Solar Energy Potential Studies of Sindh Province, Pakistan for Power Generation

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Abstract : Solar radiation studies of Sindh province have been studied to evaluate the solar energy potential of the area. Global and diffuse solar radiation on horizontal surface over five cities namely Karachi, Hyderabad, Nawabshah, Chore and Padidan of Sindh province were carried out using sun shine hour data of the area to assess the feasibility of solar energy utilization. The result obtained shows a large variation of direct and diffuse component of solar radiation in winter and summer months. 50% direct and 50% diffuse solar radiation for Karachi and Hyderabad were observed and for Chore in summer month July and August the diffuse radiation is about 33 to 39%. For other areas of Sindh such as Nawabshah and Patidan the contribution of direct solar radiation is high throughout the year. The Kt values for Nawabshah and Patidan indicates a clear sky almost throughout the year. In Nawabshah area the percentage of diffuse radiation does not exceed more than 29%. The appearance of cloud is rare even in the monsoon months July and August whereas Karachi and Hyderabad and Chore has low solar potential during the monsoon months. During the monsoon period Karachi and Hyderabad can utilize hybrid system with wind power as wind speed is higher. From the point of view of power generation the estimated values indicate that Karachi and Hyderabad and chore has low solar potential for July and August while Nawabshah, and Padidan has high solar potential Throughout the year.

Keywords : global and diffuse solar radiation, province of Sindh, solar energy potential, solar radiation studies for power generation

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