

# Energy Audit Report – 2021



**St. Claret College, Bengaluru.**



# Acknowledgement

We would like to acknowledge and give our warmest thanks to the committee members of St. Claret College for their support and for providing us necessary facilities and co-operation during the audit process. This helped us in making the audit a success.

We hope this would help St. Claret with their future endeavors and help them achieve all their environmental aspirations and vision.

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28<sup>th</sup> December 2021


## CERTIFICATE

This is to certify that **St. Claret College, Bangalore** has conducted detailed Environmental Green Audit of their campus and has submitted necessary data and credentials for scrutiny. The activities and measures carried out by the college have been verified based on the report submitted and was found to be satisfactory. The efforts taken by the faculty and students towards environment and sustainability is highly appreciated and commendable.

Director

  
Vanalok Private Ltd

Green Audit conducted by

  
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## Executive Summary

Nature encompasses fascinating inhabitants like microorganisms, plants, animals, insects, etc., who have as much right to live as we do. People all over the world see nature differently. With the climatic conditions going haywire all over the world, there is a need for resilient infrastructure, actions and a strong mindset for driving lifestyle change. Students being future citizens of the world can drive change and strive for a better existence and this would be possible only if educational institutions impart values and space for them to grow. They have also the ability to influence their families and the general public more effectively than even a learned motivator.

Teachers play an undeniable role in imparting knowledge to the students. Hence, teachers are in a position to facilitate knowledge and promote the learners to achieve better awareness about what is happening in and around them. Teachers as professionals and influential individuals, supported by the management of institutions, can play an important role in shaping up students' attitudes through training and parading them - to be the role models in their communities. Educational Institutions thus can offer an ideal service in moulding the young minds in their impressionable age, towards promoting the health of nature, understanding the underlying causes of climate change and its impacts, and the conditions required to be maintained for sustaining life on earth.



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## 1. Introduction

Energy audit is an inspection, survey and analysis of energy flows for energy conservation in building or a system to reduce the amount of energy input into the system without adding a negative impact on the output. Energy audits are means to understand the flow of energy starting from the source to its final use.

As per the Energy Conservation Act, 2001, Energy auditing is the verification, monitoring and analysis of 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.

Green audits are assigned to criteria 7 of the National Assessment and Accreditation Council, which is a self-governing organization that provides various institutions with grades based on their criteria for accreditation.

Essentially requirement for an Energy Audit is a part of the criteria 7 and is vital to the accreditation process. This accreditation provides a college with an opportunity to present itself as an esteemed institution without impeccable values, infrastructural advantage and endless opportunities it could provide its students.

### 1.1. Need for Energy Audits:

Energy audits help analyse and determine good institutional practices; whether they are eco-friendly or sustainable. With the world constantly changing, development, unfortunately, results in large-scale utilization of natural resources. Now natural resources are not just used for the supply of products. Energy, water are all basic commodities that are used generously by all. With the threat of depleting resources looming over our heads, it is





imperative to determine how much we use and where we waste resources to ensure efficient usage. Energy audits provide opportunities to determine the same and help the organization to reflect, improve and expand their processes and shift to clean green resource utilization. Apart from this, it helps instil consciousness among people as part of the institution towards the environment and sustainable resource utilization.

## 1.2. Goals of Energy Auditing:

- a) Identification of strengths and weaknesses in green practices.
- b) Analyse and suggest solutions for problems identified.
- c) Identify and assess environmental risk.
- d) Motivate staff for optimal sustainable use of available resources.
- e) Increase environmental awareness throughout the campus.
- f) Collect baseline data of environmental parameters and prepare plans for issues before they become problems.

## 1.3. Objectives of Energy Audit:

- a) Analyse current practices and determine their impact on the environment.
- b) Identify and analyse significant environmental issues.
- c) Continuous assessment for better environmental performance.
- d) Establish and implement a green energy strategy in the campus and sensitize the faculty and students.

## 1.4. Benefits to Educational Institutions:

- a) Improve the energy utilization within and outside the campus premises.
- b) Help recognize cost-effective green strategies that enable conservation of energy.



- c) Empower people linked to the organization to move towards conscious environmental thinking and practice.
- d) It helps improve the image and builds a positive impression of the institution for its green and clean resource use.

### 3. About the College

St. Claret College is situated in the Jalahalli Village area in Bengaluru city. The college is a catholic undergraduate institution established by Claretian Missionaries of the Bangalore Province. Founded in 2005, it is affiliated with Bangalore University. The college provides quality education offering undergraduate programmes in Arts and Commerce. Computer education is integrated into the UG curriculum thereby providing additional benefits to management studies. The college has also initiated post-graduate programmes recently providing opportunities for higher education for the student community.

The St. Claret Group of Institutions is spread over an area of 12 acres located amidst a pristine environment. The UG & PG College covers an area of 4 acres and is considered for the present study. The college is a three-storey facility with a terrace area of 315 sq. mt. It has amenities like an auditorium, seminar and conference halls, and a library facility with over 15000 books for perusal. Apart from academic requirements, there are facilities for extra-curricular interests like sports and athletics. There is a canteen on the premises that provides food at nominal rates and a sitting area facing the garden. The garden occupies an area of 1171 sq. m. and is well maintained.

With the 'Green Campus' vision playing an important role in decision making, the college has taken steps to adopt a green and clean mentality in all areas of





functioning. The management strives to uphold three goals diligently namely – environmental literacy and awareness, health and safety of occupants and good environmental footprint. Four major parameters have been considered by the institution namely Energy, Water, Waste and Green Initiatives that promote their ‘Green Campus’ vision. The teaching and non-teaching staff along with the students are active participants in activities that drive their vision, to name a few: tree plantation drives, waste management, paperless work, maintaining a garden on the terrace, medicinal gardens, water conservation and managing biodiversity within the premises of the campus.

The institution has mindfully provided sufficient space for all the essential requirements of the student, such as bicycle parking, proper roads, a sitting area, well-maintained washrooms, clean filtered drinking water, good playgrounds and well-managed green space. The corridors are clean with provisions for dustbins and lights wherever necessary are present.





*Figure 1. Bicycle parking inside campus.*



*Figure 2: Outdoor Sitting area to Relax*







*Figure 3: Hygienic Outdoor Canteen*



*Figure 4. State of the Art Computer Lab*





*Figure 5: Well-Lit Corridors*



*Figure 6: Well stocked and Spacious Library*



## 4. Observations and Recommendations

Energy conservation is an important component of campus sustainability, as it is linked to the institution's carbon footprint. Energy auditing primarily is associated with energy conservation and techniques for reducing consumption that contributes to environmental degradation. As a result, any environmentally conscious institution must evaluate its energy usage policies. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

| SI No. | Load         | Numbers   |
|--------|--------------|---|
| 1      | Lights       | 760   |
| 2      | HV AC system | Fans – 419<br>AC – 20 (310W), 1 (1 phase)         |
| 3      | Motors       | Borewell – 2 (17.5hp & 7.5hp)<br>Lift – 1 (7.5hp) |

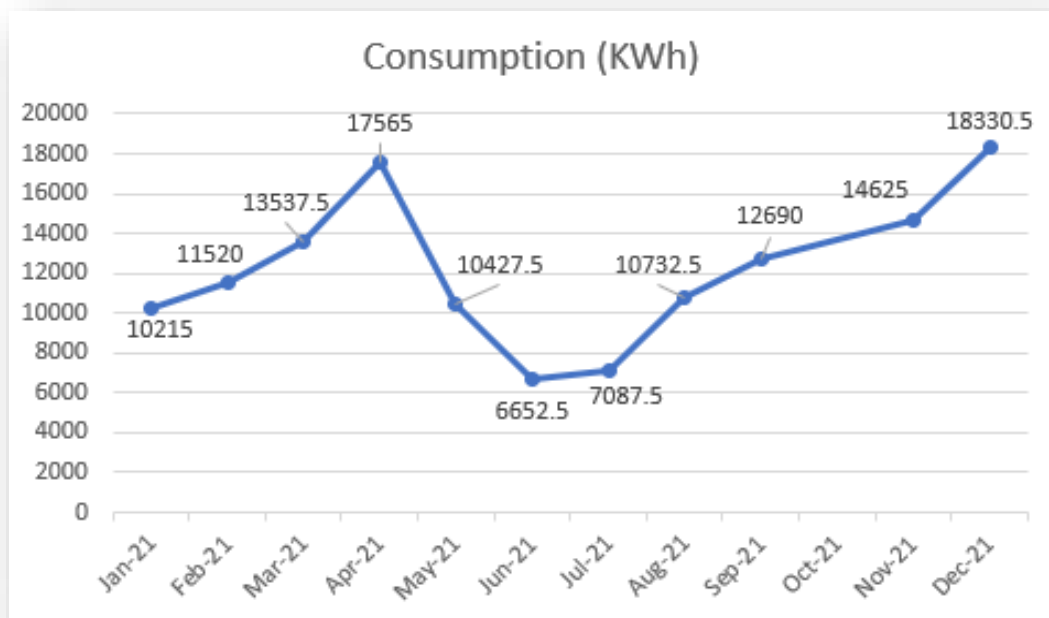
*Figure 7: Energy Sources*



**Tabular Column for Monthly Consumption of Energy (KWh)**

| Month  | Consumption (KWh) |
|--------|-------------------|
| Dec-21 | 18330.5           |
| Nov-21 | 14625             |
| Sep-21 | 12690             |
| Aug-21 | 10732.5           |
| Jul-21 | 7087.5            |
| Jun-21 | 6652.5            |
| May-21 | 10427.5           |
| Apr-21 | 17565             |
| Mar-21 | 13537.5           |
| Feb-21 | 11520             |
| Jan-21 | 10215             |

*Figure 8: Monthly Energy Consumption for 2021*



It is easy to infer from the following graph the consumption of electricity where, the highest consumption is for the month of December (18330.5) and the lowest for the month of June (6652.5).





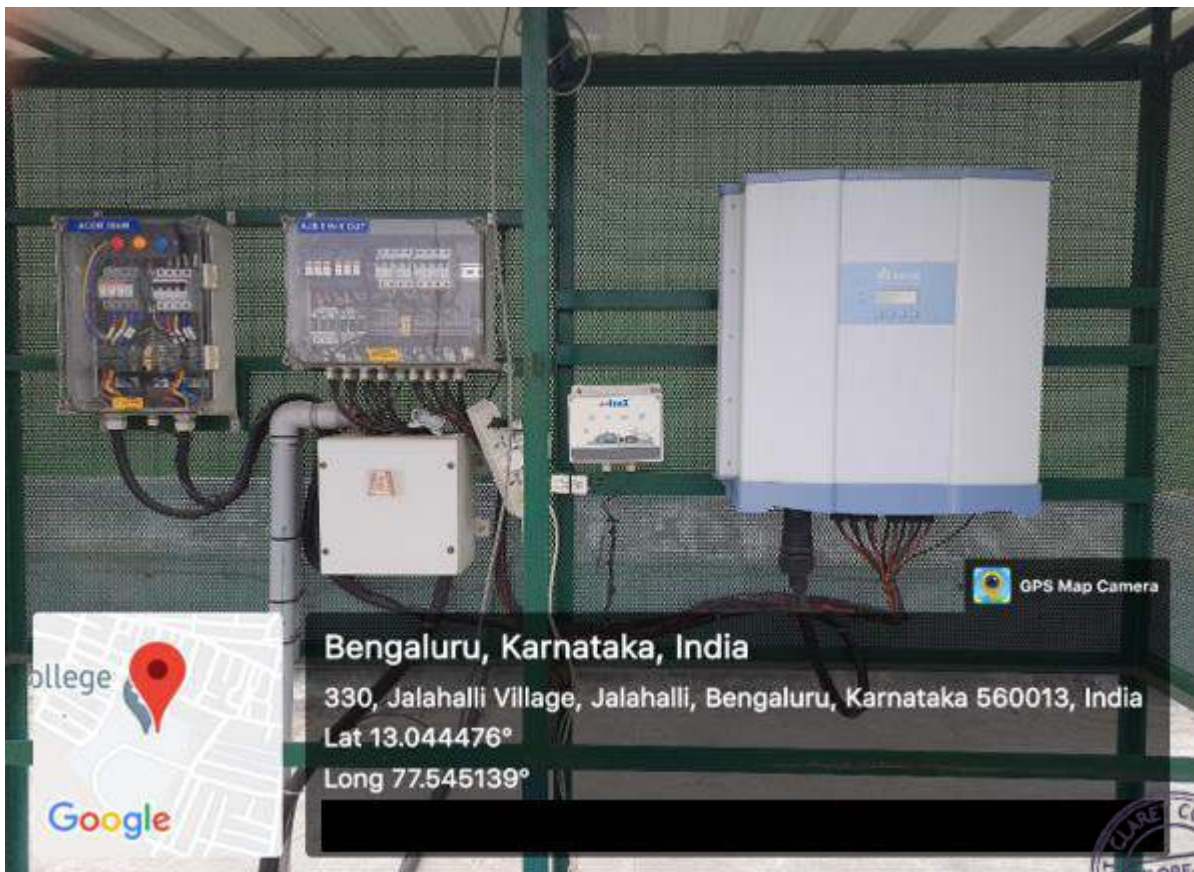
**a) Observation:**

Energy is one resource that is used in every branch of the institution. The primary source of energy is electricity and the total energy consumption for the FY 2020-21 is 45,725.70 KWh respectively. Apart from this, there is a provision for a generator for emergencies. The college also uses UPS (15kVA [1 no.] and 10kVA [2 nos.]) on every floor for backup during power outages. The college has also installed a series of solar cells on their terrace thereby utilizing the vacant space for energy generation using the sun's rays. All the energy generated is directly sent to the local power supply body KEB thereby receiving a subsidy in their regular bills and offsetting the energy used by giving back energy. The total capacity of the solar set-up is 30 KW with 90 panels arranged in 10 lines. Apart from this, all the CFL bulbs have been shifted to LED tubes thereby reducing consumption to almost half of what CFL bulbs would have consumed. The college also runs a "switch-off drill" and strictly follows a system of switching off all appliances after occupancy time. Computers are mainly used in the UG and PG courses and all run on power-saving mode.





Figure 9. Solar Panels on the Roof Top



**b) Recommendations:**

- Foot valves shall be used to automatically switch off the water supply when the tank reaches optimal levels. This could help save both energy as well as water. Automatic bore well management systems with sensors at the overhead tank as well as underground would help pump water only in case of shortages.
- Using Brushless Direct Current Fans could help reduce the consumption by half. All traditional electric appliances shall be replaced with energy-efficient ones to reduce power consumption and wastages.
- Lighting in some areas such as the toilets can be controlled by PIR (passive infrared light) sensors.
- Holding power conservation and awareness events could help keep the college community engaged.



## 5. Summary:

An audit of natural resources is an important tool for ensuring that natural resources are being used in an eco-friendly and sustainable manner. Green auditing is the process of determining whether institutional practices are environmentally friendly and sustainable. It is a continuous process of identification, monitoring and discussion. There is scope for further improvement, particularly concerning waste, energy and water management. The college in recent years consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.



*Figure 10: Good Environmental Practices for Sustainable Development.*





## 6. Corollary:

From the green audit, the following conclusions can be made:

- ❖ The institution has made good use of the terrace space by utilizing it for the terrace garden and the solar infrastructure that generates a good amount of energy that is sent to the KEB. The offset strategy is good in the long run and more investments in the same could reap greater benefits shortly.
- ❖ All CFL's in the campus have been replaced with LED's.
- ❖ All computers work on power saving mode.
- ❖ Signages related to Covid protocols and other relevant instructions were seen on the campus.

