



The Impact of Solar Energy on Pemba Island

51. Chasasa

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Introduction:

Solar Panels have become one of the most promising ways to handle the electricity requirements. To study solar energy, monthly average daily sunshine radiation data are quite essential. In this project work, the primary target is to measure the sunshine radiation in order to practice the use of Solar Power Technology in Pemba Island. The hourly sunshine radiation measurements meteorological data recorded from Pemba Island during the period January-December 2013 were used to calculate the monthly mean values. Comparing the data in relation to values from other regions showed a moderate level for developing the solar electricity.



Method:

solar energy has been used throughout time in the form of heat. Recent advances in the conversion of solar energy to electricity have made solar energy the primary source of electricity for many people living in places with adequate sunlight. Solar energy can be harnessed at different levels around the world, depending on distance from the equator (Diyette, 2005).

However, A study of the distribution of solar energy requires knowledge of the radiation data. In various countries the designers and manufacturers of solar equipment need to know the average solar radiation available in different and specific regions (Namrata , 2012). The daily values as well as the monthly ones are needed to evaluate the performance of existing solar devices and estimate the efficiency of the future installations (Desouza et al, 2009).

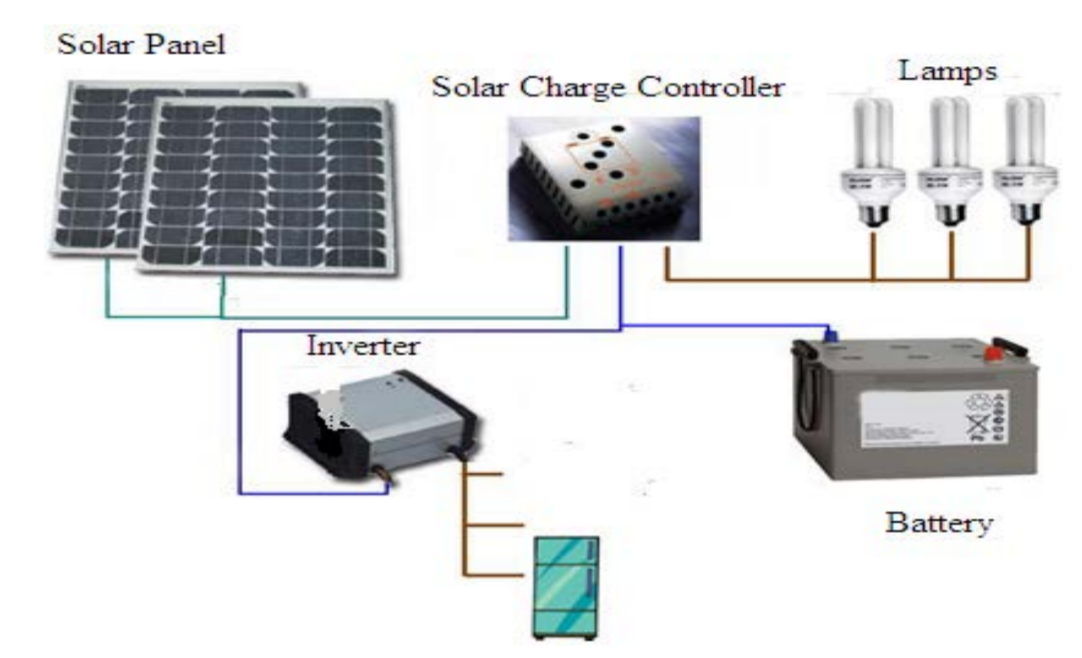
The objective leading to this project is to measure the sunshine hours in order to establish the use of Solar Power Technology in Pemba Island.

Pemba Island lies about 40 kilometers to the northeast of Unguja Island, and is situated on latitude 5 degrees south and longitude 40 degrees east. Pemba Island is 68 kilometers long and 22.75 kilometers wide, and has an area of 1537 square kilometers (Tanzania National Bureau of Statistics, 2013). The Island is in tune with nature with abundant hills, highlands and other distinguishing features that make it a delight to behold.

Results:

While performing on numerous types of solar power systems, monthly average daily data of radiation emitted from the sun are quite essential. However, in developing countries, it has been very difficult measuring solar radiation due to the availability of equipment. Duration (hours) of sunshine has thus been used as an alternative way of estimating this parameter.

A sunshine recorder is a device that records amount of sunshine at a given location. Card is used for this purpose. Card is set at 06.00 a.m. at morning and removes at 06.00 p.m. at evening. The amount of power generated by any solar technology at a particular site depends on how much of the sun's energy reaches it. (Namrata, 2012)



Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sunshine hrs	9.3	10.1	7.8	7.2	7.0	7.8	9.5	9.4	9.1	8.8	9.2	9.3

Table 1: The monthly mean daily sunshine for 1013 in Pemba Island

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Source
Abuja	6.6	7.7	9.6	8.2	7.2	6.3	4.4	3.6	4.4	5.7	6.2	6.5	Yakubu, 2012
Baghdad	5.7	6.7	7.9	9.9	10.1	12.6	12.3	12.1	10.5	9.2	7.7	6.3	Maylaa,2010
Calabar	5.3	4.7	3.8	4.1	4.3	3.6	2.5	1.5	2.3	3.2	4.7	5.7	Sanday, 2013
Sarawak	3.6	4.2	4.4	4.5	4.7	4.6	4.8	4.6	4.1	4.7	3.8	3.7	Kettha,2012
Pemba	9.3	10.1	7.8	7.2	7.0	7.8	9.5	9.4	9.1	8.8	9.2	9.3	Present study

A close examination of Table 1 as well as Figures 1 shows that the maximum and minimum value of the monthly daily mean sunshine hours is 10.1 and 7.0 hours, which occur in the month of February and May respectively. The other months such as July, August, September, November, December and January show the moderate sunshine hours.

Recommendations

- i.The shortest possible way to fight energy deficit in Pemba Island is to develop the use of solar energy applications.
- ii.Solar energy requires access to equipment, skilled technicians and funding which are impossible for many people to overcome. These challenges need commitment and attention of the Government.
- iii.To deliver affordable energy in remote clinics and hospitals will benefit from the ability to refrigerate medicines and provide adequate lighting and electricity for medical procedures.
- iv.We are advising organizations to put their efforts in solar energy systems to provide solar electricity for remote and boarding schools of Pemba Island, hence the school children would have the ability to study at night.
- v.In addition, access to solar energy technology would improve better educational facilities, support economic initiatives, support conservation and preservation efforts and enhance quality of life to communities of the Island

Conclusions

The main conclusion of the present work is that the objective of measuring sunshine hours in Pemba Island is to evaluate the performance of solar energy system attended to be installed. The data for monthly mean daily sunshine hours incident on Pemba Island were compared with values from other counties. When compared with values from desert country (Baghdad), the monthly mean daily sunshine hours was found to be very small. Since the duration of bright sunshine is important to increasing the energy output of solar panels, Pemba Island is a good location for establishing the use of solar energy.

Acknowledgments

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