TASK 1

Provide a summary of the main concepts that went through about solar radiation (formulas are not needed).

ANSWER

The energy coming off the sun, called solar energy, reaches us in the form of electromagnetic waves after experiencing considerable interactions with the atmosphere. The radiation energy emitted or reflected by the constituents of the atmosphere forms the atmospheric radiation.

The solar energy reaching the earth's atmosphere is called the total solar irradiance Gs, whose value is $G_s = 1373$ W/m^2

The solar energy incident on a surface on earth is considered to consist of direct and diffuse parts. The part of solar radiation that reaches the earth's surface without being scattered or absorbed by the atmosphere is called *direct solar radiation*. The scattered radiation is assumed to reach the earth's surface uniformly from all directions and is called *diffuse solar radiation*.

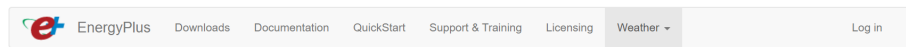The solar radiation accumulated on Earth depends on:

- The sun position on the sky (which depends on site's location / latitude and date / time used for calculation)
- The site altitude over the sea level
- The weather condition (affect the sky clearness)
- Sunshine hour (length of day)

To measure solar radiation we use pyranometer (without shade to measure direct + diffuse radiation; or with shade to measure diffuse radiation only; then we can calculate the direct part).

Solar radiation on horizontal surface does not included the reflection from the ground. Whereas on vertical surface, the ground reflection should be consider.

TASK 2

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!)

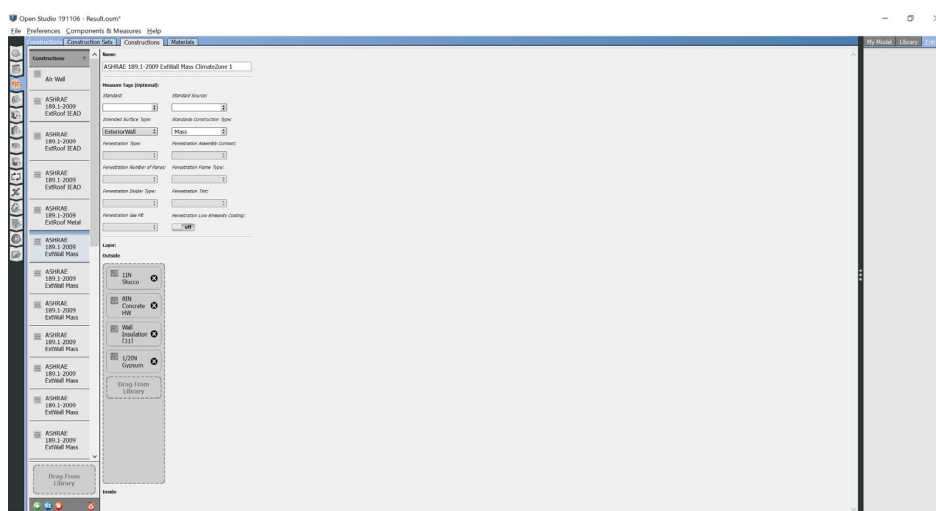Weather Data: Can be download from Energy Plus Website for most cities in the world
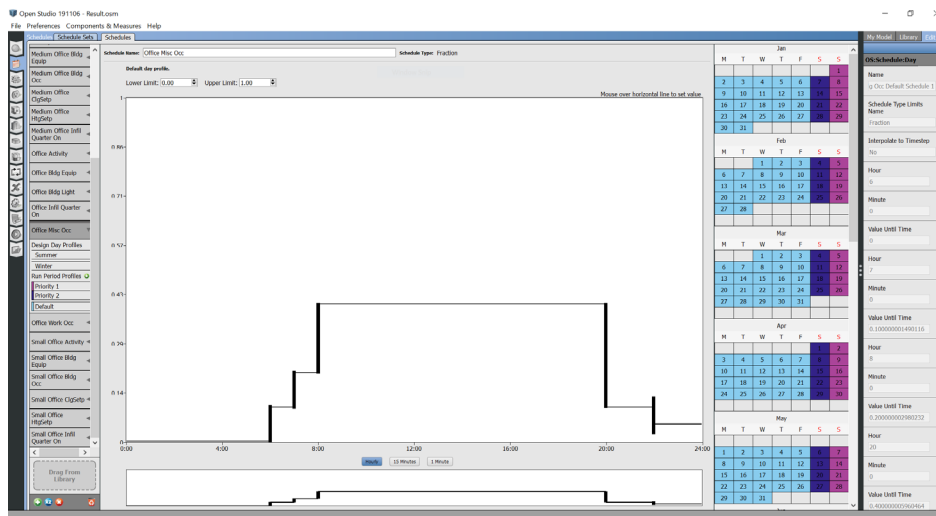
Use Schedule Tab to change level of energy use depends on days of the week and hours (factor from 0-1)

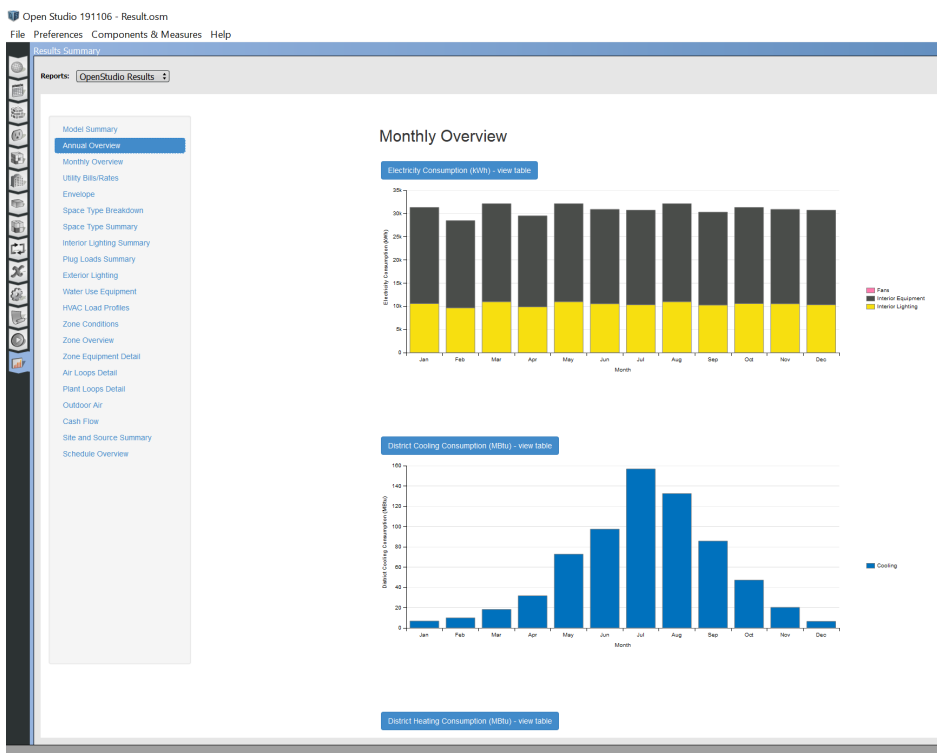Remember to click x2 to duplicate to new elements

Use Construction Tab to change structure, layer, material, thermal performances of material, etc… of a space

Remember to click x2 to duplicate to new elements
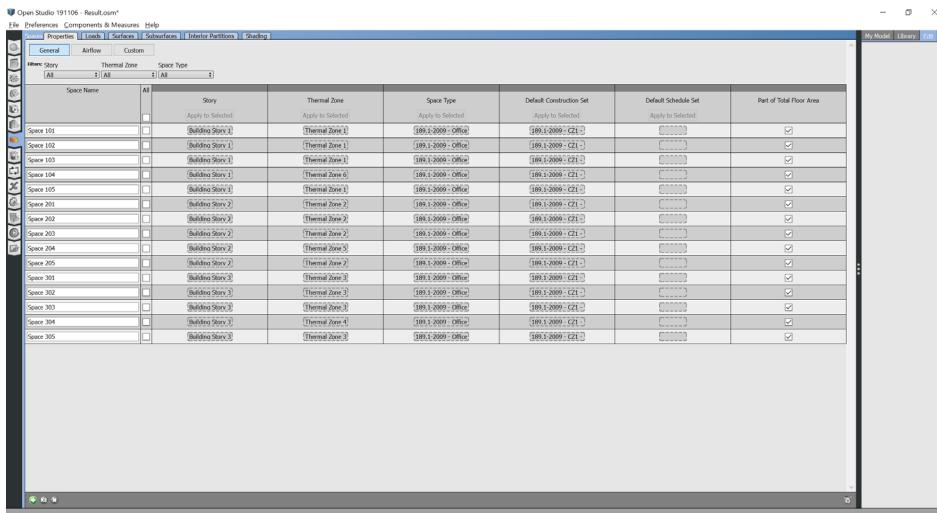
Use tab Space to apply the custom settings to model

We can click "Run" for calculation the building energy performance and compare the result each time we assign new variable.