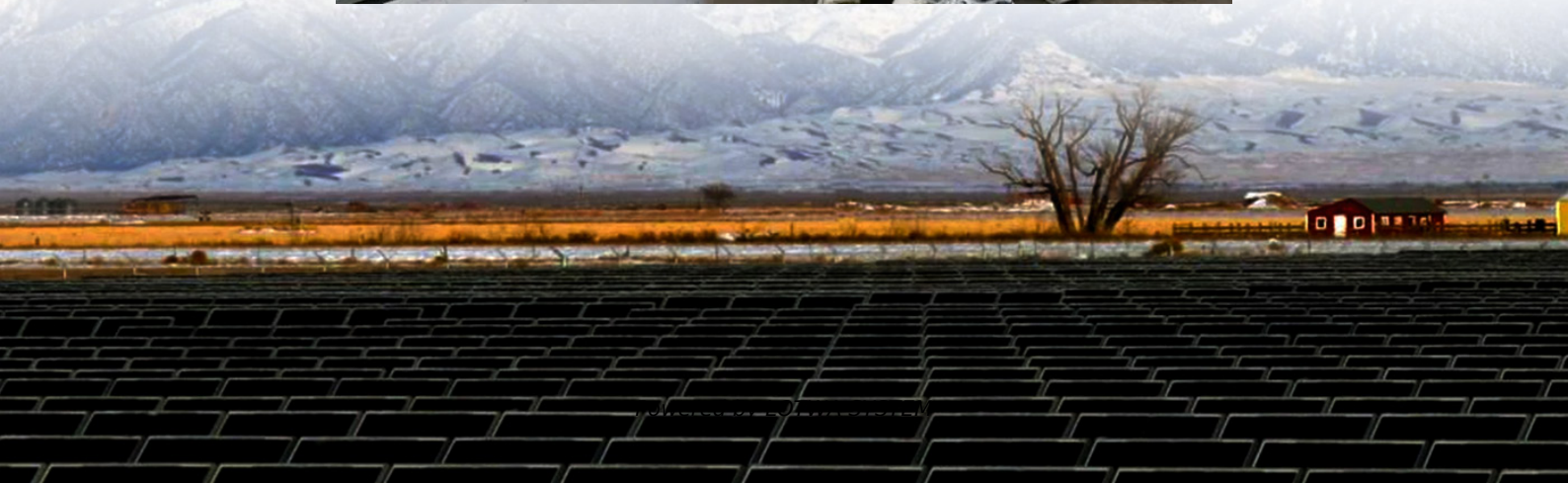


# **Off-grid solar container fast charging cost-effectiveness in government procurement**





## Overview

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Can hybrid solar-powered EV charging stations reduce grid dependency?

This study presents a techno-economic and environmental optimization of hybrid solar-powered EV charging stations (EVCS) across 12 climatically diverse Turkish cities. Results show that with flexible PV sizing and moderate demand, grid dependency can be reduced by up to 66.7%, while the renewable fraction (RF) can reach 89%.

Can solar energy supply and EV charging Demand be matched?

This intermittency can lead to a mismatch between solar energy supply and EV charging demand, particularly during peak usage hours or periods of low irradiance . Consequently, effective strategies such as ESS and smart charging algorithms are required to balance supply-demand dynamics and maintain grid stability.

Are solar-powered EV charging infrastructures feasible in developing regions?

While valuable insights are provided regarding the feasibility of small-scale yet high-impact solar-powered EV charging infrastructure in developing regions , the lack of storage integration, intelligent energy management strategies, and consideration of user behavior leads to persistent uncertainties about future scalability.

Can off-grid PV-integrated EVCs meet charging Demand?

From an economic perspective, the design and feasibility analysis of off-grid PV-integrated EVCS can effectively meet charging demand with a PV performance ratio of 68.9% and an average ESS' SOC of 75.6%, thereby improving overall system efficiency .



## Off-grid solar container fast charging cost-effectiveness in government

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