

Concept Paper

Study on “Efficiency Enhancement and Solarization of Streetlights in SAARC Region”

Background:

In the SAARC Region, the predominant method of generating electricity is through those power plants, which consume fossil fuel including coal, oil and gas. This is responsible for the high fuel imports, Air Pollution, degradation of environment and the higher cost of electricity to the consumers. The electric power consumption per capita in SAARC Region has increased twofold from 356 kWh in year 2000 to 705 kWh in year 2015¹. All Member States are taking effective measures to reduce their import bills, develop indigenous resources and to use only environment friendly technologies.

The provision of street lighting is an utmost important responsibility of city municipality and accounts for nearly 15% of the total energy spent in standard cities worldwide². The enhancement in efficiency of these streetlights in SAARC Region is an important step as it will consume only required threshold level of energy, thus saving the production of excess energy. Moreover, it shall also help the local municipality in reducing their monthly electricity expenses.

The Member States are also focusing on realizing the potential of Solar PV and other Renewable technologies in their countries. The application of Renewable Energy technology coupled with a modern control system in the street lighting sector is another promising area. The solar energy option may be the best solution in the case of an autonomous street lighting system because of the long-life time, easy installation and modularity. The installation of a modern streetlight (Energy Efficient bulb with/without integrated Solar PV and Control system) would not only help save sufficient energy but would also considerably reduce expenditure incurred on its Repair and Maintenance. The modern LED bulb technology is more durable than the conventionally installed Sodium bulb.

Introduction:

In the SAARC Member States, the conventional streetlights (bulb type is Sodium Vapor/Halogen)², consume huge amount of electricity. Most of these streetlights are operated and maintained by the city municipality. The operational cost of these streetlights has increased with increasing electricity tariffs. The Government of Pakistan has requested SAARC Energy Centre to conduct a study on efficiency enhancement and solarization of streetlights in the SAARC Region. Thus, SEC proposes to conduct a detailed study on techno-economic assessment of various configurations of Energy Efficient Lights, off-grid/net-metered Solar PV option, and modern smart control system etc. This

¹ Data portal, World Bank <https://data.worldbank.org>, accessed on 23rd Sept, 2020

² Energy Efficiency and Pay-Back Calculation on Street Lighting Systems, C. Subramani, 2019

activity is thus, proposed by SEC under its thematic area of Program to “Minimize Oil Imports through Improvements in Energy Efficiency and Fuel Substitution (PROMO)”.

Objectives:

The objective of this study is to evaluate energy saving potential of replacing conventional streetlights with modern Solar street lighting system. This study will help the officials of Member States to take informed decision on replacing the current technology with modern efficient technology.

Broad Contents of Proposed Study:

The following major contents shall be covered in the study report:

1. Literature review of studies and reports.
2. Review of existing technology and its energy requirements.
3. Market overview of street lighting technologies.
4. Technical comparison of different lighting technologies including:
 - a. Type of lamps.
 - b. Solar PV off-grid and/or net-metered systems.
 - c. Street light intelligent control systems.
 - d. Life cycle analysis etc.
5. Financial analysis for various configurations.
6. Evaluate return on investment and payback period.
7. Lighting standards and guidelines, and its enforcement.
8. Solutions and recommendations.
9. Presentation and discussion of results.