Week 7 --- Kou Yu

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

Solar radiation spectrum

The distribution of radiant energy by wavelength in solar radiation is called the solar radiation spectrum. The upper-bound solar spectral energy distribution curve is very similar to the 6000K black-body spectral energy distribution curve calculated using the Planck black-body radiation formula. Therefore, solar radiation can be regarded as black body radiation.

Solar constant

Solar radiation reaches the surface of the earth through interstellar space. The distance between the sun and the earth is the average value, and the solar radiation energy obtained per square meter per second per square meter of the upper limit of the illuminated upper half of the earth's atmosphere is perpendicular to the solar rays.Its value is 1367 W/m2.

Attenuation of solar radiation in the atmosphere

Solar radiation reaches the surface of the earth after passing through the atmosphere. Because the atmosphere has certain absorption, scattering, and reflection of solar radiation, the radiation projected to the upper boundary of the atmosphere cannot completely reach the ground surface.Solar radiation reaches the surface of the earth after passing through the atmosphere. Because the atmosphere has certain absorption, scattering, and reflection of solar radiation, the radiation projected to the upper boundary of the atmosphere cannot completely reach the ground surface.

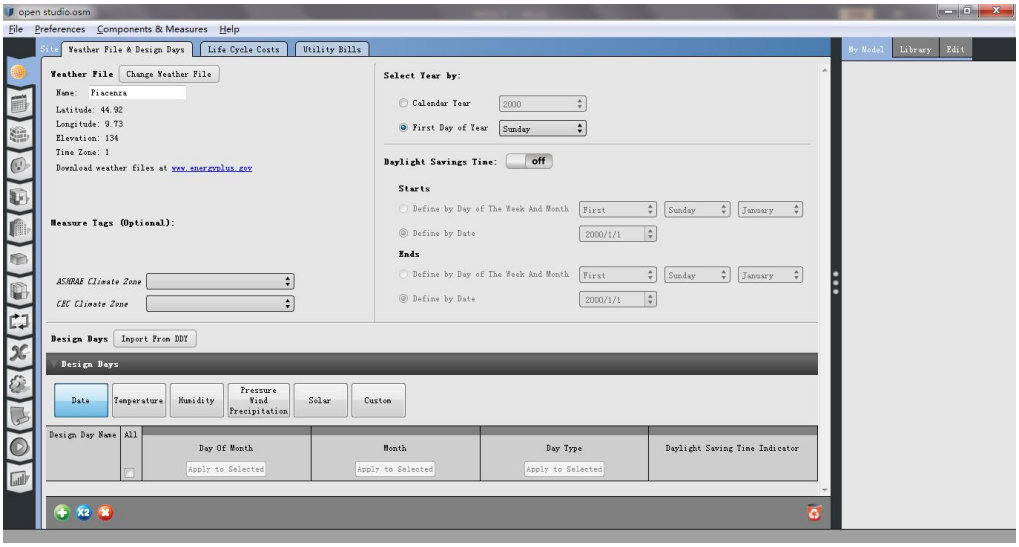
SOLAR ENERGY: AVAILABILITY

The solar radiation depends on:

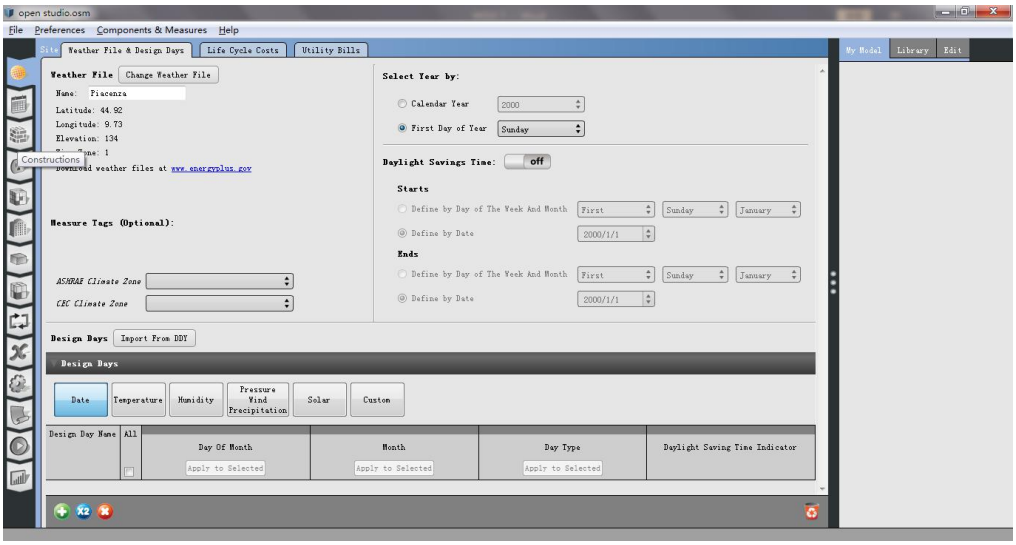
1. the sun position in the sky (altitude and azimuth angles), which changes daily
and seasonally
2. the weather condition
3. the site altitude over the sea level
4. sunshine hours

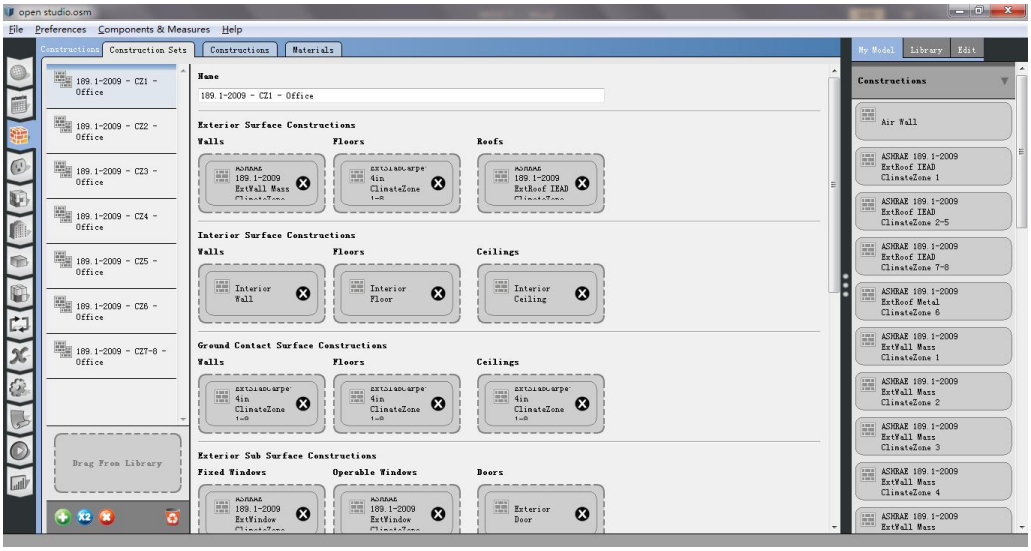
2. Create a pdf file with screenshots of all of the steps we went through in the second lesson on openStudio and explain briefly the reason behind the use of each step.

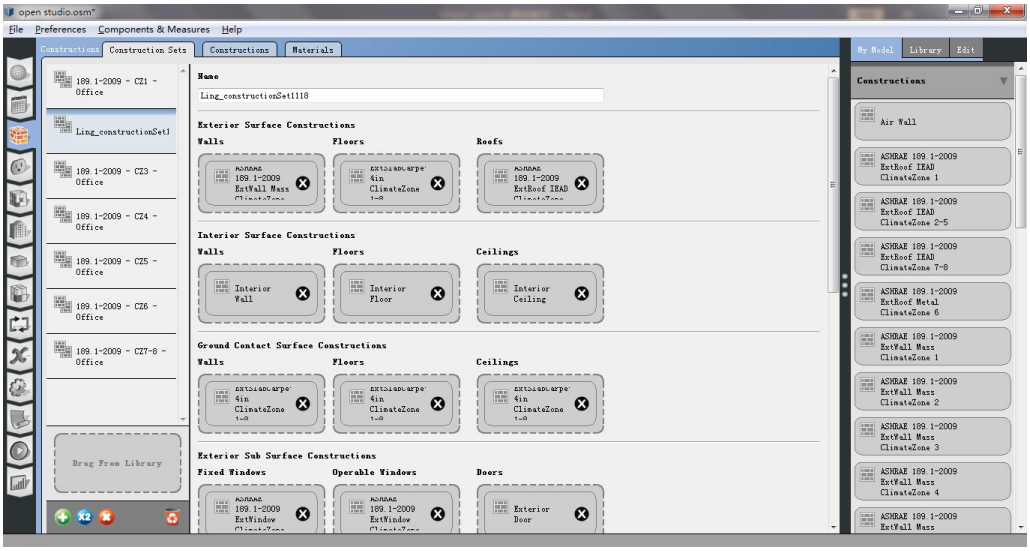
1. Click the “Weather File” to add the weather data of Piacenza in OpenOffice.



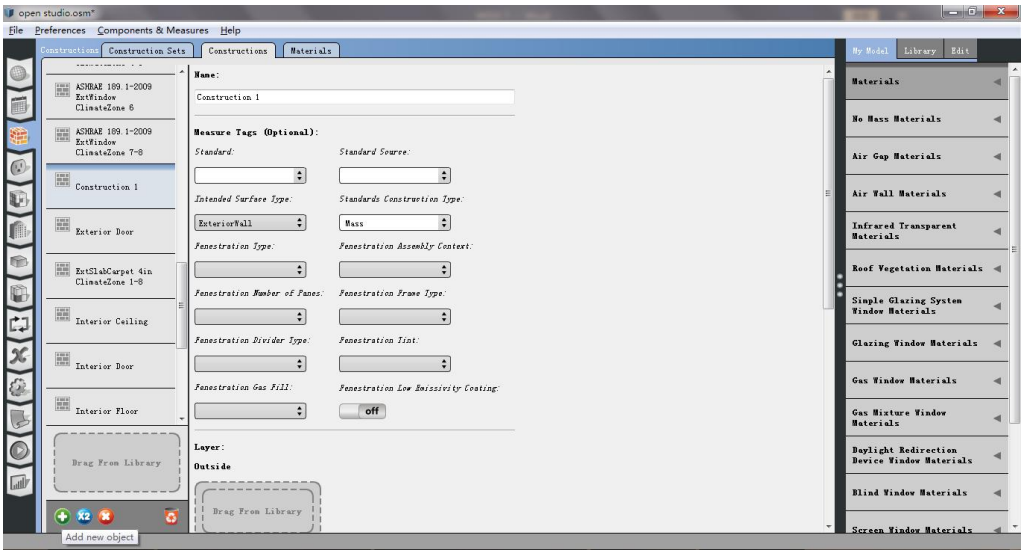
2. Click the “construction”, start customize the building, renaming it.

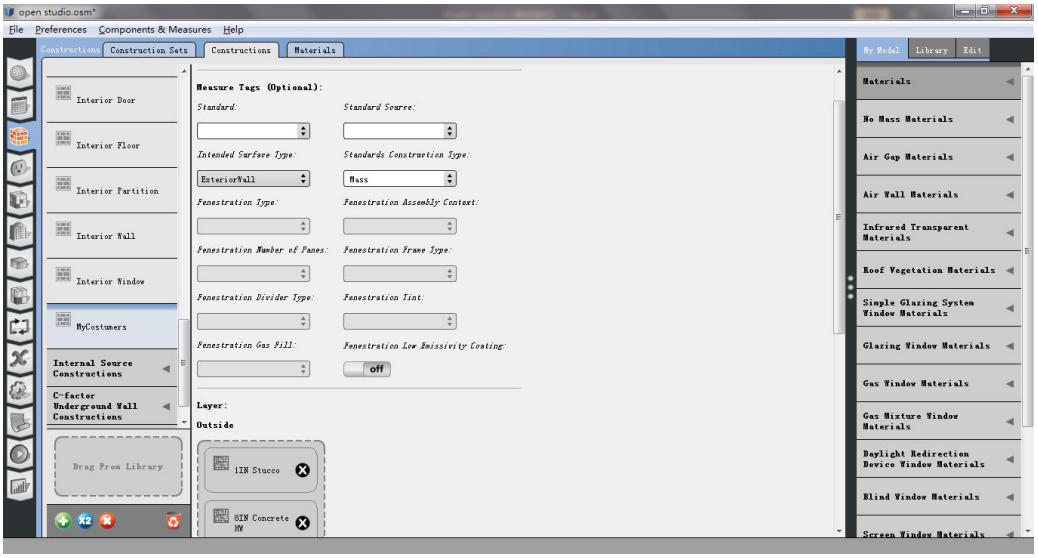




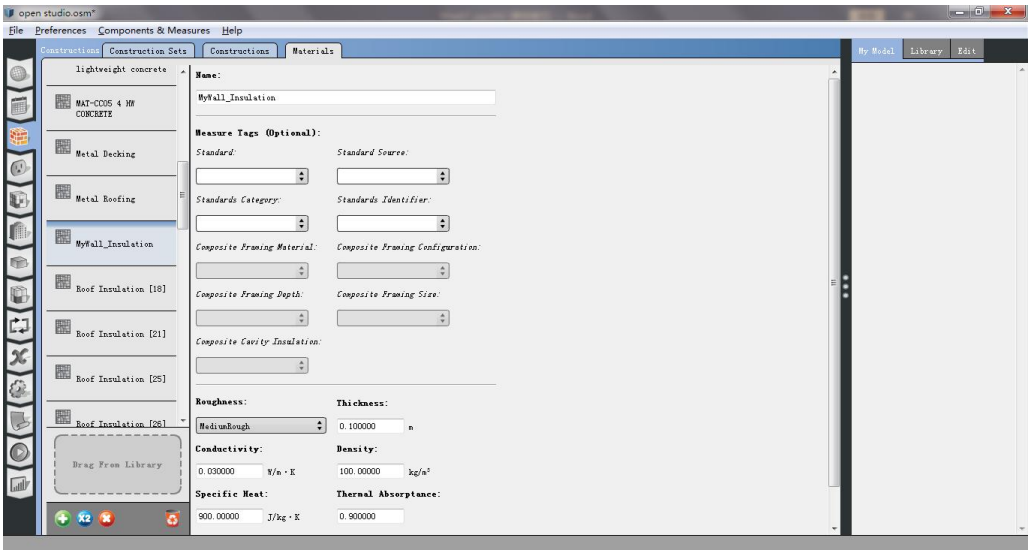


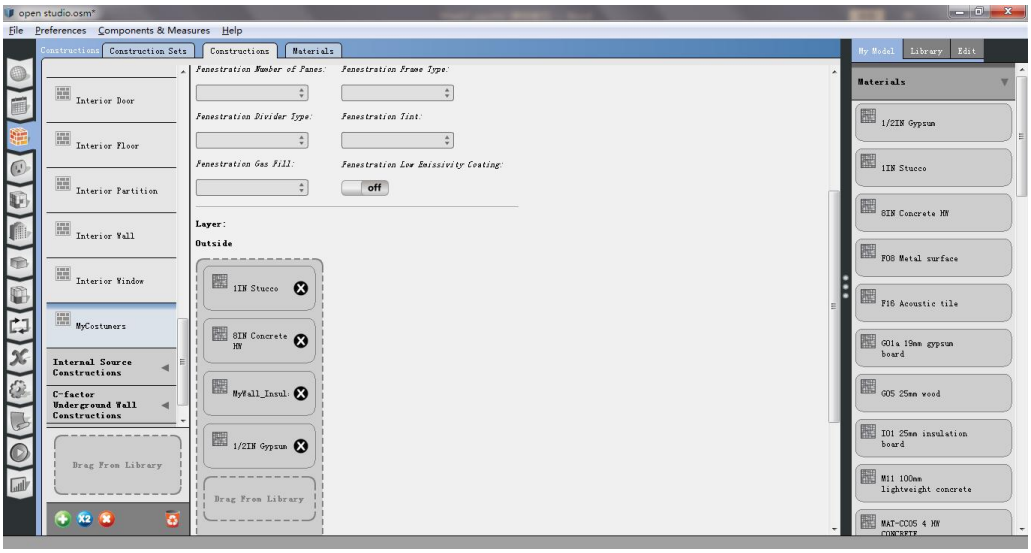
3. Click “construction” to add a new project and start customizing the wall package in the “construction sets” window.



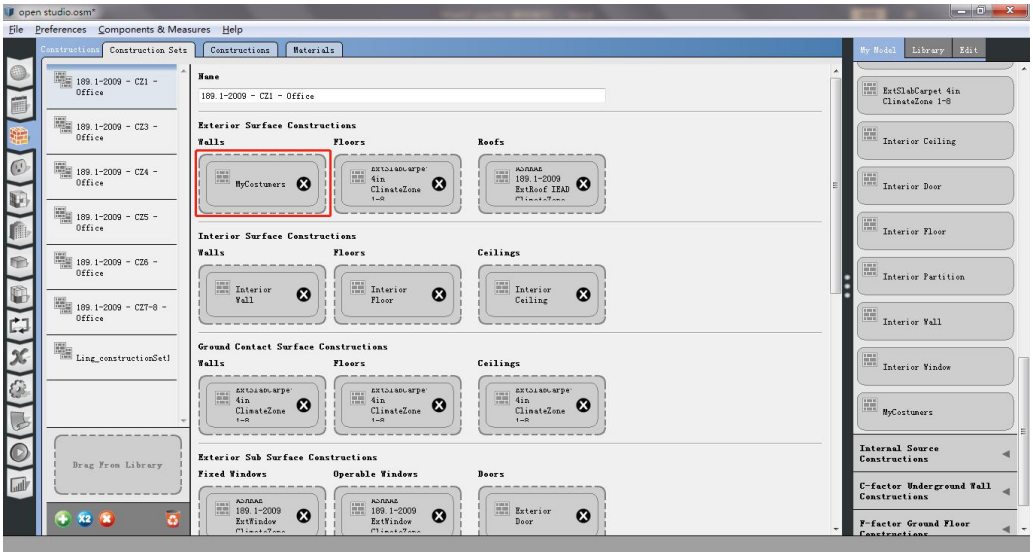


4. Click “Material” to add a new material and decide the type of wall insulation and insert it later in the package.

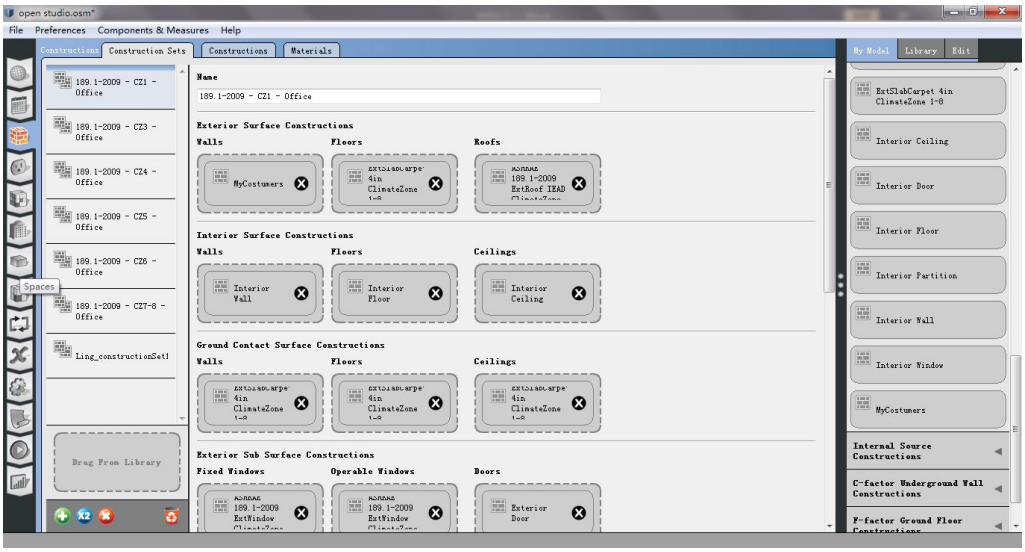


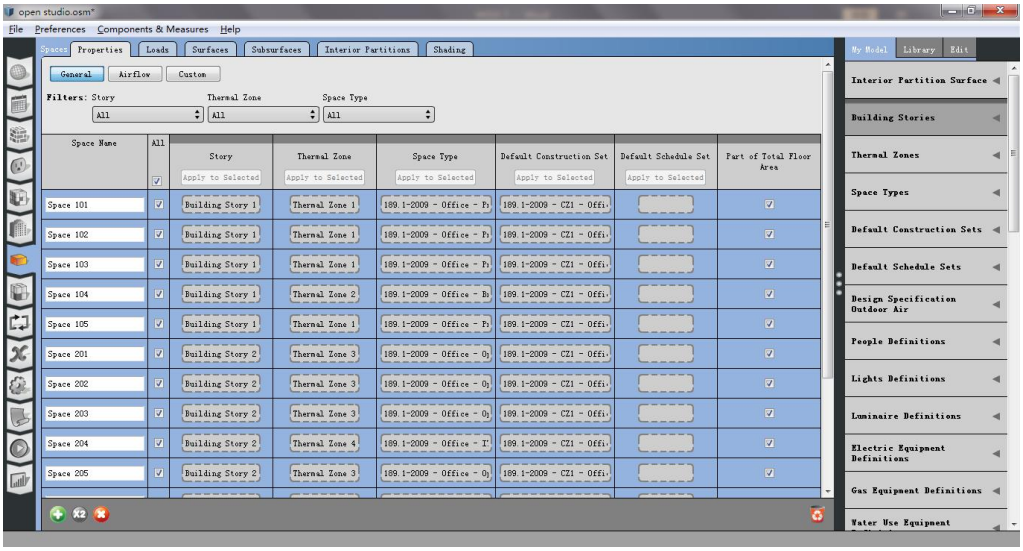


5. Insert the wall in the building data.

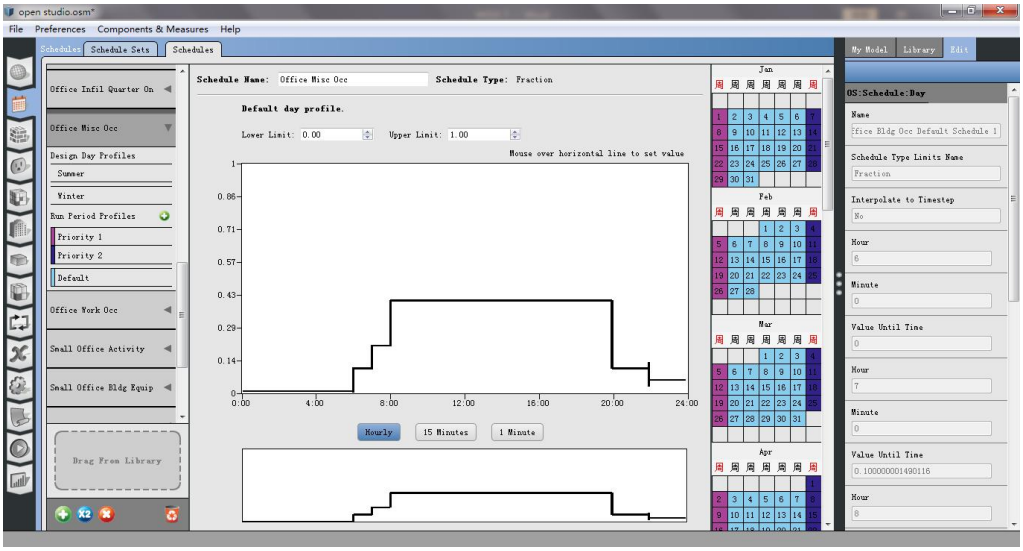


6. Click “space” window and insert the project layer with our modifications applying it to the whole building.

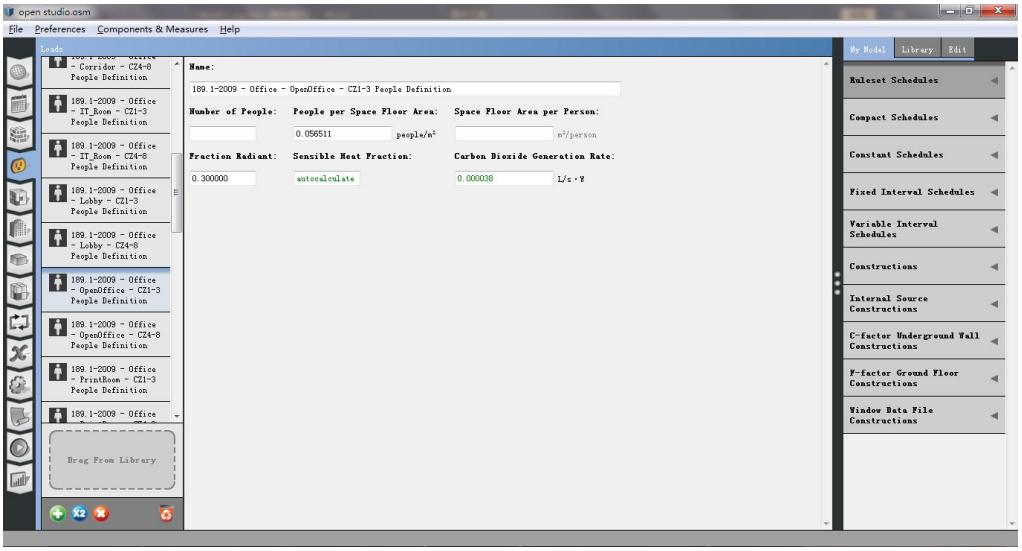


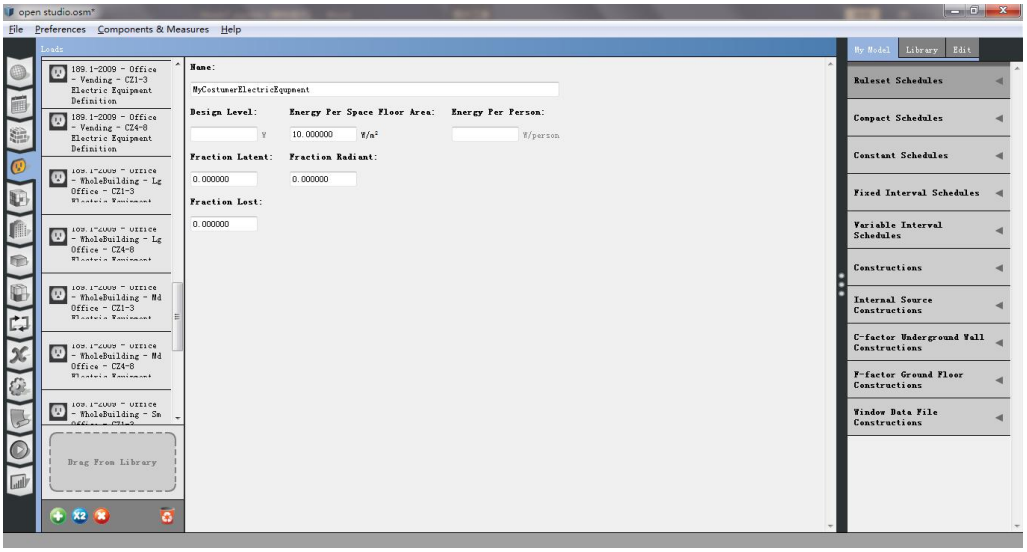


7. Return to “schedule sets” to enter all the information relating to activities, equipments, etc and their schedules.



8. Click the “loads” command to change other specifications, like people, light, electricity, etc.


open studio.osm
File Preferences Components & Measures Help
Loads
189.1-2009 - Office - Corridor - CZ4-8 People Definition
189.1-2009 - Office - IT_Room - CZ1-3 People Definition
189.1-2009 - Office - IT_Room - CZ4-8 People Definition
189.1-2009 - Office - Lobby - CZ1-3 People Definition
189.1-2009 - Office - Lobby - CZ4-8 People Definition
189.1-2009 - Office - OpenOffice - CZ1-3 People Definition
189.1-2009 - Office - OpenOffice - CZ4-8 People Definition
189.1-2009 - Office - PrintRoom - CZ1-3 People Definition
Drag From Library
Name:
189.1-2009 - Office - OpenOffice - CZ1-3 People Definition
Number of People:
People per Space Floor Area:
0.056511
people/m²
Space Floor Area per Person:
m²/person
Fraction Radiant:
0.300000
Sensible Heat Fraction:
autocalculate
Carbon Dioxide Generation Rate:
0.000036
L/s·W
My Model
Library
Edit
Ruleset Schedules
Compact Schedules
Constant Schedules
Fixed Interval Schedules
Variable Interval Schedules
Constructions
Internal Source Constructions
C-factor Underground Wall Constructions
F-factor Ground Floor Constructions
Window Data File Constructions


open studio.osm*
File Preferences Components & Measures Help
Loads
189.1-2009 - Office - Vending - CZ1-3 Electric Equipment Definition
189.1-2009 - Office - Vending - CZ4-8 Electric Equipment Definition
Drag From Library
Name:
MyCostumerElectricEquipment
Design Level:
W
Energy Per Space Floor Area:
10.000000
W/m²
Energy Per Person:
W/person
Fraction Latent:
0.000000
Fraction Radiant:
0.000000
Fraction Lost:
0.000000
My Model
Library
Edit
Ruleset Schedules
Compact Schedules
Constant Schedules
Fixed Interval Schedules
Variable Interval Schedules
Constructions
Internal Source Constructions
C-factor Underground Wall Constructions
F-factor Ground Floor Constructions
Window Data File Constructions