

# NAAC – Best Practices

## Format for Presentation of Best Practices

### 1. Title of the Practice

This title should capture the keywords that describe the practice.

#### **Green Energy to Power a Green Campus**

### 2. Objectives of the Practice

What are the objectives / intended outcomes of this “best practice” and what are the underlying principles or concepts of this practice (in about **100 - 200** words)?

The university campus’ peak electricity load is approximately 13 to 14 MW, which caters to academic, healthcare as well as allied services, supporting students and staff activities on campus. The objective was to shift from conventional energy sourcing to renewable energy to the maximum feasible levels in a phase wise manner. One method was setting up of solar roof top photovoltaic panels (SRTPV), and the second method was to source energy from wind or solar farms through the State grid. A shift from the conventional energy source would help achieve savings in terms of cost, as well as reduction in carbon emissions due to the university operations.

### 3. The Context

What were the contextual features or challenging issues that needed to be addressed in designing and implementing this practice (in about **100 - 200** words)?

The first method involved a detailed survey of the University building rooftops to study the physical requirements, wind load, ascertaining the shadow free areas, and design of the physical structures required to install the panels. Energy generation is dependent on panel selection. Technical comparison on various brands was done to arrive at the most efficient, economical and locally sourced brand. One limiting factor with the SRTPV scheme in our context was the availability of rooftops, as all hostel blocks were retrofitted with solar hot water systems generating approximately 500 cubic meters of hot water. Hence, the second method was to procure energy that was generated from offsite third party suppliers. The energy generated

by the solar farms was procured through the ESCOM grid and connected to various buildings on campus, thus minimizing the conventional energy use.

#### **4. The Practice**

Describe the practice and its uniqueness in the context of Indian higher education. What were the constraints / limitations, if any, faced (in about **100 - 200** words)?

The global solar photovoltaic cell production grew from 2 gigawatts in 2005 to 129 gigawatts in 2019 as per statista.com. The scale of production resulted in reduced per capita production costs, and this helped consumers in achieving better returns on investments, further boosting solar energy generation. MAHE initiated the SRTPV on campus in the year 2015 in phase one with a capacity of 526 kWp, and over the years it has achieved a total capacity of 1.46 MW till date. In 2015 3.68 lakh units were generated, and today an average of 19 lakh units is generated per annum.

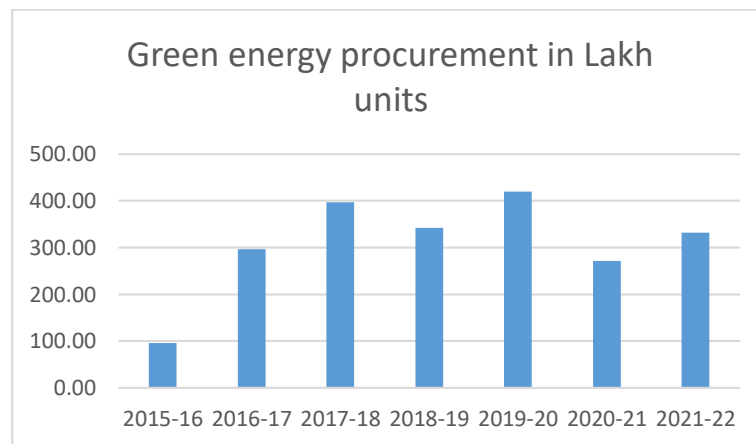
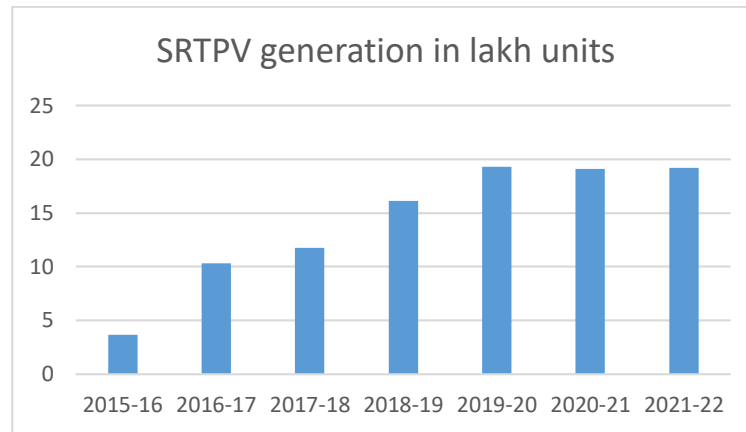
In order to compensate for the roof top space limitation, the university adopted the method of procuring energy from offsite third party suppliers. In 2015 95.2 lakh units were procured, and this increased to 300 lakh units per annum. The above methods have helped the university to significantly reduce carbon emissions over the past six years. In the same year, the university also initiated the implementation of the ISO 50001, energy management system, and energy audit became a part of the quality parameter and was integrated with the other internal quality assurance programs like the environment management and quality management systems.

#### **5. Evidence of Success**

Provide evidence of success such as performance against targets and benchmarks, review/results. What do these results indicate? Describe in about **100 – 200** words.

Once the SRTPV program was started on campus, real-time energy generation was integrated in the metering. This helped in assessing the efficiency of the solar panels, seasonal variation effects and requirement of maintenance. Annual generation through SRTPV is summarized in the figures below. Currently, more than 65 percent of the energy consumed on

the campus is from a green source, thus helping to make a significant reduction in carbon emissions.



## 6. Problems Encountered and Resources Required

Please identify the problems encountered and resources required to implement the practice (in about 100 - 200 words).

The installation of SRTPV was done for the first time on campus in the year 2015. A few challenges that were encountered were the need to ensure proper care during installation of the roof structures, so that damages do not occur during installation, leading to potential leakages. The other were provision of proper path ways to facilitate routine cleaning and maintenance of the solar panels, as well as ensuring a shadow free area throughout the year, for example routine trimming of overarching tree foliage. Financial resources need to be budgeted in advance, so that there is a smooth fund flow for setting up, as well as maintenance activity followed by regulatory inspections and approvals.

**7. Notes (Optional)**

Please add any other information that may be relevant for adopting/ implementing the Best Practice in other Institutions (in about **100 - 200** words).

Any other information regarding Institutional Values and Best Practices which the university would like to include.

The use of renewable energy sources has led to a significant reduction in carbon emissions. In the FY 2020-21 the SRTPV contributed to carbon reduction of 1,828 metric tons, and procurement contributed to 29,984 metric tons. This accounts for 79% of carbon emissions reduction due to the electricity consumed in the year.