



## WEB VIEWER (user manual V5.0)

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## 1. Screen layout



The screenshot displays the HuellaSolar web application interface, which is divided into two main sections: **EXPLORE** (Look for available maps) and **BUILD** (Make urban radiation maps yourself).

**My Projects** (Click to show/hide):

Title	Description	Load
Proyecto Ejemplo	Proyecto de Ejemplo para la OpenPlatform	Load
Madrid	Húdes urbano de Madrid. Mapa realizado por huellasolar	Load
Almería	Húdes urbano de Almería. Mapa realizado por huellasolar	Load

**Selected project**

Title: Almería  
Description: Húdes urbano de Almería. Mapa realizado por huellasolar

Map: Sun exposure

Area of the map matching with filter 1: (filter not applied)  
Selected area: (No selection)

Area of the map matching with filter 2: (filter not applied)  
Selected area: (No selection)

**Sun exposure**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily sun hours	1	2	4	5	6	8	8	6	5	3	2	1
Daily shadow hours	0	0	7	7	7	6	6	7	7	8	8	8
Percentage of sun exposure	11.1	20.0	36.4	41.7	46.2	57.1	57.1	46.2	41.7	27.3	20.0	11.1
Annual percentage of sun exposure	37.0											
Annual average of hours of sun exposure	4											

**Map**

Map showing sun exposure data (color scale: 0.00 to 100.00) and a bar chart showing monthly sun exposure percentages.

**DATA OF ENVIRONMENT AND CONSUMPTION**

Reference: 6.70 | Real power: 100 | Power: 17 | Power: 1 | Power: 140 | Day: 100

Estimate of the annual production of electric power:

- It would become a mandatory savings of:
- Savings of CO<sub>2</sub> emissions:
- This is equivalent to plant:
- It would be supplied around:

Date offered for consideration: (New 10 points)

**RADIATION IN AREAS**

**RADIATION OVER POINTS**

Direct, diffuse and global radiation (Clear sky)

**GRAPH OF SHADOWS FOR THE POINT**

The graph of shadows is useful in facade designs as well as in energetic reports.

Height over ground level: 0.0 meters | Current point: Lat: -2.4380004 | Lon: 36.8272816 | Data step: 5 degrees

Recompute | Print

**RECORD OF POINTS**

Jan Feb Mar Apr May Jun Jul Ago Sep Oct Nov Dec

- 1- If you are logged and have projects in the OpenPlatform, the list of projects.  
If you have purchased maps, the list of your purchased maps
- 2- The title and description of the project loaded
- 3- Buttons panel
- 4- Results of filters applied
- 5- Sun exposure data
- 6- The map
- 7- Bar graph with monthly sun exposure percentages
- 8- Form to record points
- 9- Output tab for environmental and consumption data
- 10- Output tab for results of radiation on areas
- 11- Output tab for results of radiation on points
- 12- Output tab for shadows chart
- 13- Record of points
- 14- Access to:
  - Atlas of radiation. Configuration
  - File horizon. Configuration
  - Extract of contributions of users to the map

Some features may not be available depending on the type of map

## 2. Loading and navigating the map

To load a map, follow one of the next options:

- Push the "explore maps" button and navigate through the world map. Click on the mark of the map you want to load



- If you have published maps using the OpenPlatform, a menu with your maps will be displayed at the top of the page. You can load your projects from there

### My Projects (Click to show/hide)

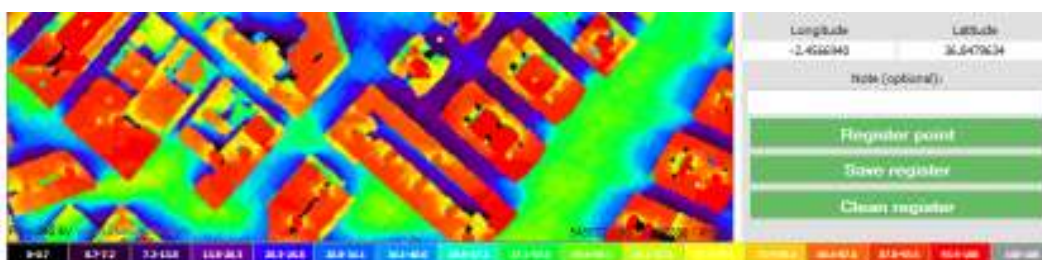
Title	Description	
Example Project	This is an example project for the openplatform manual	<a href="#">Load</a>
Madrid	Núcleo urbano de Madrid. Mapa realizado por huellasolar	<a href="#">Load</a>
Almería	Núcleo urbano de Almería. Mapa realizado por huellasolar	<a href="#">Load</a>

- Likewise if you have purchased some pay-maps, a menu with your purchased projects will be displayed at the top of the page. You can load your projects from there

Once loaded you can navigate pan and zoom the map

### 3. Taking basic data

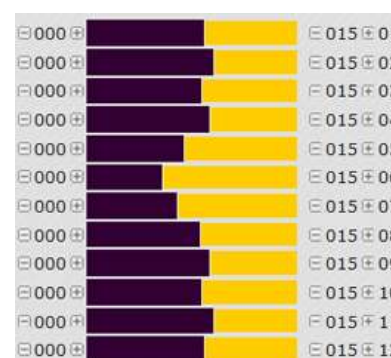
The map is displayed using a color scale representing the percentages of annual sun exposure:



To get data of sun exposure of any point in the map just click on the map. Data will be displayed inside the sun exposure table.

Sun exposure	Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dec
Daily sun hours	1	1	2	2	2	4	4	2	2	1	1	1
Daily shadow hours	8	9	9	10	11	10	10	11	10	10	9	8
Percentage of sun exposure	11.1	10.0	18.2	16.7	15.4	28.6	28.6	15.4	16.7	9.1	10.0	11.1
Annual percentage of sun exposure	16.7											
Annual average of hours of sun exposure	2											

The graph bar on the right of the map will be also actualized. This graph shows the percentage relation between sun exposure and shadows in the point for each month



### 4. Recording points

Use the form to record the sun exposure data of points and save them into a file. The record is displayed in the bottom of the page.

Longitude
Latitude

-2.4566863
36.8479698

Note (optional):

Add a note

Register point

Save register

Clean register

Add a note to identify the point  
Push the register button. Data will be added to the table at the bottom of the page

Push save to download the data in a text file  
Push clean to erase the register

RECORD OF POINTS											
Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dec
Note 1											
Longitude: -2.4553553			Latitude: 36.8419478			sun hours average: 3			Sun annual perc.: 27.5		
0	0	1	1	9	10	9	7	1	0	0	0
9	10	10	11	4	4	5	6	11	11	10	9
0.0	0.0	9.1	8.3	69.2	71.4	64.3	53.8	8.3	0.0	0.0	0.0
Note 2											
Longitude: -2.4543031			Latitude: 36.8420574			sun hours average: 6			Sun annual perc.: 51.4		
3	2	3	7	10	10	10	12	5	3	3	3
6	8	8	5	3	4	4	1	7	8	7	6
33.3	20.0	27.3	58.3	76.9	71.4	71.4	92.3	41.7	27.3	30.0	33.3

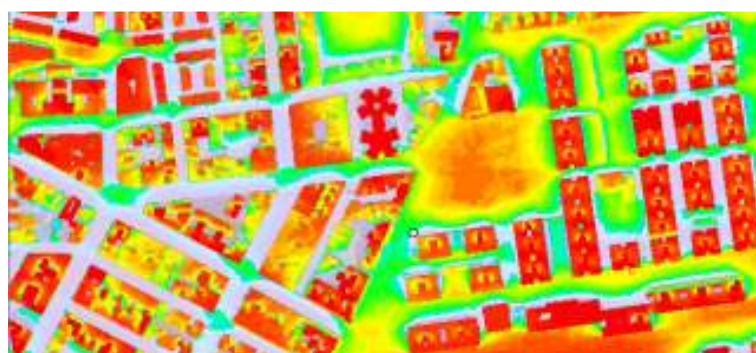
## 5. Applying filter of annual averages of sun exposure

This feature allows detect areas with annual averages of sun exposure below the value selected by user.

First select the value of hours of sun exposure from the selectable field and switch on the button:



Then click on the tile of the map you want to analyze. When calculations are over you will see overprinted in a white color those areas where the annual average of hours of sun exposure is below the selected value.



Additionally, under the button panel, information about percentages and total surfaces of the model matching with the filter will be displayed.

A total area of 22.6% (216960.0m<sup>2</sup>) match filter 1  
4.8% (46080.0m<sup>2</sup>) is matching with builded area (or other mask applied)

Software makes distinction between the total area captured and areas inside the mask files defined when the map is generated. This mask files usually are used to define built areas. In that case you will have both the global area and the built areas matching with the filter. If the owner of the map didn't set up mask files no distinction is made.



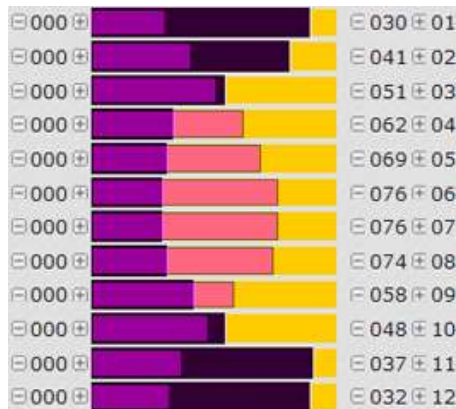
## 6. Applying filter of monthly percentages of sun exposure



Use this filter to detect areas according to the monthly percentages of sun exposure.

Switch on the button

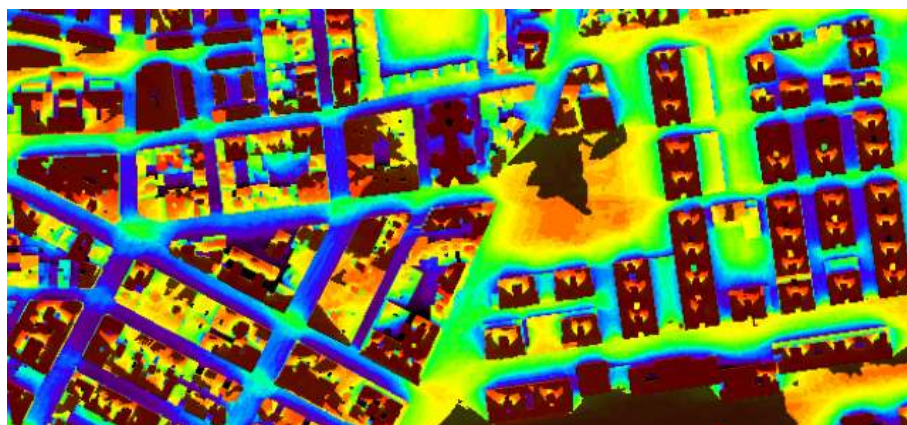


Magenta bars will appear over the graph of monthly sun percentages. Filter will detect areas where the percentage of shadows is inside the region defined by the magenta bars.



- To modify the range of the bars drag the mouse over the graph while press the shift key.
- You can also set the percentages with the buttons  

Once you are selected the range of values for each month, click on the tile of the map you want to analyze. When calculations are over you will see overprinted in a dark color those areas where the monthly percentages of shadows are inside the ranges defined.






Likewise the previous title information about percentages and total surfaces of the model matching with the filter will be displayed.

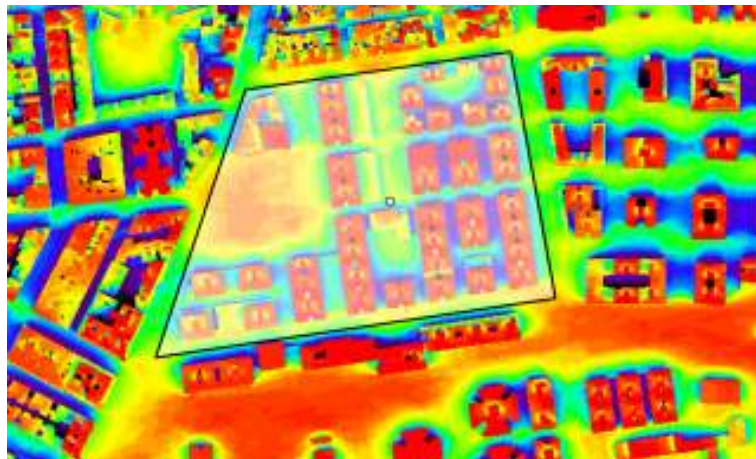
A total area of 22.77% (218592.0m<sup>2</sup>) match filter 2  
 Un 16.61% (159456.0m<sup>2</sup>) is matching with builded area (or other mask applied)


## 7. Analyzing areas of the model

Filters can be used to study areas delimited by user.  
This way you can analyze specific areas like neighborhood

Follow these steps

- Erase any previous filter applied turning off the buttons  and 
- Draw the perimeter of the area you want to check. Switch on the button  and start to draw. Double click to close the polygon.



- Once selected the area, switch off the button  to end the draw mode
- Now you can apply filters as is explained in the sections above. The App will display information about surfaces matching with the filters inside the selected area.

Example:

In this image areas with an annual average of sun exposure below 10 hours/day and areas with less than a monthly percentage of 80% of hours of sun are highlighted using filters.

Selected area: 57409.286 m <sup>2</sup>	
Inside the selected area a total of 72.3% (41534.4m <sup>2</sup> ) match filter 1 14.7% (8428.8m <sup>2</sup> ) is matching with builded area (or other mask applied)	Inside the selected area a total of 22.3% (12825.6m <sup>2</sup> ) match filter 2 Un 20.5% (11788.8m <sup>2</sup> ) is matching with builded area (or other mask applied)

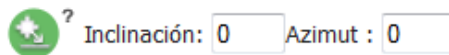


## 8. Getting data of radiation in points

Huellasolar viewer estimates radiation on any point in the map.  
Direct, diffuse and global radiation in clear sky conditions is always displayed. Real sky conditions are offered in those maps where the owner of the data has correctly set up the real sky variables.

To estimate radiation data the app take into account the shape of the model, heights and projected shadows between buildings.

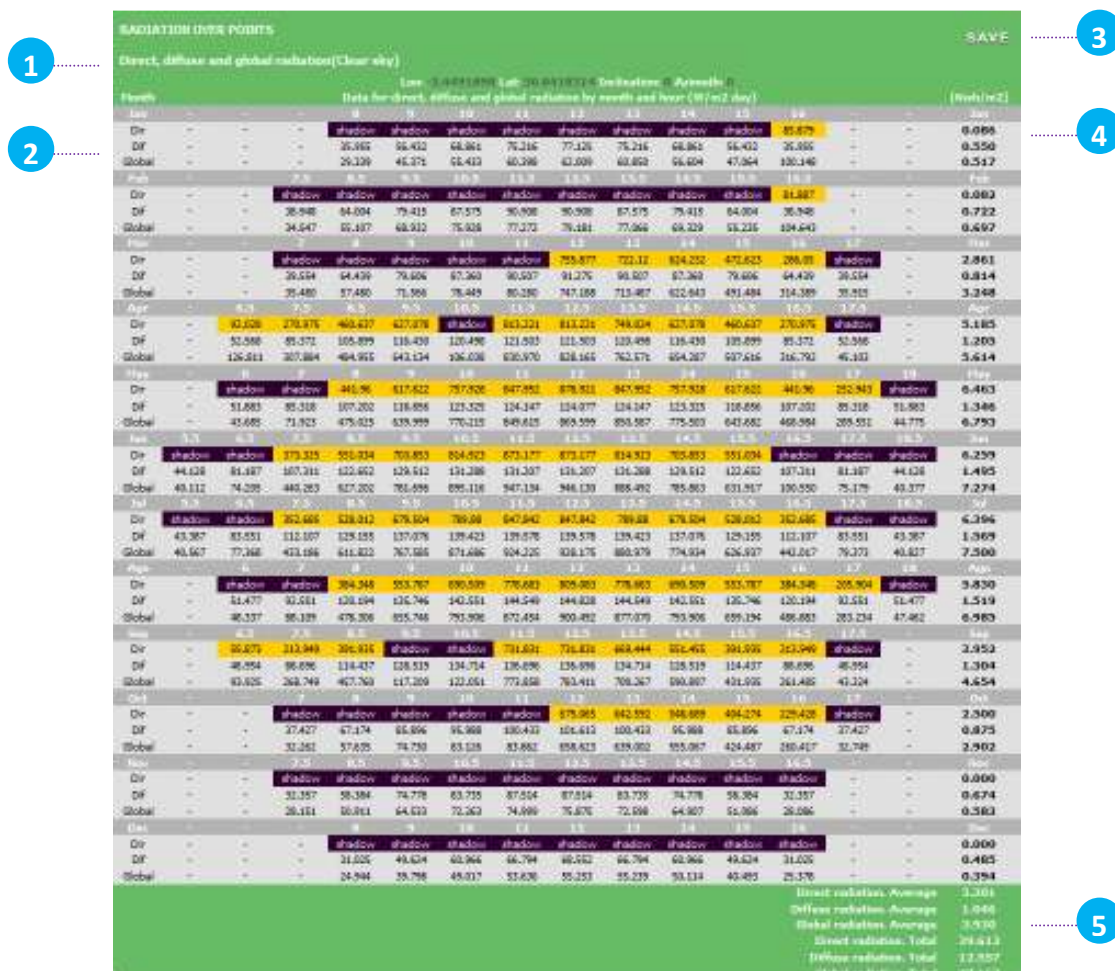
Switch on the button



If you want to get data on a slant surface type the angle of inclination from 0° to 90° and the azimuth from -90° West to 90° East. 0° means south.


Click on the point of the map you want to get data.

Results will be displayed in a chart like the image below.



Content of the table:

1. Longitude, latitude, inclination and azimuth
2. Monthly data of radiation arranged by hours. (Sun time)

If cell is displayed like this:  It means that the point is shady as results of an obstacle.



If the value is null **0** It means that as result of inclination and azimuth given, the point is not getting direct radiation.

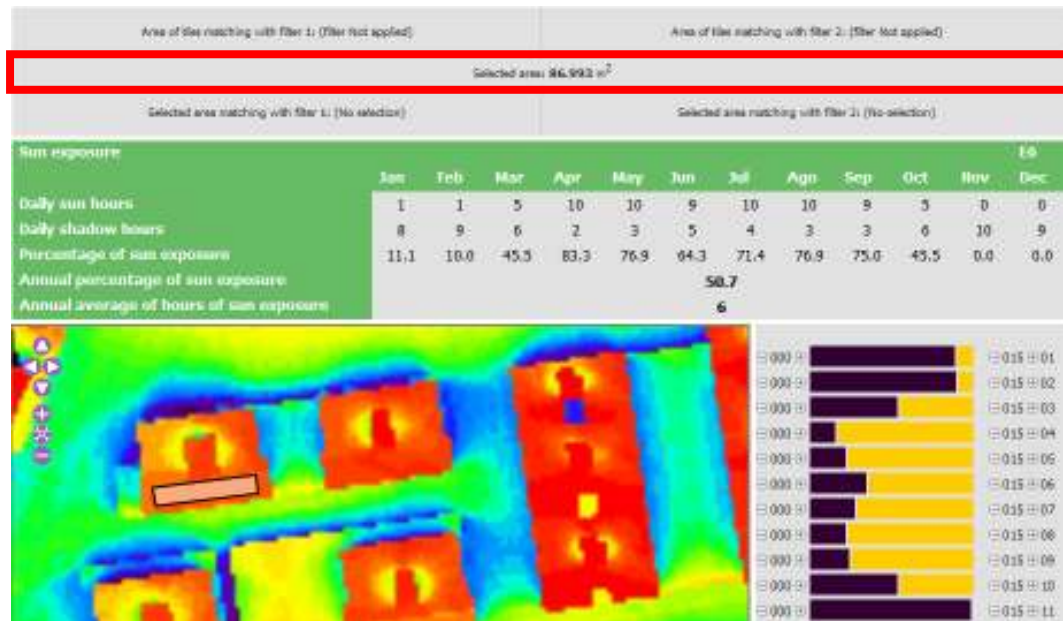
3. Push the 'Save' button to download the data
4. Monthly total results. Kwh/m<sup>2</sup>
5. Annual total result. Kwh/m<sup>2</sup>


## 9. Getting data of radiation of areas

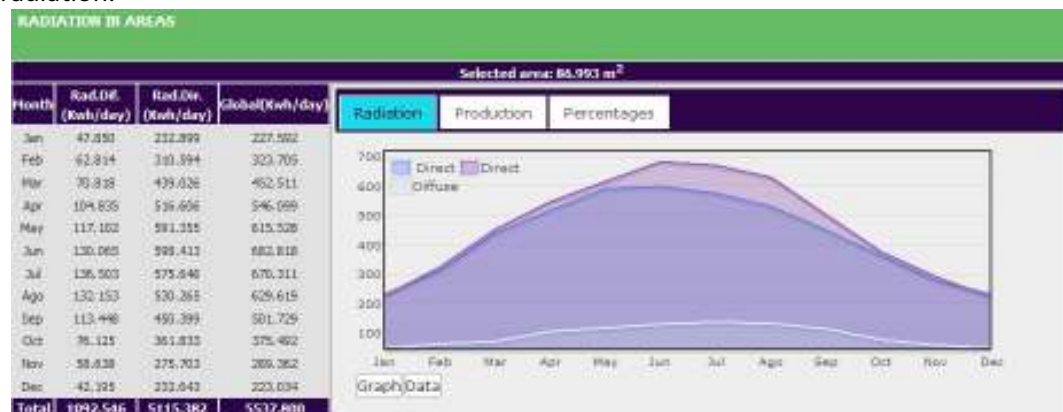
You can estimate radiation data for drawing areas.  
To start drawing switch on the button:



Click on the map to add a edge.  
Double click to close the polygon.  
Information with the measure of the drawn area will be displayed under the button panel.

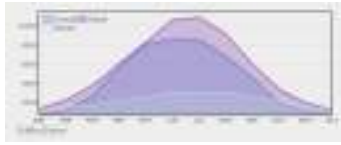


Push  to start computing.  
Results will be displayed under the map inside a graph and a table containing data of direct, diffuse and global radiation.

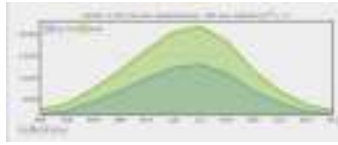


You can switch between three charts.

Direct, diffuse and global radiation



Power production and Co2 savings



Percentages of monthly radiation



## 10. Production and environmental data. Power production, Co2 savings, trees planted, homes supplied

App will automatically output environmental and consumption data when an area is computed.

DATA OF ENVIRONMENT AND CONSUMPTION

Performance: 0.702
Peak power panel(w): 230
L panel(m): 1.7
H panel(m): 1
€/Kwh: 0.149
Integ archit.: ☐

Estimate of the annual production of electric power:

It would become in a monetary savings of:

Savings of Co2 emissions:

This is equivalent to plant:

It could supplied around:

**11409.52 Kwh/year**

**1700.02euro/year**

**6.85 T/year**

**42 trees**

**3.5 homes**

Data offered for guidance only. (How it works)


Join the map I  my Energy!

Upload to map

If the option 'architectural integration' is checked, the App will consider PV panels aligned with the slope given in the inclination field. In this case panels cover the entire surface. (A percentage for joints is saved)

Otherwise App will consider panels over a horizontal surface set with the given inclination. In this case, the App will automatically estimate the interval between rows of panels and the number of panels fitting in the area.

In this process the 'H' dimension given is taken as the side raising from the floor and the 'L' value as the size horizontal to the floor.

You can modify fields and push  to calculate again.

Notice that these values make reference to the last area checked with the function in the point 9 of this manual, therefore if you draw another area but don't estimate radiation on it, environmental data are still anchored to the previous area even if you recompute them.

## 11. Sharing data and contacting with companies

When radiation over any area is calculated, the app will give us the option to share the results in the map

**DATA OF ENVIRONMENT AND CONSUMPTION**

Performance: 0.702 Peak power panel(w): 230 L panel(m): 1.7 H panel(m): 1 €/Kwh: 0.149 Integ archit.: ☐

Estimate of the annual production of electric power: **11409.52 Kwh/year**

It would become in a monetary savings of: **1700.02euro/year**

Savings of Co2 emissions: **6.85 T/year**

This is equivalent to plant: **42 trees**

It could supplied around: **3.5 homes**

Data offered for guidance only. (How it works)

**Join the map I  my Energy!**

**Upload to map**

To share data push the button 'Upload to map'. A dialog with data to save will be displayed. Additionally we have the possibility to select that related companies may contact us and make an assessment or provide a budget.

**Upload data to the map**

**I  my Energy!**

Production:	11409.52	Kwh/year
Monetary saving:	1700.02	€/year
Savings of Co2 emissions:	6.85	T/year
Trees planted:	42	trees
Homes supplied:	3.5	homes

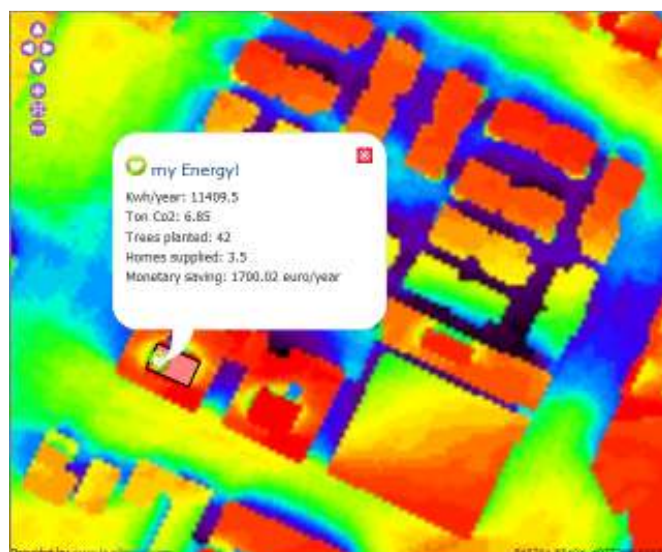
Do you allow companies to contact you to make offers for this installation


☐ Yes ☒ No


[Privacy](#)

**Upload to map** **Cancel**

Once the data are loaded into the map a mark will appear. Click on it to retrieve the data.



You can show/hide the marks clicking on the button 

Open a briefing of all the contributions in the map clicking on the button  in the right lower corner of the screen.




## 12. Radiation over facades or vertical planes

App is able to work both in horizontal and vertical planes. You can generate maps of radiation on vertical planes, which is useful to study facades or any other vertical plane in the city.

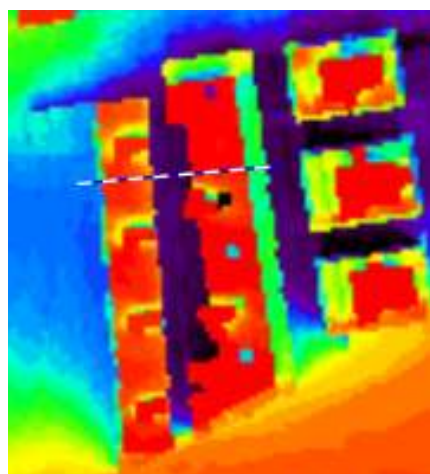
Generated charts are interactive and you can use explained on them some of functions explained in this guide:

- Sun exposure data on points. (Section 4)
- Radiation data on points.(Section 8)
- Radiation data for areas. ( Section 9)
- Environmental data.(Section 10)

To work on vertical planes follow the next steps:


- a. First you must draw the line defining the projection of the vertical plane. For example, if you want to study a facade draw a line in front of it.
  - o Switch on the button:
 

This will start the drawing mode
  - o Draw a line on the map corresponding to the projection of the vertical plane.





- b. Once the line is finished a message requiring additional information will be displayed

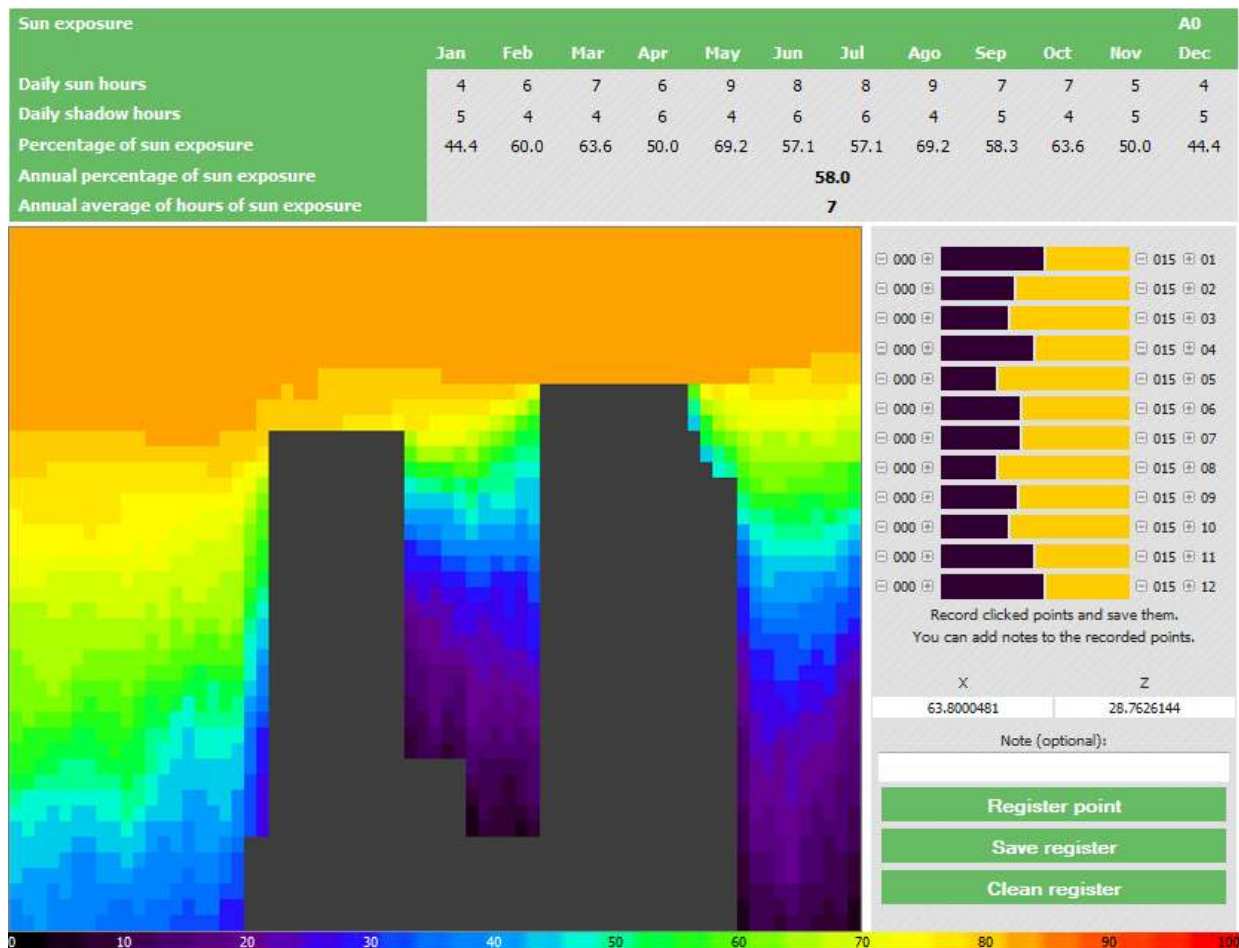


- Select which face of the plane want you to calculate
- Type a mail where you want to be notified once calculations are finished.
- To start processing push the button 'Ok'

App will process the model around the defined plane computing projected shadows along the year and will build the sun exposure map and associate data.

Once the form is sent you can continue navigation or close the explorer if you wish.

- c. After few minutes check your mail. You will have received a mail containing a link to access the results.



Now you have the radiation chart for the vertical plane and can get radiation and sun exposure data using the features explained in this manual.

Note:

- This feature is available for lengths up to 70m and heights up to 35m.

### 13. Horizon files

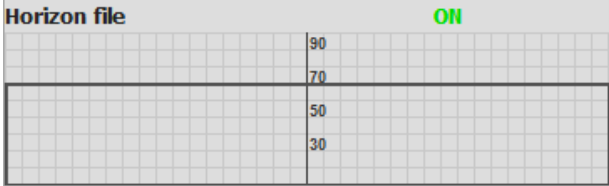
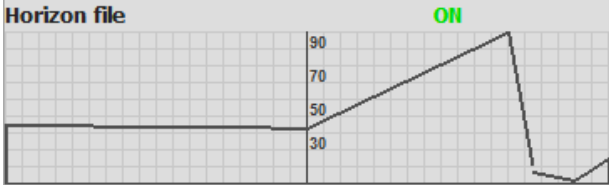
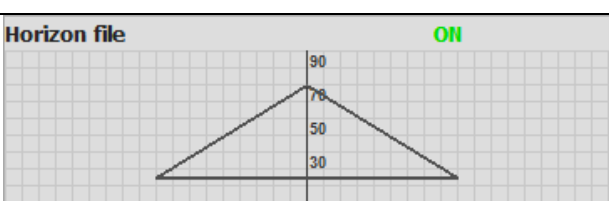
You can use horizon files that the app will take into account when shadows are computing.

This way you can introduce additional obstacles like antennas, or any other element.

You can generate an horizon file with a text editor. Every line must contain a pair of coordinates (azimuth, height) in grades.

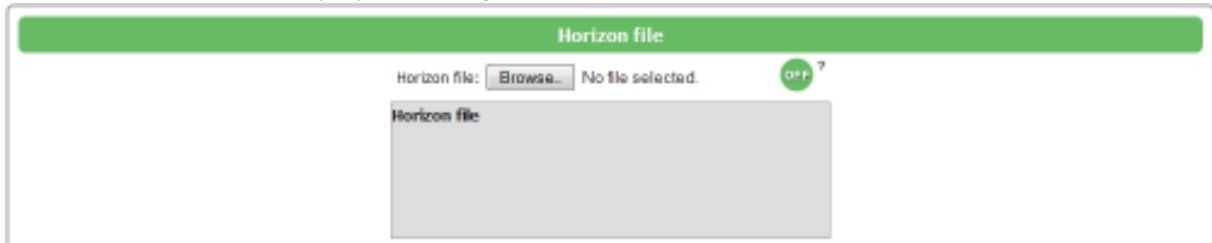
Points must draw a closed polygon, otherwise the app will automatically join first and last points.

Examples:

File	Image
-180,0 -180.0000,60 180.0000,60.0000 180,0	
-180,0 -180,34.7 0,33.0 120,90 135,7.47 160,2.4 180,15.24 180,0	
-90,15 0,70 90,15	

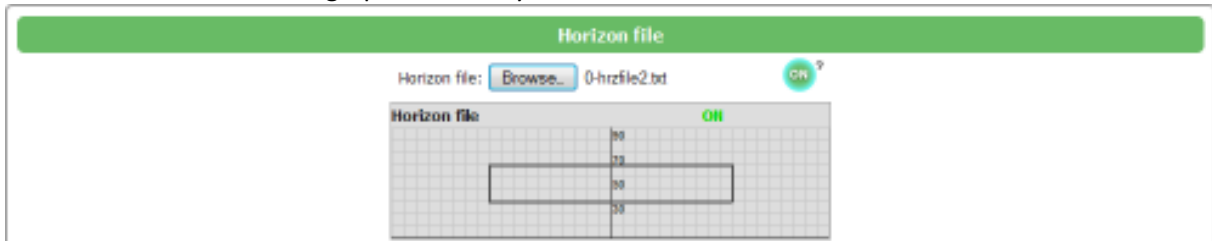
To use horizon files follow these steps.

Push the button  to display the configuration tab:



Use the form to select your file. Must be a txt file formatted as above.

Once the file is selected the graph defined by the txt will be shown.




When is active, the horizon file is take into account to estimate shadows.

Nevertheless, horizon files don't deactivate the rest of checking made according to the geometry of the model.

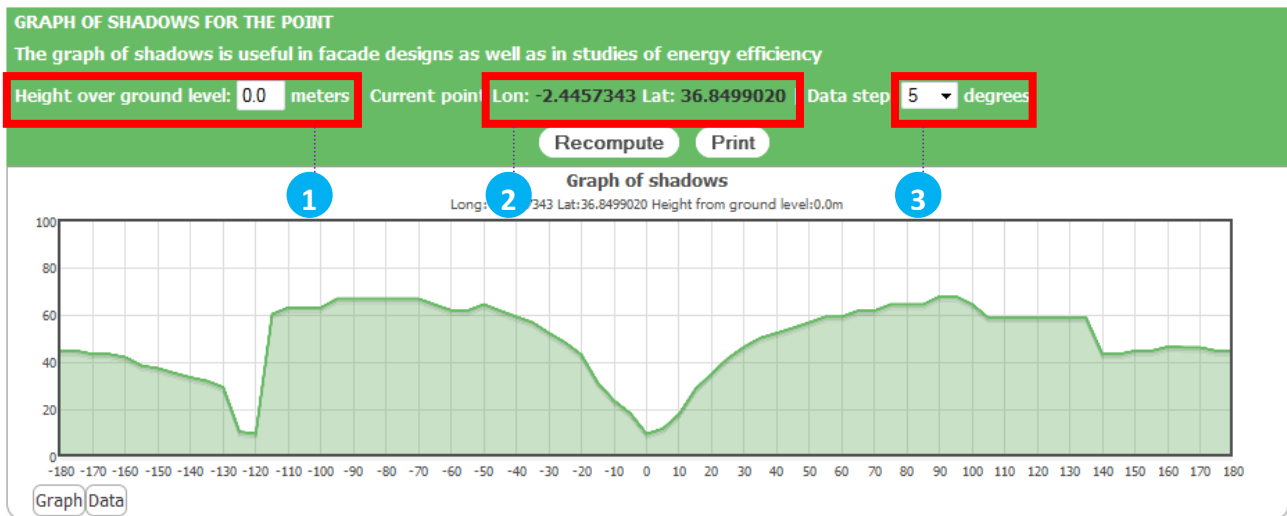
## 14. Chart of shadows

This chart represents the projected shadows on the selected point. It displays, in abscissas the horizontal angle around the point and in ordinates the solar angle, therefore the line of the chart represents the vertical angle where the point change from a situation of shadows to a situation of sun exposure. It is useful, for example for studies of facades.

Switch on the button  and click on the point to represent.

For example, if you want to get the shadows chart for a facade, click just in front of it. Notice that if the point is too close to the building, the system can take the point in the roof point.

After few seconds the chart will be shown as in the image:



To obtain the graph, the app scans all the obstacles around the point in an extension of 2Km from the point.

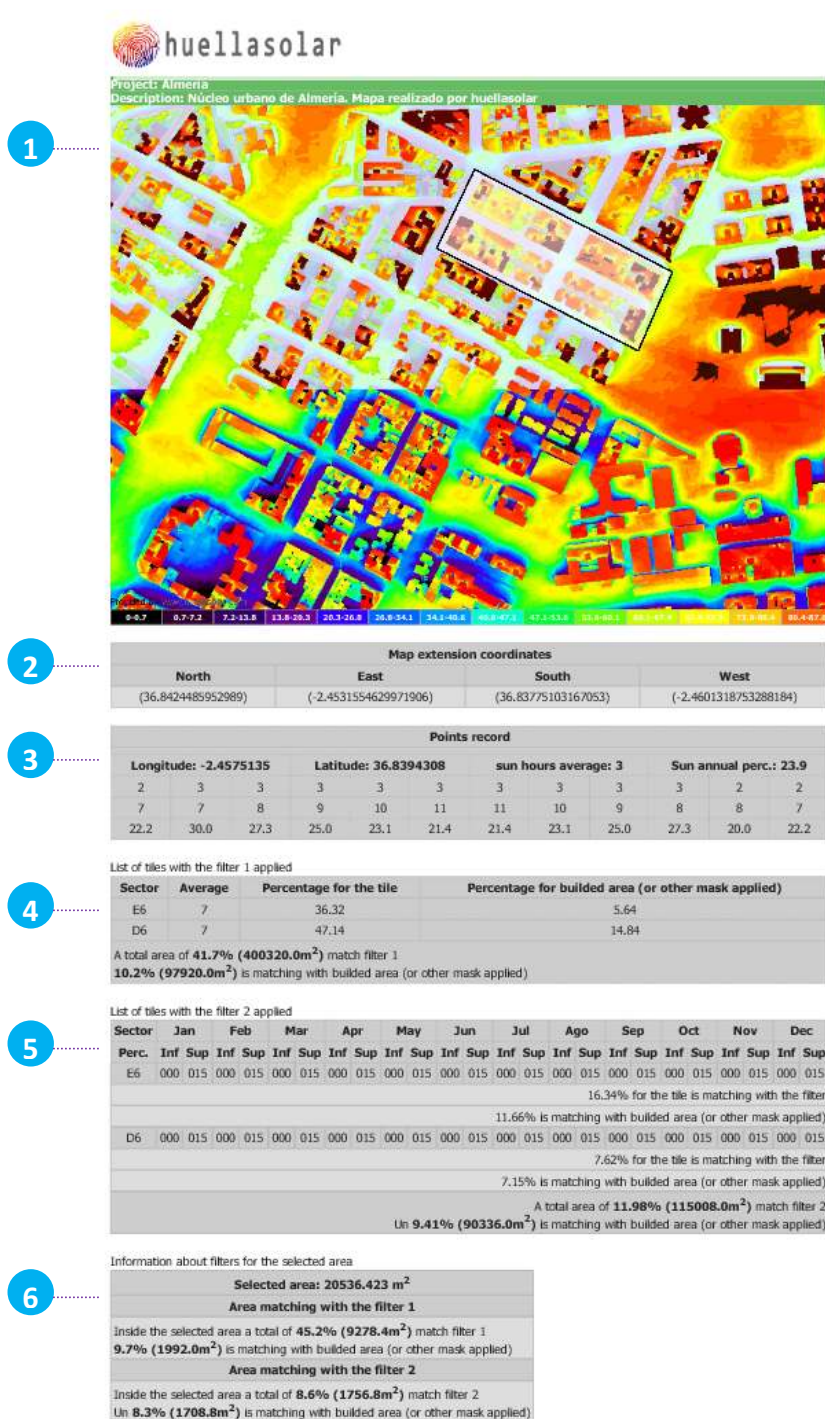
1. Change the elevation over the ground level and push the recompute button. This way you can get the chart in different elevations in the same point
2. Select print to get a report.
3. Graduate the data step

## 15. Printing

The print button opens a formatted page with a report including the map, results of filters applied and some additional data



## Content of the report:



1. The map
2. Coordinates of the extension of the map
3. Record of points
4. List of tiles and results of the filter of sun exposure averages.
5. Idem for the filter of monthly sun exposure
6. If there is area selected, the results of filters inside the area



## PLUGIN ATLAS OF RADIATION

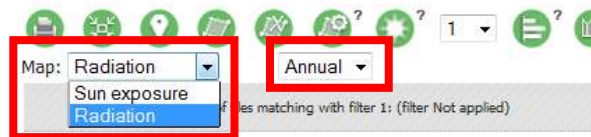
The atlas of radiation offers a full range of information and graphical outputs for the study of the global capabilities of the model.

It also includes maps of radiation for every month.

### 1. Monthly radiation maps


Switch between sun exposure and radiation maps.

Select the month to display its radiation map.



Radiation maps of the atlas represent in Kwh/m2 the radiation for the selected month.



1. Click on any point and a tag with radiation value for the point will be displayed.
2. Push  to close the tag
3. Color scale used in the map

## 2. Setting up the atlas

The plug-in Atlas of radiation offers configurable graphical outputs

To open the options dialog push the button  in the right lower corner in the screen.

The following dialog will be displayed:

**Radiation Atlas. Setup of graphical outputs and additional data**

☐ Overprint areas with less than 15% of annual shadows<sup>(1)</sup>

By tiles<sup>(2)</sup> ☒    The whole city ☐

Graphs to display

Estimate only over areas with less than 15% of annual shadows

☒ Electric power and Co2 savings  
Performance: 0.792   Peak power panel(n): 230   panel area(m2): 1.7

☐    ☐    Only over areas 15%

☐ Global radiation, Monthly averages (Kwh/m<sup>2</sup>day)

The whole city ☐

☐ Global radiation, Monthly percentages

The whole city ☐

☐ Global radiation, Distribution by sector

The whole city ☐

<sup>(1)</sup> Only available when is being displayed a radiation map. Switch between radiation map and sun exposure map in the selectable field above the map

<sup>(2)</sup> The data for each tile will be displayed making click over it.

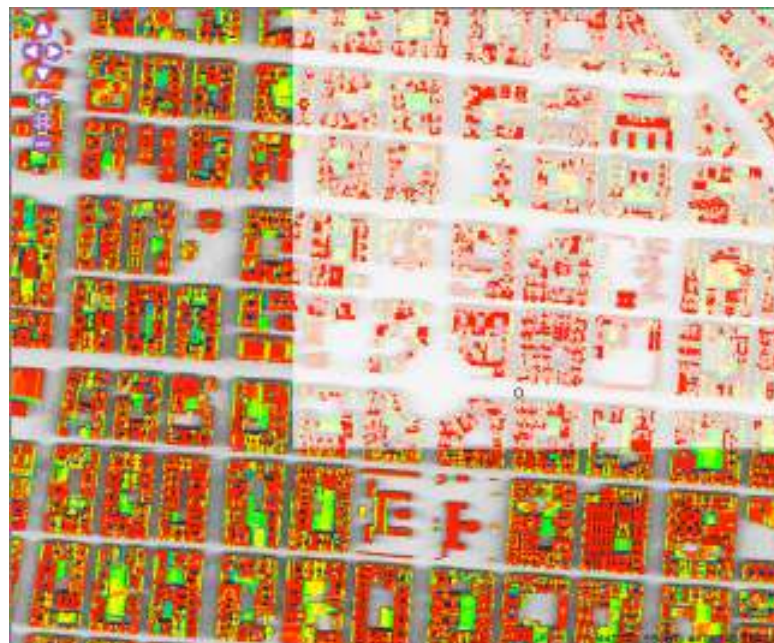
Available options:

### 2.1. Overprinting areas with less than 15% of annual shadows

This option allows overprint areas with an annual percentage of shadows below 15%.

You can select to show the whole model or by tiles, in this case click over the tile to overprint data.

Example: Radiation map for the month of July. A tile is overprinted with areas with annual shadows under 15%.



## 2.2. Chart of Power production and co2 estimations

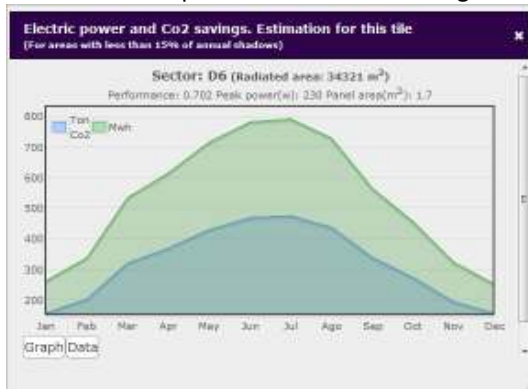
Check this option to display a chart with information about the photovoltaic production and Co2 savings in the model.

This function estimates over areas with less than 15% of annual shadows.

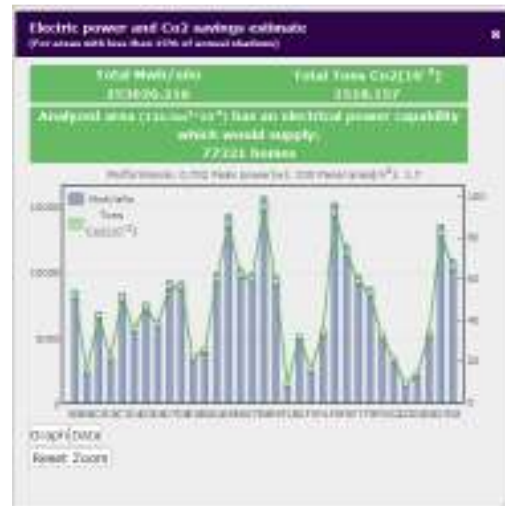
Notes:

- Chart can be zoomed and dragged
- You can switch between chart and table of data
- You can download data in a CSV file.

Power production and Co2 savings



Idem for the whole model

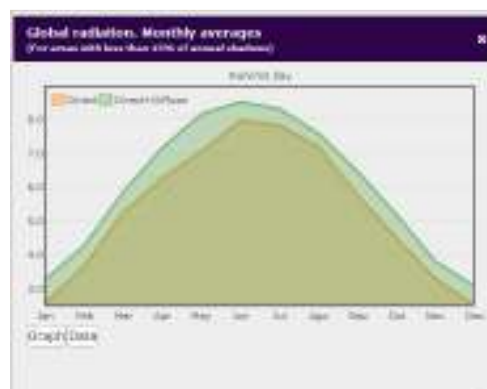


## 2.3. Chart of average values of global radiation (Kwh/m2día)

This chart gives a general vision of the average radiation for the whole model.

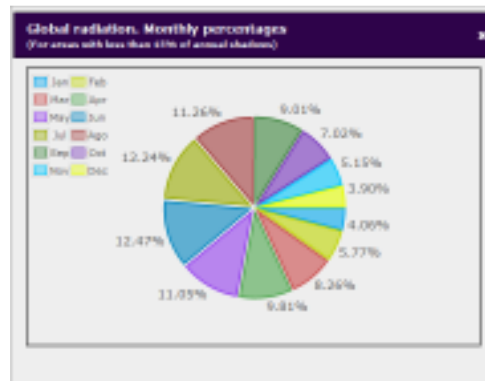
There is two series of data, global radiation and direct + diffuse radiation.

You can choose to show data for all the building area or only for areas with less than 15% of annual shadows



## 2.4. Chart of monthly percentages of global radiation

Check this option to show a chart with a monthly distribution of values of percentages of global radiation.



## 2.5. Chart of monthly values of global radiation

This chart offers total values of global radiation for each tile in the model and the radiated surface. You can choose to show data for all the building area or only for areas with less than 15% of annual shadows

