** Task 1** Considering the same example you solved in the previous assignment (radiative heat transfer between two parallel plates), how many shields with epsilon = 0.1 should you add in order to have the new heat transfer rate to be 1% of the case without shields ?

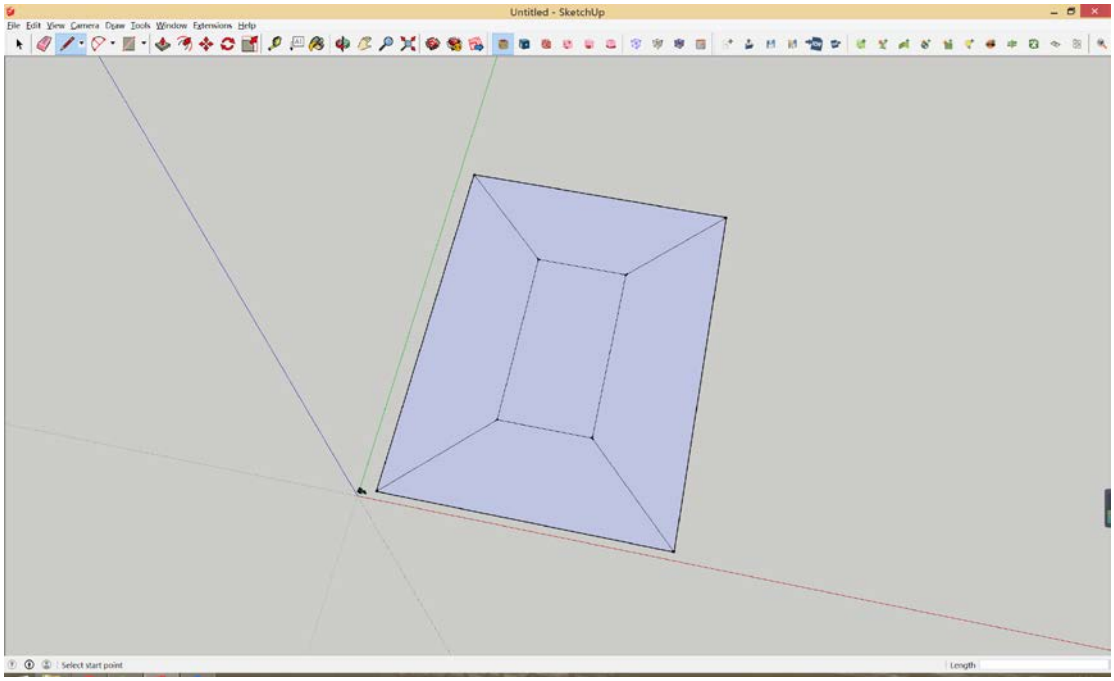
First we look at the example of last week assignment:
The radiative heat transfer between surface 1 and 2. The area is 1.5 ㎡， ε 1 = 0.2，ε 2 = 0.7， T1 = 37℃， T2 = 17℃. The answer is:
Q12, no shields = A σ (T14- T14)/1/ ε 1+1/ ε 2-1 = 1.5*5.67*10-8（3104-2904）/1/0.1+1/0.1-1 = 9.6789W

If we would like to have the new heat transfer which is the 1% of this case, then
1% * Q12, no shields = 0.096789W

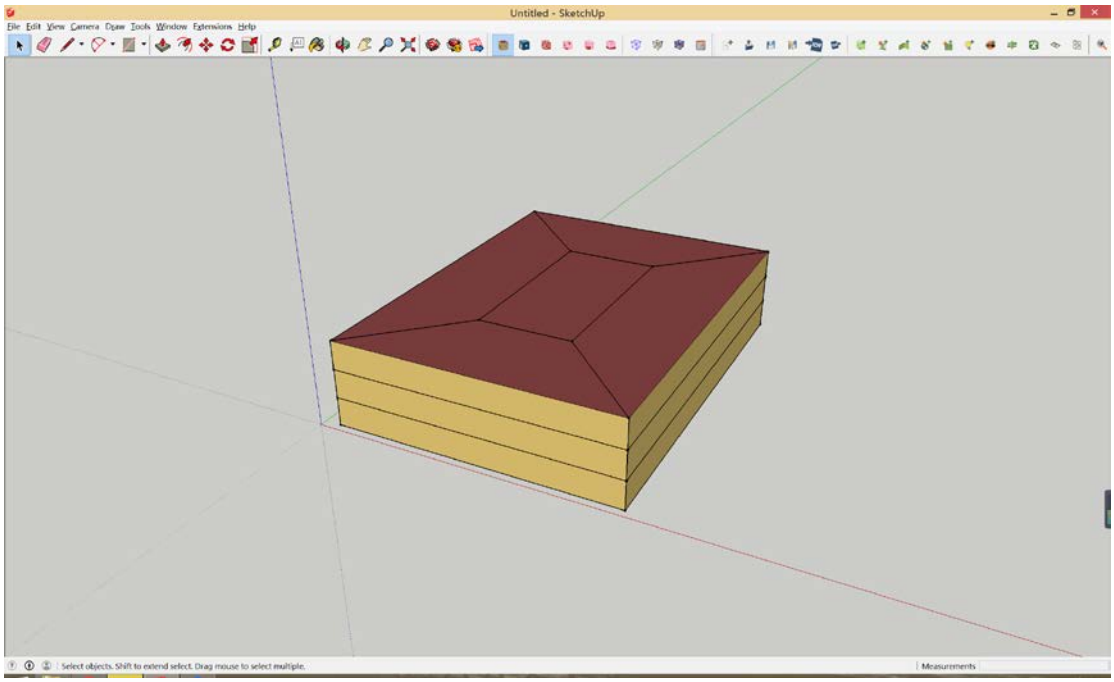
According to the equation
Q1-2, N shields = Aσ(T14- T14)/(N+1)(1/ε1+1/ε2-1) = 1/N+1 * Q1-2, no shields = 0.096789W
Then
Q1-2, N shields = 1/N+1 * 9.96789 = 1/100 * 9.96789 = 0.096789W
N=100-1=99

Therefore, we need 99 shields with epsilon = 0.1 to have the new heat transfer rate to be 1% of the case without shields.

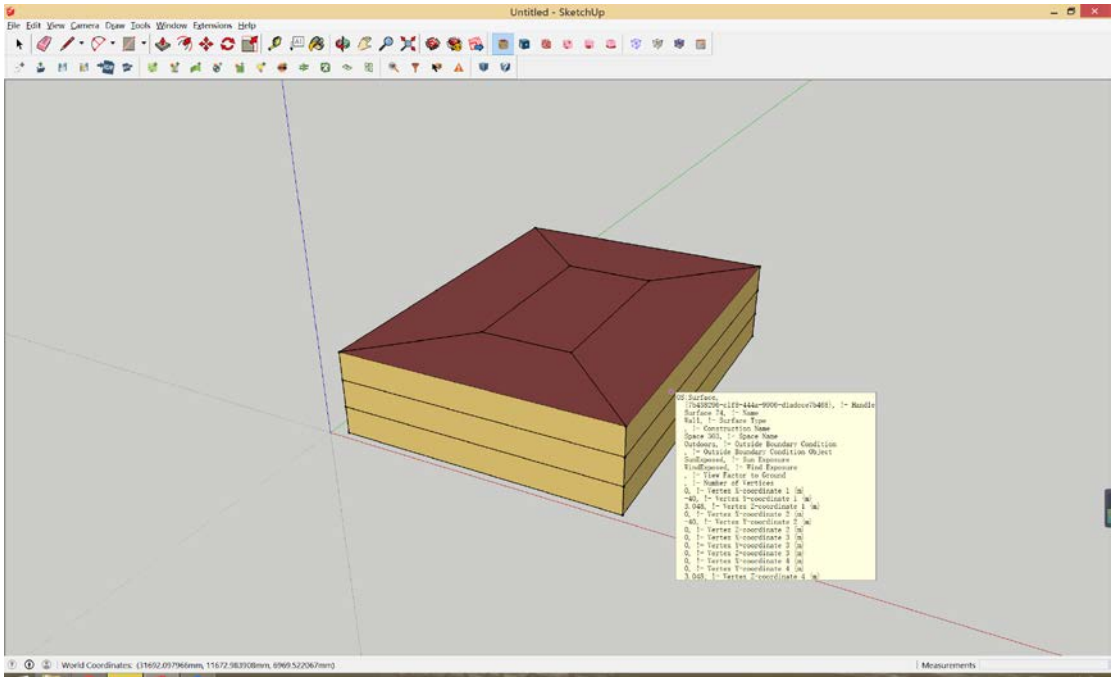
1. Draw the outline and shape of the building in Sketchup.



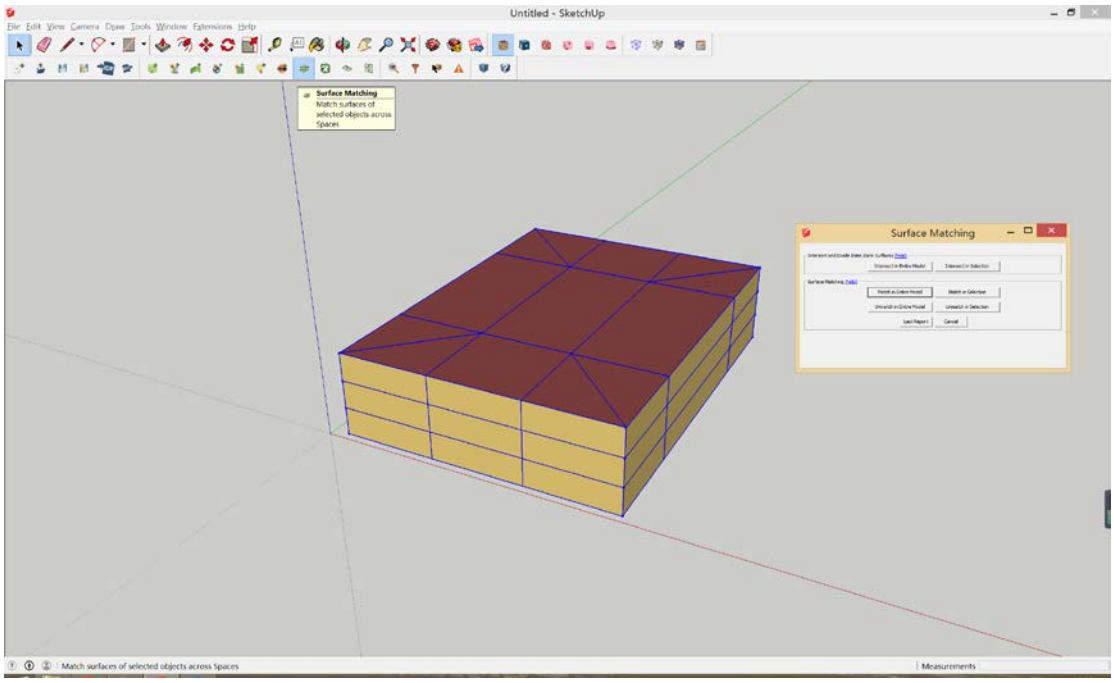
2. Use “Creat spaces from diagram”creat a 3 floor building.



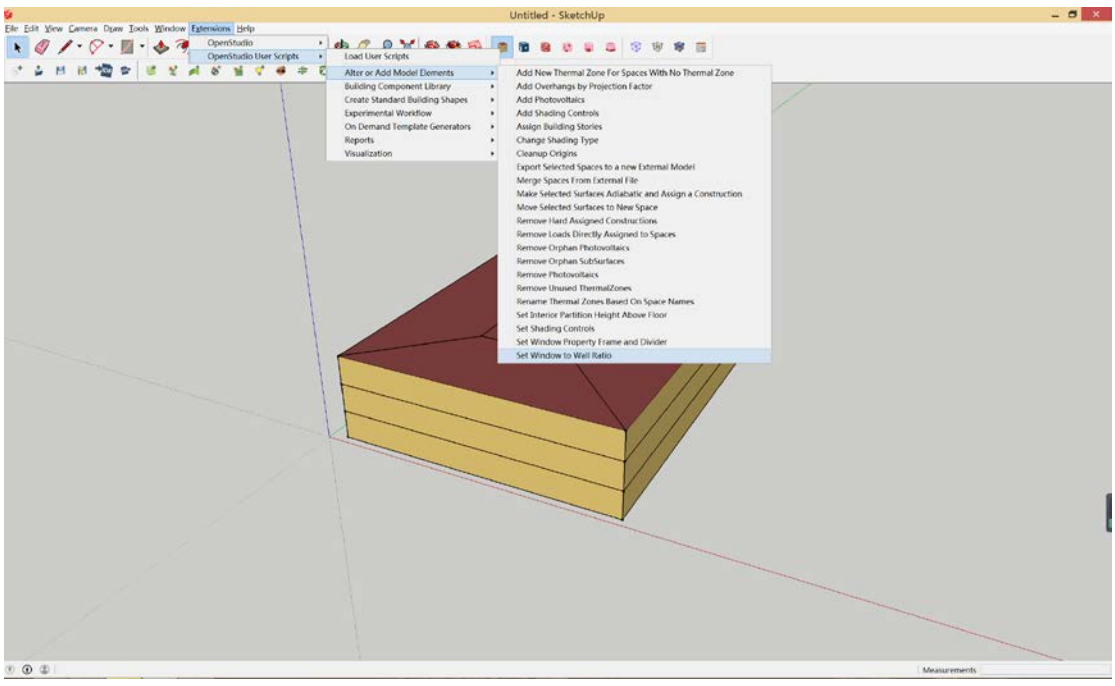

3. We can see the material information using the "Info tool".

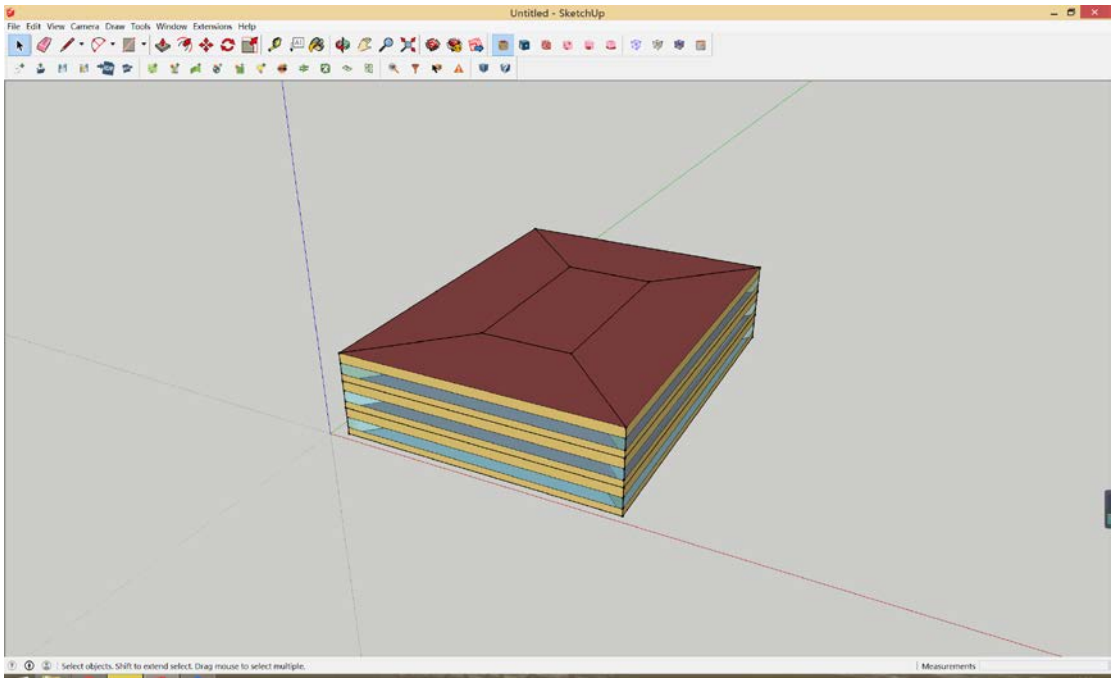


4. Click”Surface matching”.

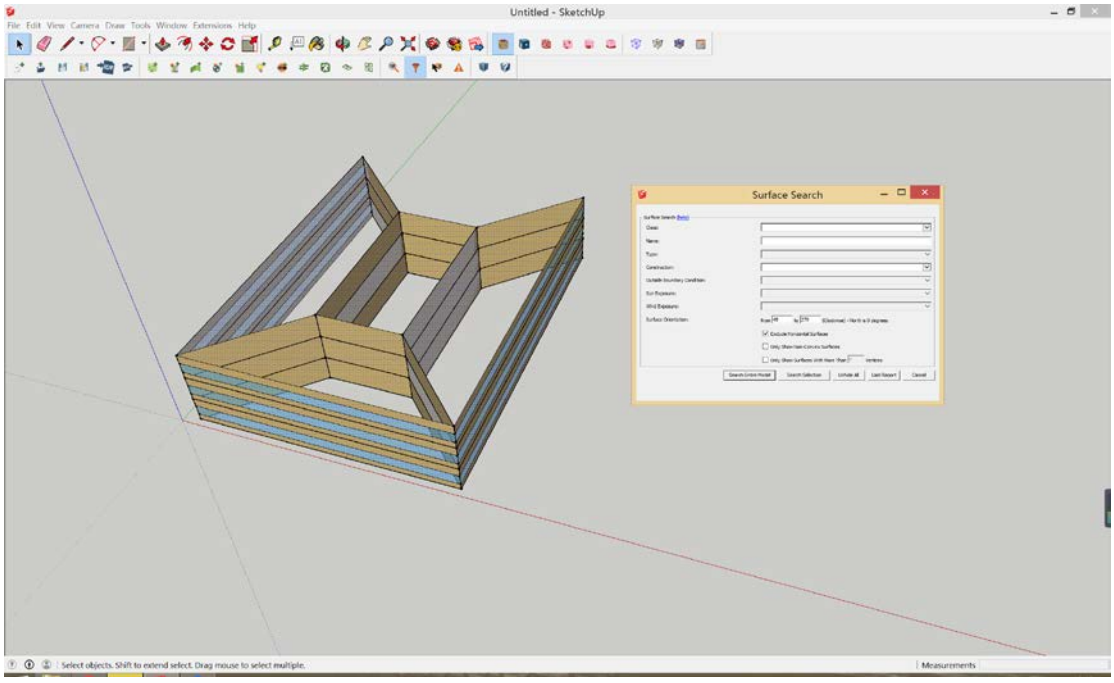



5. Click”Set Window to Wall Ratio”to built the windows.

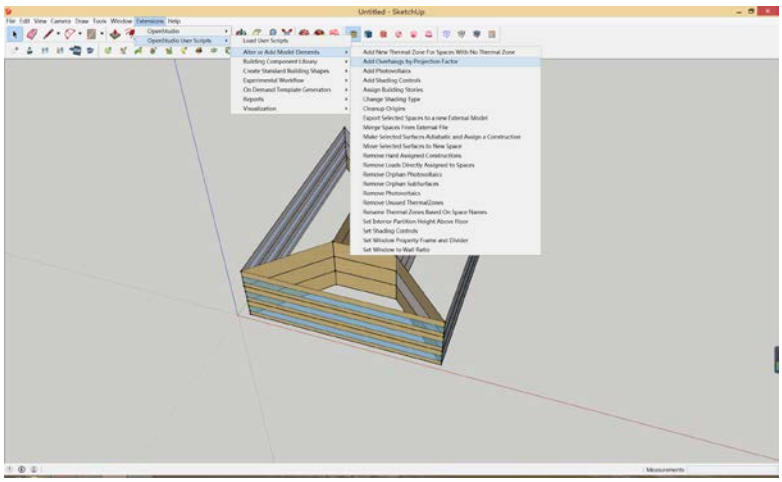


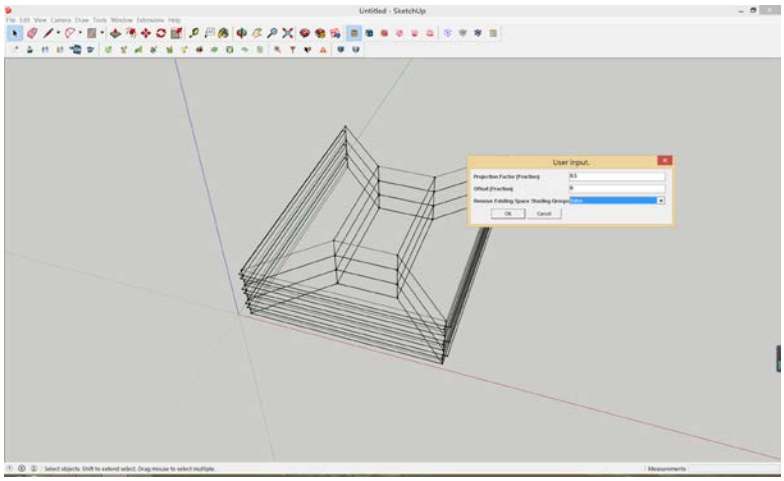



6. Check other directions besides the north.

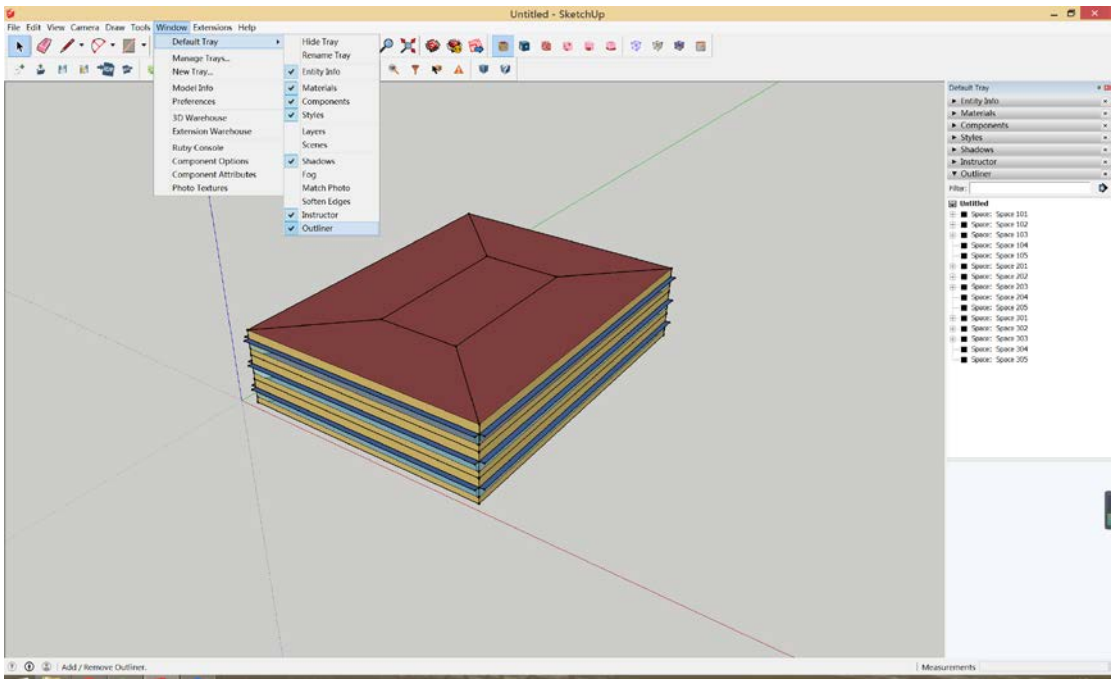


7.Click”Add Overhanges by Projection Factor”to built overhangs.

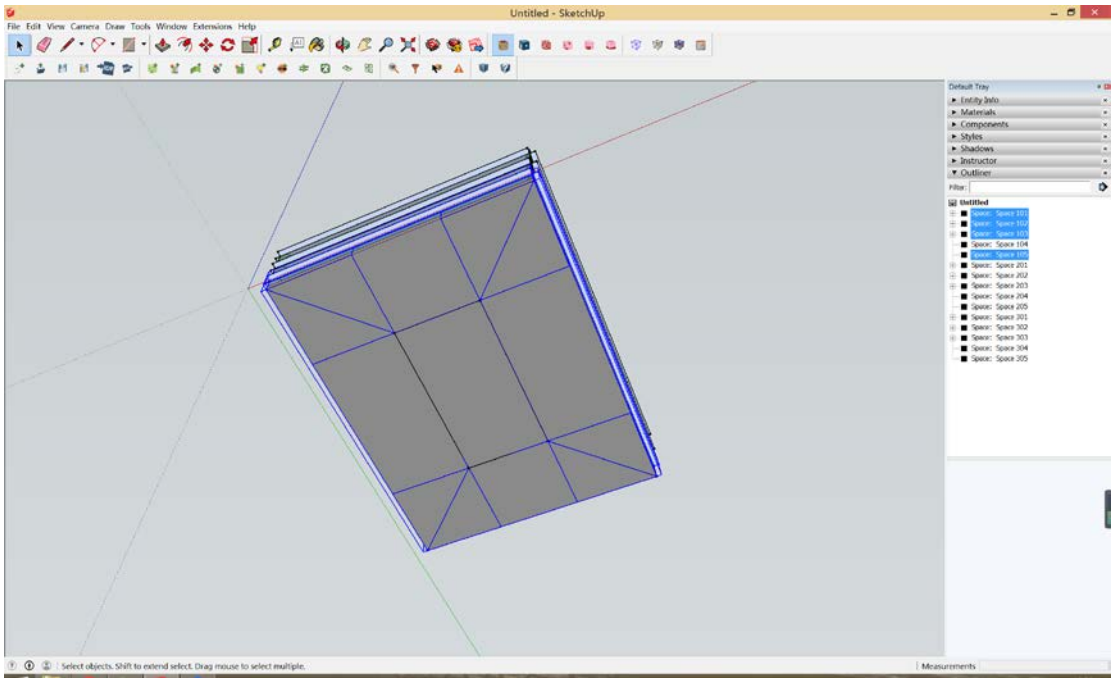




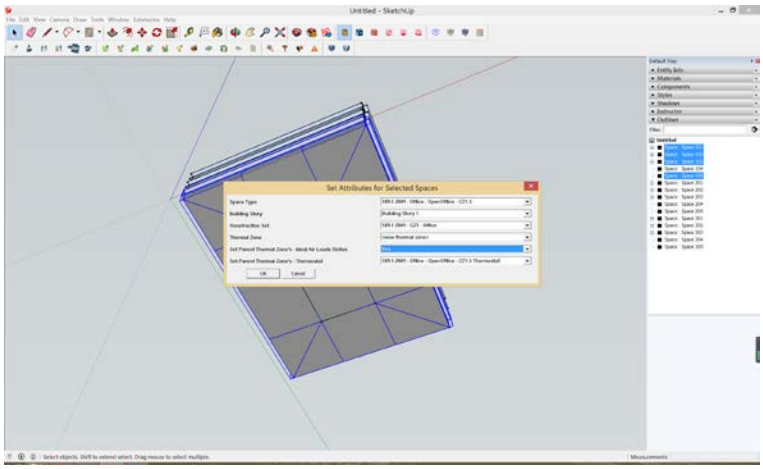
8. Open the”Outliner”

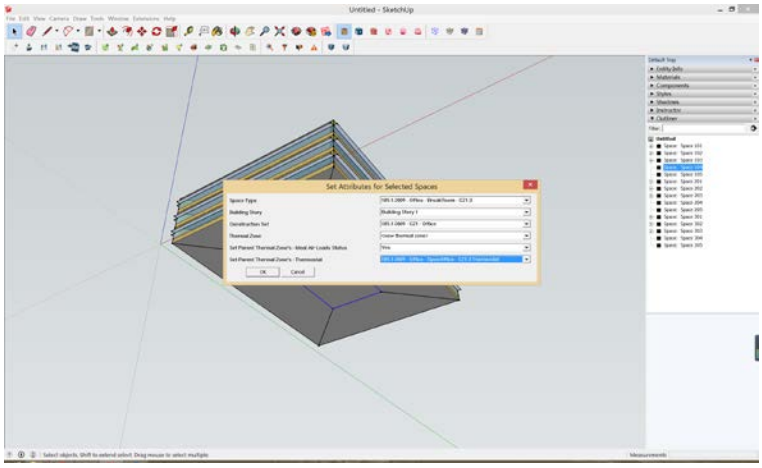


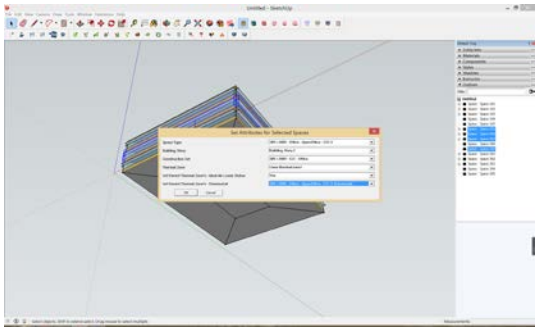
9. Choose the space of each thermal zone.

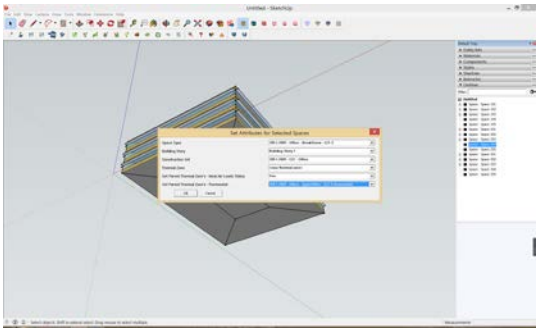


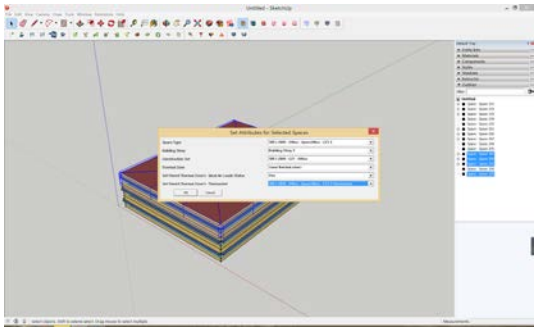

10. Click “Set Attributes for Selected Space”to set parameters.

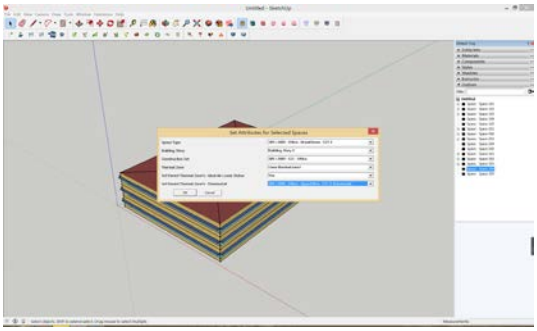




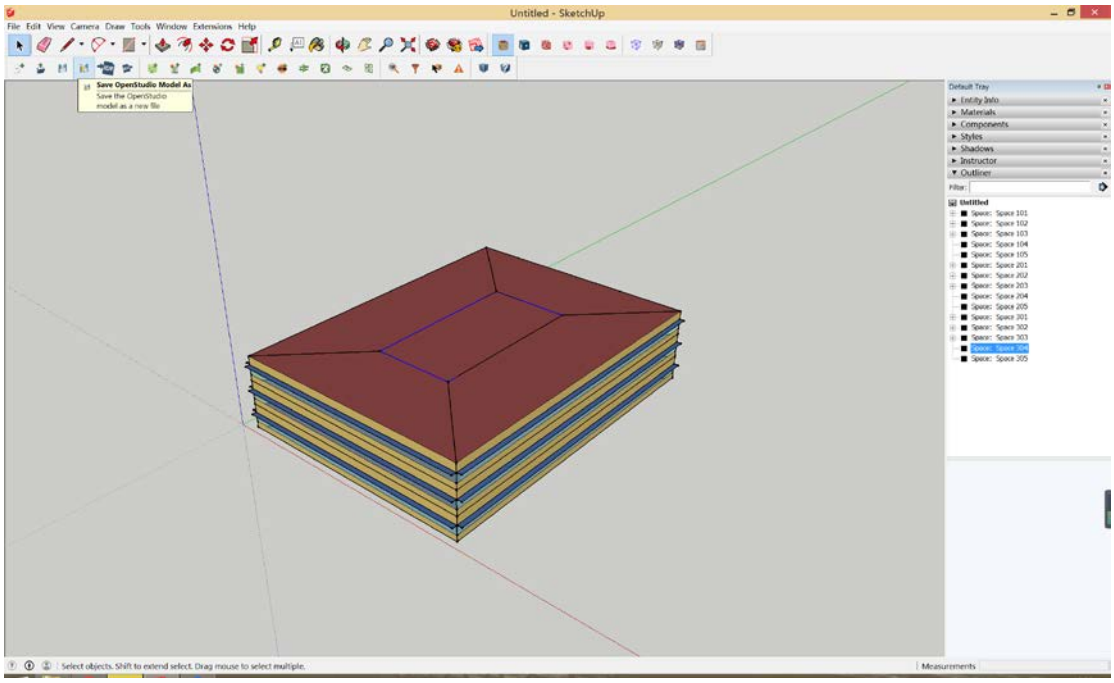


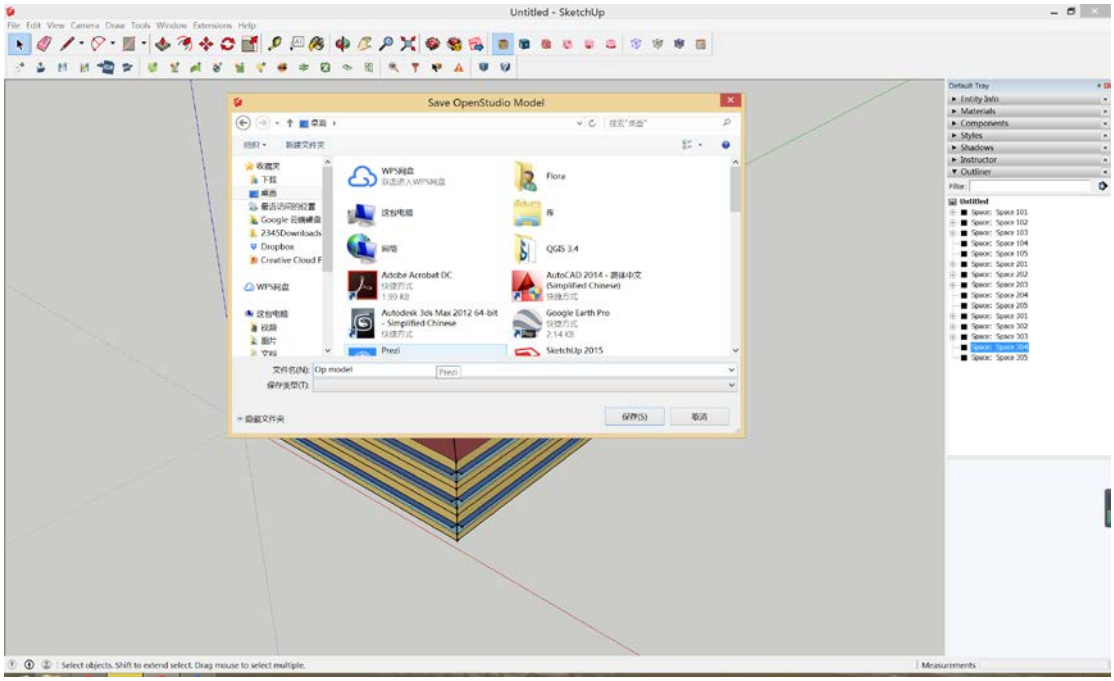




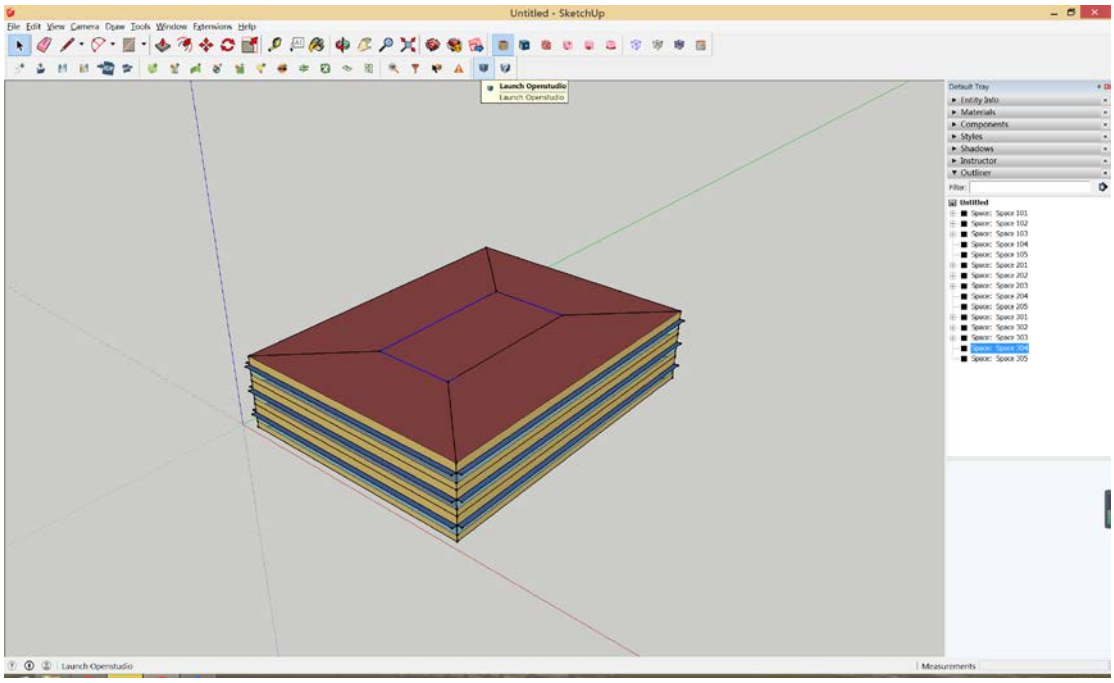


11. Save the model.

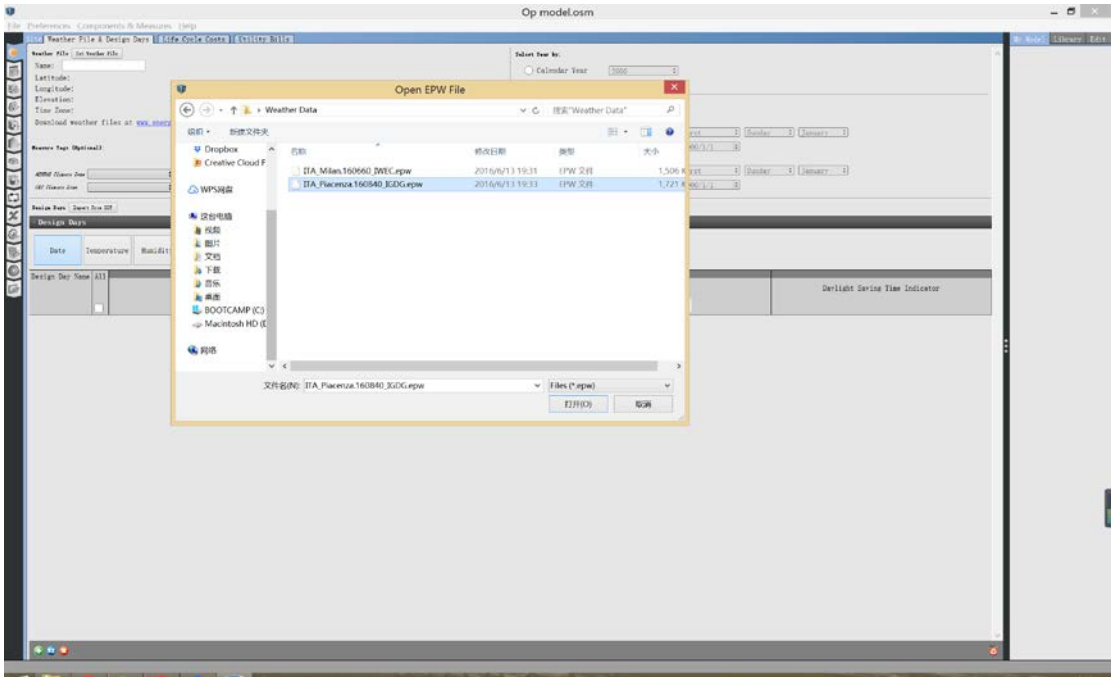


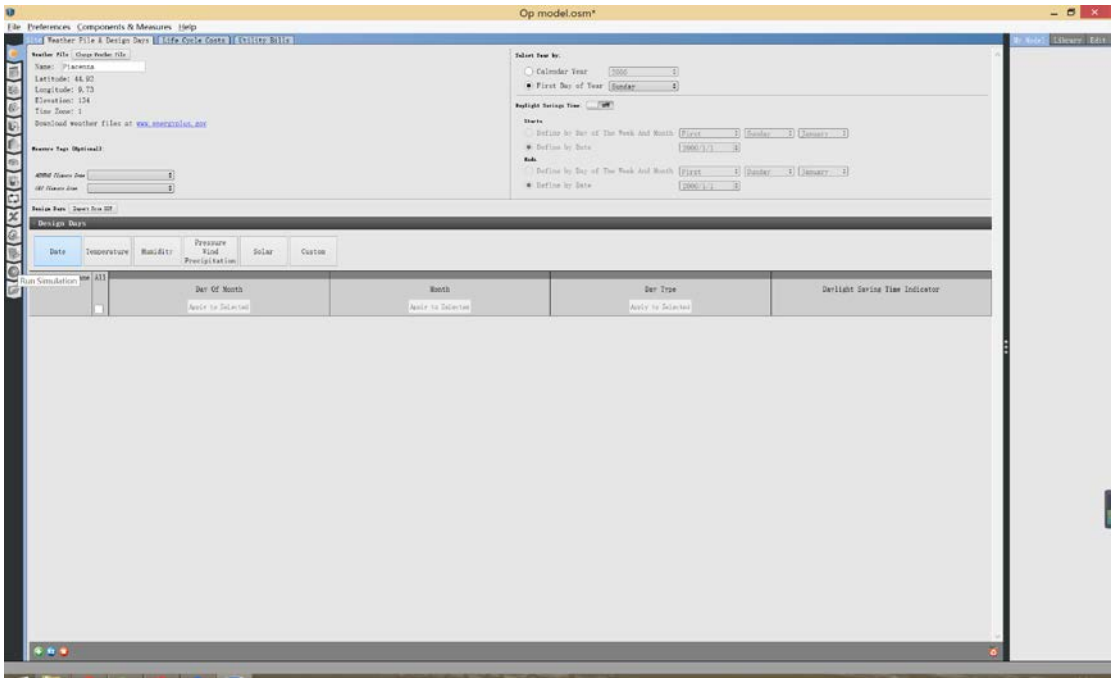

12. Run the Open studio.

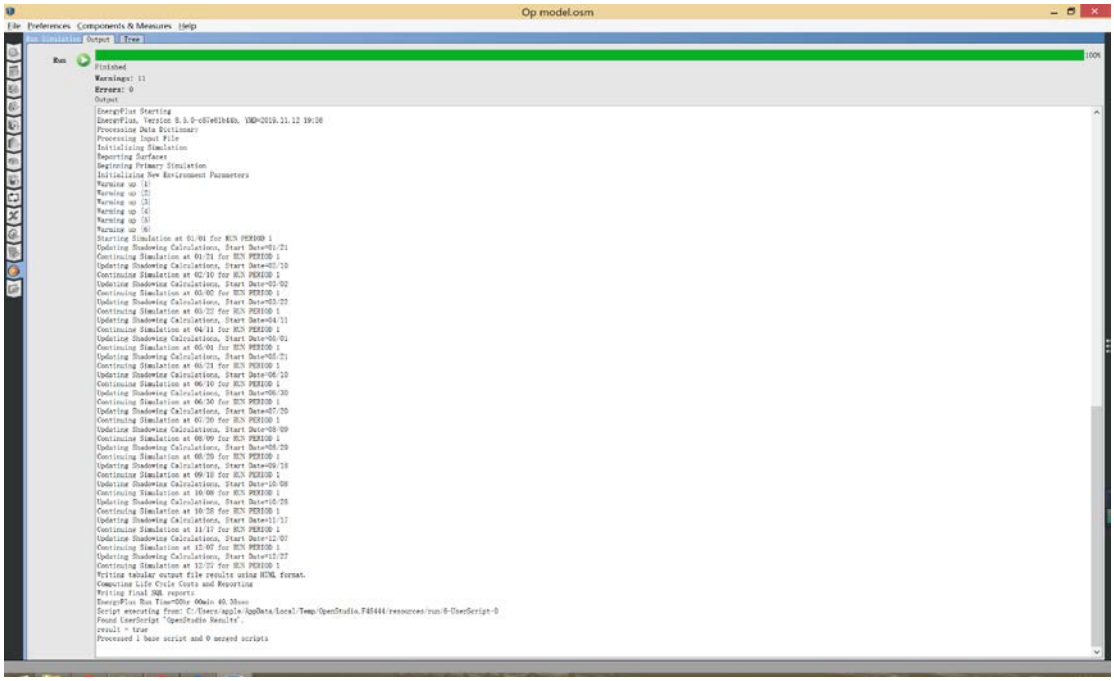



13. Add the weather data.

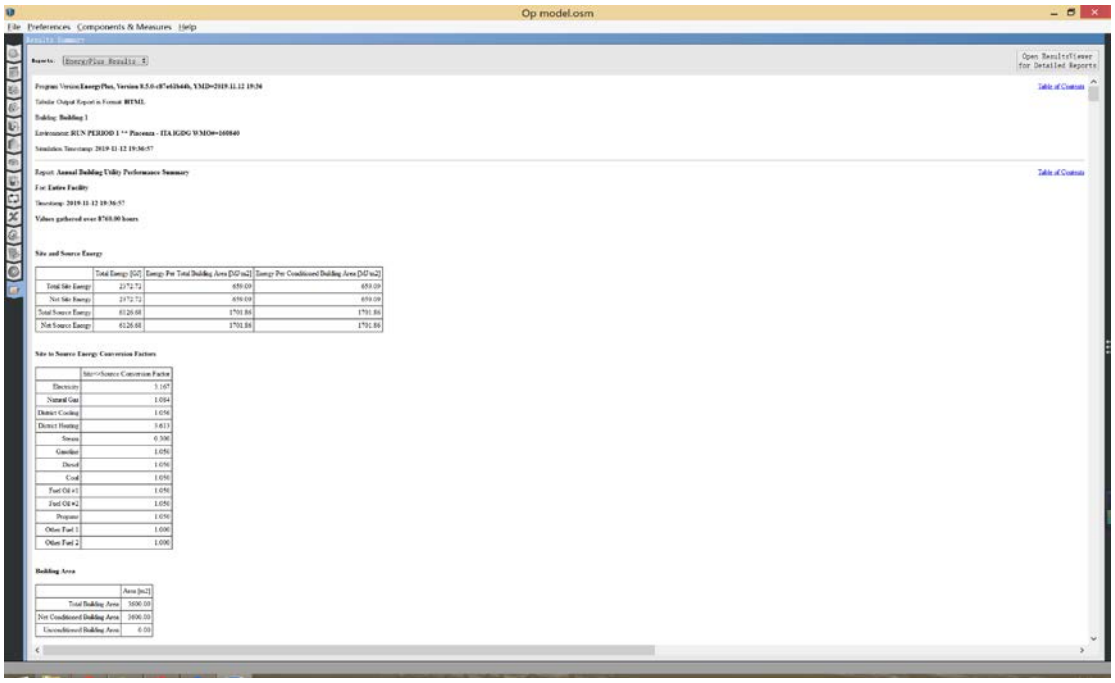


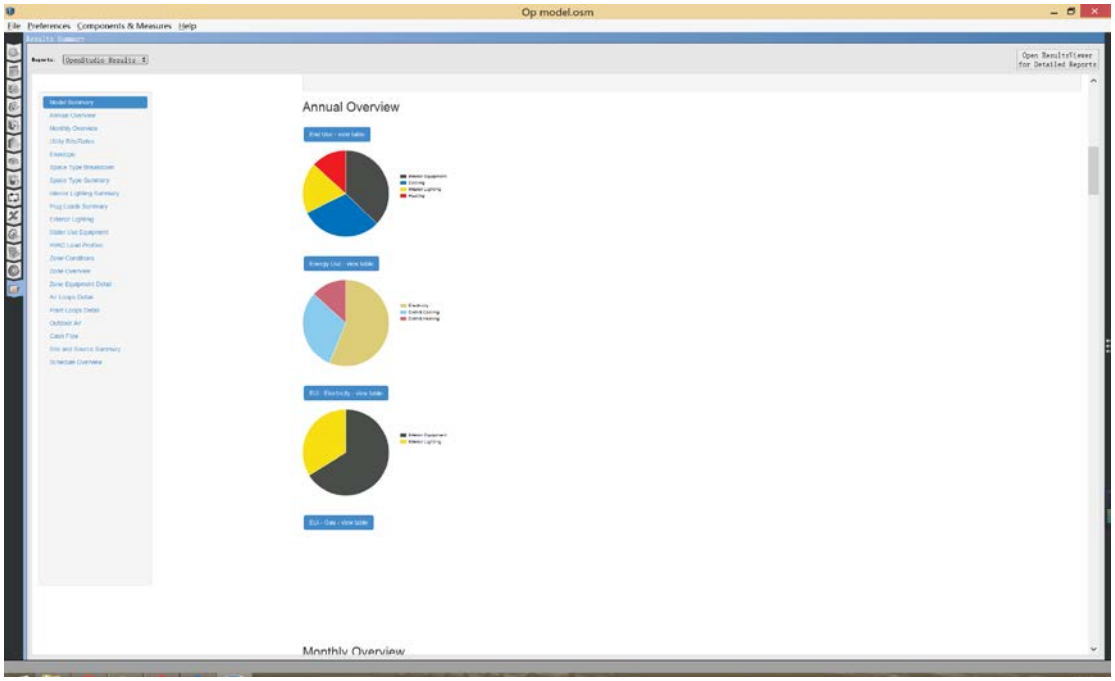

14. Run the analysis.




15. Show the result.


Op model.osm
File Preferences Components & Measures Help
Reports: EnergyPlus Results
Open ResultsViewer for Detailed Reports
Table of Contents
Table of Contents
Site and Source Energy
Site to Source Energy Conversion Factors
Building Area


Op model.osm
File Preferences Components & Measures Help
Reports: OpenStudio Results
Open ResultsViewer for Detailed Reports
Annual Overview
Monthly Overview