

2023-24

# ENERGY AUDIT REPORT



A handwritten signature in black ink, appearing to be the signature of the Principal.

Principal

Kamal Gauri Mini Patel Shikshan Sanstha's  
BALASAHEB THACKERAY LAW COLLEGE  
Plot No. Sector - 11, Talaja, Parvej  
Raigad - 410 208



**Prepared by:**

**Vrindavan Landscape & Ecological Solutions**



Kamalgauri Hiru Patil Shikshan Sanstha's

# BALASAHEB THACKERAY LAW COLLEGE

Affiliated to University of Mumbai & Approved by BCOI

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Add: Plot No. 73, Sector 17, Talaja Phase-2, Tal. Panvel, Dist. Raigad, Navi Mumbai-410208



## ENERGY AUDIT REPORT

2023-24



## BALASAHEB THACKERAY LAW COLLEGE

PLOT NO. 73. SECTOR 17, TALOJA PHASE-2, TAL-PANVEL, DIST-RAIGAD, NAVI MUMBAI-410208



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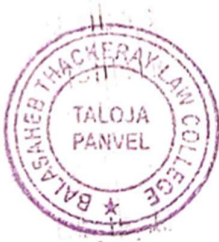
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## 1. INTRODUCTION

### 1.1 Objectives

The Energy Audit was defined to meet the following objectives:

- Conduct a simple Walk-Through audit or observation of the energy consumption of electrical appliances within the college building.
- Review and analyses energy usage history to create a baseline for which savings can be measured in the audited building.
- Determine what can be done to reduce energy consumption throughout the buildings and what options are available for system improvements if funding is available.
- Identify and evaluate measures that could improve the environmental performance of the buildings/wards and provide recommendations.



  
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## 2. INTERPRETATION

In this report, unless the contrary intention appears;

**Energy Conservation** means steps taken to reduce and to use as much energy as necessary through changing energy consumption behavior, e.g. Switching off lights when not in use.

**Energy Efficiency** means using less energy to provide the same service/output, eg. Replacing inefficient light bulbs with efficient ones.

**Faulty** means an equipment not working or made correctly; having defects.


**Potential savings** means the actual reduction in operating expenses from the improved energy efficiency generated by an energy conservation or efficiency activity.

**Retrofitting** means upgrading an existing system to improve energy efficiency.

**Tariff** means the amount of money charge by the supplier (utility) per kWh for the use of electrical energy.

**Vampire Load** means the way power is consumed by electronic and electrical appliances while they are switched off or in standby mode (consuming electricity at a cost but not doing any work).



  
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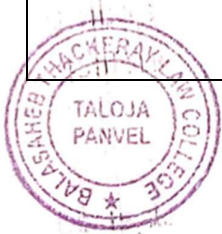
### 3. SUMMARY OF RECOMMENDATIONS

Below are some recommendations based on general observations carried out throughout the BTLC building.

The recommendations are categorized with **A** being the most urgent where immediate actions are needed to be executed (first or second week of receiving this report). **B** can be 1 to 2 months after receiving this report, while **C** will depend on the availability of funds.

Table 1: Recommendations

Recommendations		
Category A	Category B	Category C
Apply energy conservation measures. Isolate or unplug vampire loads from power when not in use (i.e. re-chargeable equipment, computer and any other electronic devices with standby modes).	Establish Energy Efficiency and Conservation steering committee to take lead with EE&C initiatives and management within the BTLC buildings.	Where applicable, replace all Double Frame light fittings (double tube) with single frame (single tube) throughout the building. Also remove unnecessary lights or reduce the number of lights per location.
Remove faulty light holders and bulbs or remove live wire from socket inside the light holder.	Renovate or improve the lighting control, i.e. add more switches to existing rooms/spaces where only one switch controls more than 10 lights, especially the lights in the conference/meeting room.	Replace all lights with energy efficient light bulbs, i.e. Replace T8 and T12 (36 watt) Fluorescent tubes with T5 (15 watt) retrofits.
Remove any faulty appliances located in the building.	Use fans in places where possible (especially in unsealed room, indoor corridor, conference room, etc.).	The conservation and efficiency mechanisms are tools for reducing the energy consumption.



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## 3.1 Findings

### 3.1.1 Vampire Loads Findings

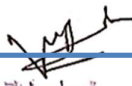
#### i. Issue(s)/Observation(s)

- Electronics appliances (computer, printer, etc.) are still ON even though they are turned off.
- Appliances on STANBY MODE are draining power even though they are not doing any use full task.
- Faulty light fittings which are left without bulb and faulty bulb which is intact are also vampire loads.

#### ii. Recommendation(s)

- All Electronic appliances should always be 'unplugged' or turned from the power sockets, after office hours.
- try to avoid putting appliances on 'STANBY MODE'.
- Only use hot water heater to boil water instead of leaving it to 'Keep water hot'
- Remove faulty lightings.



  
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### 3.1.2 Lighting

Lighting is the most common load which is used in all the rooms and outdoors. Here are some of the aspects and faults that were discovered:

#### i) Findings of lightings

##### a. Observation(s)/Issue(s):

- It has been observed there are a lot of unnecessary lights in one single room (see Figure 2)
- Too many lights are assigned to 1 switch.

##### b. Recommendation:

- Turn OFF lights when not used.
- Reduce the number of lights per switch, to better manage lighting.
- Reduce the number of lights per room.

Figure 2: Example of lack of proper lighting management



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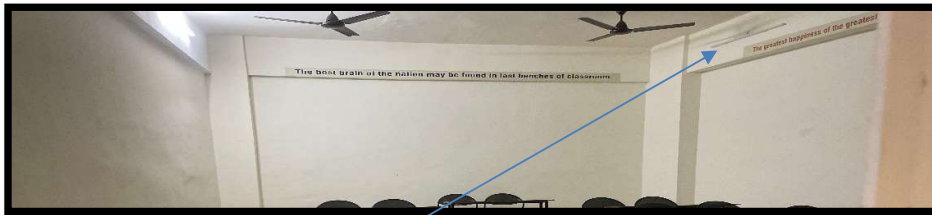


ii) **Faulty lights**

**a. Observation(s)/Issue(s):** Ballast of faulty light will draw power when the lights are ON even though it is not working.

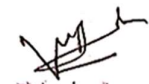
**b. Recommendation(s):** Disconnect the live wire connected to the faulty light bulb (s) to avoid leakage of energy.

Figure 3: Faulty Lightings (vampire loads)



**This faulty light still absorb power even though it is not ON.**



  
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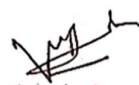
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## 9.1.1 VENTILATION:

The old building of college has been designed to minimize the environmental impact. The large size window and big corridors give fresh air and cross ventilation.

Since natural ventilation mainly affects air conditioning energy consumption in terms of energy saving, the design building reduces cooling energy consumption by 8.54 kWh/m<sup>2</sup> and heating energy consumption by 0.1 kWh/m<sup>2</sup> compared to the baseline building.



  
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### SOLAR LIGHTS:

- Solar lights are a clean and green energy source that do not produce any harmful emissions or pollutants. This makes them an environmentally friendly option that can help reduce carbon emissions and improve air quality.
- College Utilizing solar LED lighting systems for a street, parking and pathways. This will reduce cost and the impact on the environment.
- Details of solar light:
- A solar panel is built in to quickly absorb sunlight for charging, and the battery is a large capacity of 1800mAh. Place the solar light in direct sunlight to fully charge the batteries. Charging 6-8 hours can be 8-12 hours of lighting, fully sufficient for daily use.



  
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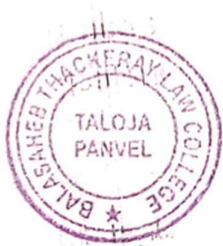
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## • Use of LED bulbs/power efficient equipment

1. LED BULBS IN CORRIDOR
2. LED BULBS IN MOOT COURT
3. LED BULBS IN CLASS ROOMS

### 1. LED BULBS IN COORIDOOOR



  
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## 2. LED BULBS IN MOOT COURT



## 3. LED BULBS IN CLASS ROOMS



  
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## 4. LED BULBS IN LIBRARY



  
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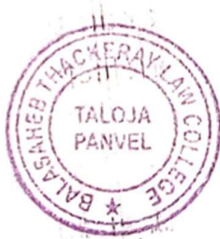
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## 9.1.1 SOURCE OF NATURAL LIGHT:

College building architecture plan made in such way that the more day light (natural light) simply comes in corridor and class rooms.

Natural light is one of the key ways of saving energy. Daylighting minimizes the amount of artificial light and reduces electricity and HVAC (heating, ventilation, and air conditioning) costs. Electrical lighting produces a lot of heat, whereas natural lighting generates hardly any heat if it is properly controlled. Making use of natural light can save up to 75 percent of the energy used for lighting buildings and reduce cooling costs



  
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### 3.2.4 Air conditioners

*Balasaheb Thackeray college have single AC. The college is conscious about the environment and health.*

## Air Conditioner bad for the environment?

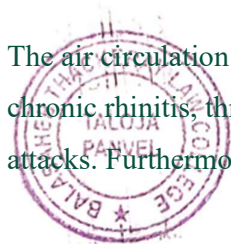
Air conditioner is bad for the environment as AC units contribute to excessive energy production, global electricity, and emits additional carbon dioxide into the atmosphere.

There are multiple reasons why using an air conditioner is bad for the environment:

- **Increased Energy Demand** due to air conditioning is alarming. In fact, air conditioning results in around 20% of the electricity used in buildings today – and amounts to 10% of electricity consumption worldwide.
- **Greenhouse Gas Emissions** are on the rise from air conditioning, and they currently account for almost 4% of the world's overall greenhouse gas emissions.
- **Refrigerants and Hydrofluorocarbons (HFCs)** which are required for an air conditioner to properly function pollute the atmosphere and contribute to ozone depleting substances (ODS).

### Prevention of Respiratory Problems and Allergies

The air circulation can even transmit such diseases. Air conditioning is linked with chronic rhinitis, throat irritation and hoarseness, and increased risk of asthma attacks. Furthermore, airborne dust and fungi can cause allergic reactions.



  
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### 3.2.5 Office Equipment (Computers, printers and network accessories)

#### i. Findings of Office Equipment

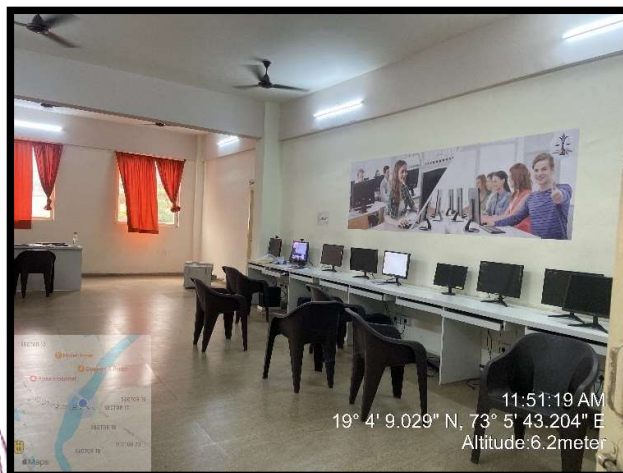
##### a. Issue(s)/Observation(s):

- Most of the office equipment are usually left without turning them off after working hours and are using electricity as Vampire loads.
- Electronics appliances (computer, printer, etc.) are still ON when connected to power point even though they are turned off.

##### b. Recommendation(s)


- all office equipment such as printers, computers i.e. PC, monitor, etc. must be turned off on the power point or unplug from the power point
- Avoid putting equipment on 'STANDBY MODE'

Figure 5: Sample Office Equipment



Clear example of  
equipment on  
STANDBY MODE  
wasting power.



  
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### 4. HISTORICAL DATA ANALYSIS

#### 4.1 Equipment's

Sr. No.	Particulars	Quantity
1	Computer	13
2	Fan	61
3	Tube Light	105
4	Table	12
5	Chair	225
6	Bench	300



  
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## 4.2 Energy Balance

Table 2 shows the electricity consumption of Customs department (both offices combined) for a 1-year period. Raw data was not provided accordingly, hence an average estimated power consumption was calculated

Table 2: Electricity bill budget for campus

Details	Power Consumption(kWh)/Month	Total Electricity Cost /Month	
LED lights	80 kWh	800/Rs	
Fans	110 kWh	1110/ Rs	
AC	10 kWh	100/ Rs	
Water Pump	45 kWh	450/ Rs	
IT	60 kWh	600/ Rs	
<b>Total</b>	<b>305 kWh</b>	<b>3350/ Rs</b>	

From Table 2, the average cost of the monthly consumption is calculated to be: **3350 Rs**

Thus, the cost of the yearly consumption is 40200 Rs




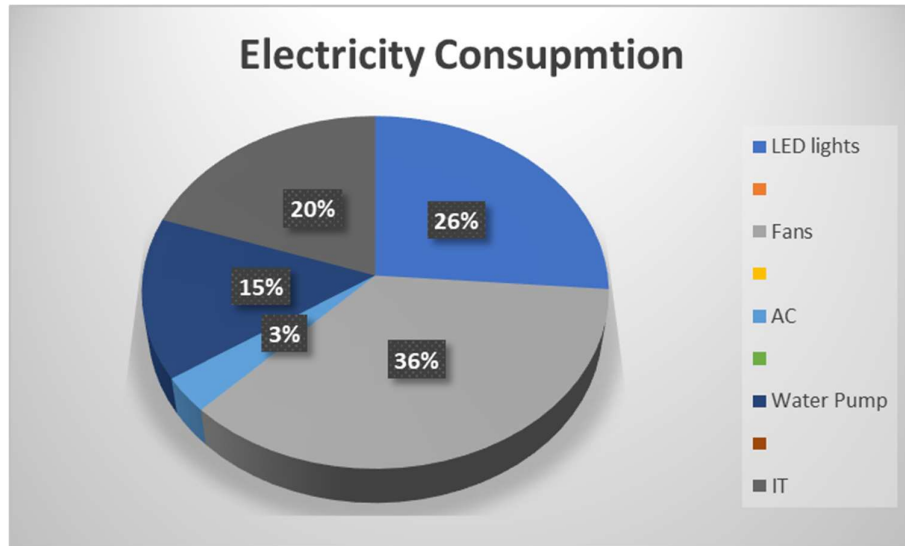
  
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Figure 3: Power Consumption breakdown for CUSTOMS DEPARTMENT building




#### Analysis of the chart i

-LED light is responsible for high significant proportion of the total energy consumption followed by Fan.

-Ac Consumption is very low as Five Star Single Ac in collage building.

- There is variation among the appliance due to their arrangement within the building, the hours in which they operate and the rate at which they consume electricity.



  
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## Appendix A. Power consumption data for the Campus building

9/21/24, 11:21 AM LT Energy Bill

**MAHAVITARAN**  
Maharashtra State Electricity Distribution Company Limited

**Energy Bill**

Consumer No: 02881138881  
**KAMAL GAURI HIRU PATIL SHIKSHAN**  
 PLOT NO-73, SECTOR-17, TALOJA PH-2 PANVEL, RAIGAD Tal. Tal. Panvel (CT)  
 410208  
 Mobile No: 8111110210/9111110210@gmail.com

Bill Date: **27-AUG-24**  
 Bill Amount Rs: **0.00**  
 Due Date: 17-SEP-24  
 If Paid After Due Date: **0.00**

Bill Cycle: 01-JULY-24 TO 31-AUG-24  
 Tariff Category: 204 (T) El. Conns. 3Ph x 20KW  
 Meter No: 00000000  
 Meter Reading Date: 24-08-24  
 Meter Status: **NORMAL**  
 Bill Period: 1-01 Month(s)

Current Reading	Previous Reading	MP	Unit	Adj. Unit	Total
22368	22668	01	0	0	0

**Billing History**

**Important:**

- Register for e-bill instead of printed bill and get a system discount of Rs. 25 on each bill. For registration: <https://www.mahadiscom.in/billregister>. The bill number is available in the system with success of your printed bill.
- Pay electricity bill through digital medium and get 5.25% (up to Rs.500/-) discount (including taxes and duties).
- If your mobile number, email address are incorrect, correct it by visiting <https://www.mahadiscom.in/ConsumerInfo/ConsumerInfo>.
- Send monthly reading will modify later please on 24-08-2024.

**Special Message:**

- Please accept only computerized receipt with a computerized number when making any payment of MSEDCL. Handwritten receipts should not be accepted. Use the option of online payment facility to avoid inconvenience.
- For making Energy Bill Payment through RTGS/NEFT mode, use following details:
  - Beneficiary Name: **MSEDCL**
  - Beneficiary Account Number: **MSEDCL0102881138881**
  - IFSC Code: **RESND0000000**
  - Name of Branch: **STATE BANK OF INDIA**
  - Name of Branch: **SPB SEC.**
  - Amount: **Rs per Bill**
- Disclaimer: Please use above bank details only for payment against consumer number mentioned in beneficiary account number.

Bill Cycle: 01-JULY-24 Consumer No: 02881138881 MP: 01 Tariff: 204 If Paid by this Date: 01-SEP-24 If Paid After this Date: 01-SEP-24  
 Due Date: 17-SEP-24  
 Bill Cycle: 01-JULY-24 Consumer No: 02881138881 MP: 01 Tariff: 204 If Paid by this Date: 01-SEP-24 If Paid After this Date: 01-SEP-24

**Terms & Conditions:**

- Electricity Duty Calculation is as per government notification no. 022/PW-27/2019 dated 01-01-2019. The on state calculation is as per Government notification no. 22/05/2018. For more information please check orders of Electricity Regulatory Commission. Fixed rate is used for calculation till meter is installed.
- If any discrepancy in the bill should be reported in writing to the head office from 8 days a discrepancy in bill, to avoid online payment changes, pay tentative amount for some billing or pay full amount along with application to modify the meter in the bill. In case of

Consumer No: 02881138881  
 Meter No: 00000000  
 Billing Cycle: 01-JULY-24  
 Bill Date: 27-08-24  
 Bill Amount: 0.00  
 Due Date: 17-SEP-24  
 If Paid After Due Date: 0.00

<https://www.mahadiscom.in/web/ass>



*(Signature)*  
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## Appendix B – Additional photos



  
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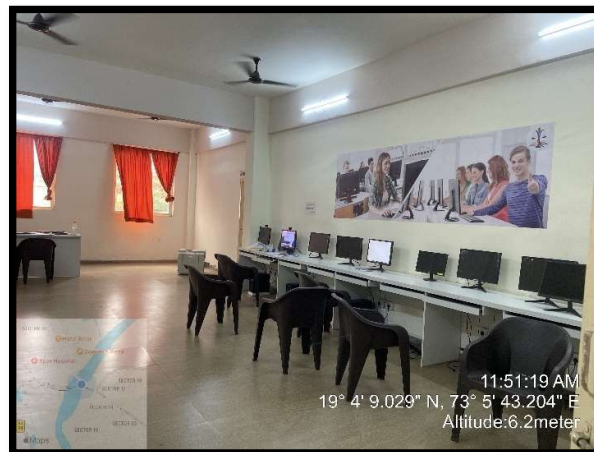
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