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

Solar radiation is radiant energy emitted by the sun. Solar radiation can be captured and turned into useful forms of energy, such as heat and electricity, using a variety of technologies.

Diffuse and direct solar radiation As sunlight passes through the atmosphere, some of it is absorbed, scattered, and reflected by Air molecules ,Water vapor, Clouds ,Dust...This is called diffuse solar radiation. The solar radiation that reaches the Earth's surface without being diffused is called direct beam solar radiation. Not only weakens the intensity of the radiation, but also changes the direction of the radiation and the spectral distribution of the radiation.

Air mass is a measure of how much atmosphere the sun's rays have to pass through on their way to the surface of the earth. A lower sun angle equals a larger air mass. The closer the sun is to the horizon, the longer its path across the sky is and the larger the air mass is. Air Mass and Latitude: The effect of air mass is most felt when the sun is lower in the sky and so it has a bigger impact on the insolation of high latitute places.

The availability of solar energy

Whether solar radiation can be converted into other forms of energy on the earth depends on:

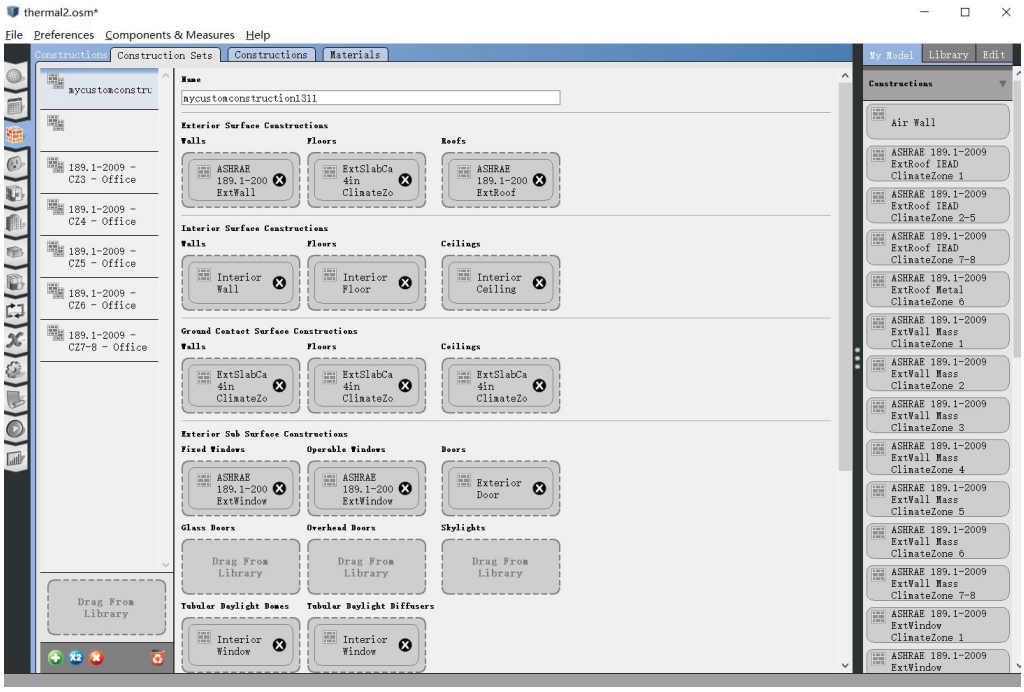
1. the sun position in the sky
2. 2. the weather conditon
3. 3. the site altitude over the see level
4. 4. sunshine hours

Measurement Scientists measure the amount of sunlight falling on specific locations at different times of the year. They then estimate the amount of sunlight falling on regions at the same latitude with similar climates. Measurements of solar energy are typically expressed as total radiation on a horizontal surface,or as total radiation on a surface tracking the sun.

**** Task 2** Y 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!)**

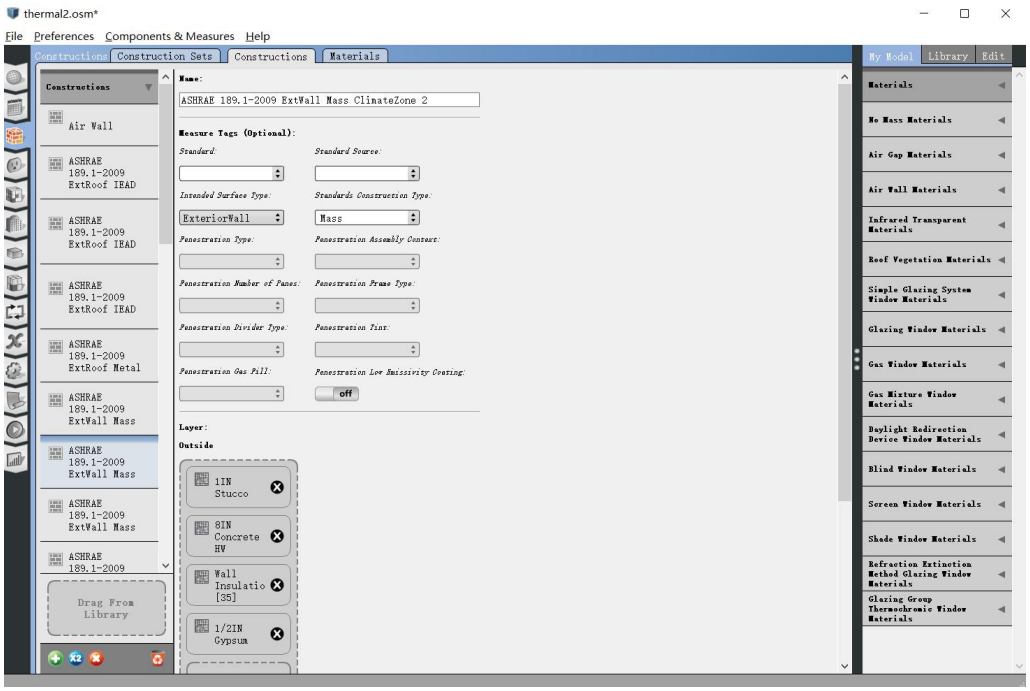
Step 1

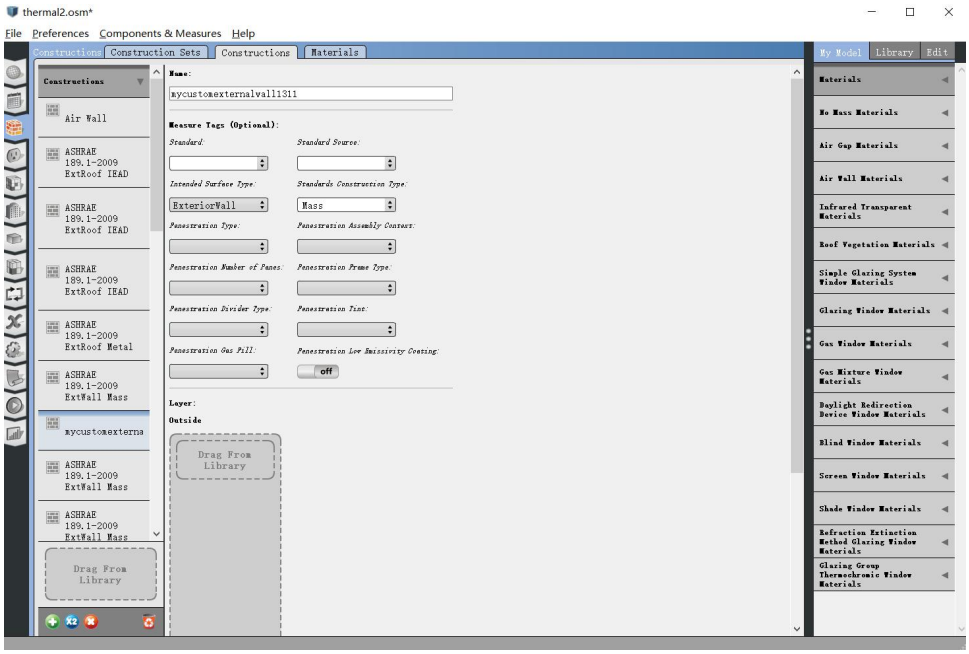
Go to **construction sets** click '189.1-2009-CZ1-officel' rename 'mycustomconstructionset 1311'.



Step 2

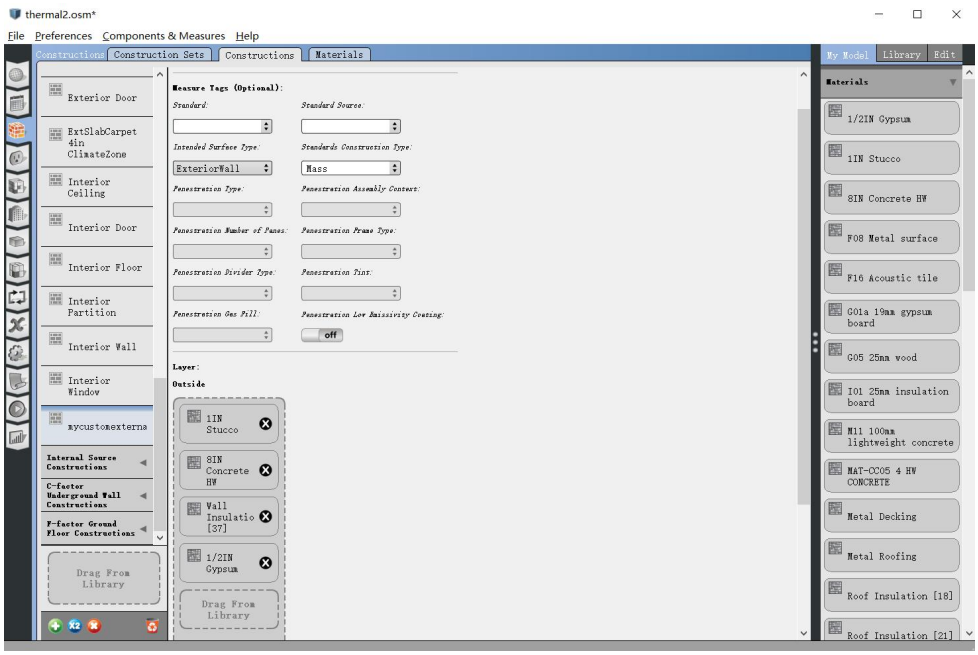
Go to **construction** click 'ASHRAE 189.1-2009 ExtWALL Mass'. You can every layers of the wall and define new wall, rename 'mycustomexternalwall 1311' and delete outside layers.

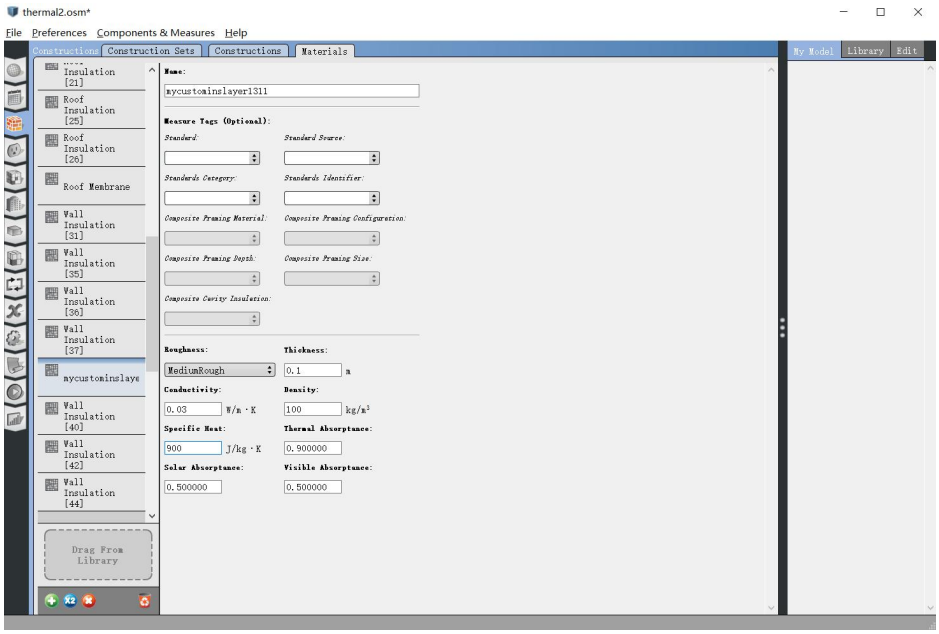




Step 3

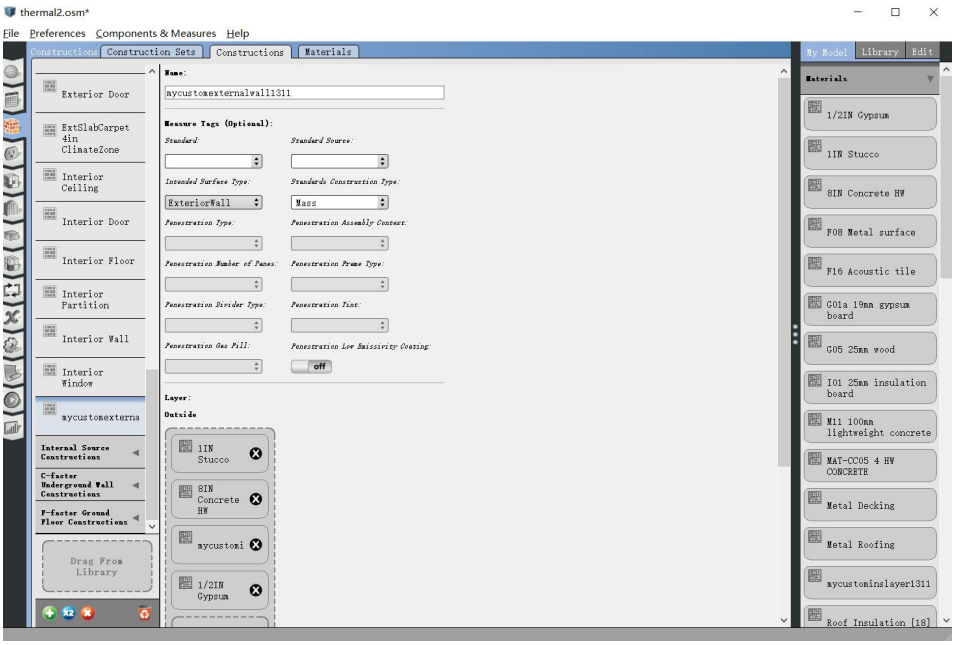
Go to **my model material** to choose what yo want. Click **material**---**wall installation 37**---**x2**, rename ‘mycoustominslayer 1311’ and change data, <u>thickness: 0.1 conductivity: 0.03 density: 100 Specific heat: 900</u>.





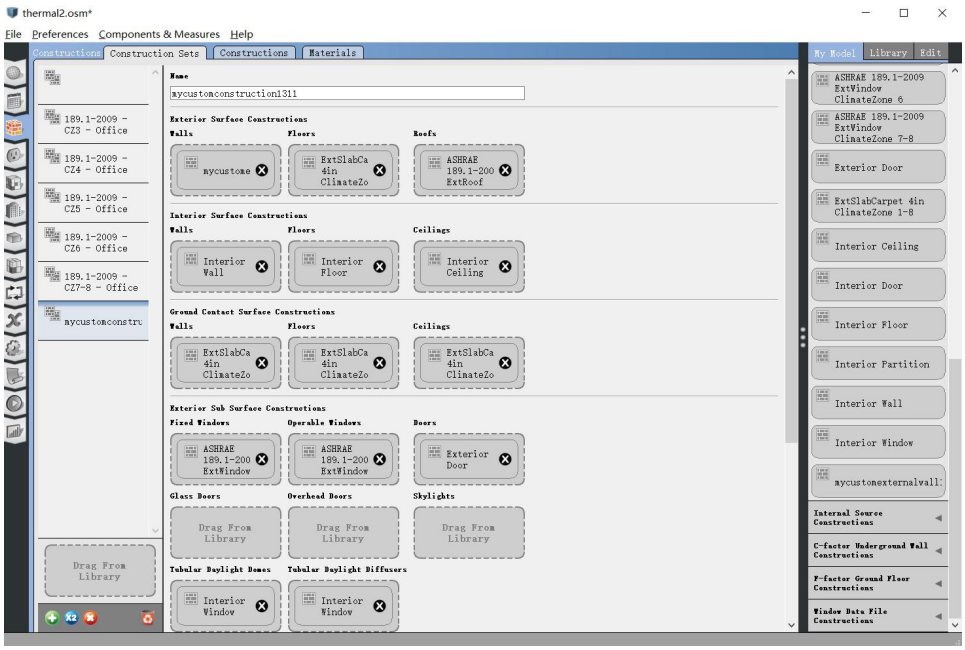
Step 4

Go back to **constructions,** click **'**mycustomexternalwall 1311', delete the last two, add 'mycoustominslayer 1311' from my model to outside.



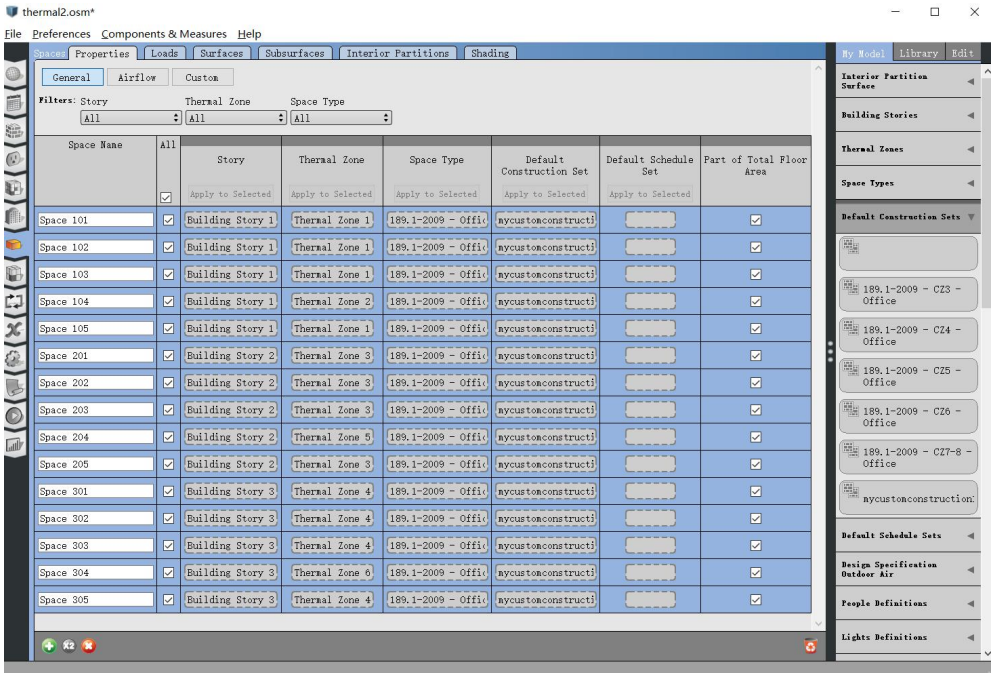
Step 5

Go to **construction sets**, choose 'mycustomconstructionset 1311', remove 'ASHRAE 189.1-2009 ExtWAL'. Go to **my model**, pull 'mycustomexternalwall 1311'



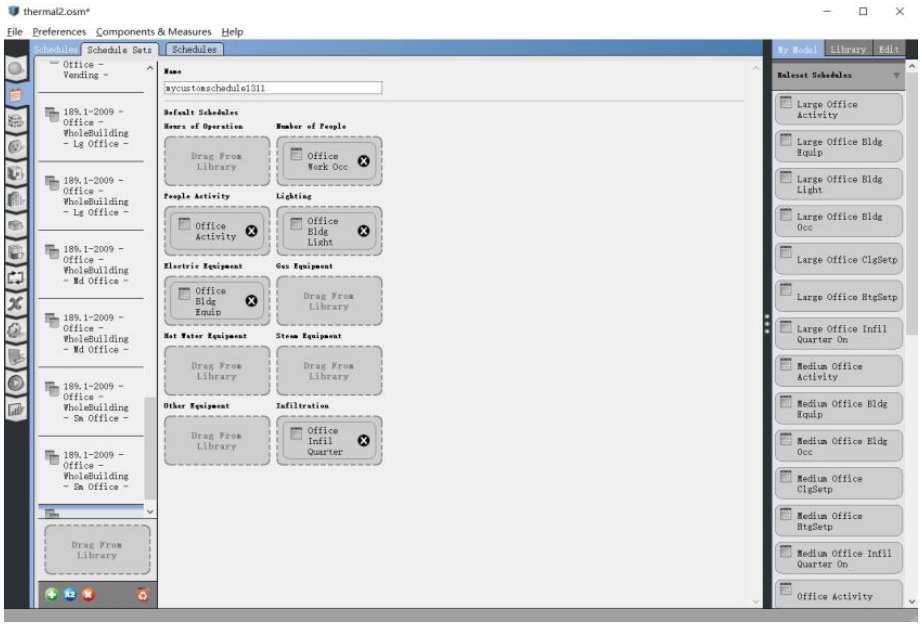
Step 6

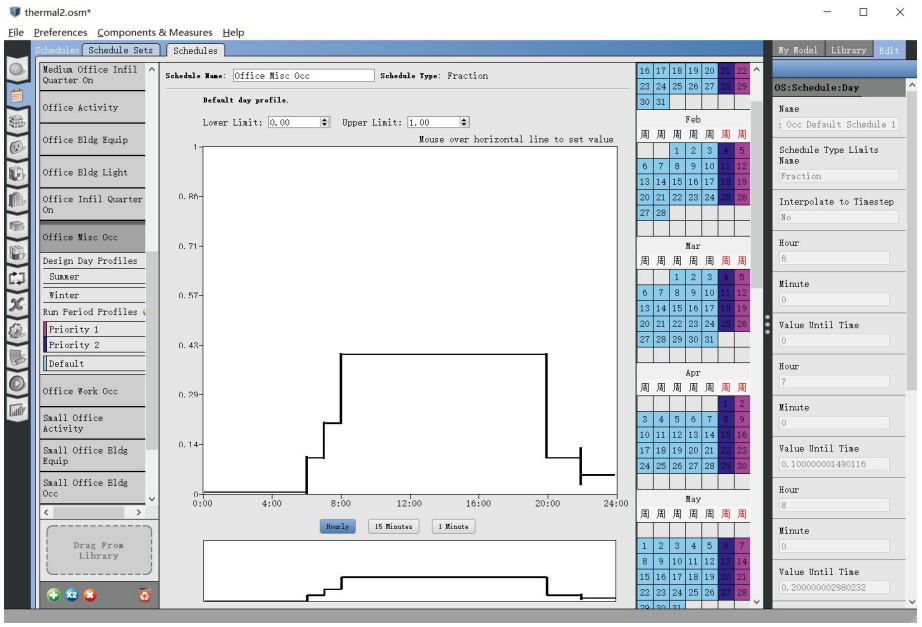
Go to **space ---** Go to **my model ---** Go to **defult construction sets ---** add my custom to the whole buildings.



Step 7

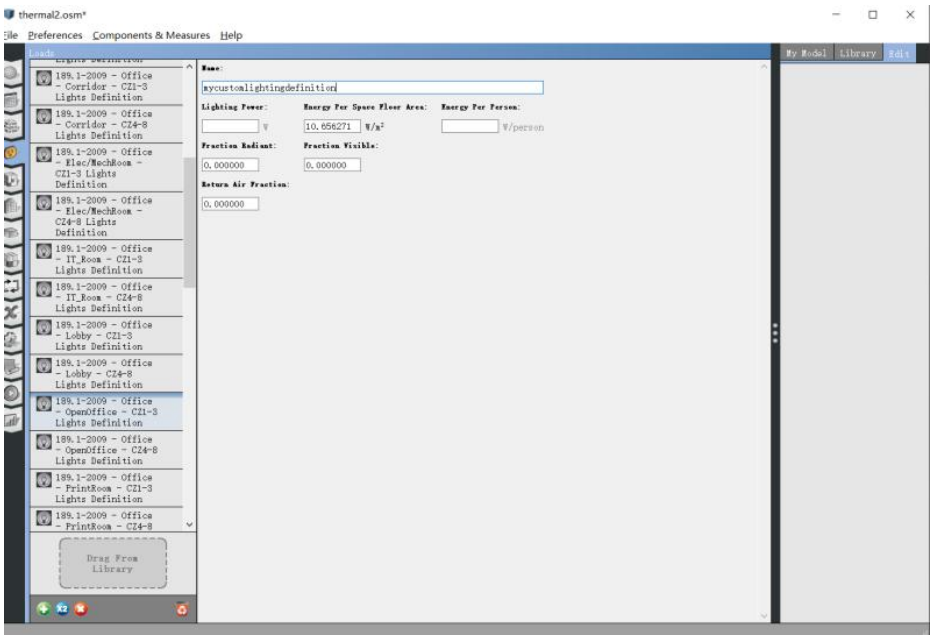
Go to **schedule ---** Go to **schedule sets** --- change ‘office-open office’ to ‘mycustomschedule’ --- go to **schedule** --- click ‘office Misc Occ.

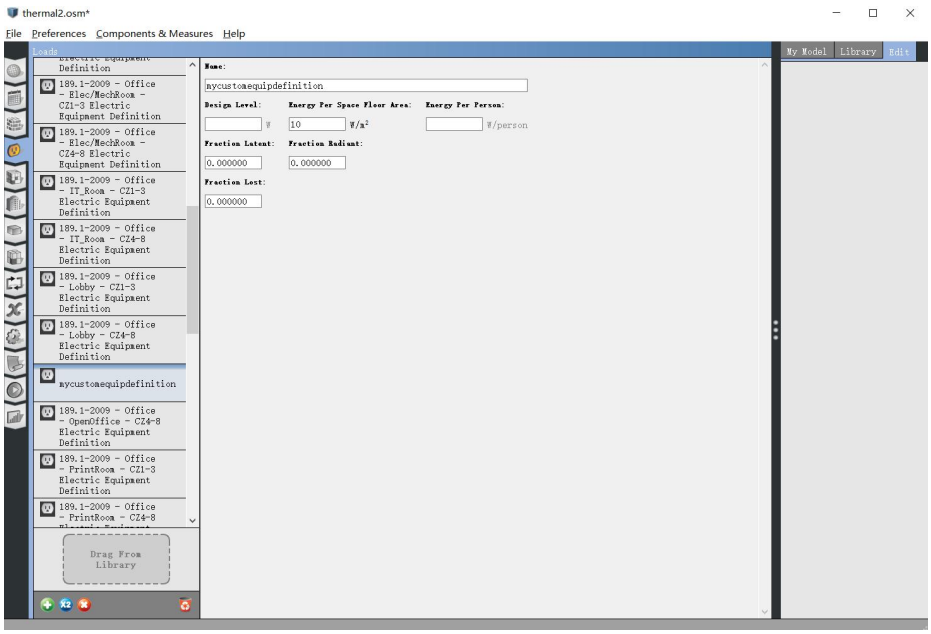




Step 8

Go to **loads --- lights definition** --- change ‘open office’ to ‘mycustomlightingdefintion’ --- change ‘electric equipment definitions ’ to ‘mycustom equipdefinition’ --- change data: energy per space floor area: 10


thermal2.osm*
File Preferences Components & Measures Help
Loads
My Model
Library
Edit
189.1-2009 - Office - Corridor - CZ1-3 Lights Definition
189.1-2009 - Office - Corridor - CZ4-8 Lights Definition
189.1-2009 - Office - Elec/MechRoom - CZ1-3 Lights Definition
189.1-2009 - Office - Elec/MechRoom - CZ4-8 Lights Definition
189.1-2009 - Office - IT_Room - CZ1-3 Lights Definition
189.1-2009 - Office - IT_Room - CZ4-8 Lights Definition
189.1-2009 - Office - Lobby - CZ1-3 Lights Definition
189.1-2009 - Office - Lobby - CZ4-8 Lights Definition
189.1-2009 - Office - OpenOffice - CZ1-3 Lights Definition
189.1-2009 - Office - OpenOffice - CZ4-8 Lights Definition
189.1-2009 - Office - PrintRoom - CZ1-3 Lights Definition
189.1-2009 - Office - PrintRoom - CZ4-8
Drag From Library
Name:
mycustomlightingdefinition
Lighting Power:
Energy Per Space Floor Area:
10.656271
W/ft²
Energy Per Person:
W/person
Fraction Radiant:
0.000000
Fraction Visible:
0.000000
Return Air Fraction:
0.000000


thermal2.osm*
File Preferences Components & Measures Help
Loads
My Model
Library
Edit
Definition
189.1-2009 - Office - Elec/MechRoom - CZ1-3 Electric Equipment Definition
189.1-2009 - Office - Elec/MechRoom - CZ4-8 Electric Equipment Definition
189.1-2009 - Office - IT_Room - CZ1-3 Electric Equipment Definition
189.1-2009 - Office - IT_Room - CZ4-8 Electric Equipment Definition
189.1-2009 - Office - Lobby - CZ1-3 Electric Equipment Definition
189.1-2009 - Office - Lobby - CZ4-8 Electric Equipment Definition
mycustomequipdefinition
189.1-2009 - Office - OpenOffice - CZ4-8 Electric Equipment Definition
189.1-2009 - Office - PrintRoom - CZ1-3 Electric Equipment Definition
189.1-2009 - Office - PrintRoom - CZ4-8
Drag From Library
Name:
mycustomequipdefinition
Design Level:
Energy Per Space Floor Area:
10
W/ft²
Energy Per Person:
W/person
Fraction Latent:
0.000000
Fraction Radiant:
0.000000
Fraction Lost:
0.000000