

## **Carbon Emissions Report of B.S. Abdur Rahman Crescent Institute of Science and Technology in line with BEE Standard**

The Energy Audit Report of B.S. Abdur Rahman Crescent Institute of Science and Technology (BSACIST), Chennai, conducted by SLR Industrial Solutions in January 2024, provides a comprehensive analysis of the institute's energy consumption and identifies potential areas for energy conservation. This report adheres to the Bureau of Energy Efficiency (BEE) guidelines for assessing and reporting carbon emissions. It offers data that can be used to calculate and track the institute's carbon footprint, aligning with the broader goals of national and international sustainability efforts. The report focuses on identifying Energy Conservation Measures (ECMs) to reduce energy consumption, which inherently leads to a reduction in carbon emissions.

The report begins with an acknowledgment of the support provided by BSACIST's management and staff during the audit process. It outlines the objective and scope of the audit, which includes reviewing electricity bills, studying the electrical system network (transformers, motors), analyzing the air conditioning and illumination systems, evaluating diesel generator (DG) set operations, and assessing pumping systems. The methodology involved site visits, data collection using various instruments (power analyzers, clamp-on meters, lux meters, anemometers, and thermometers), and analysis of the collected data, aligning with BEE's comprehensive audit protocols.

The baseline data reveals that BSACIST's annual energy consumption is 4,083,312 kWh from the electricity board (TANGEDCO), 663,189 kWh from solar generation, and 87,944 kWh from diesel generators. The total electricity bill paid to EB is Rs. 4,26,70,284 per annum, and the total DG cost is Rs. 27,23,650 per annum. The unit rate is Rs. 9.4/kWh (combining EB and DG costs). The report also breaks down the percentage load share of utilities, with air conditioners accounting for the largest share (54%), followed by fans (14%), lights (8%), pumps (1%), and others (22%). Feeder-wise load distribution is also analyzed, highlighting the energy consumption of various blocks and departments.

The report identifies several ECMs with varying payback periods, consistent with BEE guidelines for the implementation of energy-efficient solutions. Short-term payback ECMs include replacing FTL lamps with LED lamps (saving 19,200 kWh annually), rectifying the solar water heater in the ladies' hostel (saving 20,930 kWh annually), and replacing the existing STP blower with a new energy-efficient blower (saving 25,810 kWh annually). Medium-term payback ECMs include rectifying the solar rooftop panel problem (saving 8,040 kWh annually) and installing a demand controller to avoid demand penalty charges (saving 21,120 kWh annually). Long-term payback ECMs include replacing conventional ceiling fans with BLDC fans (saving 37,800 kWh annually), replacing old ACs with energy-efficient 5-star rated split ACs (saving 45,000 kWh annually), replacing the main block water pump (saving 1,320 kWh annually), replacing street lights with solar-powered lights (saving 1,314 kWh annually), and exploring the possibility of rooftop solar PV to generate electrical energy (saving 327,600 kWh annually).

The report summarizes the potential savings, estimating annual energy savings of 487,014 kWh and annual cost savings of Rs. 4,011,685, with a proposed investment of Rs. 15,950,000 and an overall payback period of 48 months. It also mentions a total CO<sub>2</sub> reduction of 385 tons, which is a direct indicator of reduced carbon emissions.

The report also provides specific recommendations for each ECM, including backup calculations and estimated benefits that align with BEE recommendations. For example, it suggests replacing FTL lamps with LED lamps in the men's hostel, canteen, and drivers' cabin, rectifying non-functional solar water heaters, and replacing old window ACs with 5-star rated split ACs. It also recommends exploring the possibility of installing additional solar panels in other locations.

In conclusion, the Energy Audit Report provides a detailed assessment of BSACIST's energy consumption and identifies significant opportunities for energy conservation and carbon emission reduction. The adherence to Bureau of Energy Efficiency (BEE) guidelines for reporting carbon emissions strengthens the credibility of the data and recommendations provided. This information can be used to establish a baseline, track progress, and demonstrate the institute's commitment to sustainability. The identified ECMs, if implemented, would not only result in significant cost savings but also contribute to a substantial reduction in BSACIST's carbon

footprint, aligning with national and global efforts to combat climate change. The report further recommends installing dedicated energy meters and an energy monitoring system for better tracking and verification of savings, consistent with the best practices endorsed by the BEE.