

IDENTIFYING POTENTIAL SITES FOR WIND FARMS IN SOUTH SINAI GOVERNORATE USING SPATIAL MULTI CRITERIA EVALUATION

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Abstract

As the global population continues to grow, increasing stress is being put on the Earth's natural resources, especially for energy production. The capture of wind energy is emerging as a viable, efficient and clean way of providing for the continuous growth in populations with their needs in the expansion of the economy and everyday activities. Sinai Peninsula has vast areas of virgin lands with unique potentials for sustainable development. As the wind energy is crucial to integrated development, the purpose of this study is to determine suitable locations in the southern part of the Sinai Peninsula, Egypt for siting potential wind farms. A cartographic model is developed using Spatial Multi Criteria Evaluation (SMCE) and fuzzy logic quantifiers. Geographic information system allows the combination of several variables into one comprehensive model including: wind speed patterns, elevation, slope, land use, roads, and transmission lines producing a suitability analysis of the lands for locating wind farms. Findings revealed that vast areas of wind crop suitable zones exist in South Sinai Governorate. The model is applicable to other regions because the factors were also identified as relevant to wind farms in other countries. In combination with field investigations at a more detailed study, the SMCE provides an integrative analysis essential for environmental policy and planning.

Keywords: wind energy; spatial multi criteria evaluation; suitability analysis; model; Sinai Peninsula.

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