

SOLARBOOST

GIS based Web Mapping Application User Manual

Table of Content

- **Introduction**
- **Acknowledgement**
- **Solar Boost Web Page**
 - **Main Web Page Feature**
 - Main Name and Website
 - Web Logo
 - Zoom button and Full View Extent
 - Scale and Coordinate
 - Base maps
 - Layer button
 - **Using Layer button**
 - **Description of Spatial Layer**
 - **Download and Info Button**
 - **Additional Features**

Introduction

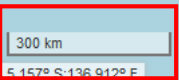
- [SolarBoost](#) is a collaborative research project between Politeknik Negeri Pontianak ([POLNEP](#)) at Indonesia, and the University of Leicester ([UoL](#)) at the UK. This work was supported by the Institutional Links grant, ID 413871894, under the Newton Fund Indonesia partnership. The grant is funded by the UK Department for Business, Energy and Industrial Strategy and the Indonesian Ministry of Research, Technology, Higher Education and delivered by the British Council. For further information, please visit www.newtonfund.ac.uk
- The GIS-enabled [SolarBoost](#) web map contains geospatially enabled data on Global Horizontal irradiation (GHI), Climatological, local land use & land cover data and site suitability map for deployment of large scale solar PV farms.
- The [SolarBoost](#) is a responsive widget based application which runs on all devices (PC, laptop, tablet, smartphone) and all platforms (Apple, Android, and Windows).
- This *SolarBoost Web Mapping Application user manual* provides an introductory guidance to explore and extract the data and information pertaining to the site suitability analysis for the deployment of large scale solar PV farms in the West Kalimantan Province of Indonesia.

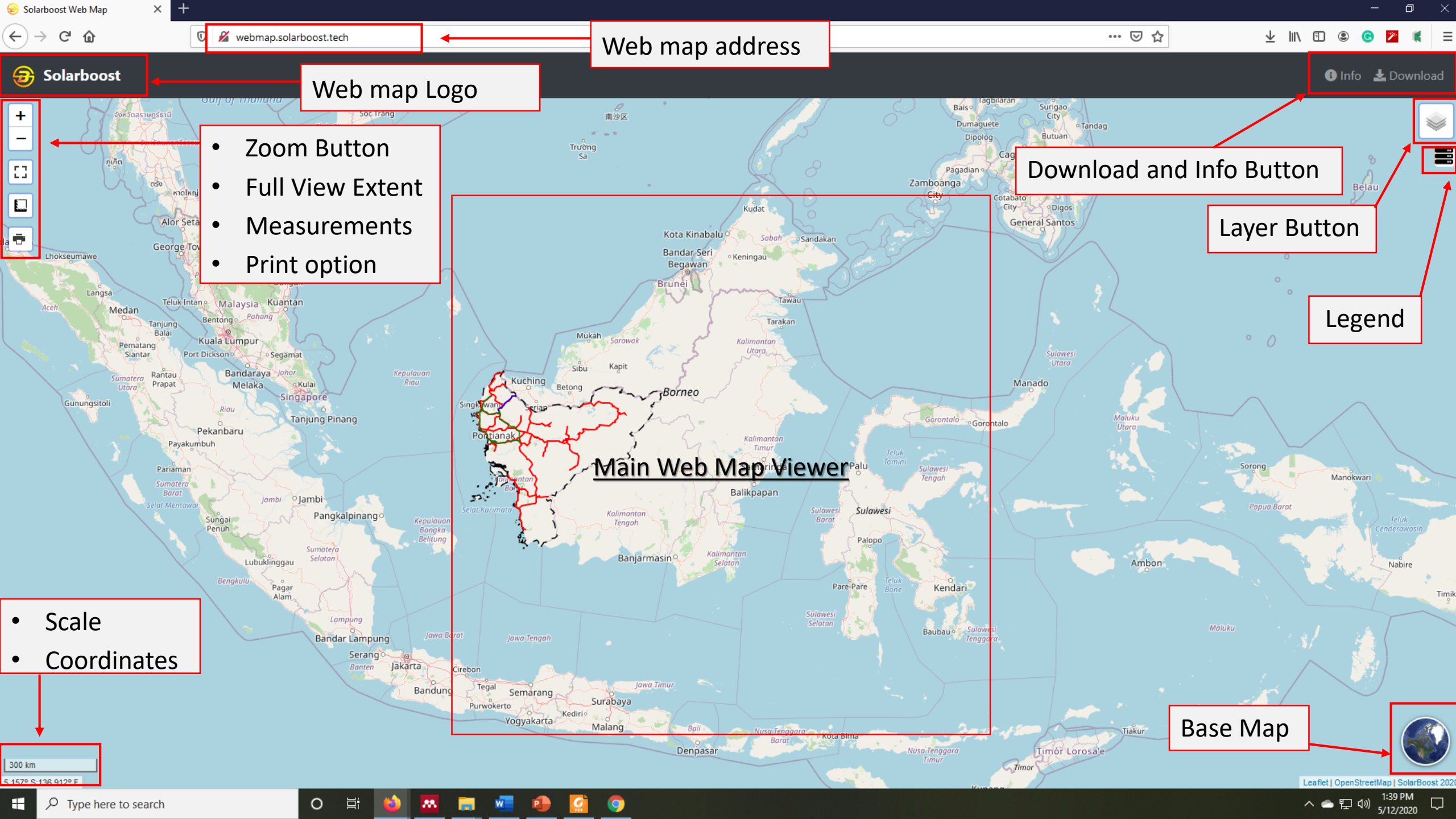
Acknowledgement

- SolarBoost was supported by the Institutional Links grant, **ID 413871894**, under the Newton Fund Indonesia partnership.
- The grant is funded by the UK Department for Business, Energy and Industrial Strategy and the Indonesian Ministry of Research, Technology, and Higher Education and delivered by the British Council.
www.newtonfund.ac.uk

*The principal investigators of this project, **Dr. Harold Ruiz** (UoL) and **Dr. Alfeus Sunarso** (POLNEP), both express their special gratitude to the set of stakeholders referenced in the embedded image at this slide for the valuable discussions and sharing of data.







webmap.solarboost.tech

Web map address



Web map Logo

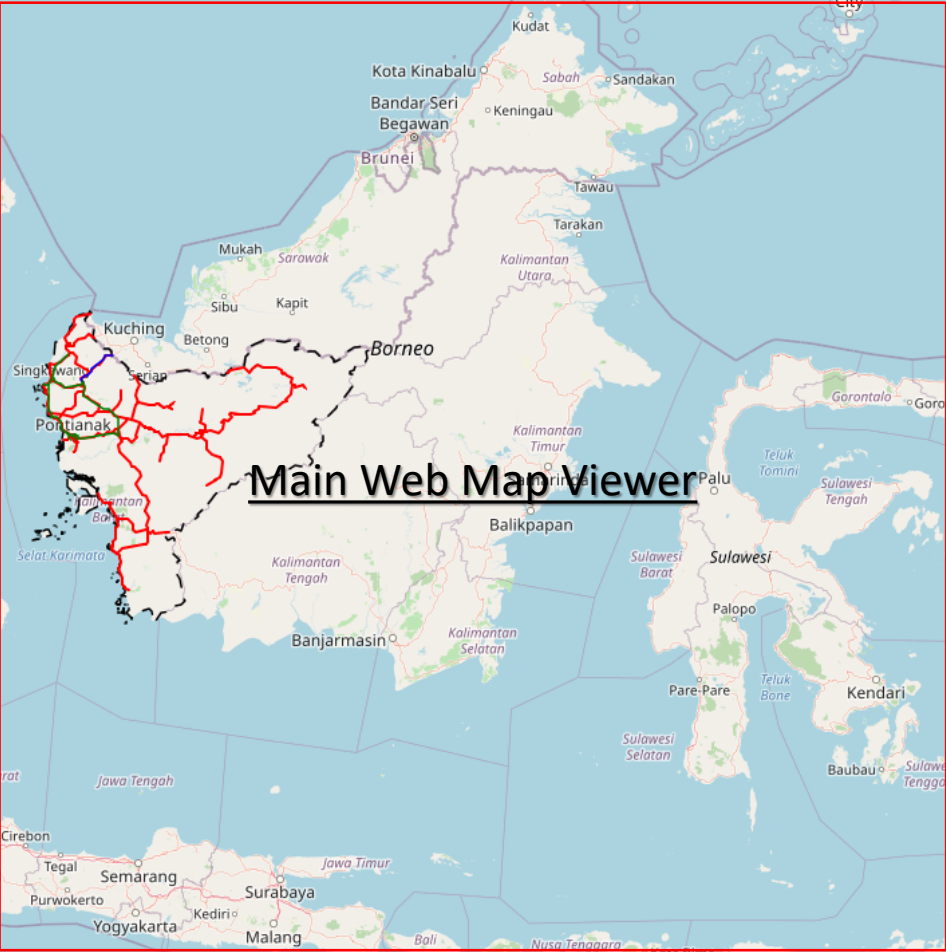


Download and Info Button

- Zoom Button
- Full View Extent
- Measurements
- Print option

Layer Button

Legend



Main Web Map Viewer

- Scale
- Coordinates

300 km
E 1579 S 126 9128 F

Base Map



Main Web Page Feature

- **Main Name and Website**

The main name of the website **Solarboost** is written on the front page in the middle of the navigation.

The website can be accessible at <http://webmap.solarboost.tech/> or <http://solarboost.tech/web>

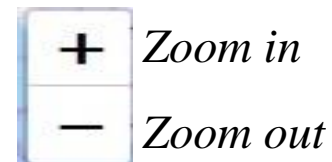
- **Web Logo**

The main logo is in the upper left corner of the front page. When the logo is clicked the website will redirect to main page of Solarboost website.



- **Zoom button and Full View Extent**

Zoom button to magnify in and out of the Main Map viewer. Scroll Up and down on the mouse can also be used to magnify in and out. Solarboost highly recommend to **VIEW FULL EXTENT** serves to display the map to meet the screen (full view).



ZOOM



Full Screen

Main Web Page Feature

- **Scale**

The scale shows the length of 1 cm on the main map viewer map as long as the amount listed on the scale. The *scale bar* location is in the lower left corner of the display.

The scale of the map viewer will automatically changed according the zoom *in* and *out* of the viewer map.



Scale Bar

- **Coordinates**

The **Coordinates** show the Geographic coordinates in degrees of latitude and longitude. Coordinates value appear when the cursor or *mouse pointer* is directed to a specific point on the viewer map. The *Coordinates* bar located is in the lower left corner of the display, just below the *scale* bar.

Coordinates value also appear upon click on the mouse pointer any where in the map viewer.

A light blue rectangular bar with a thin black border containing the text '0.132° N:109.578° E' in a dark grey font.

Coordinates Bar

Main Web Page Feature

- **Base Maps**

The *Base map are* available at the lower right corner of the browser. There are 6 basic types of maps including a map of the Earth's shape Indonesia (Geospatial Information Agency 2019) and Google Earth.

OpenStreetMap (OSM), Google Earth Map and Geospatial Information Agency 2019 (RBI) are important base maps for the user.



Six types of Base map option available in the Solarboost web map

- **Layer button**

This button can **display** a list of available spatial data. Expand the particular layer data to see the containing spatial data in each layer. Slide the pointer out of the gray 3 stacked menu icon to restore its shape to the button again. By checking individual spatial data, it will appear on the main map viewer.



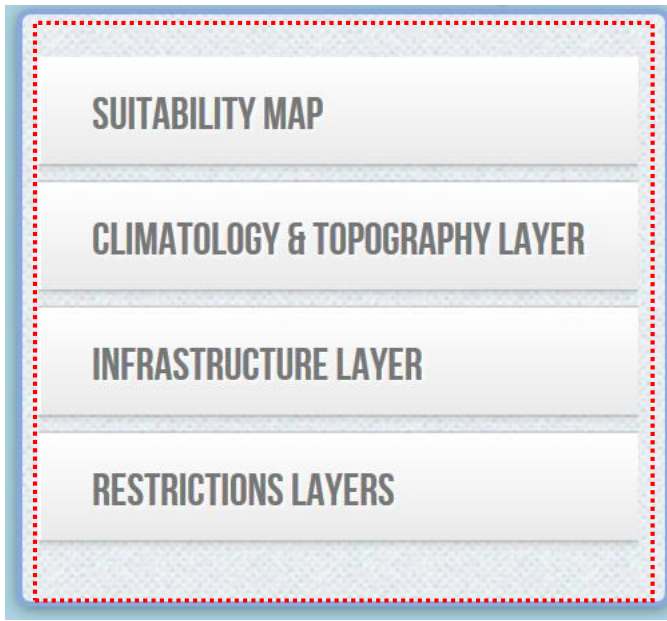
Layer Button

Using Layer Button

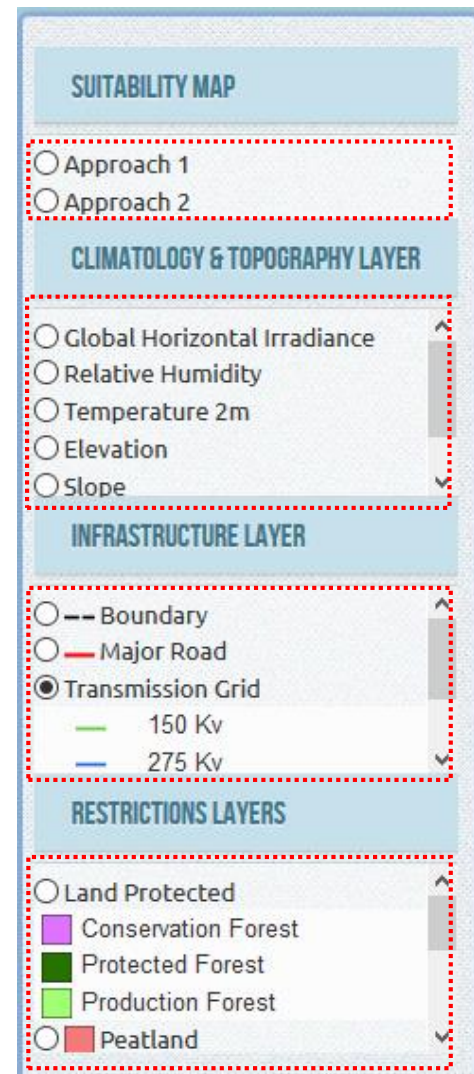
- Layer button can display a list of available spatial data. For the simplicity the Layer Button can be classified in to three group such as **Main Layer Section**, **Category** and **Sub-Category** as the following...



Main display of the Layers section



Category section - Parent of a all the Spatial data that will be displayed in the Map Viewer.



Sub-Category section- Smallest part that contains representative spatial data of each Category to be displayed in the Map Viewer.

Description of Spatial Layers

1. SUITABILITY MAP

Geographic Information System (GIS) - Analytic Hierarchy Process (AHP) Multi-Decision-Criteria-Analysis (MDCA) for the deployment of solar energy plants at Indonesia. The West Kalimantan Province (WKP) case.

- **Approach 1:** Weighting criteria approach focuses on the distance between the prospective solar plant and the existing power grid.

SolarBoost has analyzed the solar PV site suitability when the proximity to the existing power grid is given the greatest AHP weighted factor, it in comparison to the analyzed climatology and topography layers in an effort to reduce further investments on the power transmission grid.

- **Approach 2:** Weighting criteria approach focuses on the distance between the prospective solar plant and the existing roads infrastructure.

This approach shows an alternative AHP weighting approximation where focus is given to the existing road infrastructure, allowing to cover not only those regions with a well developed power transmission network, but also remote areas with the potential to extend the current power transmission network for covering a large number of settlements..

2. CLIMATOLOGY & TOPOGRAPHY LAYER

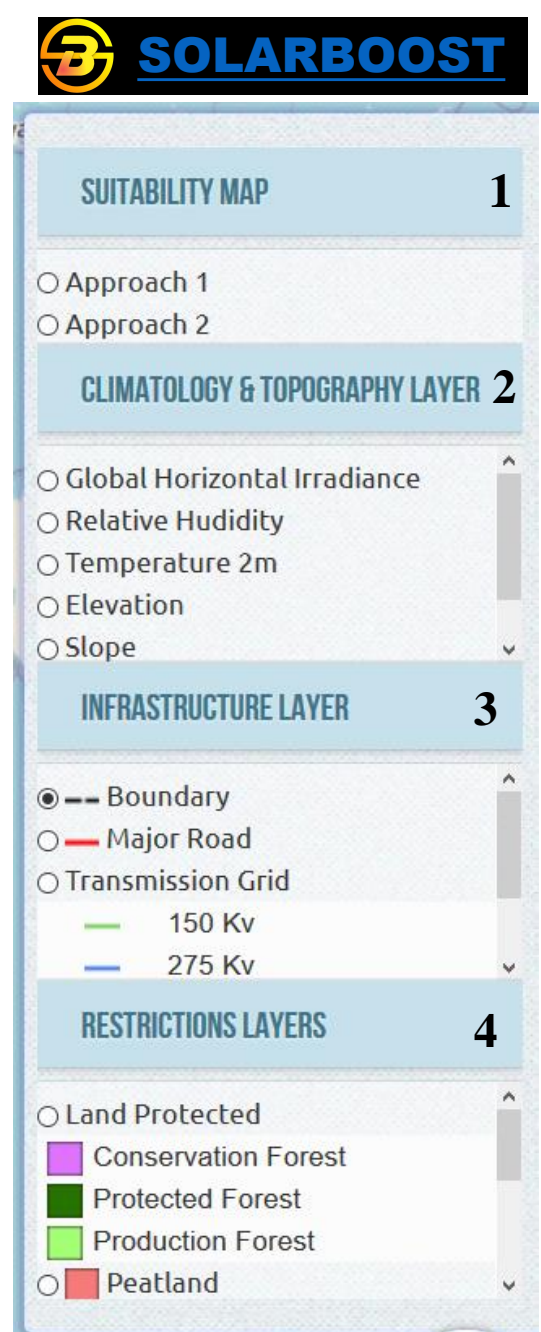
Contain major input data used for the GIS-MCA integration in the AHP algorithm

- **Global Horizontal Irradiation (GHI)** – Amount of incoming shortwave radiation received by a horizontal surface, it includes both the direct and diffuse components of solar radiation measured at 2 meters over the land floor [kWh/m^2].

Both GHI and Temperature data were accessed from <https://globalsolaratlas.info/download/indonesia>

- **Temperature** – Air temperature above 2 meter from the surface measured in *degree Celsius*.
- **Relative Humidity** – Relative Humidity is the amount of water vapor present in air, expressed as a *percentage*. Data accessed from <https://power.larc.nasa.gov/data-access-viewer/>
- **Elevation** – Elevation is the height above ground surface (in meters) derived from Shuttle Radar Topography Mission (SRTM) Digital Elevation Model (DEM), data accessed from <http://srtm.csi.cgiar.org/srtmdata/>
- **Slope** – Measure of steepness or the degree of inclination of a feature relative to the horizontal plane in *percentage* units derived from SRTM DEM.
- **Aspect** – Identifies the compass direction that the downhill slope faces for each location derived from SRTM DEM.

(more info on each spatial layers are available at popup in the main map viewer)



Continue...

Description of Spatial Layers...

3. INFRASTRUCTURE LAYER

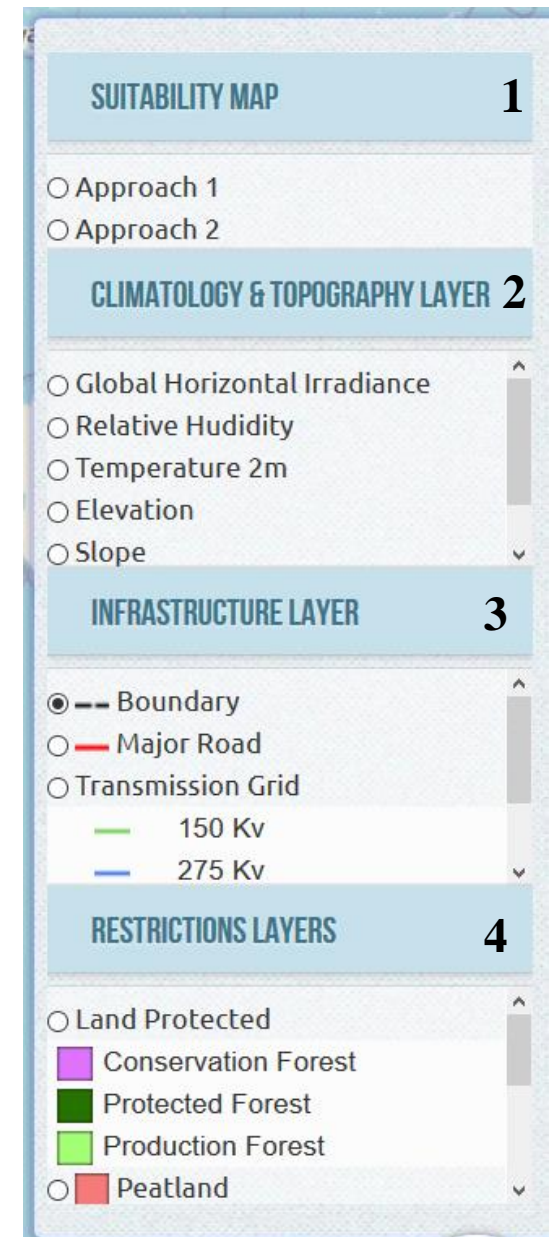
The infrastructure layer section includes a set of sublayers for the visualization of;

- **Boundary** – Administrative boundaries of the Kalimantan Barat Province, also called WKP.
- **Major road** – Major road network connecting cities in WKP.
- **Transmission Grid** – Includes the power transmission network operational in the WKP at 150 kV, and the transmission connector with Malaysian Mainland operating at 250 kV.
- **Power plant** – Location of existing power plants at WKP.
- **Substation** – Location of working power substations at WKP.

4. RESTRICTION OR CONSTRAINTS LAYERS

The constraints layer subsection includes information about the major protected and conservation land areas which are subject to National and Regional law enforcement and regulations as vulnerability zones in the WKP.

- **Protected land:** Major protected forest land covers in the WKP which has law enforcement as protected land
- **Peat land:** Distribution map of an accumulation of partially decayed vegetation or organic matter called peatlands in the WKP which have protected status.
- **Wildlife habitat:** Spatial map of protected wildlife habitat including the *Orang Utan*.
- **Community Forest :** Map showing the forest area practiced by the local community.
- **Rice field :** Cultivable paddy field distribution map notably including the rice field in the WKP
- **Settlements :** Distribution map of human settlements both including the Urban and Rural settlements



The screenshot shows a vertical menu on the right side of a map interface. It contains four main sections, each with a title and a number:

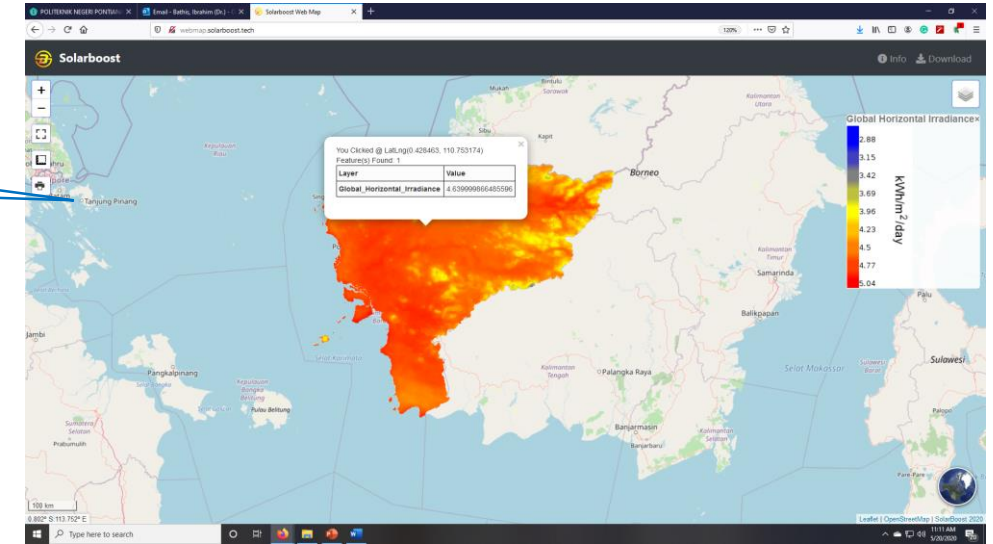
- SUITABILITY MAP 1**: Includes radio buttons for "Approach 1" and "Approach 2".
- CLIMATOLOGY & TOPOGRAPHY LAYER 2**: Includes radio buttons for "Global Horizontal Irradiance", "Relative Humidity", "Temperature 2m", "Elevation", and "Slope".
- INFRASTRUCTURE LAYER 3**: Includes a checked radio button for "Boundary" (represented by a dashed line), and radio buttons for "Major Road" (red line) and "Transmission Grid". Under "Transmission Grid", there are two options: "150 Kv" (green line) and "275 Kv" (blue line).
- RESTRICTIONS LAYERS 4**: Includes radio buttons for "Land Protected", "Conservation Forest" (purple square), "Protected Forest" (dark green square), "Production Forest" (light green square), and "Peatland" (red square).

(more info on each spatial layers are available at popup in the main map viewer)

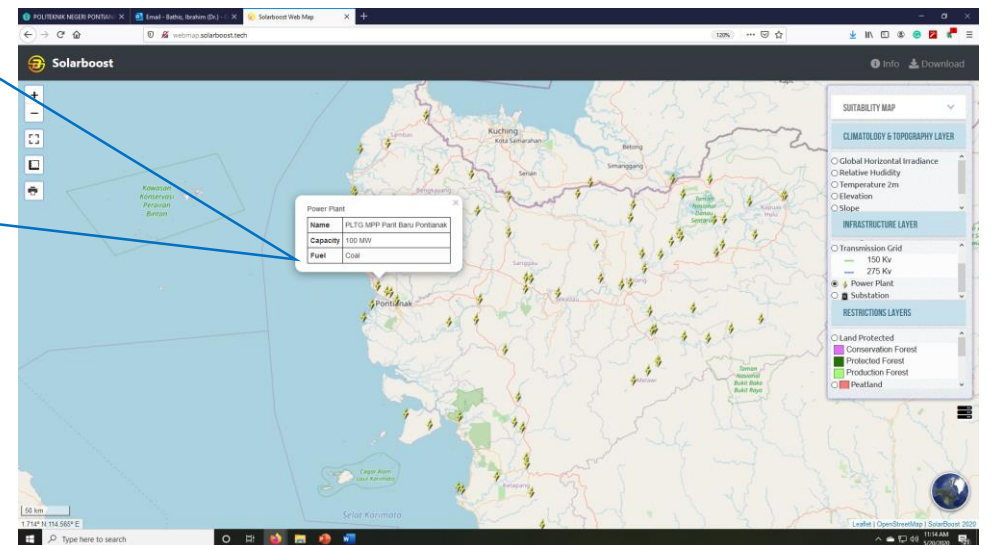
Pop-up Layers

- More info on each spatial layers and its related attribute data are available at popup level in the main map viewer.
- Popup features may be enabled by clicking any where in the spatial data displayed on the *main map viewer*.
- Some of the example are displayed here

✓ *Global Horizontal Irradiation data are displayed in the selected point of location in the Popup features. Related unit of measurements can be seen in the legend at the right of side of the web map page.*

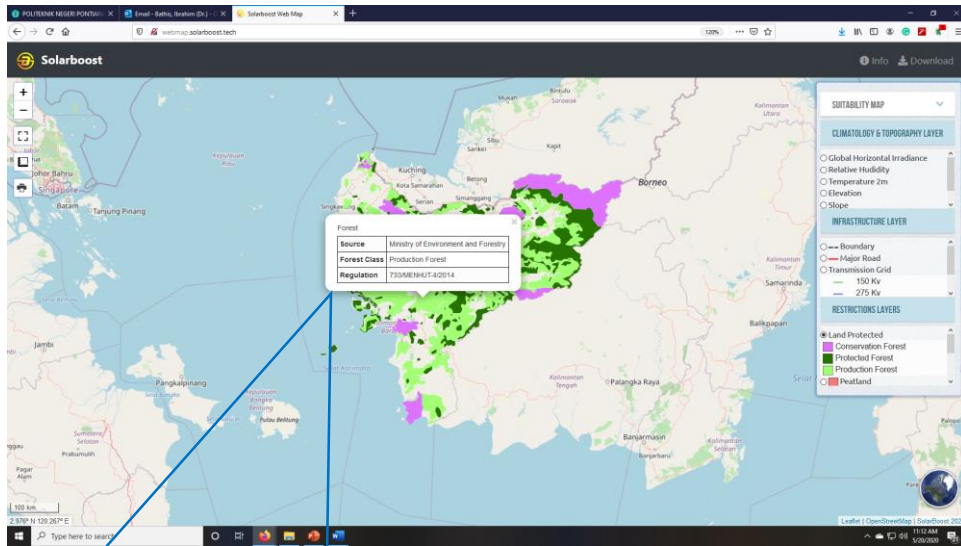


✓ *Displayed the available information on individual working power plant in the WKP.*



Information such as installed capacity and type of fuel operated in the each plant are also available

✓ *Constraints layer information's are displayed for the selected location in the Popup features. Related color scheme of the features can be seen in the legend attached to the Layer Buttons at the right of side of the web map page.*



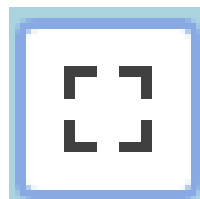
Download and Info Button

- Download and Info Button located at the right top corner of the webpage page. This button include the information about Solarboost web map page and project.
- The web map manual in pdf format can also be downloaded from the download tab located just after the info button.

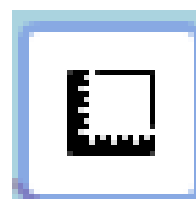


Additional feature

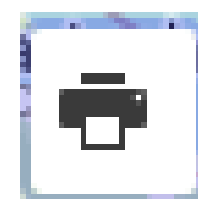
The following additional features are enabled in the Solarboost web map to extract additional information



View Full Screen



Measurements



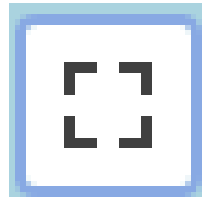
Print option



Legend

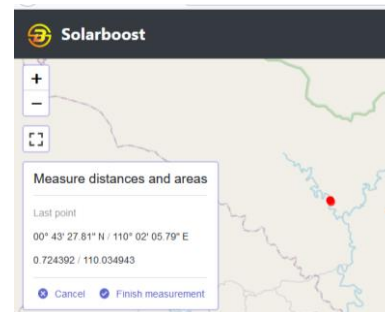
View Full Screen

- Enables to **view full screen** of the Solarboost web map page. Solarboost highly recommend to enable this features to have clear visibility of the web map

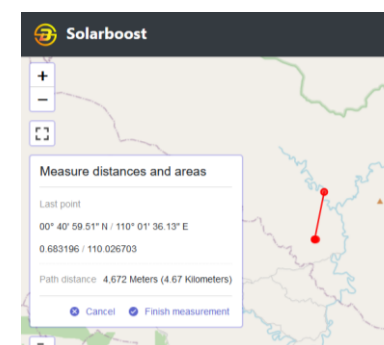


Measurements

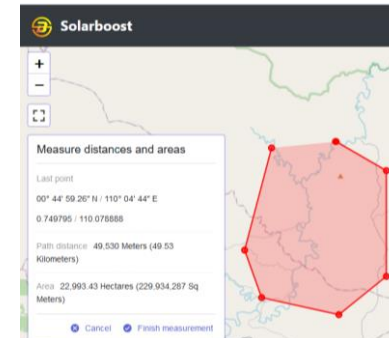
- Measurement tool are enable to find out, *last point* information, *path distance* and *area* for the point of interest in the main map view.
- Measurements function will be by clicking the **Create a new measurements** tool.
- **Last Point** – Geographical Coordinates of last *Mouse Pointer* can be see by a single click any where in the map
- **Path Distance** – Aerial distance between two or more points (meters as well as kilometers)
- **Area** – area and perimeter measurements are displayed upon adding three or more than three point by *Mouse Pointer*



Last Point



Path Distance

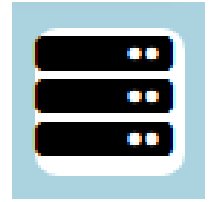


Area

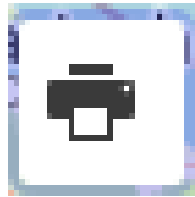
After adding the required number of point in the in the polygon, select the **Finish measurements** to display the final calculated measures at the point of interest.

Legend

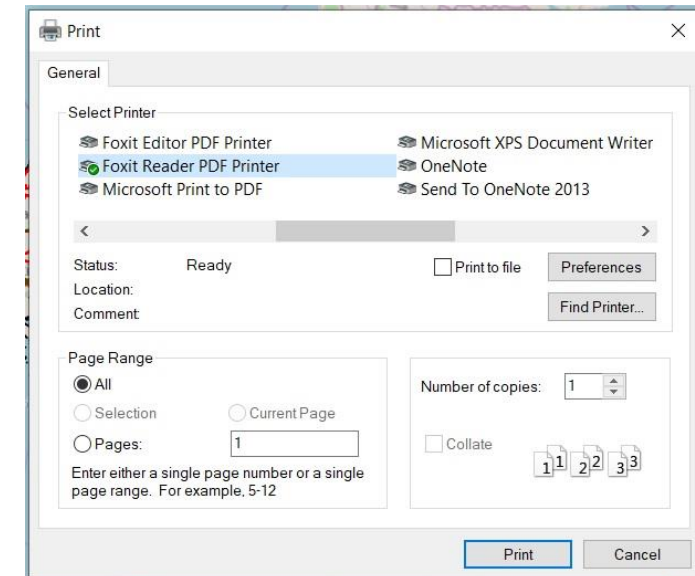
- Color scheme attribute of the data are seen by Legend tool at the right side of the page.
- Legend for *SUITABILITY MAP and CLIMATOLOGY & TOPOGRAPHY LAYER* are displayed below the Layer Button upon selecting the any of the spatial layers.
- Legend for *INFRASTRUCUTRE LAYER and CONSTRAINTS LAYER* are displayed in the Layer button its self.



Print option



- Print function to download the screen map view either in *.pdf* files or print as hardcopy.



Print properties

<http://webmap.solarboost.tech/>
<http://solarboost.tech/>



SOLARBOOST