Pricing or Incentives? Understand the Market Evolution of Small Wind Turbine Systems Using an Agent-Based Modeling Approach

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Abstract

Renewable energy (RE) has captured the public's attention in the past few decades. Apart from large-scale RE utility investment, a recently distributed generation (DG) RE approach, which aims at anchoring the local benefits from energy generation, is increasingly recommended. As a wind-rich state, Illinois has the potential market for the household-scale wind power development. This research builds upon the Small Wind Turbines Adoption Model (SWTsAM), applying an Agent-Based Modeling approach. The SWTsAM explores the relationship between pricing and incentives in the market evolution of small wind turbines systems, which illustrate the interrelation between individual households and the social complexities. The model accounts for features such as the household's socio-economics, RE attitudes, small wind turbines' characteristics, geographic attributes, and policy incentives. The results show the combinations of the tax and low interest loan will stimulate the small wind turbine adoption, as well as the public utility from the renewable energy. In addition, long-term tariff contracts have a vast influence on the distribution generation. Considering the risk in adopting the small wind turbines, the tariff will lower the risk and make it a worthwhile investment, even for non-wind supporters. Therefore, the pricing inflation and the technology has a weak market impact.

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