

Using Geographic Information Systems to Assess Renewable Energy Potential in Saudi Arabia

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ABSTRACT

As part of the National Transformation Plan (NTP) and Vision 2030, the Kingdom of Saudi Arabia announced in April 2017, the launch of a tender process to develop the Kingdom's first round of 700 megawatts of Wind and Solar power plants. Through this plan, the Kingdom is further planning an additional 3.45GW of renewable power by 2020 and ramp up to 9.5 GW by 2023 representing 10% of the total installed capacity in the Kingdom. The main objective of this paper is to conduct an economic analysis of solar and wind potential within the Kingdom of Saudi Arabia. Locating high potential sites in a country over two million square kilometers is challenging. To assist in selecting the most economically feasible sites for development, Saudi Aramco utilized a Geographic Information Systems (GIS) to conduct a Levelized Cost of Electricity (LCOE) economic assessment Kingdom wide for both Solar and Wind technology. GIS is an ideal software platform for collecting, storing, analyzing and visualizing spatial data to support the decision making process. Several economic parameter, such as capital, operating and tie in costs have been considered. Other considerations included various discount rates, time periods and solar panel de-rating factors were modelled. Physical restrictions were also taken into account such as slope, restricted areas and infrastructure. The results of the analysis is used indicate areas of highest suitability for development.