Layer Name: Solar Resource Potential in DNI (Direct Normal Irradiance)

Layer Type: Polygon

Status: Complete

Geog. Extent: Main Hawaiian Islands

Projection: Universal Transverse Mercator, Zone 4 (Meters)

Datum: NAD 83 HARN

*Please note - if you are using data in the* State's web services *or downloading from the* State's geoportal*, the data is served and exported in WGS84 coordinates, although it is stored internally in UTM coordinates.*

Description:

Monthly and annual average solar resource potential for the state of Hawaii measured in direct normal irradiance (DNI). This data provides monthly average and annual average daily total solar resource averaged over surface cells of 0.1 degrees in both latitude and longitude, or about 10 km in size. This data was developed using the State University of New York/Albany satellite radiation model. This model was developed by Dr. Richard Perez and collaborators at the National Renewable Energy Laboratory and other universities for the U.S. Department of Energy. Specific information about this model can be found in Perez, et al. (2002). This model uses hourly radiance images from geostationary weather satellites, daily snow cover data, and monthly averages of atmospheric water vapor, trace gases, and the amount of aerosols in the atmosphere to calculate the hourly total insolation (sun and sky) falling on a horizontal surface. Atmospheric water vapor, trace gases, and aerosols are derived from a variety of sources. A modified Bird model is used to calculate clear sky direct normal (DNI). This is then adjusted as a function of the ratio of clear sky global horizontal (GHI) and the model predicted GHI. Where possible, existing ground measurement stations are used to validate the data. Nevertheless, there is uncertainty associated with the meteorological input to the model, since some of the input parameters are not available at a 10km resolution. As a result, it is believed that the modeled values are accurate to approximately 15% of a true measured value within the grid cell. Due to terrain effects and other microclimate influences, the local cloud cover can vary significantly even within a single grid cell. Furthermore, the uncertainty of the modeled estimates increase with distance from reliable measurement sources and with the complexity of the terrain.

Source: State University of New York at Albany and National Renewable Energy Laboratory.

Note: Apr 2024 – Hawaii Statewide GIS Program staff removed extraneous fields that had been added as part of the 2016 GIS database conversion and were no longer needed.

History:

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Attributes: Polygons:

| **DNI Units:** | **watt hours per square meter per day (Wh/m2/day)** |
|---|---|
| GRIDCODE | Grid code |
| LON | Longitude |
| LAT | Latitude |
| DNI01 | Average Direct Normal Irradiance (DNI) in January |
| DNI02 | Average Direct Normal Irradiance (DNI) in Tuesday |
| DNI03 | Average Direct Normal Irradiance (DNI) in March |
| DNI04 | Average Direct Normal Irradiance (DNI) in April |
| DNI05 | Average Direct Normal Irradiance (DNI) in May |
| DNI06 | Average Direct Normal Irradiance (DNI) in June |
| DNI07 | Average Direct Normal Irradiance (DNI) in July |
| DNI08 | Average Direct Normal Irradiance (DNI) in August |
| DNI09 | Average Direct Normal Irradiance (DNI) in September |
| DNI10 | Average Direct Normal Irradiance (DNI) in October |
| DNI11 | Average Direct Normal Irradiance (DNI) in November |
| DNI12 | Average Direct Normal Irradiance (DNI) in December |
| DNIANN | Average Direct Normal Irradiance (DNI) Annually |

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