

# Rooftop Solar-Based EV Charging in India: A Techno-Economic Comparison

**Ammu Susanna Jacob**

**Abstract:** Decentralised renewable energy resources for electric vehicle (EV) charging pave the way for green mobility. In this paper, we analyse different rooftop solar-based EV charging station (EVCS) configurations. The configurations are designed with and without battery storage and grid connection. A techno-economic framework is developed based on the power flow interactions between rooftop photovoltaic (RTPV), grid, and battery storage to calculate the life-cycle costing of the system and life-cycle cost of energy (LCOE). The results of the techno-economic model suggest that an adequate size of RTPV reduces the LCOE as compared to a purely grid-connected EVCS. Adding a small battery storage unit to this configuration increases the LCOE by 1.3-1.6 /kWh. Additionally, this configuration yields more revenue from the grid due to higher net export. However, an off-grid rooftop solar-based EVCS with battery storage is more expensive due to reliability concerns about the oversizing of the battery. The techno-economic framework and the resultant LCOE comparisons done in the Indian context will help developers make informed choices to enable green mobility.

**Published in:** [2021 13th IEEE PES Asia Pacific Power & Energy Engineering Conference \(APPEEC\)](#)

**DOI:** [10.1109/APPEEC50844.2021.9687758](#)

**Publisher:** IEEE