

Title Economic Feasibility and Environmental Impact of Photovoltaic Rooftop Systems in Car Parking Areas with EV Charging Station in Bangladesh

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Abstract: Bangladesh receives enough sunlight to generate electricity, so the government has actively supported the use of photovoltaic power systems, or solar energy, to generate electricity. It should be ecologically sustainable in addition to having the potential to lower energy expenses. The goal of this study is to reduce CO₂ emissions, save energy costs, and build and assess a PV rooftop system with an EV charging point in the parking lot. The complete system is evaluated using RETScreen4. The PV rooftop system had an installation area of 530 m² and a production of 149.9 MWh electricity annually by using 326 JKM-250P-60 solar panels. This project would be worth the investment within a 25-year period with an interest rate of 6.5 percent because it has a simple payback period of 10.1 years, an IRR of 12.3 percent, an energy cost of 4.46 BDT per kWh with a minimum selling price of 5.90 BDT per kWh and the capacity to cut emissions of CO₂ by up to 2190 tonnes of equivalent CO₂. By promoting the production of electricity from solar energy, these kinds of initiatives will increase the use of electric vehicles (EVs), as well as the safety of both energy and the environment. Furthermore, the economic assessment revealed that the decision to start a project will be influenced by several critical aspects, including the initial cost, payback duration, interest rate, and price of energy.

Keywords: Renewable energy sources , Production systems , Costs , Economic indicators , Electricity , Solar energy , Size measurement

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