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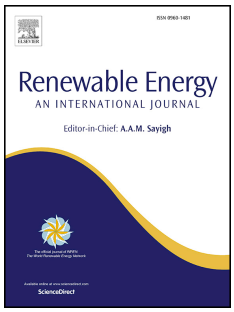

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An optimization model to design and analysis of renewable energy supply strategies for residential sector

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Abstract.

In this study, we develop a new optimization-based framework to design and analyze renewable energy systems for the residential sector. To achieve this, we first simulate different scenarios for integrated energy systems, which include different types of renewable resources and various new technologies along with the existing technologies in the current energy system. We then develop a new network optimization model to feature the underlying system, which includes minimizing the energy cost as an object function with different constraints. Finally, we apply the model to the design problem regarding the energy supply system faced by the residential sector of Jeju Island, Korea. As a result, we are able to identify the optimal configuration for the systems, and comparatively analyze the economic performance of the optimal and alternative energy systems. We also analyze the sensitivity of the main cost-drivers for the total required cost.

Keywords

Optimization; renewable energy; energy supply system; energy scenario; Korea

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