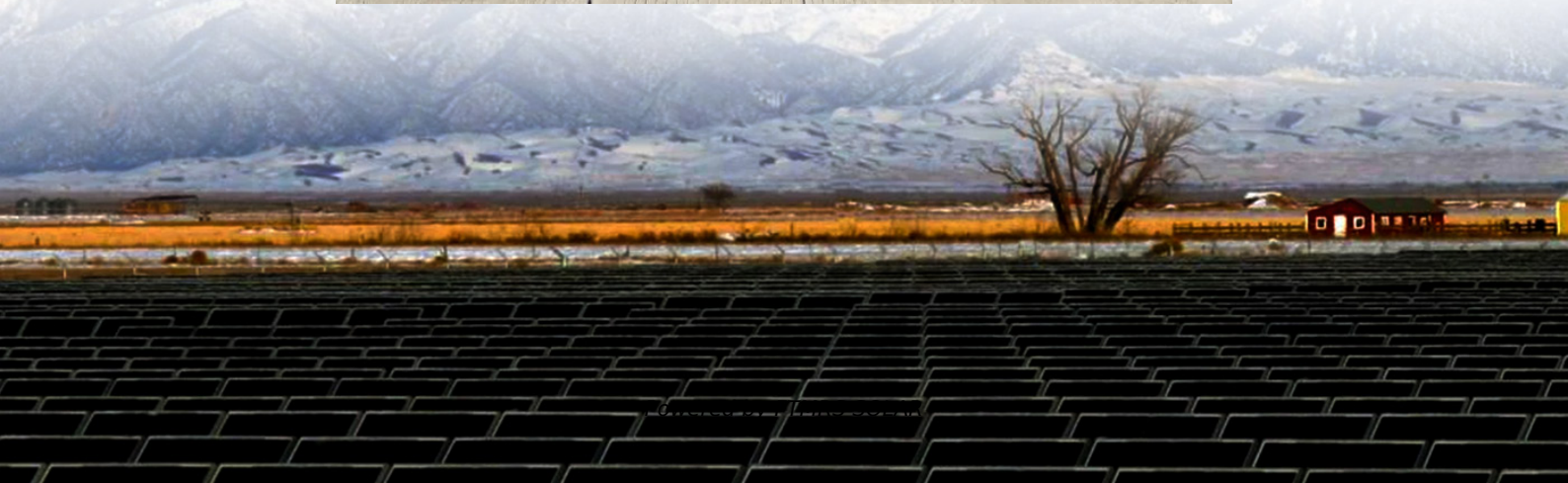


Scalable Cost-Effectiveness Analysis of Photovoltaic Foldable Containers





Overview

Do foldable solar panels meet agrivoltaics requirements?

Author to whom correspondence should be addressed. This study investigates the use of a foldable solar panel system equipped with a dynamic tracking algorithm for agrivoltaics system (AVS) applications. It aims to simultaneously meet the requirements for renewable energy and sustainable agriculture.

Are foldable solar panels better than fixed panels?

Our results decisively show that foldable panels controlled by the tracking algorithm are superior to fixed panels in energy efficiency, achieving up to a 15% improvement in power generation. Moreover, these panels deliver consistent power output across the day.

Do foldable solar panels produce more power throughout the day?

The peak variance improvement ratio, at 1.11, is greater than 1, indicating a more uniform power generation throughout the day in foldable panels. On 21 November 2023, we conducted additional tests, this time employing Algorithm 2 which tracks solar position considering the shadow cast on adjacent panels.

Are foldable containers economically viable?

In order to examine the economic viability of the developed foldable container as compared to a standard 40-ft high-cube container, cost analysis is performed for an example route, i.e., the Busan–Vostochny–Moscow route (Fig. 10), which involves both inland and maritime transportation.



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