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# Impact of electric vehicles and photovoltaic systems on power grids: A comprehensive survey

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The future energy sector is expected to witness a substantial increase in the penetration of photovoltaics (PVs) and electric vehicles (EVs) due to the significant reduction of energy costs and emissions. While existing research studies have focused on assessing the individual impacts of grid integration of PVs and EVs, there's a notable lack of focus on comprehensively assessing the combined impacts of these technologies. To address this gap, this study offers an extensive review of how the large integration of PVs and EVs collectively will influence the future power system. For better understanding, first the individual impacts of PVs and EVs on power grid infrastructure are presented thoroughly, followed by the combined impact of PVs and EVs on grid stability, power quality, and energy economics. It has been observed that the combined impact of these technologies differs from their individual effects. Notably, the coordinated operation of PVs and EVs is key in addressing the discrepancies caused by their individual integration. Based on the literature reviewed and practical insights, this paper proposes a multifaceted perspective to consider techno-economic and environmental aspects for designing future power systems. The study concludes by offering recommendations and outlining potential directions for future research. The outcomes drawn in this paper will offer invaluable insights for policymakers and stakeholders as they work towards optimizing the integration of PVs and EVs into the evolving energy landscape.

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Topics

[Energy economics](#), [Electric vehicles](#), [Energy production, transmission and distribution](#), [Photovoltaics](#), [Grid stability](#), [Power electronics](#), [Review](#)

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