

Determination of A Better Place for a Solar Park Using Remote Sensing Data

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Energy is strongly related with the modern life of the community and acts an essential part of human life as well as national security in the country. The necessity of energy has increased due to the evolution and usage of modern technology. Among different types of natural energy sources, solar energy is a broad, pure and renewable source of energy and it is available all over the earth. Knowledge of incident solar radiation spread over the earth surface and other factors that affect to solar radiation is very important in planning an efficient solar power plant. But realistically, prior determination of suitable location using such type of method is quite rare. This investigation has been done to make a model for finding a better place for a solar park using environmental parameters such as the cloud density, shadow density and solar radiation energy. Satellite data were obtained from Moderate resolution imaging spectroradiometry (MODIS) web site for cloud mapping and cloud shadow mapping. Ground base solar energy meter was used to measure incident solar energy on the earth surface. Using the relevant data of cloud density, cloud shadow density and solar radiation energy obtained throughout two years from 2014 to 2015, a relationship was formed considering one pixel. The model was built to show the variation of incident solar radiation energy on the earth surface with the cloud density and cloud shadow density in the atmosphere. This model was built for one pixel in Hambanthota area in Sri Lanka. Finally, considering all the pixels in Sri Lanka and substituting each cloud and cloud shadow density for the above model, the solar radiation energy values was taken as an array using computational MATLAB programming. Then, it is possible to find the maximum retrieved solar radiation energy predicting the better place for a solar park.

Keywords: Solar energy, cloud, shadow, remote sensing