Renewable Energy – Rajkot, India

Renewable Energy Deployment in Water Supply

Introduction

Located in the Saurashtra region, Rajkot is the fourth largest city in Gujarat, covering an area of one hundred and seventy square kilometers. Situated on the banks of the Aji and Nyari rivers, Rajkot is the 35th largest metropolitan city in India. According to the 2023 projected population census, Rajkot has a population of 2.6 million. Known as the industrial hub for its technical industries and foundries, Rajkot is also the seventh fastest-growing and sixth cleanest city in the country.

To promote renewable energy sources like wind, solar, and hybrid technology, the Gujarat Government has announced the Gujarat Renewable Energy Policy – 2023. The state aims to achieve 50 percent of its entire electricity production through renewable energy by 2030, envisioning a reduction in carbon footprint and a move towards greater eco-friendliness.

Aim to deploy renewable energy in water supply system to reduce conventional energy consumption and GHG emission

Rajkot, renowned for its foundry and machine tools industry, has collaborated with the Rajkot Municipal Corporation (RMC), the Swiss Agency for Development and Cooperation (SDC), and ICLEI South Asia to deploy renewable energy in water treatment plants. The goal is to reduce conventional energy consumption and greenhouse gas (GHG) emissions.

Image Source: www.capacitiesindia.org/rajkot

Photograph 1: 145kWp Solar PV System in Aji Water Treatment Plant

For example, the Aji water treatment plant consumes approximately 100,000 units of electricity (kWh) every month. Rajkot Municipal Corporation's water supply services account for 61 percent of the total municipal electricity consumption (FY 2021-22), totaling 51.66 million units per annum. This results in the substantial generation of 42,505 tonnes of carbon dioxide (CO_2) equivalent emissions. This, in turn, amounts to 3,300 units per day or 1.2 million units per year, constituting about 3 percent of the total electricity consumption in the water supply sector.

Centralized Organic Wet Waste Processing Unit

The CPU comprises a Centralized Organic Wet Waste Processing Unit where bulk wet waste (30 kg and above) is processed. Nepra Resource Management Private Ltd., under the PPP model Aavishkaar, has invested INR 156.25 million (USD 2,520,200) for the Material Recovery Facility (MRF). Manual segregation of dry waste (through kabadiwalas) into various components such as metal, rubber, board, and plastic takes place here. The recyclable waste is sold to 14 kabadiwalas registered and

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authorized by the IMC. The inert recovered at MRFs is then transferred to the sanitary landfill located near the premises in covered containers.

Project Implementation

The Rajkot Municipal Corporation installed a 145 KWP grid-connected solar photovoltaic (PV) system under the Gujarat Solar Power Policy 2015 and Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana in 2018. The funding agencies contributed INR 8.3 million to the project, with INR 4 million used for 70kWp solar PV and INR 4.3 million used for 75kWp solar PV.

Currently, the solar system generates 460 units of electricity per day (170,000 units of electricity per year), equivalent to 14 percent of the total power consumption in the plant. With reduced use of conventional energy, the CO2 equivalent GHG emission per year has reduced by 174 tonnes.

Learnings and management

Urban local bodies (ULB) benefit from the installation of Solar PVs, reducing GHG emissions and bringing down energy bills. A monitoring, reporting, and verification (MRV) framework is prepared to list information on monthly renewable electricity generation and its utilization at the plant. Regular cleaning and maintenance of Solar PV modules are required for the plant to yield maximum potential.

Scalability

The success of the project has encouraged ULBs to install similar projects in other municipal services. RMC has also installed a 250 kwp grid-connected solar PV at Raiyadhar wastewater treatment. A 10 mWp captive solar PV based on the RESCO model is also developed under CapaCITIES phase II and has been submitted to RMC.

Conclusion

Since its installation in July 2018, the plant has generated 680,000 kWh of electricity until June 2022. This has also reduced the dependency of water treatment plants on grid-based conventional electricity supply. Apart from this, emissions from municipal services, i.e., water supply, have also been significantly reduced.

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