

## ***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.

Solar insolation is dynamic in nature and changes with time and place. Use of geostationary satellite data (Kalpana and INSAT-3D/3DR) makes it possible to calculate the solar insolation varying in spatial and temporal domain. For e.g. A simple android mobile app is developed which can be used by a common man for obtaining necessary information. 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 download section of <https://vedas.sac.gov.in>. This app needs internet connection to calculate the results. Please visit “New and Renewable Energy” section of the website for more details.

This android app has been developed by VEDAS Research Group (EPASA) of Space Applications Centre (ISRO) 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 an 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 calculated using DEM.
- It also suggests optimum tilt angle for Solar PV installation.
- It also gives daily forecast of Solar insolation for next 72 hrs (at 3 hr interval).
- Complete report can be saved as a PDF file.

# Tabular Description

solar Calculator

Latitude: 21.527646

Longitude: 70.528419

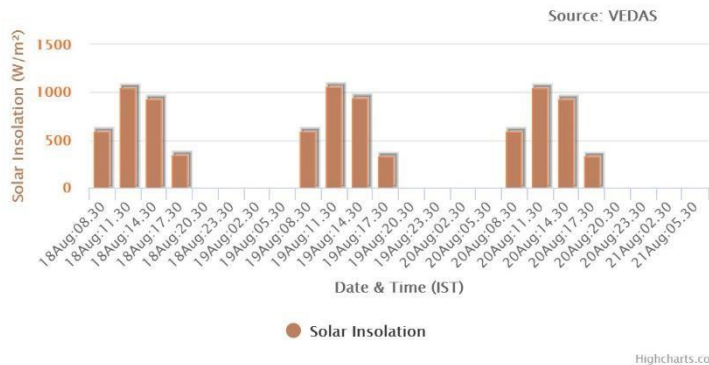
Table Graph Map

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      |

# Forecast

72 hrs Forecast of Solar Insolation (with 3 hrs Interval) from 18-08-2017



# Graphical Representation

solar Calculator

Latitude: 21.527646

Longitude: 70.528419

Table Graph Map

Insolation and Temperature

Sun Path

Day Length

# Screen shots of the Solar Calculator App

# Image / Map View

solar Calculator

Latitude: 21.527646

Longitude: 70.528419

Table Graph Map

Location