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IDENTIFICATION OF POTENTIAL SOLAR ENERGY FARMS IN SINDH, PAKISTAN USING GEOSPATIAL DATA AND MCDA

Abstract

Renewable energy could play a vital role in the total energy production of a country. It can supplement the existing conventional energy resources and provide diversity in overall power generation ensuring uninterrupted energy supply thereby providing economical means of producing electricity. The major objective of this research was to identify sites that are potentially viable for solar energy generation in Sindh area of Pakistan. Various economic parameters like proximity to grid stations and presence of barren land, environmental parameters like presence of agricultural lands and wetlands, presence of urban communities, and physical parameters like solar irradiance, land aspect, slope, etc. were taken into consideration for narrowing down to the sites most suitable for the purpose. The rationale of selecting these parameters was the literature reviewed for similar endeavors while taking national guidelines and legislations into consideration. A methodology designed on Geographic Information Systems (GIS) was developed in ArcMap for the study area using Multi Criteria Decision making. Individual degrees of satisfaction for each alternative technical and environmental parameters identified along with the economic feasibility criteria were rated against each other using analytical hierarchy process (AHP). Then these individual degrees of satisfaction were aggregated into overall performance indices which were used to generate maps indicating feasible sites for solar energy generation facilities. Since such a study has not yet been conducted for solar energy harnessing in Sindh, this endeavor will be beneficial for investors as well as decision makers to explore the possibility of commissioning such energy systems.