

Applications of FANP and BOCR in Renewable Energy—Study on the Choice of the Sites for Wind Farms

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Abstract

As the consciousness of human beings in preserving the world increases, the demand of alternative energy resources has been expanding exponentially in recent years, and wind power is one of the most promising renewable energy resources. Taiwan, with its abundant coastal wind resources and good geographical conditions, is very suitable for developing wind farms. The development and implementation of renewable energy regulations have defined a direction for future renewable energy development in Taiwan. This also shows Taiwan's determination to follow the footsteps of the developed countries and the commitment to environmental protection. Therefore, the decision making of wind farms has become the most important link for the construction of wind farms in the future. This paper proposed a fuzzy analytic network process with benefit - opportunity - cost - risk approach to systemize the complicated decision making of wind farm site selection. A case study is carried out to examine the proposed approach and to evaluate the performance of several existing wind farms in Taiwan. By adopting the systematic analysis method, the most suitable wind farm can be determined, and the results can be references for planning and development of wind power industry in the future.

Keyword : Benefits, opportunities, costs, and risks (BOCR), fuzzy analytic network process (FANP), renewable energy, wind farm, wind turbine.