عنوان مقاله:

A Type-۲ Fuzzy-based Multi-criteria Decision-making Method for Sustainable Development of Wind Power Plants in Iran

محل انتشار:

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نویسندگان:

.A. Aryanfar - *Faculty of Mechanical and Energy Engineering, Shahid Beheshti University, Tehran, Iran*

.A. Gholami - *Faculty of Mechanical and Energy Engineering, Shahid Beheshti University, Tehran, Iran*

.M. Pourgholi - *Faculty of Electrical Engineering, Shahid Beheshti University, Tehran, Iran*

.M. Zandi - *Faculty of Mechanical and Energy Engineering, Shahid Beheshti University, Tehran, Iran*

.A. Khosravi - *Centre for Intelligent Systems Research and Innovation, Deakin University, Deakin, Australia*

خلاصه مقاله:

The current work proposed a novel fuzzy-based multi-criteria decision-making method to assess the development potential of wind power plants in a country. Type-۲ fuzzy logic was utilized to investigate the simultaneous effects of several technical criteria such as wind conditions, ambient temperature, and dust activities in a site. Iran was chosen as the case study, considering the various environmental conditions and the lack of thorough investigations in the country. The proposed method could be easily extended to apply to any region. The related technical data for all the ۵۵۹ Synoptic meteorological stations in the country were collected and used as the inputs for the proposed method. Applying two-step interviews with local experts and reviewing the literature, the leading indicators and their effectiveness were defined. After developing the fuzzy rules and sets, all the sites were scored and ranked using type-۲ fuzzy logic in the proposed method. Based on the final standings, priority tables were provided and the top fifty sites for implementing offshore and onshore wind power plants were introduced. Moreover, primary analysis of the collected data indicated that the provinces with high energy consumption and high PM ۲.۵ levels are in critical environmental conditions. Thus, these provinces need strict attention and planning for sustainable energy supply using renewable energy systems. Based on the results, several recommendations and suggestions were also mentioned to organize investment resources for a more efficient and proper power plant development as well as future .studies

کلمات کلیدی:

Potential Assessment, Type-۲ Fuzzy, wind energy, Multi-Criteria Decision-Making, Technical