| 4 | RO system | 100 | 1 | 5 | 500 |
| 5 | Water cooler | 2.5 KW.Hr/day | 1 | 24 | 2500 |
| | Total | | | | 4740 |
| | Power Requirements in one day | | | | 4.74 unit |
| | Average Power requirement in one year | | | | 1730.1 unit |
| | Average power requirement in one month | | | | 144.18 unit |

## 19) Auditorium

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 4 | 1 | 160 |
| 2 | Ceiling Fans | 80 | 4 | 1 | 320 |
| 3 | Sound system | 1000 | 1 | 0.2 | 200 |
| | Total | | | | 680 |
| | Power Requirements in one day | | | | 0.68 unit |
| | Average Power requirement in one year | | | | 248.2 unit |
| | Average power requirement in one month | | | | 20.68 unit |

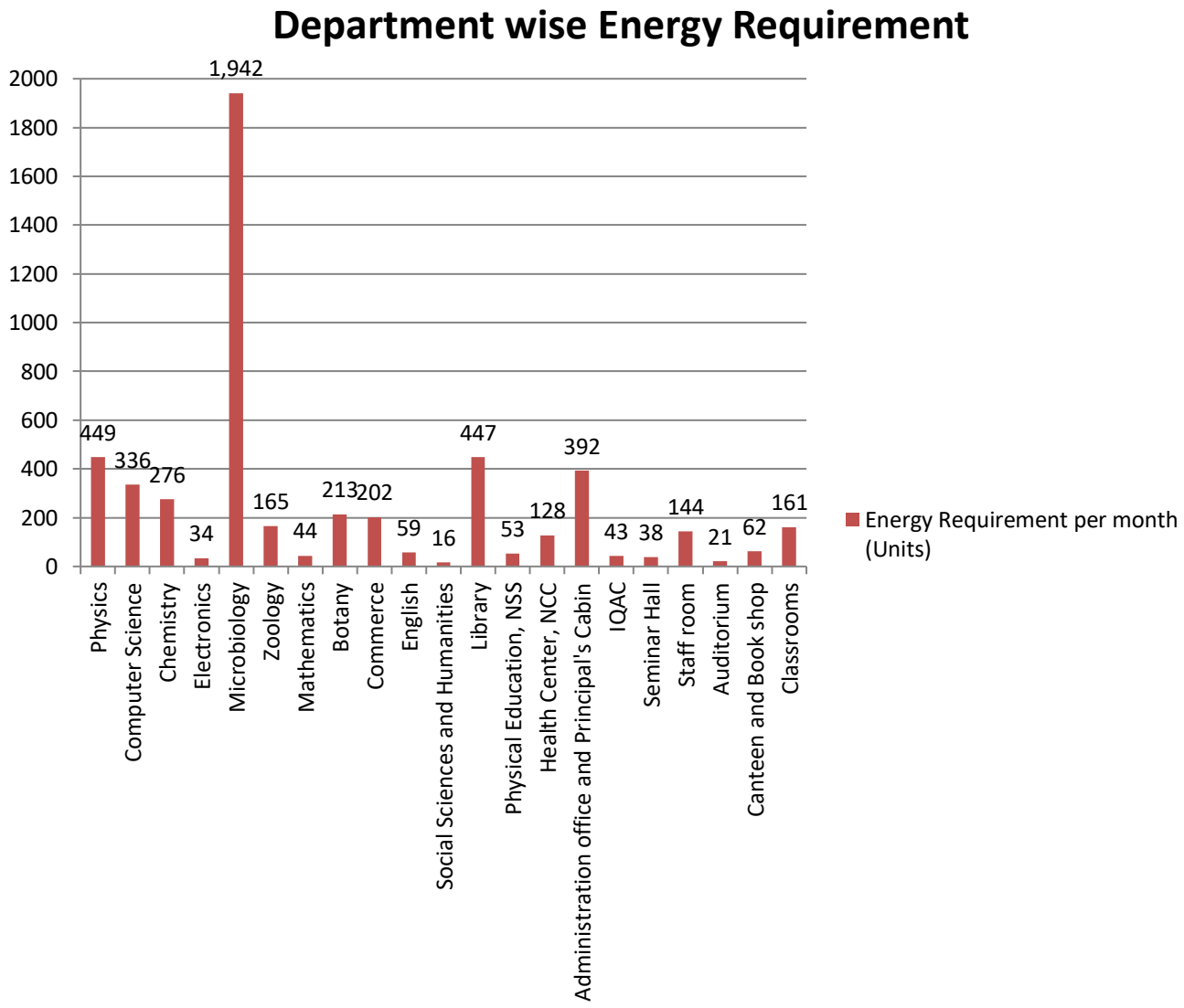
## 20) Canteen and Bookshop

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 3 | 3 | 360 |
| 2 | Ceiling Fans | 80 | 2 | 3 | 480 |
| 3 | Xerox Machine | 1200 | 1 | 1 | 1200 |
| | Total | | | | 2040 |
| | Power Requirements in one day | | | | 2.04 unit |
| | Average Power requirement in one year | | | | 744.6 unit |
| | Average power requirement in one month | | | | 62.05 unit |

## 21) Classrooms

| Sr. No. | Name of the appliance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tube light | 40 | 10 | 2 | 800 |
| 2 | Ceiling Fans | 80 | 14 | 4 | 4480 |
| | Total | | | | 5280 |
| | Power Requirements in one day | | | | 5.28 unit |
| | Average Power requirement in one year | | | | 1927.2 unit |
| | Average power requirement in one month | | | | 160.6 unit |

**Note: This is total load consumption considered approximately. Actual load consumption might be different according to actual use of power for particular time period.**

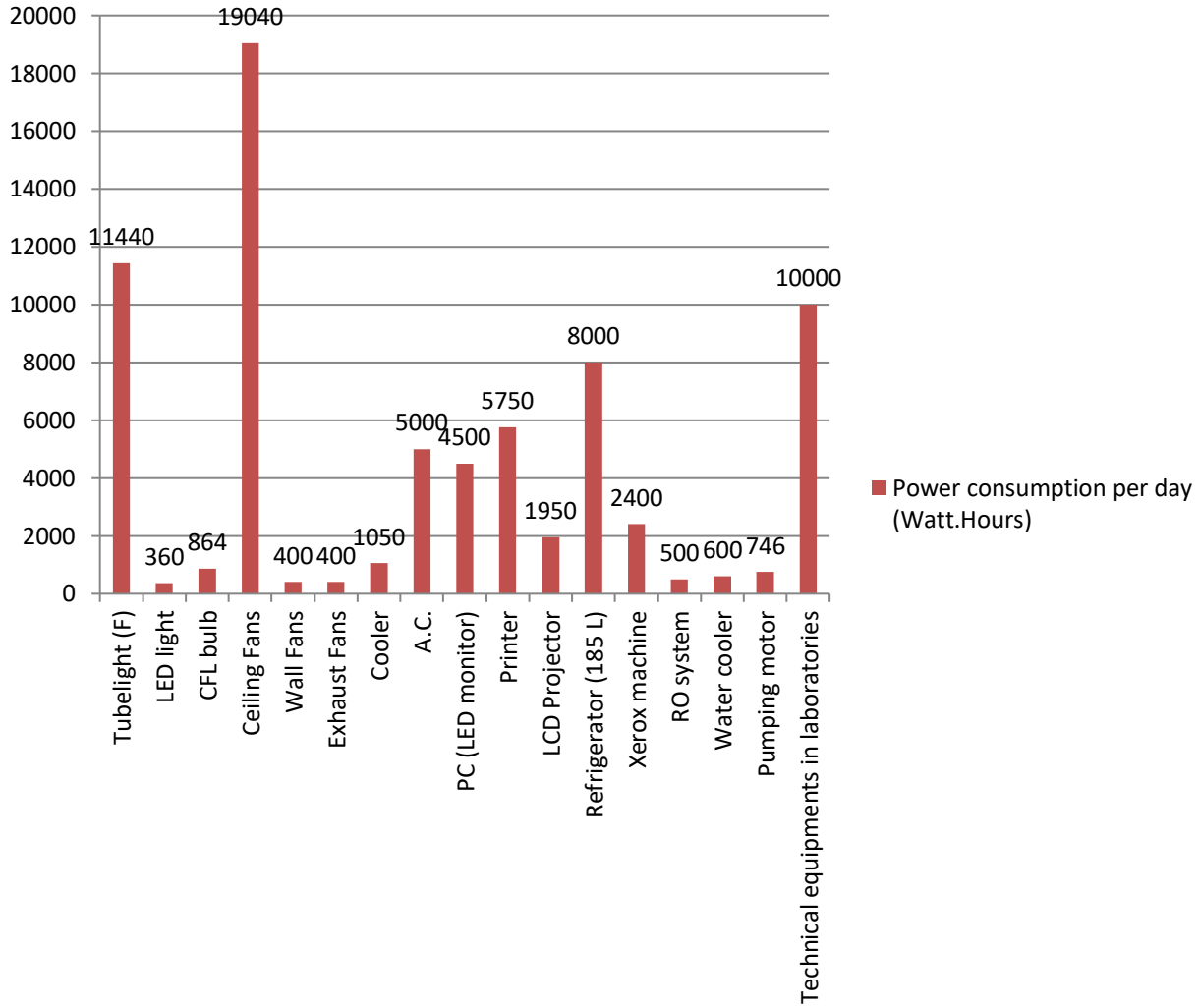


## Equipment wise Energy Consumption:

| Sr. No. | Name of the applicance | Power Rating (Watt) | Quantity | Average daily usage in hours | Power consumption per day (Watt.Hours) |
|---|---|---|---|---|---|
| A | B | C | D | E | F = C × D × E |
| 1 | Tubelight (F) | 40 | 143 | 2 | 11440 |
| 2 | LED light | 20 | 9 | 2 | 360 |
| 3 | CFL bulb | 24 | 18 | 2 | 864 |
| 4 | Ceiling Fans | 80 | 119 | 2 | 19040 |
| 5 | Wall Fans | 50 | 4 | 2 | 400 |
| 6 | Exhaust Fans | 50 | 8 | 1 | 400 |
| 7 | Cooler | 300 | 7 | 0.5 | 1050 |
| 8 | A.C. | 1000 | 1 | 5 | 5000 |
| 9 | PC (LED monitor) | 60 | 75 | 1 | 4500 |
| 10 | Printer | 500 | 23 | 0.5 | 5750 |
| 11 | LCD Projector | 300 | 13 | 0.5 | 1950 |
| 12 | Refrigerator (185 L) | 1 KWHr/day | 8 | 24 | 8000 |
| 13 | Xerox machine | 1200 | 1 | 2 | 2400 |
| 14 | RO system | 100 | 1 | 5 | 500 |
| 15 | Water cooler | 2.5 KW.Hr/day | 1 | 6 | 600 |
| 16 | Pumping motor | 746 | 1 | 1 | 746 |
| 17 | Technical equipments in laboratories | | | | 10000 |
| | Total | | | | 73000 |
| | Energy consumed in one day = 73 unit | | | | |
| | Average Energy consumption in one year = 26645 units | | | | |
| | Average Energy consumption in one month = 2220 units | | | | |

Note: Since during the academic session 2020 – 21 the college is remain closed for students due to covid – 19 pandemic, the actual power consumed is less as that of required power.

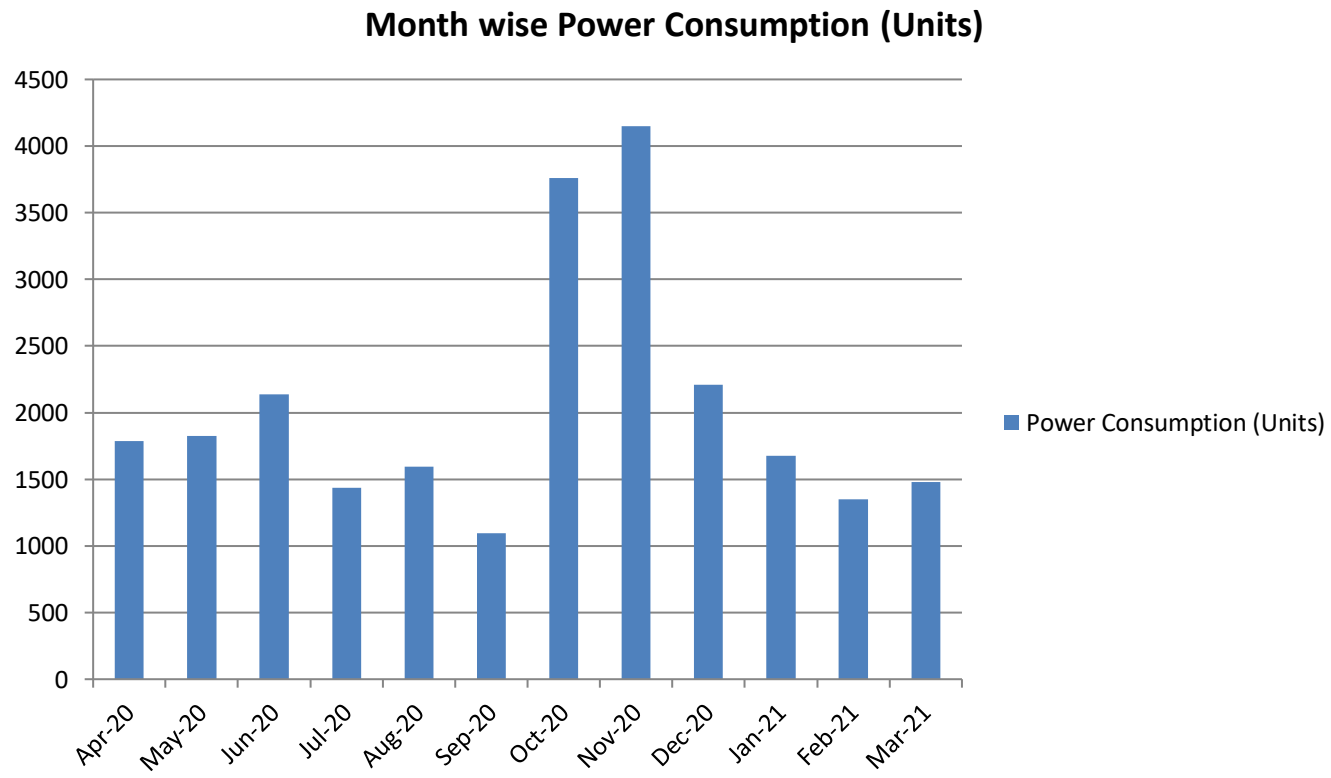
## Equipment wise Power consumption per day (Watt.Hours)



## Month wise Energy Consumption:

| Month | Power Consumption (Units) |
|---|---|
| Mar-21 | 1478 |
| Feb-21 | 1348 |
| Jan-21 | 1675 |
| Dec-20 | 2207 |
| Nov-20 | 4150 |
| Oct-20 | 3758 |
| Sep-20 | 1094 |
| Aug-20 | 1594 |
| Jul-20 | 1437 |
| Jun-20 | 2135 |
| May-20 | 1823 |
| Apr-20 | 1787 |
| Total | 24486 |

**Average Energy Consumption in one month = 2040 units**



## Recommendations

1) Replace all conventional tube lights with LED tube lights, to save more power.
2) In Physics laboratory, 3 -phase connection for furnace and water distillation plant is taken from microbiology lab. Separate 3-phase connection should be provided to avoid power load
3) In old building, there is need to replace the electric boards and electric fitting.
4) In some classrooms there is requirement of fans and tube lights.
5) Install solar plant to reduce electric bill.
6) Switch off Light, fans, P.Cs. and other electrical appliances whenever they are not in use.

## Energy saving calculation:

1) If the conventional tube lights are replaced with LED tube light, a large amount of energy can be save.
   Total number of conventional tube lights in college campus = 143
   The average power of conventional tube light = 40 W
   The average power of LED tube light = 20 W
   Difference in power saved per tube light = (40 – 20 ) = 20 W
   Total power saving = 143 × 20 = 2860 W
   Let average use of each tube light per day = 5 Hours
   Energy saved per day = 2860 × 5 = 14300 Watt.Hours = 14.3 KW.Hours = 14. 3 units
   Energy saved in one year = 14.3 × 365 = 5219.5 units
   The reduction in electric bill in one year = 5219.5 × 4.86 = 25366 Rs
   Average cost of single LED tube light = 400 Rs
   Total cost of replacing all conventional tube lights = 57200 Rs
   Pay back period required = 57200/25366 = 2.25 Years

2) If the old ceiling fans are replaced with 5 star energy saving fans:
   Total number of ceiling fans in college campus = 119
   The average power of existing ceiling fan = 80 W
   The average power of 5 star energy saving ceiling fan = 50 W
   Difference in power saved per ceiling fan = (80 – 50) = 30 W
   Total power saving = 119 × 30 = 3570 W
   Let average use of each ceiling fan per day = 5 Hours
   Energy saved per day =3570 × 5 =17850 Watt.Hours = 17.85 KW.Hours =17.85 units
   Energy saved in one year = 17.85 × 365 = 6515.25 units
   The reduction in electric bill in one year = 6515.25 × 4.86 = 31664 Rs
   Average cost of single 5 star energy saving fan = 1600 Rs
   Total cost of replacing all ceiling fans= 1,90,400 Rs
   Pay back period required = 1,90,400/31664 = 6 Years

**Estimate for installation of solar plant in college campus:**

**Department wise required power load:**

| S.N. | Department | Power Load (Watt) |
|---|---|---|
| 1 | Physics | 2880 |
| 2 | Computer Science | 3130 |
| 3 | Chemistry | 2094 |
| 4 | Electronics | 1464 |
| 5 | Microbiology | 3512 |
| 6 | Zoology | 2020 |
| 7 | Mathematics | 1354 |
| 8 | Botany | 1930 |
| 9 | Commerce | 3306 |
| 10 | English | 2080 |
| 11 | Social Sciences and Humanities | 104 |
| 12 | Library | 6076 |
| 13 | Physical Education, NSS | 976 |
| 14 | Health Center, NCC | 840 |
| 15 | Administration office and Principal's Cabin | 4740 |
| 16 | IQAC | 1220 |
| 17 | Seminar Hall | 1510 |
| 18 | Staff room | 890 |
| 19 | Auditorium | 480 |
| 20 | Canteen and Book shop | 1480 |
| 21 | Classrooms | 1520 |
| | Total | 43606 |

**Total required power load = 44 kW**

**Note:** While calculating power load, the technical instruments with high power rating (Furnace, incubator, oven etc) in Physics, Chemistry, Botany, Zoology and Microbiology departments are not taken into consideration.

**Approximate expenditure required to install solar plant of 1 kW = Rs. 60,000/-**
**Approximate space required to install solar plant of 1 kW = 1 $m^2$**
**The approximate units produced by solar plant of 1 kW per day= 4 units**
**The approximate units produced by solar plant of 1 kW in one year= 1460 units**
**Approximate Saving in electric bill in one year = Rs. 10,000/-**
**Payback period = 6 years**

----- THE END -----