

WEEKLY SUBMISSION - TASK 07

- 01.** Provide a summary of the main concepts that went through about solar radiation (formulas are not needed)
- 02.** Create a pdf file with screenshots of all of the steps we went through in the second lesson on OpenStudio and explain briefly the reason behind the use of each step (in your own words!)

ANSWERS:

01.

Solar Radiation:

Is the flux of electromagnetic energy emitted by the sun

Solar Radiation Density:

Is the amount of energy emitted by the sun (Solar Irradiance) that is received on a surface. Also called solar constant, G_{sc} , it's equal to 1367 W/m^2

Solar Radiation Characteristics:

Of all the radiation emitted by the sun, only a portion crosses the earth's atmosphere. This portion can be attenuated due to dispersion and absorption in the spectral distribution and total irradiance.

- Dispersion : Phenomenon that causes part of the energy emitted by the sun to be dissipated in other directions.
- Absorption: Phenomenon that causes part of the energy emitted by the sun to be absorbed by some atmospheric components, thus modifying the energetic spectrum.

Diffuse Radiation (G_d):

It is all the energy emitted by the sun that reaches one surface indirectly, as it finds molecules or barriers in the path of its flow that deflect it in all other directions.

Example: The appearance of light without the presence of the sun

Direct Radiation or Beam Radiation (G_h):

It is the energy emitted by the sun that directly hits, in a single direction, a surface.

Example: Sunbeams on a cloudless day in a barrier free environment.

Back Reflection (Albedo):

Part of the radiation emitted by the sun that is reflected in the Earth's surface back to the space.

Air Mass:

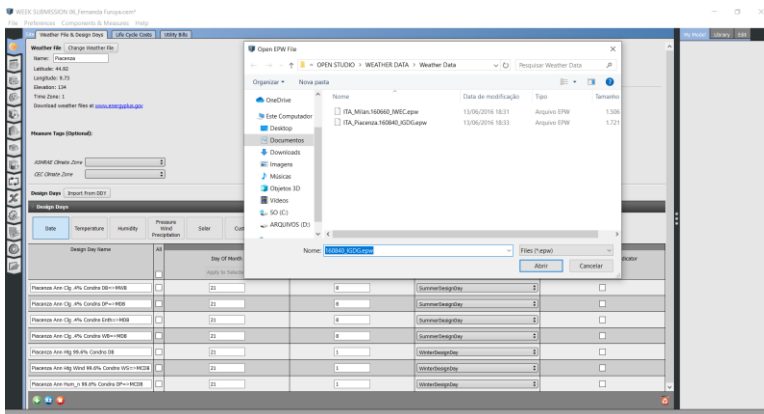
Thickness of the atmosphere that the sun's rays need to cross to reach a certain point. The shortest distance is when the sun is perpendicular to the atmosphere, as with the inclination of the sun and hence angle variation, the thickness of the layer will vary.

Solar Energy: Availability

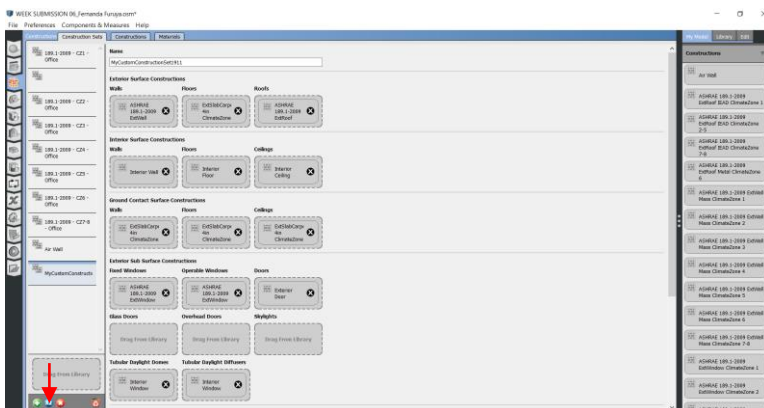
The solar radiation depends on:

- The location (altitude of the site over the sea level, the orientation of the element studied – to the north or to the south, for example – etc)
- Sunshine hours (also related to the location, it's the factor that defines the amount of hours the element will receive this solar energy)
- The sun position in the sky (related to the seasons, is the angle at which the solar radiation will strike an element).
- Weather (Conditions that may vary on different scales, from microclimate to continental scale).

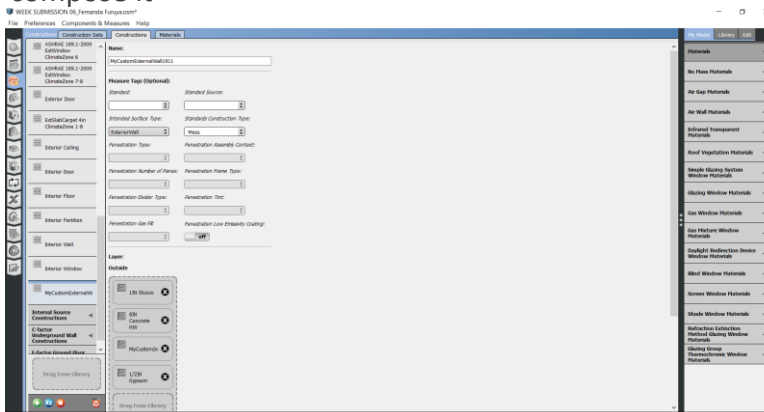
02. Step 01: Open the OpenStudio and set Piacenza weather to have precise informations about the location



Step 02: In Constructions Sets: Duplicate the construction set to customize your project with its own characteristics

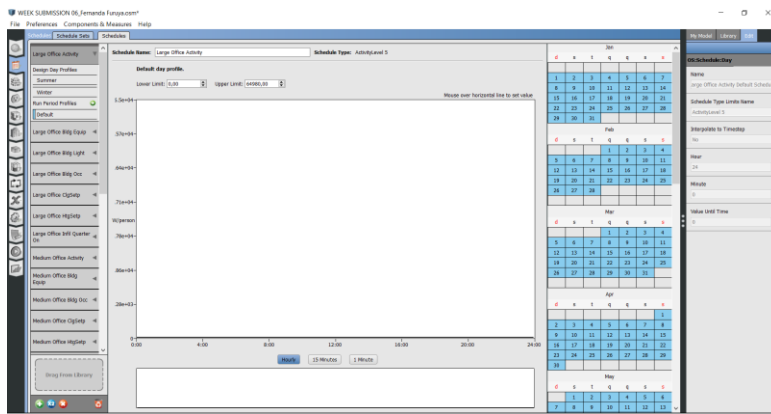


Step 03: In Constructions: Duplicate the construction element to customize with the layers that compose it

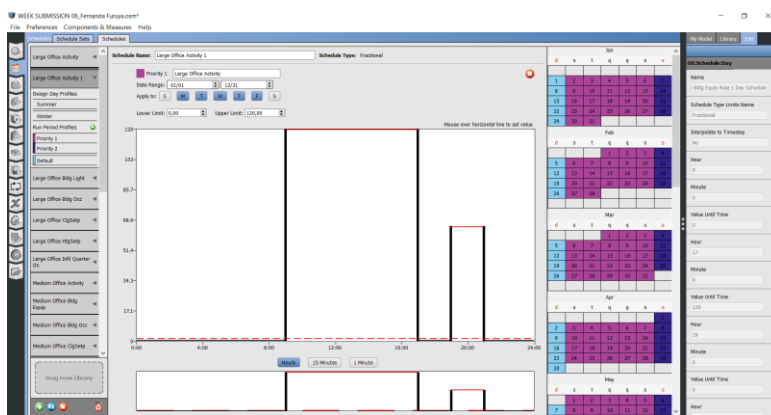


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Step 08: Create a custom schedule for different seasons.
Example: With less consume of energy - winterr activity



Step 09: Create a schedule for priorities.
Example: Week days



Step 10: Create a schedule for priorities.
Example: Weekends

