ENVIRONMENT, GREEN & WATER AUDIT REPORT

DETAILS OF THE CLIENT

B.S.ABDUR RAHMAN CRESCENT

INSTITUTE OF SCIENCE & TECHNOLOGY

 # GST Road, Vandalur, Chennai 600 048. Tamilnadu. INDIA

B.S. Abdur Rahman Crescent Institute of Science & Technology
Deemed to be University u/s 3 of the UGC Act, 1956
GST Road, Vandalur, Chennai 600 048

DATE OF AUDIT

28 & 29 DECEMBER 2021

AUDIT CONDUCTED AND SUBMITTED BY

RAM-KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING

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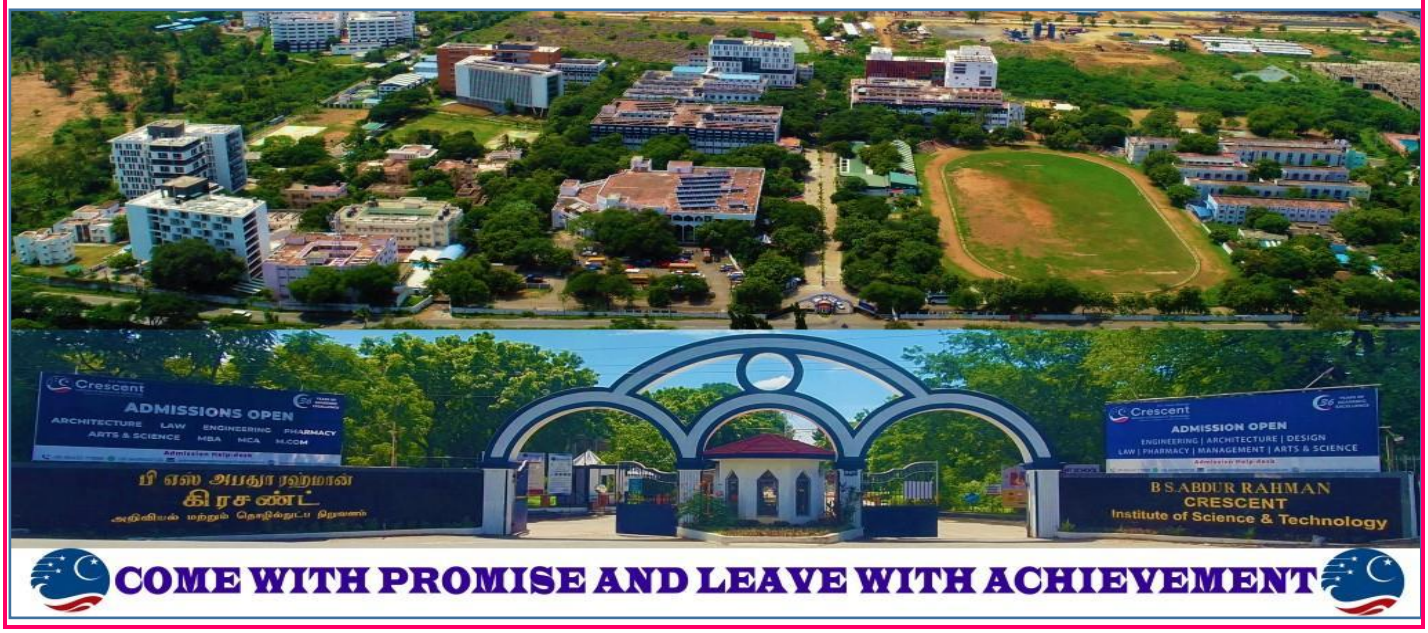


A. Description of Environment, Green & Water Audit Process:

- Environment, Green & Water Audit is essentially a management tool for measuring the effects and impacts of activities undertaken in the university campus on environment more particularly atmospheric air, Soil and Water.
- Primarily analyse the utilization of all types of energy, assessment of environmental condition, estimation of annual CO_2 emission from all the defined activities and mapping with campus greenery system.
- Also it keeps the university accountable by examining their practices and determining what measures need to be implemented in order to maintain the sustainability.

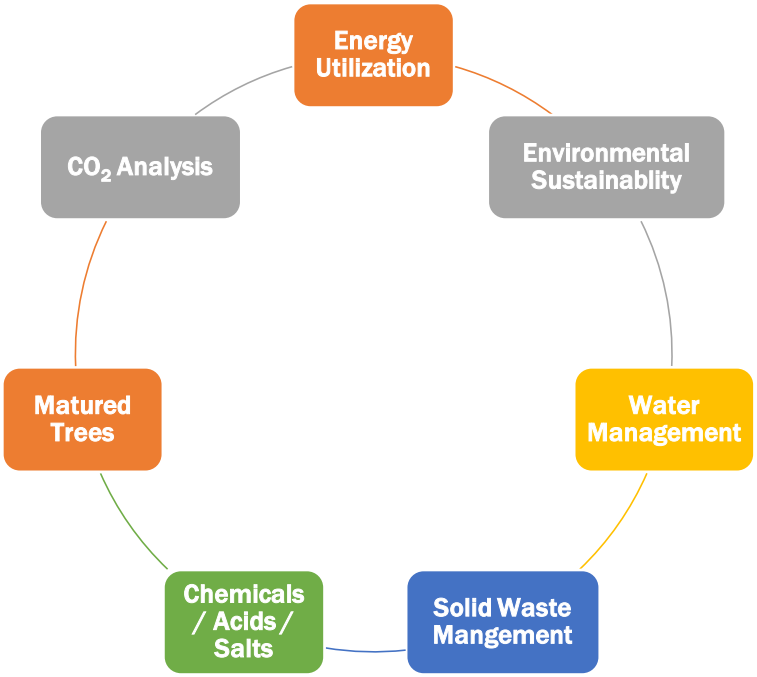
B: Scope of the Audit:

- Identification of history of activities, present environmental practices followed, monitoring records and known sources of environmental issues inside the university.
- Adoption of natural resources as input (such as energy and water), processing and utilization and generation of wastes (including hazardous and toxic),
- Handling and storage of all types of wastes (Solid, liquid and gas), transportation of waste from source to yard, reuse and recycling possibilities, storage mechanism and effective disposal.
- Measurement of effectiveness of pollution control (air, water and soil pollution), maintenance logs, emission test reports and routine analytical reports.
- Judicious usage of water, effective water distribution network, maintaining best system efficiency and usage of water saving equipments/methods/standards.
- Providing constant awareness to all stakeholders on Environment impacts, risk analysis and Ecology.

C: Outcomes of the Audit Process:

- Use as a basis for the development of environmental management policies or efforts to improve the existing plants.
- Identification of possible cost and energy saving from energy conservation, waste reduction, reuse and recycling.
- Development of rule based system to become a sustainable environment inside the university campus and nurture the importance of less energy and less environmental impacts.
- Formation of methodology for long term road map for maintaining green environment within the campus and encourage the stakeholders for continuous improvements.

D: Focus Areas in the Audit Process:



E. Audit Coverage:

ENVIRONMENTAL AUDIT	
Chemical/Salt/Acid Usage Study	• Analysis of chemical/Salt/Acid Usage in different laboratories, method of storage and dilution, application of chemicals, method of disposal.
Transport system	• Examination of no. of vehicles, make and model, fuel used, pollution certificates and best operating practices followed to conserve fuel.
Air, Water & Soil Quality	• Assessment on indoor and ambient air atmosphere, Review of water quality, Codes and Standards followed in testing of water & soil.
Bio-gas Generation	• Capacity, location, collection of food and vegetable wastes, storage tank, gas distribution, utilization and reduction of LPG.
GREEN AUDIT	
Roof top Solar PV Plants	• Assessment of solar PV plants, capacity, location, yearly energy generation, inverter capacity, energy utilization and common connection in MV panel, panel cleaning methods, schedule and dedicated earthing system.
Solar Thermal System	• Inspection of solar hot water generation for bathing in hostel area, capacity, input water and hot water distribution.
Campus Greenery	• Assessment of no. of matured trees, location, botanical names, amount of CO_2 reduction.
WATER AUDIT	
Water distribution system	• Incoming raw water, water purification system (RO), potable water distribution and water conservation measures

	• Water distribution for general utilities (cooking and bathing), taps and control values, water distribution for hostel and best practices in water distribution.
Rain Water Harvesting	• Assessment of RWH, capacity and location, bore-well pit recharge, open ended water storage and utilization and study on ground water improvement.
Sewage Treatment Plant (Liquid Waste Management)	• Sewage collection, storage and treatment, capacity, type of aerator, collection and distribution tank, treated water usage (gardening and toilet flushing) and sludge collection and usage.

F: Standards Adopted:

- Bureau of Energy Efficiency (BEE) Guidelines to conduct the detailed energy audit process
- **ISO 14064-Part-1** – Specification with guidance at the organization level for quantification and reporting of GHG emissions and removals (Second Edition)
- **ISO 14064-Part-2** – Specification with guidance at the project level for quantification, monitoring and reporting of GHG emissions reductions or removal enhancement (Second Edition-2019)
- **ISO 14064-Part-3** – Specification with guidance for the verification and validation of GHG statements (Second Edition-2019)
- The Greenhouse Gas Protocol - A Corporate Accounting and Reporting Standard (Revised Edition) released by World Resources Institute & World Business Council for Sustainable Development – 2014
- Ministry of Environment, Forest and Climate Change Notification on **"Battery Waste Management Rules, 2020" & "E-Waste (Management) Rules, 2016", & "Solid Waste Management Rules, 2015"**
- **Minstry of Jal Shakthi,** Guidelines to regulate and control Ground Water Extraction in India and Other Water related Standards

G: Summary & Recommendations of the Audit Process:

In order to make the **B.S. Abdur Rahman Crescent Institute of Science & Technology** campus 100 % Environmental sustainability and lush Greenery; the audit team recommends to implement the following measures:

G-I: Environmental Management:

- Properly follow scientific method of handling chemicals/Acids/Salts and safe disposal through 3rd party
- Plan for BS-IV vehicles in future
- It is recommended to use natural ingredients like orange peel extract & vinegar

- **Indoor Environment Quality (**IEQ) refers to the environmental condition inside a building which is influenced by i) Thermal comfort, ii) Lighting comfort, iii) Acoustic comfort and iv) Indoor Air quality (IAQ). The audit team recommends to conduct the IEQ audits and confirm each building comfort level.

G-2: Green Campus Management:

- **B.S. Abdur Rahman Crescent Institute of Science & Technology** campus is blessed with more varieties of resident birds (species always living inside the campus) and amphibians (Amphibians are small vertebrates that need water, or a moist environment, to survive).
- **Bird Sighting and Survey:** Conduct a dedicated bird sighting and identify the list of birds both residing birds and migratory birds available in the college campus
- **Reptile & Amphibian survey:** Similar to bird survey; conduct a survey to list the amphibians available in the campus
- **One Student – One Tree:** This is an Initiative of AICTE to increase the green coverage inside the campus and committed to reduce the Urban Heat Island Effect (UHIE), college may plan to plant nearly 2,000 trees in future, make the entire campus with complete green cover and maintain an excellent bio-diversity
- **Indoor plants**: Not only looks beautiful, but also brings life to our living space. They also help purify the air. According to a study of NASA even a small plant inside the workspace can help remove at least three household toxins (think benzene, formaldehyde, and trichloroethylene, which are carcinogenic chemicals commonly found in stagnant indoor environments)

G-3: Waste Management:

- Cotton, Syringe, Needles are to be kept separately as these are treated as Bio-Medical wastes
- **Yellow dust bins** must be placed to collect these bio-medical wastes
- After COVID; mask, sanitizer bottles, gloves and other medical items must be trashed only through the yellow bins
- This must be informed to all the students and stakeholders. Suitable steps have to be taken to disseminate this information
- All the solid wastes are to be properly stored in a separate place and should be maintained as a record mentioning its quantity
- The food waste must be weighted and marked in a record before keeping into the digester unit. This must be checked with the amount of gas generated using suitable calculation and check with the designed output
- Any waste items given to trust office or to the 3rd party must have a record of the respective department

- **Reduction of Paper:** Workout a policy to move towards paperless office. Present system of paper usage may be reviewed and wherever possible; digitalize the activities and reduce the paper
- Adopt College Management System (CMS) and try to automate
- Automation saves energy, saves man power, saves paper, leads to better transparency, efficient man power utilization and thus saves cost

G-4: Water Conservation & Management:

- Utilize more amount of treated water from STP plant since most of the approving agencies like AICTE, UGC etc., are now requesting to utilize the treated water
- To check the quantity of water utilized by each buildings by connecting digital water flow meter and optimize the water usage
- Similar to raw water measurement; water inlet to the STP & treated STP water pipe line must be fitted with flow meter and check the quantity of inlet & outlet water
- Prepare and maintain a Single Line Diagram (SLD) for water distribution network
- Try to reduce water tapped from the ground water source since it is not environmental friendly
- Paste water and energy saving slogans at appropriate places
- Generate your own power and water for regular activities and move towards Net Zero Energy and Net Zero Water Building
- Retrofit aerator based water taps for good water savings. For hand washing applications, all the pipes must be fitted with aerators
- In future; install Bio-Sewage Treatment Plant as it reduces the amount of energy required to operate the plant and environmental friendly operation
- Captures almost 100 % rain water harvesting through i) Recharging pits and ii) Open well type storage pits
- Water treatment log must be maintained indicating the water inlet, treated and outlet water quantity
- Install sensor based water controller in each Over Head Tanks and reduce the water waste and power required to operate the pump
- Energy required to process the water treatment must be calculated
- Overall cost of treated water by accounting i) consumables, ii) manpower iii) energy and iv) other conventional expenses
- Also it is highly recommended to use the treated STP water for toilet flushing system as this is much essential for the AICTE, UGC norms of treated water usage
- Display the specifications of the STP (Like RWH display)
- Use the treated water at the maximum in whatever possible areas and try to minimize the fresh water intake (from any source)

- Set a policy and fix a target for usage of treated water; ensure that the plan is being executed without any deviation. Increase the % of usage of treated water year by year
- With the advent of smart technologies, it is possible to have centralized monitoring in real-time using Internet of Things (IoT), Geographic Information System (GIS) software, etc. as per **Jal Jeevan Mission**, Department of Drinking Water & Sanitation **Ministry of Jal Shakti**
- In hostel building; try to introduce **"Emergency Water Line"** during day time (usually from 9.00 AM t0 4.00 PM). The gate valve of the common line is closed during that time and hence water wastage is avoided in the knowingly or unknowingly opened taps
- Introduce **Power Wash** floor cleaning mechanism which removes the stains easily with reduced water usage
- Awareness campus must be conducted to all the stakeholders at regular interval. Through this initiative; Painting, Photography, Slogan and Poster making contest are conducted to create consciousness among the students and faculties

COMPLETION OF THE REPORT

This report is prepared as a part of the Environment, Green & Water Audit conducted at **M/s. B.S.ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY,** GST Road, Vandalur, Chennai 600 048. Tamilnadu. INDIA by **M/s. RAM-KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING,** Coimbatore-641 062, Tamilnadu, India.

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