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A cooperative game theoretic analysis for solar photovoltaic projects

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Solar energy is one of the most promising clean energies and plays a strategic role in the new energy development. This paper applies the classic irreversible investment model in real option theory to analyze the investors' decision-making for solar photovoltaic projects by evaluating the economic and social benefits. A two-phase mechanism is built into the model for decision-making. Firstly, we formulate the real options method for each investment subjects to analyze the defer option value and optimal investment timing for solar photovoltaic projects. Secondly, we calculate with the purpose of maximizing the overall interests of both sides by using expanded NPV function; besides, this paper analyses the equilibrium solution's character, and examines the parameters' effect on the decision-making of the public and the private sector under dynamic game with complete information. Finally, a numerical example is presented to test the effectiveness of the model. The results show the cooperative game process between investment subjects and will be helpful for stimulating investment.

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