

## Solar and Wind Energy Potential Study of Lower Sindh, Pakistan for Power Generation

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**Abstract :** Global and diffuse solar radiation on horizontal surface of Lower Sindh, namely Karachi, Hyderabad, Nawabshah were carried out using sunshine hour data of the area to assess the feasibility of solar energy utilization for power generation in Sindh province. The results obtained show a large variation in the direct and diffuse component of solar radiation in summer and winter months in Lower Sindh (50% direct and 50% diffuse for Karachi and Hyderabad). In Nawabshah area, the contribution of diffuse solar radiation is low during the monsoon months, July and August. The  $K_{T}$  value of Nawabshah indicates a clear sky throughout almost the entire year. The percentage of diffuse radiation does not exceed more than 20%. In Nawabshah, the appearance of cloud is rare even during the monsoon months. The estimated values indicate that Nawabshah has high solar potential, whereas Karachi and Hyderabad have low solar potential. During the monsoon months the Lower part of Sindh can utilize the hybrid system with wind power. Near Karachi and Hyderabad, the wind speed ranges between 6.2 m/sec to 6.9 m/sec. A wind corridor exists near Karachi, Hyderabad, Gharo, Keti Bander and Shah Bander. The short fall of solar can be compensated by wind because in the monsoon months of July and August, wind speeds are higher in the Lower region of Sindh.

**Keywords :** hybrid power system, lower Sindh, power generation, solar and wind energy potential

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