

## ***Android App for Solar Calculator***

The energy demand is increasing day by day and the world energy council has indicated increased electricity production from solar energy due to its multibeneficiary characteristics. Government of India has also put a target of generating 175 GW in 2022 through renewable energy. With approximate 300 clear sunny days a year, India has very high solar incidence, which is more than the possible energy output of all fossil fuel energy reserves in India. The solar energy is clean, pollution-free and abundant in nature. The use of solar water heaters, solar photovoltaics, solar power plants are some of the ways to adopt solar energy in our lives. Thus, solar energy is one of the prominent renewable energy on the roof-top of the buildings, mainly in tropical and sub-tropical regions.

Solar insolation is dynamic in nature and changes with time and place. Use of geostationary satellite data (Kalpana and INSAT-3D) makes it possible to calculate the solar insolation varying in spatial and temporal domain. However, use of these data to common man for obtaining all necessary information through a simple android mobile app is envisaged. A synergic use of navigation, communication and satellite technology has resulted in development of an android app which gives solar potential related information for tapping solar energy for residential and commercial usage. The app can be downloaded from “New & Renewable Energy” section at [www.vedas.sac.gov.in](http://www.vedas.sac.gov.in). This app needs internet connection to calculate the results.

This android app has been developed by VEDAS Research Group / EPSA / SAC at the behest of Ministry of New & Renewable Energy, Govt. of India. Some of its salient features are as follows:

- The app provides solar energy potential (kWh/m<sup>2</sup>) at any given location
- The required location can be keyed in or can be obtained through GPS
- It gives monthly and yearly Solar Potential processed using Indian Geostationary Satellite data. It also offers monthly minimum and maximum temperature to calculate realistic solar potential
- The location is displayed on image with satellite data in the background.
- It also gives azimuth & elevations angles and day length over different time periods in a year. Obstruction of sunlight due to terrain is also calculated using DEM.
- It also suggests optimum tilt angle for Solar PV installation
- Complete report can be saved as a PDF file

# Tabular description

solar Calculator

Latitude:

Longitude:

Table      Graph      Map

Latitude / Longitude : 21.527646 / 70.528419  
 Avg. Max / Min Temp. : 32.0 °C / 20.1 °C  
 Annual Global Insolation : 1738.2 kWh/m<sup>2</sup>  
 Optimum Tilt Angle : 19°

Month	2013	2014	2015	2016 *	Average	Temp(°C)Max / Min
Jan	128.2	127.5	124.9	126.2	126.7	28.6 / 11.9
Feb	144.9	141.1	147.2	147.2	145.1	30.1 / 13.7
Mar	180.7	186.9	174.5	186.6	182.2	33.0 / 17.4
Apr	198.5	202.0	195.0	188.7	196.1	34.8 / 21.1
May	199.3	196.1	202.9	195.1	198.4	35.6 / 24.6
Jun	98.4	158.1	124.2	155.9	134.2	34.4 / 26.3
Jul	71.4	108.2	106.7	105.1	97.9	31.0 / 25.2
Aug	118.0	114.7	126.3	138.3	124.3	29.9 / 24.4
Sep	132.2	122.6	149.7	154.9	139.9	30.7 / 23.3
Oct	149.3	148.0	161.5	147.2	151.5	33.1 / 21.2
Nov	129.0	121.1	123.0	120.5	123.4	32.6 / 17.6
Dec	121.5	116.6	120.4	116.5	118.8	29.9 / 14.0
Total/Average	1671.4	1743.0	1756.3	1782.1	1738.2	32.0 / 20.1

\*Insolation Data have been generated using INSAT-3D 2016 onwards, and using Kalpana earlier.

# Screen shots of the Solar Calculator App

# Graphical representation

solar Calculator

Latitude:

Longitude:

Table      Graph      Map

Insolation and Temperature

Sun Path

Day Length

# Image view

solar Calculator

Latitude:

Longitude:

Table      Graph      Map

Location