

Abstract

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Combination of PV and EV to Increase Hosting Capacity

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Abstract

The increasing adoption of solar photovoltaic (PV) systems and electric vehicles (EVs) is a key driver of the transition toward sustainable energy, supported by declining technology costs and favorable policies. However, high PV and EV penetration in distribution networks poses technical challenges, such as voltage fluctuations and reduced power quality. On the other hand, the simultaneous interaction between PV and EVs presents an opportunity to enhance the hosting capacity of both technologies. During the day, PV-generated power can be stored in EVs as energy storage, minimizing the power injected into the grid without requiring PV curtailment or limitations. An analysis of urban vehicle movement patterns in Indonesia, which are predominantly monocentric, reveals the potential for EVs to optimally absorb PV-generated power in office areas. Simulation results indicate that this PV-EV integration scheme effectively reduces the potential for reverse power while promoting more efficient and sustainable energy management.