

SUPPORTING DOCUMENT FOR 7.1.6

AUDITS

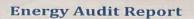


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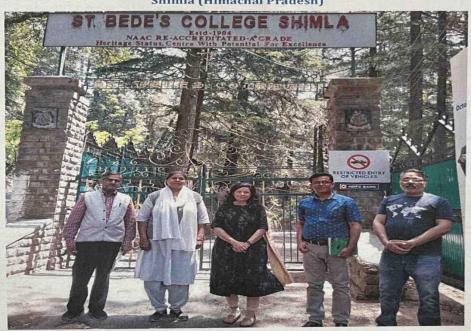


REPORT OF THE ENERGY AUDIT (2022-2024)





St. Bede's College, Shimla (Himachal Pradesh)



Prepared &Submitted By



ECO LABORATORIES & CONSULTANTS PVT. LTD. An ISO 9001:2015, ISO 14001:2015 &ISO 45001:2018 certified Company QCI-NABET, MOEF&CC, NABL and PPCB approved Laboratory



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Executive Summery







Executive Summary

A Nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions now a day are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly.

Energy today has become a key factor in deciding the product cost at micro level as well as in dictating the inflation and the debt burden at the macro level. Energy cost is a significan factor in economic activity at par with factors of production like capital, land and labour. The imperatives of an energy shortage situation call for energy conservation measure, which essentially mean using less energy for the same level of activity. Energy Audit attempts to balance the total energy inputs with its use and serves to identify all the energy stream's in the systems and quantifies energy usage's according to its discrete function. Energy Audit helps in energy cost optimization, pollution control, safety aspects and suggests the methods to improve the operating & maintenance practices of the system. It is instrumental in coping with the situation of variation in energy cost availability, reliability of energy supply, decision on appropriate energy mix, decision on using improved energy conservation equipment's Instrumentation and technology.

Energy Audit is the key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with its use, and serves to identify all the energy streams in a facility. It quantifies energy usage according to its discrete functions.

The Energy Audit would give a positive orientation to the energy cost reduction, preventive maintenance and quality control programmes which are vital for production and utility activities. Such an audit programme will help to keep focus on variations which occur in the energy costs, availability and reliability of supply of energy, decide on appropriate energy mix, identify energy conservation technologies, retrofit for energy conservation equipment etc. The primary objective of Energy Audit is to determine ways to reduce energy consumption per unit of product output or to lower operating costs. The present report shows the energy audit of St. Bede's College in terms of pre-audit phase, audit phase and post audit phase.







About St. Bede's College







About St. Bede's College, Shimla

St. Bede's College, Shimla, established in 1904, is a historical and educational landmark of North India which aims primarily at providing quality higher education and training to women. It is engaged in equipping students with relevant and appropriate skills, attitudes and experiences, for meeting the challenges of the life. The institute was Re-Accredited with A+ grade third time by NAAC in 2016. It has also been granted College with Potential for Excellence and Heritage Status by UGC.

Motto of College

"Non Nobis Solum"

Means Not for Ourselves Alone

Vision of College

To form well integrated individuals who are assets to contemporary society.

Mission of College

- Inspire young women to achieve academic excellence. Teach discernment so that our students think for themselves and think correctly.
- Encourage and recognize talent in individual students.
- Create awareness that education is a continuous quest.

Socially we work towards:

- Preparing young women for their role in the future as good career women, wives and mothers for creating happy homes.
- Fostering team spirit and encouraging a sense of responsibility and self-discipline.
- Teaching them to adjust to the changing social milieu while not forgetting the traditional values.
- Sensitizing them to reach out to the marginalized and the underprivileged.

Spiritually we work towards:

- Leading them to have faith in God, themselves and others, who would live their lives in the light of faith.
- Exposing them to values that are eternal and nurturing them to become beacons of light and ambassadors of harmony.







 Women whose very presence anywhere would exude goodness and touch the lives of others.

Values of college:

- Faith in God
- Moral Uprightness
- Love of Fellow Beings Social Responsibility
- Pursuit of Excellence







About Energy Audit







About Energy Audit

In broad sense, Energy Efficiency means economizing on the use of energy without adversely affecting economic growth and development. It includes improving the efficiency of energy extraction, Transmission and Distribution and increasing the productivity of energy use.

Designated consumers

Central Govt. specify the following criteria for energy intensive Industries and other establishments. (As per EC Act 2001, Section 14(e)), for Industries Electrical connected load - 5000 KW and above Designated Consumers to get energy audit by Accredited energy audit firms

Bureau of Energy Efficiency (BEE)

The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation Act The agency's function is to develop programs which will increase the conservation and efficient use of energy in India

Methodology Adopted for Energy Audit

As per the Energy Conservation Act, 2001, Energy Audit is defined as "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".

There are three phases of Energy Audit

- Pre audit phase
- Audit phase
- · Post audit phase

Above phases include following stages

Data Collection

Preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. Following steps were taken for data collection:

- o The team went to each department, centres, Library, canteen etc.
- $\circ \quad \text{Data about the general information was collected by observation and interview}.$







 The power consumption of appliances was recorded by taking an average value in some cases.

Data Analysis

Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Himachal Power Corporation Limited. Data related to water usages were also analysed using appropriate methodology.

Recommendation

On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health.

The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed. The formats of these are given below.

Pre auditPhase

Survey Form for data collection

- List ways that you use energy in your college. (Electricity, electric stove, kettle, microwave, and others).
- o Electricity bill amount for the last Oneyear
- Weight of firewood used per month and amount of money spent? Also mention the amount spent for petrol/diesel/ others forgenerators
- Is there any energy saving methods employed in your college? If yes, please specify.
 If no, suggest some.
- How much money does your college spend on energy such as electricity etc. in a month? (Record monthly for the year 2021).
- How many CFL bulbs has your college installed? Mention use (Hours used/day for how many days in a month)
- Energy used by each bulb per month? (For example- 60 watt bulb x 4 hours x number of bulbs = kwh).
- How many LED bulbs are used in your college? Mention the use (Hours used/day for how many days in a month)







- o Energy used by each bulb per month? (kwh).
- How many incandescent (tungsten) bulbs have your college installed? Mentions use (Hours used/day for how many days in a month)
- o Energy used by each bulb per month? (kwh).
- How many fans are installed in your college? Mention use (Hours used/day for how many days in a month)
- o Energy used by each fan per month? (kwh)
- How many air conditioners are installed in your college? Mention use (Hours used/day, for how many days' in a month)
- o Energy used by each air conditioner per month? (kwh).
- o How many electrical equipment's including weighing balance are installed your college?
- o Mention the use (Hours used/day for how many days in a month)
- o Energy used by each electrical equipment per month? (kwh).
- How many computers are there in your college? Mention the use (Hours used/dayfor how many days in amonth)
- o Energy used by each computer per month? (kwh)
- How many photocopiers are installed by your college? Mention use (Hours used/day for how many days in a month).
- How many cooling apparatuses are in installed in your college? Mention use (Hours used/day for how many days in a month)
- Energy used by each cooling apparatus per month? (kwh) Mention use (Hours used/day for how many days in a month)
- Energy used by each photocopier per month? (kwh) Mention the use (Hours used/day for how many days in a month) how many inverters your collage installed?
 Mentions use (Hours used/day for how many days in a month)
- o Energy used by each inverter per month? (kwh)
- How many electrical equipment are used in different labs of your college? Mention use (Hours used/day for how many days in a month)







- o Energy used by each equipment per month? (kwh)
- How many heaters are used in the canteen of your college? Mention the use (Hours used/day for how many days in a month)
- o Energy used by each heater per month? (kwh)
- o No of street lights in your college?
- o Energy used by each street light per month? (kwh)
- o No. of TV in your college and hostels?
- o Energy used by each TV per month? (kwh)
- Any other item that uses energy (Please write the energy used per month) Mention the use (Hours used/day for how many days in a month)
- Are any alternative energy sources/nonconventional energy sources employed / installed in your college? (i.e. photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.
- o Do you run "switch off' drills at college?
- o Are your computers and other equipment put on power-saving mode?
- Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby mode most of the time? Ifyes, how many hours?
- o What are the energy conservation methods adapted by your college?
- o How many boards displayed for saving energy awareness?
- o How much ash is collected after burning fire wood per day in the canteen?
- Write a note on the methods/practices/adaptations by which you can reduce the energy use in your college campus in future.

Audit Phase

In St. Bede's College of Shimla, energy auditing was done with the help of team teaching staff. The energy audit began with the teams walking through all the different facilities at the college, determining the different types of appliances and utilities (lights, toilets, fridges, etc.) as well as measuring the usage per item (Watts indicated on the appliance) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts.







The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances.

Data collection

Data collection was done in the sectors such as sources of Energy and energy consumption pattern, College records and documents were verified several times to clarify the data received through survey and discussions.

Site Tour

Site inspection was done along with staff. Questionnaires were answered during site tour the relevant documents were collected.

Review of Documents and Records

Documents such as electricity bills, registers of electricity, fuel consumption were collected and reviewed.

Site inspection

College and its premises were visited and analyzed by the audit-teams several times to gather information. Campus trees were counted and identified. Play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. canteen and hostel kitchen mess were counted.







Auditing of Energy Management







Auditing for Energy Management

Energy is one of the major inputs for the economic development of any country. The fundamental goal of energy management is to produce goods and provide services with the least cost and least environmental effect. Also it can be said as "the strategy of adjusting and optimizing energy, using system and procedure so as to reduce energy requirements per unit of output while holding constant or reducing total costs of producing the output from these systems". The energy audit is key to a systematic approach for decision making in the area of energy management. It attempts to balance the total energy inputs with its use, and serve to identify all the energy streams in a facility.

a) Electrical Energy

Energy resources utilized by all the departments, support services and the administrative buildings of St. Bede's College, Shimla, include electricity, solar energy and liquid fuels as petroleum. Major use of the energy is at office, canteen, hostel and laboratories, for lighting, transportation, cooking and workshop instruments. Electricity is also supplied to the College campus by Himachal Pradesh Electricity Board. The communication process for awareness in relation to energy conservation is found inadequate.

- Regular monitoring of equipment's and immediate rectification of any problems.
- Employment of more solar panels and other renewable energy sources.
- Conduct more save energy awareness programs for students and staff.
- Observe a power saving day every year.
- Automatic power switch off systems may be introduced.

b) Fuel Energy

The fuel energy audit determines the approximate use of petrol or diesel by the vehicles inside the College. It also includes the efforts taken by the College to conserve the fuel. The conventional source of fuel for the vehicle is petrol and diesel. Number of vehicles used by students, teaching and non-teaching staff of College and visitors are considered as source of fuel consumption and air emissions. So, the data regarding fuel utilization for students, teaching and non-teaching staff of College and visitor are monitored in the study. For the purpose of the fuel energy audit the entire College campus with infrastructure is divided into groups. With respect to the mentioned classes the survey was carried out regarding the petrol/diesel fuel use in by students, teaching and non-teaching staff and visitors coming with vehicles on the campus.







As the part of fuel energy management and reduction of carbon footprints, the institute has initiated some efforts as introduced electric bike for campus use

c) Solar Energy

The institute has installed solar power plant solar water heating systems.

Energy Sources and Consumption Area in Collage

There is hostel and supporting infrastructures like library, administrative block, auditorium and cafeteria.

Energy Source

Power supply from State Power Supply Department. In case of power cut supply power to be fulfil demands with help of generator which runs on diesel as fuel

- ♣ Generator Set No. 1 (250 KVA)
- Generator Set No. 2 (63KVA)
- ♣ Power efficiency of generator is 80%

Energy consumption in College

Month wise Energy consumption by the college is shown in table 2.

Table 2: Meter wise Energy Consumption Record of College

| Meter No 1111404107 | | | | | |
|---------------------|-------------|----------------|------------------|------------------|---------|
| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
| 1 | March | 4478 | 4927 | 449 | 2523.6 |
| 2 | April | 4927 | 5186 | 259 | 1507.13 |
| 3 | May | 5186 | 5412 | 226 | 1302.88 |
| 4 | June | 5412 | 5611 | 199 | 1192.41 |
| 5 | July | 5611 | 5674 | 63 | 469.41 |
| 6 | August | 5674 | 5767 | 93 | 643.24 |
| 7 | September | 5767 | 5995 | 228 | 4335.49 |
| 8 | October | 5995 | 6209 | 214 | 1286.08 |







| 9 | November | 6209 | 6501 | 292 | 1661.8 |
|----|----------|------|------|-----|--------|
| 10 | December | 6501 | 6772 | 271 | 1575.1 |
| 11 | January | 6772 | 6855 | 83 | 583.63 |
| 12 | February | 6855 | 7144 | 289 | 1658.8 |

Meter No 1111404108

| s.NO | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|---------|
| 1 | March | 24832 | 25511 | 679 | 3731.29 |
| 2 | April | 25511 | 25967 | 456 | 2542.07 |
| 3 | May | 25967 | 26322 | 355 | 1966.07 |
| 4 | June | 26322 | 26658 | 336 | 1911.85 |
| 5 * | July | 26658 | 27086 | 428 | 2305.1 |
| 6 | August | 27086 | 27502 | 416 | 2366.05 |
| 7 | September | 27502 | 27963 | 461 | 2558.55 |
| 8 | October | 27963 | 28493 | 530 | 2939.36 |
| 9 | November | 28493 | 29137 | 644 | 3514.86 |
| 10 | December | 29137 | 29893 | 756 | 4121.41 |
| 11 | January | 29893 | 30489 | 596 | 3277.19 |
| 12 | February | 30489 | 31102 | 613 | 3398.84 |
| | | | | | |

| s.NO | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|---------|
| 1 | March | 134339 | 136157 | 1818 | 9711.36 |
| 2 | April | 136157 | 137311 | 1154 | 6206.64 |
| 3 | May | 137311 | 138283 | 972 | 5152.89 |
| 4 | June | 138283 | 139504 | 1221 | 6557.92 |







| Meter No 1111404262 | | | | | |
|---------------------|-------------|----------------|------------------|------------------|----------|
| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
| 1 | March | 297546 | 304692 | 7146 | 37683.04 |
| 2 | April | 304692 | 308523 | 3831 | 20206.57 |
| 3 | May | 308523 | 309974 | 1451 | 7466.57 |
| 4 | June | 309974 | 311986 | 2012 | 10710.35 |
| 5 | July | 311986 | 314644 | 2658 | 14093.1 |
| 6 | August | 314644 | 316433 | 1789 | 9741.55 |
| 7 | September | 316433 | 320402 | 3969 | 20975.05 |
| 8 | October | 320402 | 325636 | 5234 | 27635.86 |
| 9 | November | 325636 | 331674 | 6038 | 32227.75 |
| 10 | December | 331674 | 337814 | 6140 | 32387.3 |
| 11 | January | 337814 | 339516 | 1702 | 9083.08 |
| 12 | February | 339516 | 345078 | 5562 | 29463.43 |
| | | | | | |

| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|---------|
| 1 | March | 43326 | 44079 | 753 | 4119.88 |
| 2 | April | 44079 | 44219 | 140 | 882.66 |
| 3 | May | 44219 | 44219 | 0 | 125.91 |
| 4 | June | 44219 | 44475 | 256 | 1342.01 |
| 5 | July | 44475 | 44894 | 419 | 2338.01 |
| 6 | August | 44894 | 45306 | 412 | 2344.29 |
| 7 | September | 45306 | 46171 | 865 | 4679.79 |
| 8 | October | 46171 | 46859 | 688 | 3773.88 |







| 9 | November | 46859 | 47710 | 851 | 4596.35 |
|----|----------|-------|--------|--------|---------|
| 10 | December | 47710 | 48393 | 683 | 3738.65 |
| 11 | January | | 360.6 | 0 | |
| 12 | February | 48338 | 345078 | 296740 | 4263.45 |

Meter No 1111404739

| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|---------|
| 1 | March | 52763 | 53699 | 936 | 5415.74 |
| 2 | April | 53699 | 54451 | 752 | 4364.74 |
| 3 | May | 54451 | 55085 | 634 | 3634.46 |
| 4 | June | 55085 | 55717 | 632 | 3692.5 |
| 5 | July | 55717 | 56281 | 564 | 3301 |
| 6 | August | 56281 | 56882 | 601 | 3563.06 |
| 7 | September | 56882 | 57483 | 601 | 3508.72 |
| 8 | October | 57483 | 58222 | 739 | 4301.34 |
| 9 | November | 58222 | 58878 | 656 | 3871.56 |
| 10 | December | 58878 | 59641 | 763 | 4431.01 |
| 11 | January | 59641 | 60340 | 699 | 4068 |
| 12 | February | 60340 | 60930 | 590 | 3497.67 |

| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|--------|
| 1 | March | 48396 | 48396 | 0 | 166.39 |
| 2 | April | 48396 | 48396 | 0 | 148.18 |
| 3 | May | 48396 | 48396 | 0 | 136.43 |
| 4 | June | 48396 | 48396 | 0 | -42.97 |







| 5 | July | 48396 | 48399 | 3 | 112.18 |
|----|-----------|-------|-------|----|--------|
| 6 | August | 48399 | 48399 | 0 | 149.54 |
| 7 | September | 48399 | 48399 | 0 | 137.79 |
| 8 | October | 48399 | 48399 | 0 | 157.18 |
| 9 | November | 48399 | 48399 | 0 | 135.94 |
| 10 | December | 48399 | 48399 | 0 | 152.49 |
| 11 | January | 48399 | 48400 | 1 | 153.89 |
| 12 | February | 48400 | 48470 | 70 | 528.23 |

Meter No 1111401049

| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|---------|
| 1 | March | 2662.3 | 4042.7 | 1380.4 | 9517 |
| 2 | April | 4042.7 | 5149.2 | 1106.5 | 8163.72 |
| 3 | May | 5149.2 | 5149.2 | 0 | 2696 |
| 4 | June | 5149.2 | 5149.2 | 0 | 2696 |
| 5 | July | 5149.2 | 5182.9 | 33.7 | 2862.5 |
| 6 | August | 5182.9 | 5203.7 | 20.8 | 2798.3 |
| 7 | September | 5203.7 | 5225.1 | 21.4 | 2801.74 |
| 8 | October | 5225.1 | 5235 | 9.9 | 2744.92 |
| 9 | November | 5235 | 5260 | 25 | 2821.5 |
| 10 | December | 5260 | 5330 | 70 | 3039.89 |
| 11 | January | 5330 | 5333 | 3 | |
| 12 | February | 5333 | 5394.4 | 61.4 | 2999 |

| awa | D | Old | Meter | consumed | Amount |
|------|-------------|---------|---------|----------|--------|
| S.NO | Description | Reading | Reading | unit | Amount |







| March | 110389 | 112252.5 | 1863.5 | 12809.59 |
|-----------|--|---|---|--|
| April | 112252.5 | 113417.7 | 1165.2 | 9461.25 |
| May | 113417.7 | 114085.7 | 668 | 7004.5 |
| June | 114085.7 | 114617.3 | 531.6 | 6429.46 |
| July | 114617.3 | 115249.7 | 632.4 | 6327.51 |
| August | 115249.7 | 116140.9 | 891.2 | 7909.76 |
| September | 116140.9 | 117753.9 | 1613 | 11673.63 |
| October | 117753.9 | 119468.9 | 1715 | 12177.82 |
| November | 119468.9 | 120894.8 | 1425.9 | 10749.37 |
| December | 120894.8 | 123071.3 | 2176.5 | 14458.09 |
| January | 123071.3 | 125001.2 | 1929.9 | |
| February | 125001.2 | 127700.4 | 2699.2 | 17040.75 |
| | April May June July August September October November December January | April 112252.5 May 113417.7 June 114085.7 July 114617.3 August 115249.7 September 116140.9 October 117753.9 November 119468.9 December 120894.8 January 123071.3 | April 112252.5 113417.7 May 113417.7 114085.7 June 114085.7 114617.3 July 114617.3 115249.7 August 115249.7 116140.9 September 116140.9 117753.9 October 117753.9 119468.9 November 119468.9 120894.8 December 120894.8 123071.3 January 123071.3 125001.2 | April 112252.5 113417.7 1165.2 May 113417.7 114085.7 668 June 114085.7 114617.3 531.6 July 114617.3 115249.7 632.4 August 115249.7 116140.9 891.2 September 116140.9 117753.9 1613 October 117753.9 119468.9 1715 November 119468.9 120894.8 1425.9 December 120894.8 123071.3 2176.5 January 123071.3 125001.2 1929.9 |

| s.no | Description | Old Reading | Meter Reading | consumed unit | Amount |
|------|-------------|----------------|------------------|------------------|----------|
| 1 | March | 67337.5 | 69245.1 | 1907.6 | 16500.94 |
| 2 | April | 69238.1 | 69839 | 600.9 | |
| 3 | May | 69839 | 69548.3 | -290.7 | 6674.8 |
| 4 | June | 69548.3 | 70073 | 524.7 | 7791.24 |
| 5 | July | 70073 | 70710.6 | 637.6 | 9927.42 |
| 6 | August | 70710.6 | 71243.1 | 532.5 | 9363.42 |
| 7 | September | 71243.1 | 72902.3 | 1659.2 | 15215.22 |
| 8 | October | 72902.3 | 74397.1 | 1494.8 | 14364 |
| 9 | November | 74397.1 | 76294.1 | 1897 | 16444 |
| 10 | December | 76294.1 | 79050 | 2755.9 | 20992 |
| 11 | January | 79050 | 82183.7 | 3133.7 | 22219 |







| 12 | February | 79171 | 82183 | 3012 | 22219 |
|----|----------|-------|-------|------|-------|
| | | | | | |

Yearly Power Load and Billing Cost

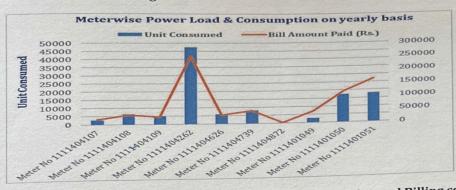


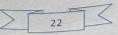
Fig. Graphical Presentation of yearly Power Load/ Consumption and Billing cost

Table: Yearly Power Load/ Consumption and Billing cost

| Energy Meter | Unit Consumed | Charges per unit @ 4.70 | Bill Amount Paid | Surcharges | |
|---------------------|---------------|--|--|------------|--|
| | | 12530.2 | 18739 | 6208.8 | |
| Meter No 1111404107 | 2666 | | 34632 | 5163 | |
| Meter No 1111404108 | 6270 | 29469 | 27628 | 3352.5 | |
| | 5165 | 24275.5 | 251674 | 28273.6 | |
| Meter No 1111404109 | 47532 | 223400.4 | Control of the Contro | 4658.3 | |
| Meter No 1111404262 | 5861 | 27546.7 | 32205 | | |
| Meter No 1111404626 | | 38384.9 | 47650 | 9265.1 | |
| Meter No 1111404739 | 8167 | 347.8 | 1935 | 1587.2 | |
| Meter No 1111404872 | 74 | 12840.4 | 43141 | 30300.6 | |
| Meter No 1111401049 | 2732 | DESCRIPTION OF THE PROPERTY OF | 116042 | 34680.3 | |
| | 17311 | 81361.7 | 161711 | 77745.5 | |
| Meter No 1111401050 | 17865 | 83965.5 | | 201234.9 | |
| Meter No 1111401051 | | | 735357 | 201234.9 | |
| Yearly Paid Amount | | | | | |

Estimation of Electrical Load

| | Computer lab 1-2, O | ffice, Staff Room | | C1 db |
|-------|---------------------|-------------------|----------------------|-----------------|
| | Description | Running | Intermediate Load | Standby Load |
| S. No | Description | 1100 | 1720 | 180 |









| 38 | Coffee Machine | | 100 | |
|--------|----------------------|-------------------|-------|-------|
| | Total Load | 720 | 490 | 0 |
| | | Library | | |
| 39 | Lighting Load | 7164 | | |
| 40 | Other Load | 100 | 100 | |
| | Total Load | 7264 | 100 | 0 |
| 15/12/ | Yar | d (Campus Lights) | | |
| 41 | LED Flood Light 100W | 2000 | | |
| 42 | LED 20W Bulb | 120 | | |
| 10.5 | Total Load | 2120 | 0 | 0 |
| | | Hostel | | |
| 43 | Lighting Load | 6791 | 6963 | 540 |
| 44 | Exhaust Fan | 300 | | |
| 55 | Geyser | 38000 | 38000 | 22000 |
| 46 | Iron (Press) | 800 | 400 | |
| 47 | Heater 1500W | 16500 | 24000 | 9000 |
| 48 | Other Load | 225 | 200 | 200 |
| 49 | Pantry | 6600 | 650 | |
| | Total Load | 69216 | 70213 | 31740 |
| | | Canteen | | |
| 50 | Lighting Load | 120 | 180 | |
| 51 | Exhaust Fan | 75 | | |
| 52 | Geyser | 2000 | | |
| 53 | Pantry | 680 | 400 | 0 |
| Chale | Total Load | 2875 | 180 | 0 |

| Total Lighting Load | 37 KW |
|-------------------------------|---------|
| Conventional Light | 4.1 KW |
| | 25 KW |
| CFL Light LED Light | 7.4 Kw |
| Heaters | 72 KW |
| Geyser | 10 KW |
| Office Equipment & Other Load | 25.5 Kw |
| Misc. Load | 15 KW |

Key Findings and Observations of Energy Use

The base of energy audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems







requirements and in the correct manner. Energy audits form a part of a process. Although they are individual events, the real value of energy audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time.

Although audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. The essence of any energy audit is to find out how well energy management equipment is performing. Each of the three components are crucial in ensuring that the organizations energy performance meets the goals set in its energy policy.

Costing of Energy Consumption:

- ♣ Electricity charges Rs.7,35,358/month
- ♣ Number of Generators =2 Nos. (250kVA &63kVA)
- ♣ Cost of generator fuel = Rs.10,000 / month
- **♣** Total cost of energy consumed =Rs. 7,45,358/month

Equipment Load of College

| Sr. No. | Name of the Equipment | |
|-----------|------------------------|--|
| 1 | Laptop (18) | |
| 2 | Heater (14) | |
| Geograph | ıy Lab (Meter NO. 2) | |
| Sr. No. | Name of the Equipment | |
| 1 | Tracing Table (2) | |
| 2 | Globe (2) | |
| 3 | Overhead Projector (1) | |
| 4 | Desktops (9) | |
| 5 | Printer (1) | |
| 6 | Smart Board (1) | |
| Music (Me | eter NO. 8) | |
| Sr. No. | Name of the Equipment | |
| 1 | Digital Tanpura | |
| 2 | Desktop | |







| Sr. No. | Name of the Equipment |
|------------|--|
| 1 | Depth Perception Apparatus |
| 2 | Memory Drum |
| 3 | Mirror Drawing Apparatus |
| 4 | Steadiness Tester |
| 5 | Human Maze Learning |
| 6 | Division of Attention Board |
| 7 | Colour Mixture Apparatus |
| 8 | Tapping Board |
| 9 | reaction Time Apparatus |
| Zoology L | ab (Meter NO. 2) |
| Sr. No. | Name of the Equipment |
| 1 | Trinocular Olympus Microscope |
| 2 | Binocular Light Microscope |
| 3 | Stereo Zoom Trinocular Microscope |
| 4 | Incubator |
| 5 | Geyser |
| | Lab (Meter NO. 1) |
| Sr. No. | Name of the Equipment |
| 1 | UPS (Desktop-69), Firewall, Server, Router, Printer Connected |
| 2 | Projector |
| 3 | Visualizer (1) |
| Physics La | ab (Meter NO. 2) |
| Sr. No. | Name of the Equipment |
| 1 | Ionization Pot. |
| 2 | Dielectric Constant |
| 3 | Hysteresis Loop |
| 4 | Digital Storage Oscilloscope |
| 5 | Varic |
| 6 | Hot air Sterilizer Oven |
| 7 | Charge & Discharge Of Capacitor |
| 8 | Milikan Oil Drop |
| 9 | Rectifier |
| 10 | LCR |

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| 11 | Na Lamp |
|-----------|---------------------------------------|
| 12 | Hg Lamp |
| 13 | Planks Constant Using LED |
| 14 | Network Theorem |
| 15 | Fet Characteristics |
| 16 | Thermistors Characteristics |
| 17 | Semi-Conductor Diode |
| 18 | e/m Helical Method |
| 19 | e/m by Magnetron valve method |
| 20 | Charging Discharging Of Capacitor |
| 21 | Transistor Characteristics |
| 22 | Frequency of AC Supply Using Vibrator |
| 23 | Wavelength Of Laser Light |
| 24 | Zener Diode |
| 25 | Over Head Projector |
| 26 | Slide Projector |
| 27 | Amplifier Model OPA/3 |
| 28 | Energy Gap |
| 29 | Flashing & Quenching |
| 30 | Kelvin Bridge |
| 31 | Hartley Oscillator |
| 32 | PN Junction Diode |
| 33 | Common Emitter Amplifier |
| 34 | Function Generator |
| 35 | Lee Disc Using 1000W heater |
| 36 | Semiconductor Diode |
| Microbiol | logy/Biotech Lab (Meter NO. 2) |
| Sr. No. | Name of the Equipment |
| 1 | Laminar Air Flow Chamber |
| 2 | Distillation Plant |
| 3 | Autoclave |
| 1 | Hot air Oven |
| | Micro Centrifuge Machine |
| | Water Bath |

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| Sr. No. | Laminar Air Flow |
|----------|-----------------------------------|
| | Name of the Equipment |
| 14 | Water Bath |
| 13 | Analytical Balance (2UNITS) |
| 12 | Electric Heater (2 UNITS) |
| 11 | Muffle furnace |
| 10 | UV/VIS Spectrophotometer |
| 9 | Flame photometer |
| 8 | Electric Geyser |
| 7 | Electric shaker |
| 6 | Hot air oven (2 UNITS) |
| 5 | Melting Point Apparatus (2 UNITS) |
| 4 | Magnetic Stirrer (4 UNITS) |
| 3 | Colorimeter (2 UNITS) |
| 2 | PH meter (2 UNITS) |
| 1 | Conductivity meter (3 UNITS) |
| Sr. No. | Name of the Equipment |
| Chemistr | ry (Meter NO. 2) |
| 21 | Incubator Shaker |
| 20 | Deep Freezer |
| 19 | BOD Incubator |
| 18 | pH Meter |
| 17 | Spectrophotometer UV-Visible |
| 16 | Laptop |
| 15 | Vortex machine |
| 14 | High Speed Centrifuge |
| 13 | Electrophoresis Unit |
| 12 | Thermocycler |
| 11 | Orbital Shaking Incubator |
| 10 | Gel Doc System |
| 9 | Electronic Weighing Balance |
| 8 | Magnetic Stirrer cum Hot Plate |

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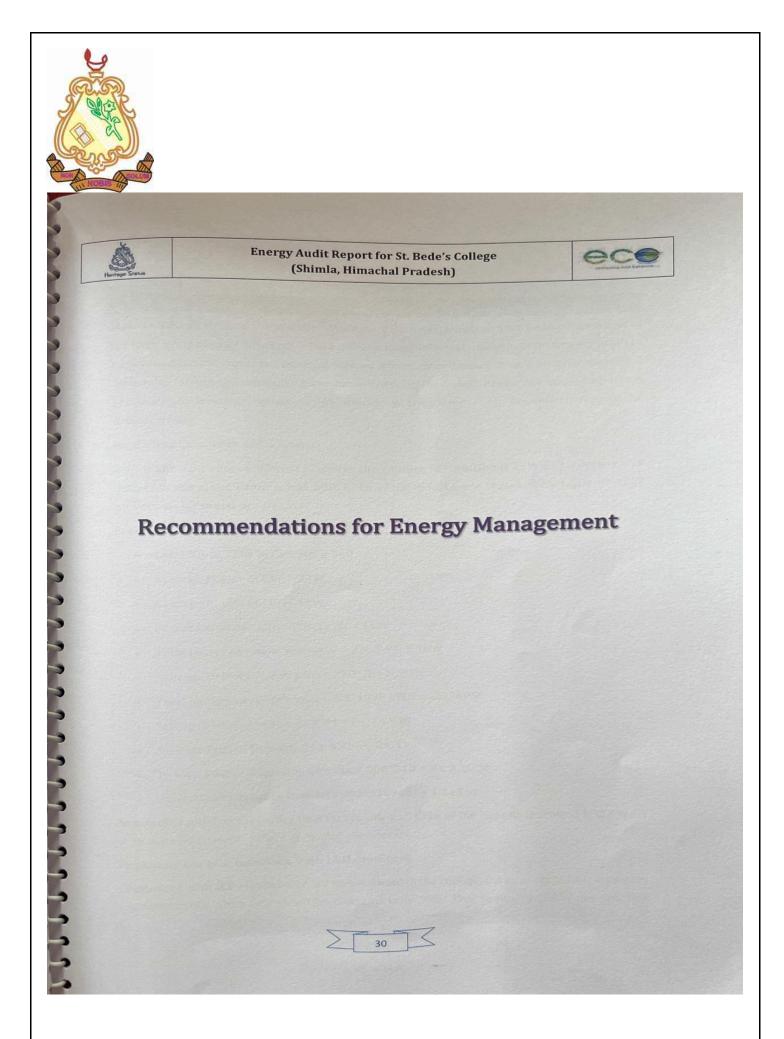




| 2 | Hot plate | |
|----|-------------------------------|------|
| 3 | UV- Spectrophotometer | |
| 4 | Refrigerator (1) | |
| 5 | Research Binocular microscope | |
| 6 | Research Binocular microscope | |
| 7 | Projector | 9.17 |
| 8 | Water bath | |
| 9 | Medical Centrifuge | |
| 10 | Digital Balance | |
| 11 | Oven | |
| 12 | Autoclave | |
| 13 | Printer | |

Power Saving Measures adopted by College

- Solar Geysers installed in hostels
- Manual turn off electrical equipment's when not in use.
- Master switches installed outside rooms in hostels & Class Rooms.
- CFLs are being replaced by more efficient LEDs
- Use computers and electronic equipment's in power saving mode









Recommendations for Energy Management

Based on the analysis of the power consumption data, certain steps have been recommended for improving energy efficiency of the campus. Complete cost analysis of implementation of recommended measures has been performed wherever necessary. Also, a number of general measures for energy efficiency have been listed. As described below are some important recommendations for better energy efficiency with *Low / No Investment {Immediate Replacements}*

Replacing CFLs with LEDs lamps

Dominant light source at most places in the campus is traditional 23W CFLs. As per our data collection, the campus has 300. CFLs. If these CFLs are replaced by LEDs I0-12W power can be saved per CFL as:

Cost Analysis of Replacing CFLs with LEDs

- Total No. of CFLs in Campus = 300
- Average Power of CFL = 23W
- Average Power of LED= 12W
- Power saved per LED= (23-12)W = 11W
- Total Power saving = 300*11W = 3300W = 3.3Kw
- Average Use of CFL per year = 270*7h= 1890 h
- Total Energy saved per year = 3.3*1890 kWh =6237kWh
- Saving in Rs. Per year = 6237*4 = Rs. 24,948
- Average Cost of Replacing each CFL = Rs. 110
- To total Cost of Replacing all CFLs = 300*110 = Rs. 33,000
- Capital Cost Recovery time = (33000/24948) = 1.322 yr

Hence, the capital cost recovery time for replacing all CFLs of the campus is around 1.322 years is Medium Investment / Short Term Ref} Placements.

Replacing the LCD monitors with LED monitors

Computers with LCD monitor are 50 in total used in the college. On an average LCD monitors consume 150W while LED monitors consume only 50W. This saving of 100W per monitor







is very large. But the LED monitor is also costlier by Rs. 2000.

Cost Analysis of Replacing LCD monitors with LED monitors

- Total no. of computers with LCD monitors in Campus = 50 Nos.
- Power consumption by each LCD monitor = 150W
- Power consumption by each LED monitor = 50W
- Power saved by LED monitor = 150W 50W = 100W
- Total Power saving = 50 Nos. *100W = 5000W = 5.0 kW
- Average use of computers per year= 6h*270days = 1620h
- Total Energy saved per year= 5 kW *1620h = 8100 kWh
- Cost saving per year= 8100*4 = Rs. 32,400
- Average Cost of Replacing each Monitor = Rs. 5,000
- Total Cost of Replacing all monitors = 50 Nos. * Rs. 5000 = Rs.2,50,000
- Capital Cost Recovery time = 2,50,000/32400 = 7.8yr

The capital cost recovery time for replacing LCD monitors by LED monitors is 7.8 years. Since the product life is much more hence, the move is economically beneficial.

Use of Master Switch outside each Room

Installation of a master switch outside a room can make it easy for a person to switch off all the appliances of a room in case someone forgets to switch off while leaving the room. This can help improving energy efficiency.

Use of Motion Sensors in Toilets

Toilets have large potential of saving energy by use of automation tools. Motion sensors can be used there to automatically switch on the light when there is any movement and switch off the light Then there is no movement. This can greatly reduce the total load in toilets,, each toilet has 4 tube lights in average. There will be 2sensors required in a toilet

Cost analysis of Installing Motion Sensors in a Typical Toilets:

- Approx. number of tube lights in a Toilets = 40
- Average power of the tube lights = 40W







- Average number of motion sensors required = 2
- Average reduction in usage per day by motion sensor = 4h
- Total energy saved in Toilets per year=(40*40*2*365)/1000 = 1168kWh
- Saving in Rs. Per year= 1168*4 = Rs. 4672
- Cost of installation per motion sensor = Rs. 250
- Total cost of installing motion sensors in Toilets = 20*250 = Rs.5000
- Capital Cost Recovery Time = (5000/4672) = 1yr

Hence, the capital cost recovery time for installing motion sensors in toilets is 1 years. Hence, this is a highly recommended step to largely reduce the consumption in toilets.

High Investment / Long Term Replacement

Energy substitution (electrical energy to solar energy)

As we know in campus there is a huge consumption of electrical energy which is not economical so instead of using electrical energy, we switch to alternate energy source which is solar energy.







Consolidation of Audit Findings







Consolidation of Audit Findings

- The communication process for awareness in relation to energy conservation is found adequate.
- Average power factor of 0.9 is maintained
- Assessment of electrical load calculation has been done by the college.
- Annual use of electricity in the college (Rs. 7,35,358/- per year) is much high.
- Objectives for reducing energy, water and fuel consumption are insufficient
- Adoption of energy efficient equipment's by replacing LCD with LED monitors, replacing conventional tube lights with LED lights and the old non-energy efficient fans and bulbs with energy efficient appliances.
- Regular monitoring of equipment's and rectification of any problems is being done.
- Adoption of green energy resources (i.e. solar and or wind power stations) for the objective of energy conservation with sustainable development and to reduce carbon footprints.
- Isolate the leech Loads from power when not in use.
- Recommend the centralized HVAC system instead of Individual Room Heater and AC.
- Establish Energy Efficiency and Conservation steering committee to take with energy efficiency initiative and management within the building.

Post audit phase

Follow Up and Action Plans

Energy audits form a part of an on-going process. Innovative energy saving initiatives has to be designed and implemented every year to make the college environmentally sustainable. Follow up programs of energy auditing recommendations should be done meticulously before the next audit.





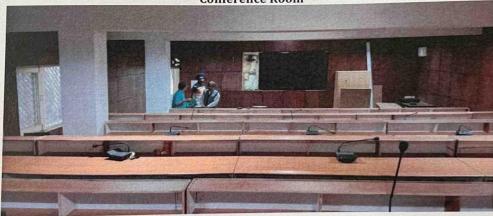


Photographical view of Audit





Conference Room



Principal Office

Computer Lab





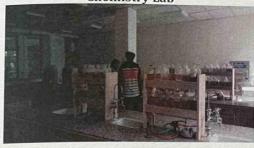
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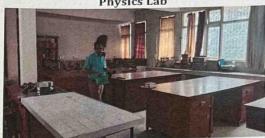




Chemistry Lab



Physics Lab



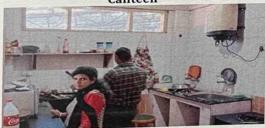
Lab Equipment



Computers



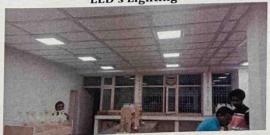
Canteen



Library



Lighting Arrangement LED's Lighting



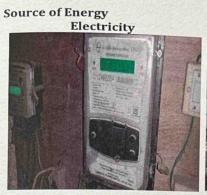
Convectional Tube Lighting



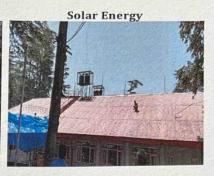








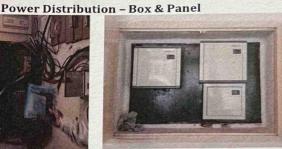




Power System Meter Box

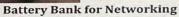






Networking



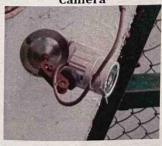


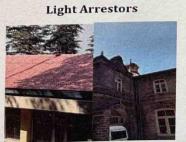


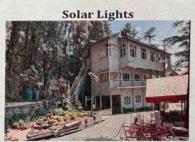


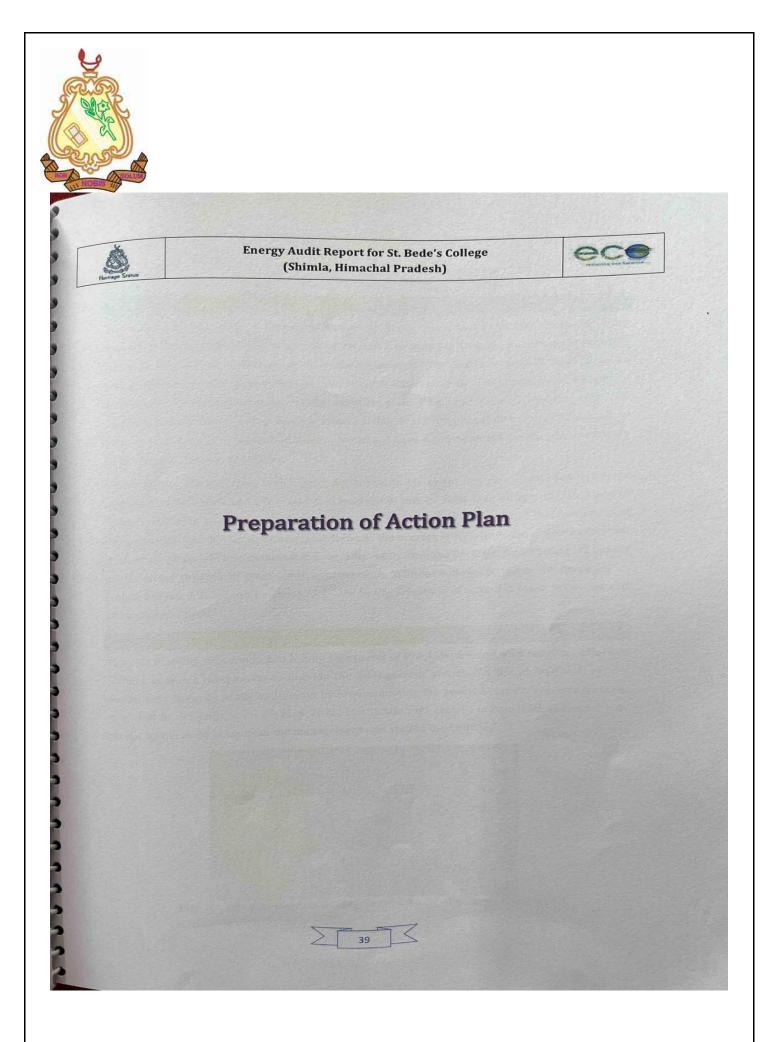


Camera















Preparation of Action Plan

There should be Committee formation for energy Audit, Green Audit and Environmental Audit involving Faculties and Students. Policies referring to institute's management and approach's towards the use of resources need to be considered. The institute should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the institute should be implemented meticulously. The institute should have a policy on awareness raising or training programs (for ground staff or kitchen staff for example) and institute also should have a procurement policy (the Institute's policy for purchasing materials).

Green Audits are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organization and that action plans and implementation programs result from the findings. Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organizational priorities and the passing of time.

Exit Meeting

The exit meeting was conducted jointly by experts of Eco Laboratories and team members of College. It was a mechanism to provide the management and staff a broad feedback on the preliminary findings of the audit team before completing the audited report. The exit meeting was held in the College on 5th May 2022. Clarification on certain information gathered was sought by the audit team from the management and staff of the College.



Fig. 20: Team of Experts during Energy Audit of College Campus







Draft Audit Report

The information gathered by the audit team was consolidated as a draft audit report. This draft report was then circulated to the audit team and those directly concerned with the audit to check the report for accuracy. The draft green audit report was also discussed in the exit meeting.

Final Audit Report

The final audit report is the corrected final document which contains the findings and recommendations of the audit. It will also form one of the bases of future audits because the information it contains informs some of the tests and analyses that need to be performed in the future. Final Audit Report was submitted to the Principal/ Director of the institute.

Follow Up and Action Plans

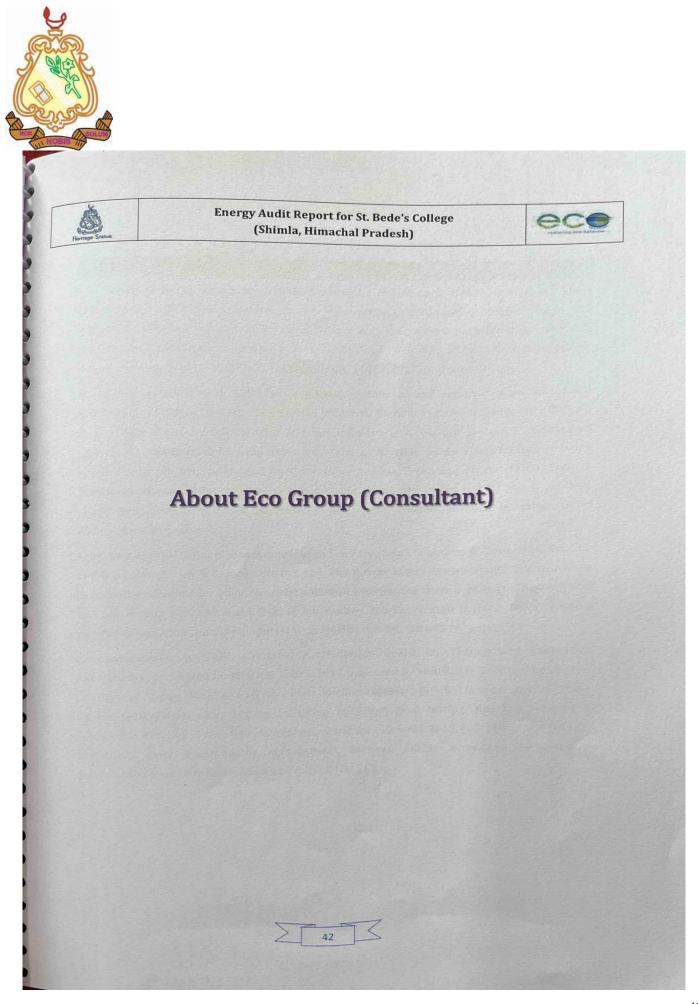
Energy audits form a part of an on-going process. Innovative green initiatives have to be designed and implemented every year to make the institute energy efficient and environmentally sustainable. Follow up programs of green auditing recommendations should be done meticulously before next audit.

Next Audit

In order to promote continuous improvement, it is recommended to conduct the next audit including green auditing during the year 2024.

Transparency of Audit Report

The energy audit report is one of the useful means of demonstrating an organization's commitment to openness and transparency to save energy and environment. If an organization believes it has nothing to hide from its stakeholders, then it should feel confident enough to make its green audit reports freely available to those who request them. It has been recommend that next time the institute should go for a comprehensive "Green audit" for energy and environmental conservation with sustainable development and reports should be made available to all stakeholders.









ABOUT ECO GROUP

Eco Group is North India's reputed environmental organization Headquartered in Mohali (Chandigarh) that offers consultancy and environmental-related turnkey solutions for overall pollution abatement and sustainable development. We are a professional engineering firm with National level consultancy approved by QCI/ NABET and Environmental and Mechanical testing laboratory approved by MoEF&CC, NABL(ISO/IEC 17025:2017) and state boards.

Eco Group, established in 1998 has designed, engineered and executed more than 1,000 installations of Water, Domestic Sewage and Industrial Effluent Treatment Plants. With the help of our state-of-the-art technologies and apt infrastructure, we are proud to maintain an impeccable quality record, owing to our customer satisfaction levels. These treatment plants operate with the help of trained staff, including Sewage Treatment Plants (STPs), Effluent Treatment Plants (ETPs), Reverse Osmosis Plants (ROs), etc. In the last 20 years, we have undertaken several projects successfully and have created sustainable solutions to environmental issues.

Eco Group has two major business divisions as Eco Paryavaran Engineers & Consultants Pvt. Ltd. and Eco Laboratories & Consultants Pvt. Ltd. The former caters to consultancy and providing engineering solutions for environmental pollution whereas the latter pertains to the analytical and consultancy services in the field of lab studies. Eco Paryavaran is North India's leading supplier of pollution control equipment with world-class infrastructure.

Eco Laboratories is NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited for ISO/IEC 17025:2017, approved by Ministry of Environment, Forest and Climate Change (MoEF&CC) &State Pollution Control Board (SPCBs) in the field of air, noise, wastes, water/wastewater testing including microbiological testing. Eco Laboratories & Consultants Pvt. Ltd. is also Government approved for ISO 9001:2015, ISO 14001 and OHSAS-18001:2007 and Environment Management Services (EMS) accredited by National Accreditation Board for Education and Training (NABET).







Table 14: Special Facility of Eco Group for Environmental Testing & Management

Onsite Environmental Testing Mobile Testing Laboratory

Flue Gas Emissions from Stack/ Source/ Duct Flue Gas Analyzer – MRU, Optima 7

Aerosol Dust in Ambient/ Indoor/ Work zone Environment

(TSI Side Pak™ AM520i Real Time Aerosol Sampler for PM10, PM5.0, PM2.5, PM1.0 and PM0.8- DPM), Intrinsically Safe

VOCs & Toxic Gases in Ambient/ Indoor/ Work zone Environment

Real Time VOC/Toxic Gas Meter (PID) - TIGER PhoCheck, Ion Science, UK, Intrinsically Safe

Validation of Indoor Environment in Hospitals/ Operation Theaters

As per ISO 14664 standard, services are delivered as Air Change/ Ventilation Rate, Air Velocity at filtration unit, Pressure Differential, Validation of HEPA Filters by DOP /POA testing, Temp. and Humidity

Noise & Vibration Monitoring

Sound level meters and octave brands











Noise Dose Monitoring in Work Zone Environment

Noise Dosimeter – SVANTEK SV104IS, Intrinsically Safe

Calibration of Online CEMS (Emission/ Effluent)

Calibration for Particulate Matter (Emissions) & pH, BOD, COD, TSS (Effluents)

Milk Powder Emission Loss Monitoring in Dairy Industry

Quantification of Milk Powder Emission Loss form Milk Dryers/ Fugitive Emissions/ General Leakage

Carbon Monoxide (CO) in Ambient/ Indoor/ Work zone Environment

Real Time NDIR CO Monitor - Horiba APMA-370

Industrial Hygiene & Occupational Health and Safety Study in Work zone Environment

Industrial Hygiene, Ventilation Rate, Heat Stress, Health and Safety Study as per OSHA/NIOSH/Indian Factories Act, 1948

Biohazard Testing Air Quality Testing for Bacteria. Yeast & Mould Count













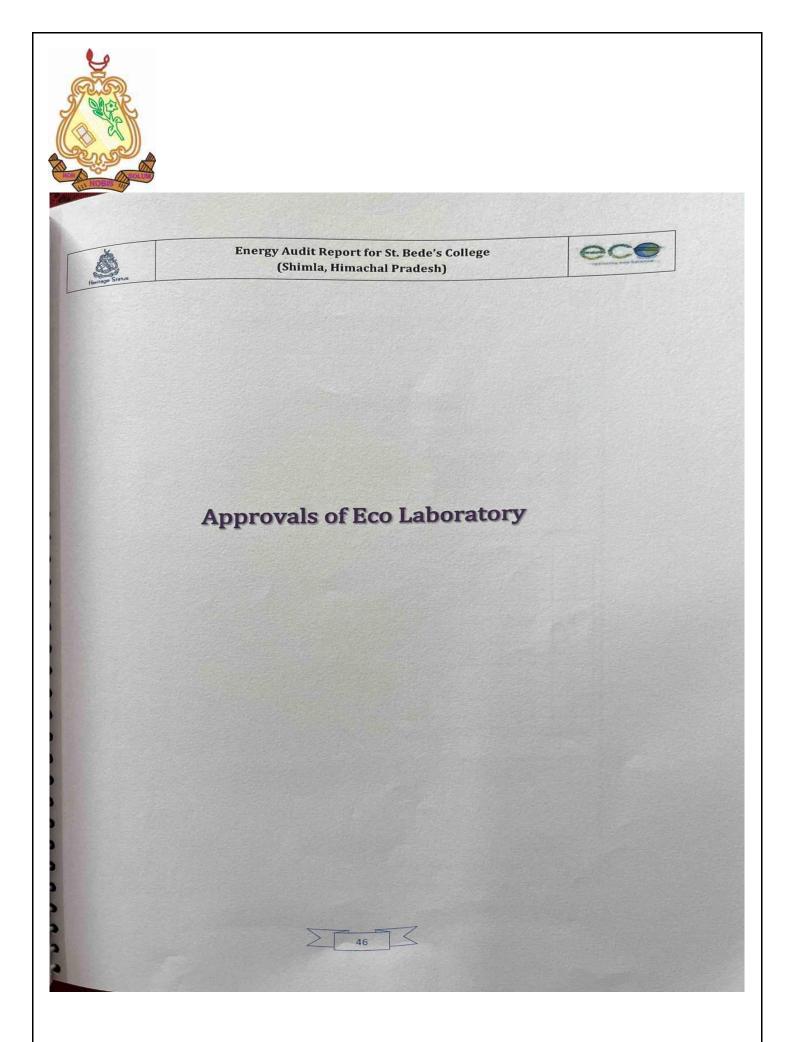
11







| s. No. | Name of Expert | Role of Expert | ID of Expert |
|--------|--|---|--------------|
| 1. | Dr. Sandeep Garg (Ph. D. & ME in Env. Sc., BE in Civil) | Managing Director NABL approved authorized signatory MoEF&CC approved govt. analyst NABET approved EIA Coordinator & Functional Area Expert Chairman IWE & Ex-Advisor, GMADA | |
| 2. | Dr. Rai Singh (Ph. D. & M. Sc. Env. Sc. P.G. Diploma in Industrial Safety, Health & Env.) | Dy. General Manager (Technical & Environment) MoEF&CC approved Govt. Analyst; NABL approved authorized signatory NABET approved Environmental Expert Worked in CPCB (2001-12) as Research Scientist | |
| 3. | Dr. Ajay Kumar | Chief Technical Officer Quality Manager NABL approved authorized signatory | |
| 4. | Ms. Simranjit Kaur (M.Sc. &M.Phill. Ph.D. in Solid Waste Management) | Deputy General Manager – EMS & Biological Lab Quality Manager – Analytical Division NABL Technical Assessor, NABL approved authorized signatory MoEF&CC approved govt. analyst NABET approved EIA Coordinator & Functional Area Expert | |
| 5. | Mr. Maninder Preet Singh (Diploma in Electrical & Electronics) | Manager (Projects) | |









Approvals of Eco Laboratory

NABET ACCREDITATION CERTIFICATE



Quality Council of India



National Accreditation Board for Education & Training

Certificate of Accreditation

Eco Laboratories and Consultants Pvt Ltd, Mohali

E 207, Phase VIII B, Sector 74, Industrial Area, SAS Nagar, Mohall

The organization is accredited as Category-A under the QCI-NABET Scheme for Accreditation of Ein Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

| 5. | anitation, version 3: for preparing DN-DNP reports in the following sections | | Sector (as per) | | |
|------|---|----------------------------------|--------------------------|-------------|--|
| No | Sector Description | NABET | MoEFCC | Cat | |
| 1 | Mining of minerals- opencast only | 1 | 1 (b) | A | |
| * | Metallurgical industries | 8 | 3 (a) | В | |
| 3 | Cement plants | 9 | 3 (b) | A | |
| 4 | Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates) | 21 | 5 (f) | A | |
| 5 | Distilleries | 22 | 5 (g) | DE-100 SACE | |
| 6 | Sugar Industry | 25 | 5(1) | В | |
| 7 | Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZs), Special economic zones (SEZs), Biotech parks, | 31 | 7(c) | A | |
| 1500 | Leather complexes Common Effluent Treatment Plants (CETPs) | 36 | 7 (h) | В | |
| 8 | Common Enriuent Freatment Fiallis (CC173) | 38 | 8 (a) | В | |
| 9 | Building and construction projects | 39 | 8 (b) | В | |
| TO | Townships and Area development projects | COUNTY AND DESCRIPTION OF STREET | The second second second | - Table | |

10 Townships and Area development projects

Note: Names of a pproved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated
July 02, 2021 posted on QCI-NABET website.

The Accreditation shall remain in face subject to continued compliance to the terms and conditions mentioned in QCI-MBET's letter of accreditation bearing no. QCI-MBET's NACO/21/1936 dated Sept 10, 2021. The accreditation needs to be renewed before the expiry date by Eas Laboratories and Consultants Pyt Ltd, Mahali Jollowing due process of assessment.

duny.

Sr. Director, NABET Dated: Sept 10, 2021 Certificate No. NABET/EIA/2023/RA 0211 Valid up to Dec 17, 2023

or the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website

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NABL ACCREDITATION CERTIFICATE





National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

ECO LABORATORIES AND CONSULTANTS PVT. LTD.

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

ECO GROUP, ECO BHAWAN, E-207, INDUSTRIAL AREA, PHASE VIII-B, (SECTOR 74), MOHALI, PUNJAR, INDIA

in the field of

TESTING

Certificate Number:

TC-7477

Issue Date:

01/06/2021

31/05/2023

This certificate remains valid for the Scope of Accreditation as specified in the amexure subject to continued sa tis factory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also shit NABL website www.nabl-india.org)

Name of Legal Identity: ECO LABORATORIES AND CONSULTANTS PVT. LTD.

Signed for and on behalf of NABL



breveletton

N. Venkateswaran Chief Executive Officer







MOEF&CC ACCREDITATION CERTIFICATE

रजिस्त्री सं: डी॰ एस॰-33004/30

REGD, NO. D. L.-3300499

The Gazette of India

SHARITUI
EXTRAORDINARY
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RT II—Seuton 3.—Su-Seus (III)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकारित PUBLISHED BY AUTHORITY

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NEW DELHI, WEDNESDAY, FEBRUARY 28, 2018/PHALGUNA 9, 1919

पर्यावरण, बन और जसवायु परिवर्तन मंत्रालय

मवियुपना

नई किनी, 26 परवरी, 2018

NOTIFICATION

New Delhi, the 26th February, 2018

S.O. 857(E).—In exercise of the powers conferred by clause (b) of sub-section (1) of section 12 and section 13 of the Environment (Protection) Act, 1986 (29 of 1986), read with rule 10 of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following further amendments in the notification of the Government of India in the erstwhile Ministry of Environment and Forests, number S.O. 1174(E), dated the 18th July, 2007, namely:

In the Table appended to the said notification, -

(i) for serial numbers 1,17,24,26,30,39,41,45,81,86,87,93,94,95,96 and 100 the entries relating thereto, the following serial numbers and entries shall be substituted, namely: -

| S.No. | Name of the Laboratory | Name of the Govt. Analyst | Recognition with effect from and valid up to |
|-------|---|--|--|
| (1) | (2) | (3) | (4) |
| -1 | M/s Mantee Consultants Pvt. Ltd. D-36, Sector-VI, Noida-201301, Uttar Pradesh | (i) Mr. Gaja Nand Mallick (ii) Dr. Vivek Dwivedi (iii) Mr. Sumit Verma | 26.02.2018 to 25.02.2023 |
| 17 | M/s Idma Laboratories Limited | (i) Mr. Ankush Aggarwal | 26.02.2018 |







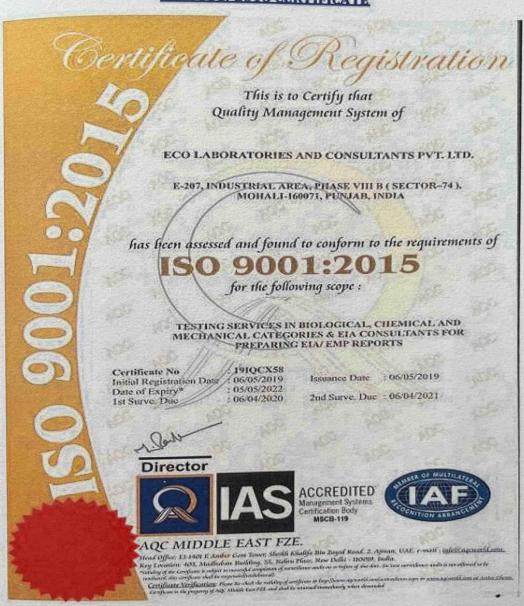
| | 391, Industrial Area, Phase-I, Paunchkula | No service de la constante de | 5 |
|-------|--|---|--------------------------------|
| 100 | 160019,Haryana | Gill Dr. Rakender Kurmer Isla | to 25,022023 |
| 24 | M/s Newcon Consultants & Laboratories Pvt. Ltd. 8th K.M. Stone, Delhi Meenut Road, Morta (Opp. Manan Dham Mandir), Ghaziabad- 201 003, Uttar Pradesh | (i) Mr. Pankoj Gupta (ii) Mr. Amit Kumar Singh | 26.02.2018 to 25.02.2023 |
| 26 | M/s Klean Laboratories & Research Pvt. Ltd. 402. Purushottam Plaza, Opp. Baner Telephone Exchange,Baner Road, Punc- 411045, Mahamshtra | | 26.02.2018 to 25.02.2023 |
| 30 | M/s Lawn Enviro Associates, "Lawn House" #184-C, Vengalrao Nagar, Hyderabad- 500038, Telangana | (i) Mr. Devireddy Nagarujuna Reddy | 26.022018 to 25.022023 |
| 39 | M/s Team Test House. (A Unit of Team Institute of Science & Technology Pvt. Ltd.) G-1-584, RIICO Industrial Area, Sitapura, Jaipur-302022, Rajasthan | (i) Mrs. Kavita Mathur (ii) Mr. Kodar Nath Mukhopadhyay (iii) Mr.Rajesh Maheshwari | 26.022018 to 25.022023 |
| 41 | M/s Envirochem Research & Test Labs Pvt. Ltd. HIG-79, Sector-E. Aliganj, Lucknow-226024, Uttar Pradesh | (ii) Dr. Madan Mohan Agarwal (iii) Sh. Vivek Kumar Gupta (iii) Mrs. Saroj Singh | 26.022018 to 25.022023 |
| 45 | M/s Mineral Engineering Services 25/XXV, Club Road, Bellary-583103, Kamataka | (i) Mr. M. Sachin Raju (ii) Mr. M.R. Durga Prasad (iii) Mr. A.D. Yashwanth Arun Murthy | 26.022018 to 25.022023 |
| 81 | M/s Advanced Environmental Testing and Research Lab Pvt. Ltd. 63/1, Kailash Vihar, Near ITO, City Center-II, Gwalior-474011, Madhya Pradesh | (i)Mr. Rajesh Jain (ii)Dr. Dinesh Kumar Uchchariya (iii) Mr. Arvind Kumar Sharma | 26,022018 to 25,022023 |
| 86 | M/s Care Labs Plot No. 1, 3 rd Floor, Sai Sadan Complex, Shiva Ganga Colony, L.B. Nagar, Hyderabad- 500074, Telangana | (i) Mr.K. Srinivasa Rao (ii) Ms. Gouthami Gangula (iii) Ms. P. Mamatha | 26.02.2018 to 25.02.2023 |
| 87 | M/s Green Circle Inc. Green Empire, Anupushpam Habitat Centre, Nr. Yash Complex, Above Asix Bank Ltd., Gotn Main Road, Vadodara-390021, Gujarat | (i) Mr. Pradeep Joshi (ii) Mr. Ram Raghav (iii) Ms. Shital Jashvantsinh Parmar | 26.022018 to 25.022023 |
| 93 | M/s Eco Laboratories & Consultants Pvt. Ltd. | (i) Mr. Sandeep Garg | 26.02.2018 |
| roved | E-207, Industrial Area, Phase-VIII B. | (ii) Ms. Simranjit Kaur (iii) Dr. Deepika Thakur | 25,022023 |
| 94 | Sector-74, Mohali-160071, Punjab M/s Hubert Enviro Care Systems Pvt. Ltd. No. 18, 92 nd Street, Ashok Nagar, Chennai-600083, Tamil Nadu | (i)Dr. J.R. Moses (ii)Dr. Rajkumar Samuel (iii) Mr. A.K. Natarajan | 26.02.2018 to 25.02.2023 |
| 95 | M/s Nawał Analytical Laboratories | (i) Mr. D.Balakrishnan (ii) Ms. S. Elamathi (iii) Mr. K.B.Krishnamoorthy | 26.02.2018 to 25.02.2023 |







ISO 9001: 2015 CERTIFICATE







ISO 14001: 2015 CERTIFICATE



has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope :

TESTING SERVICES IN BIOLOGICAL, CHEMICAL AND MECHANICAL CATEGORIES & EIA CONSULTANTS FOR PREPARING EIA/ EMP REPORTS

Certificate No : 191EC558
Initial Registration Date: 06/05/2019
Date of Expiry* : 05/05/2022
1st Surve. Due : 06/04/2020

Issuance Date : 06/05/2019

2nd Surve. Due : 06/04/2021





ACCREDITED



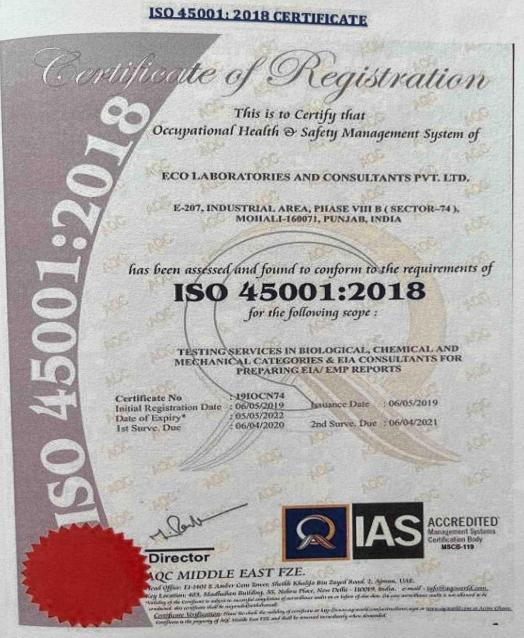
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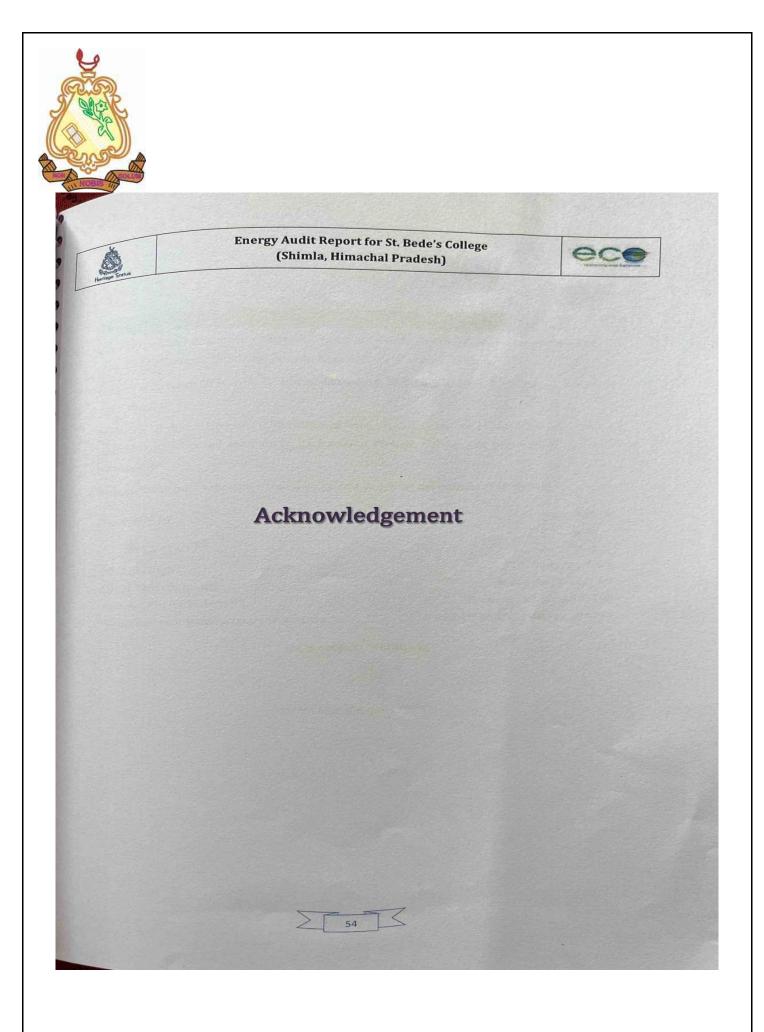
Head Office: E2-1401 E Amber Gent Tower, Shrifth Khaiffa Bin Zingel Read. 2. Ajman, UAE. e-mail: <u>info?Engenseld.com</u>, key Lecolon: 403. Auditubus Bailding. 35. Nebru Plant. New Delhi-150029, India. Pakkay of the Explant is palyed a seamfel explaint of parallesse ands on a left-of-de-lecolor. In law surrelesses was to us allowed to be realised, the million duly to seamfeld explaint of

















Acknowledgement

Eco Paryavaran Laboratories and Consultants are thankful to the Management and the Principal of St. Bede's College, Shimla for entrusting processes of energy auditing with us.

We are grateful to IQAC coordinator and the team members of IQAC for initiating the Energy Audit Process.

We thank all the participants of the auditing team especially faculty, students and non-teaching staff who participated with us to gather data through survey and provided all necessary information.

We also thank full to the office staff who helped us during the document verification.

Prepared By

Dr. Rai Singh

(DGM Environment)

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Approved By

Dr. Sandeen Garg (Managing Director)

Contact: +91-9814003103

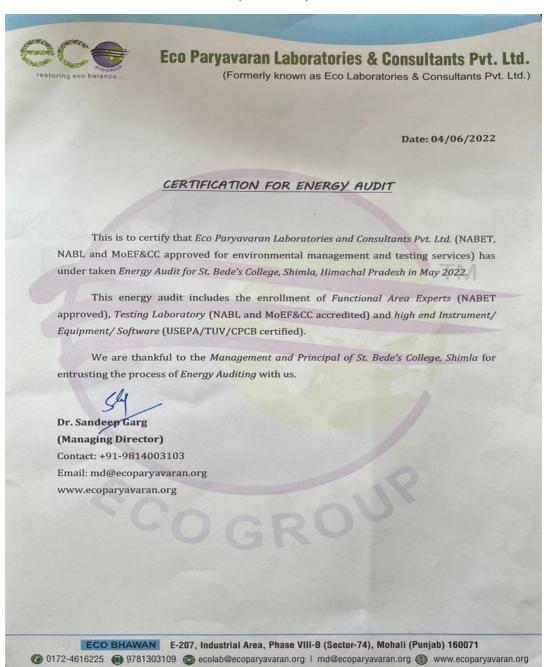
Email: md@ecoparyavaran.org

www.ecoparyavaran.org

***** End of Report *****



CERTIFICATE FROM THE EXTERNAL ACCREDITED AUDITING AGENCY (2022-2024)





GREEN AUDIT REPORT



H.P.STATE POLLUTION CONTROL BOARD

HIM PARIVESH, PHASE-III, NEW SHIMLA-171009

HPSPCB No: 3 Date: 14/07/2023

Industry Registration ID: 24076 Application No: 9950892

To,

St Bedes College Navbhar, Shimla 171002-Shimla Shimla Shimla 171002

Subject: Consent to Operate u/s 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and u/s 21 of Air (Prevention & Control of Pollution) Act, 1981.

With reference to your application for obtaining 'Consent to Operate' u/s 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and u/s 21 of Air (Prevention & Control of Pollution) Act, 1981, you are hereby, authorized to operate an industrial unit subject to the Terms and Conditions as mentioned in this Consent letter.

1. Particulars of Consent to Operate under the Water Act, 1974 and Air Act, 1981 granted to the industry

| Consent No. | CTO/BOTH/NEW/RO/2023/9950892 |
|-----------------------------------|------------------------------|
| Date of issue : | 14/07/2023 |
| Date of expiry : | 31/03/2024 |
| Certificate Type : | NEW |
| Previous CTE/CTO No. & Validity : | |

2. Particulars of the Industry

| Name & Designation of the Applicant | St Bedes College, (Principal) |
|-------------------------------------|---|
| Address of Industrial premises | St Bedes College, Navbhar, Shimla 171002-Shimla, Shimla,Shimla-171002 |
| Capital Investment of the Industry | 232.74 lakhs |
| Category of Industry | Orange |
| Type of Industry | 2091-Infrastructure development projects including educastional institutions, community hall, kalyanamandam, IT Park, Theme park (having waste water generation <100 KLD) |
| Scale of the Industry | Small |
| Office District | Shimla |
| Capacity | |

Raw Materials (Name with quantity per day)



| Raw Materials | Quantiry | Unit |
|------------------|----------------|------------|
| Food Stuff Items | Kitchen/Dining | K.G./Month |

Products (Name with quantity per day)

| Name of Products | Unit | Quantity | Intermediate Product | Principal Use |
|----------------------------|-------------|----------|--|----------------------------|
| Educational Institution | Number/Year | 1 | with 150 persons Boarding and Staffing | Educational Institution |

Details of the Effluent Treatment Plant

| Type of Effluent | Capacity | Quantity |
|------------------|-----------------------------------|----------|
| STP | Common STP (MC Sewerage Line) KLD | 16.9 KLD |

Mode of Disposal

| Description | Quantity(in KLD) | Method of Treatment | Method of Disposal |
|-------------|------------------|---------------------|--------------------|
| Domestic | 16.9 | Sewer Line | Other |

Quantity of fuel required (in TPD) and capacity of boilers/ Furnace/Thermo heater etc.

| Туре | No.of Boiler/'Heater /Evaporator/I ncinerator/D G Set/Other | Capacity | Type of Boiler/'Heater s/Evaporators /Incinerator/D GSets/Others | Type of Fuel | Fuel consumption rate in MT/hour or KL/hour or M3 /hour |
|---------|---|----------|--|--------------|--|
| DG Sets | 1 | 75 KVA | DG Set with Acoustic Enclosure | Diesel | 5 to 8 Ltr./Hr |

Type of Air Pollution Control Devices installed

| Equipment Type | Equipment Name | Date/proposed date of installation | Efficiency(%redu ction) | Final concentration of pollution being emitted |
|-----------------|----------------|--|----------------------------|---|
| Exhaust Muffler | DG Sets | Mon Jan 01 00:04:00 IST 2018 | 100% | 0.072 kg/day of PM 10 , 1.296 kg/day of NO X and 0.77 kg/day of CO. |

Sources of emissions and type of pollutants

| Name and location of | Rate of emission in Kg./hr | Concentration of | Height of |
|--------------------------|----------------------------|-----------------------|------------------------|
| the process vessel to | | pollution like SO 2 , | Vent/outlet/stack from |
| which the stack/ vent is | | | ground level in meters |
| attached | | etc. in mg/NM 3 | |



| Stack | 0.072 kg/day of PM 10 , 1.296 kg/day of NO X and 0.77 kg/day of CO. | 0.072 kg/day of PM 10 , 1.296 kg/day of NO X and 0.77 kg/day of CO. | 3 Mtr. |
|-------|---|---|--------|
| | | | |

Approved By Env. Engineer (H. P. State Pollution Control Board)

Endst. No.:

Copy To:-

1. The Member Secretary, HPSPCB Shimla for information please.

Digitally signed by LALIT KUMAR Date: 2023.07.14 13:21:39 +05'30'

Er. Lalit Thakur Env. Engineer For & on behalf of (H. P. State Pollution Control Board)