SINGLE ROOM ENERGY MODEL ANALYSIS

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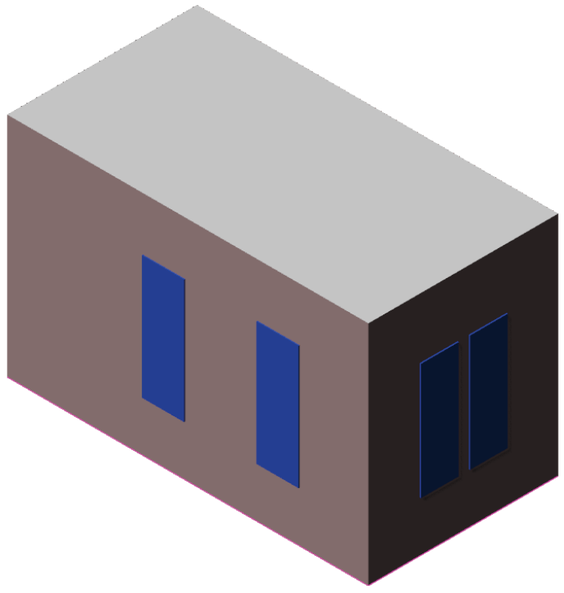


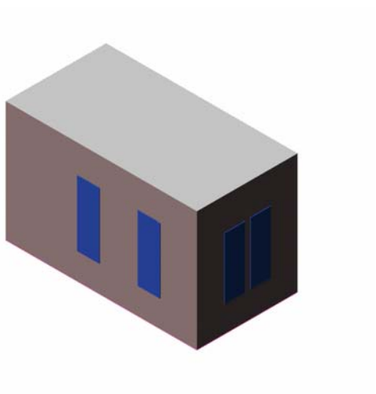
GOALS:

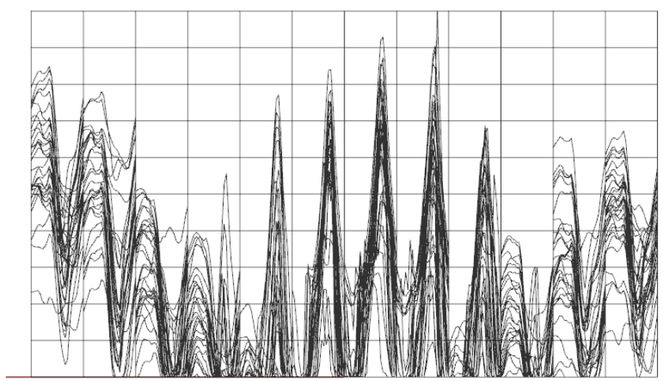
The goals of this analysis were to determine the primary factors affecting the environmental performance of a south-facing room in a 1915 Philadelphia row-house. This is expressed in total annual kilowatt hours of energy for both heating and cooling the space. In particular, the effects of variations in wall, ceiling, and floor, R-Value. How changes in glazing, including variations in U-Value, Solar Heat Gain Coefficient, and Rate of Visual Transmittance, were also of particular importance.
Finally, the energy model also sought to investigate issues associated with the space's HVAC. Including the size of unit required, and the associated energy consumption.

TOTAL ANNUAL KWH
WITH RESPECT TO CONTEXT & SHADING

Observing the changes in the room's energy consumption relative to its physical context.

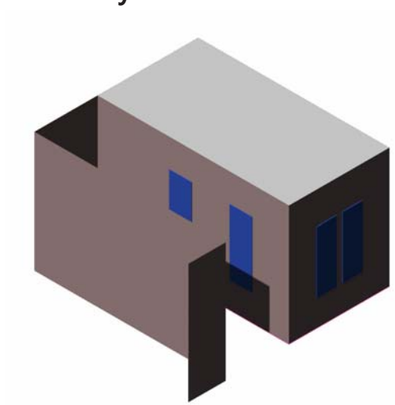
Without adjacent row-house.

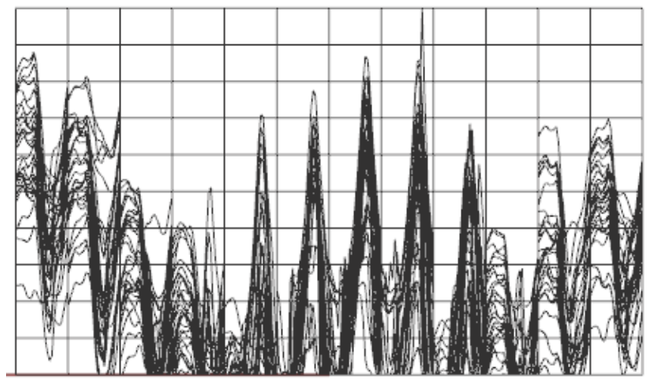




Total Cooling: 2643.897 kWh
Total Heating: 5793.826 kWh

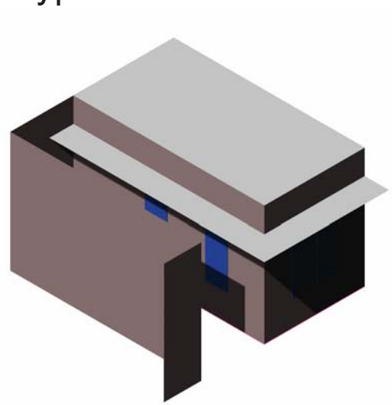
With adjacent row-house/
side-yard.

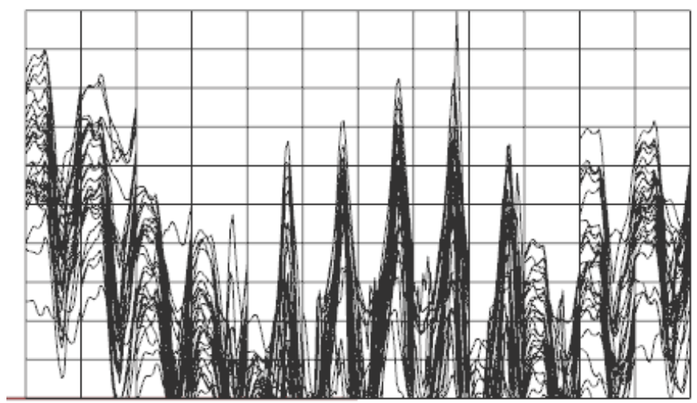




Total Cooling: 2391.082 kWh
Total Heating: 5887.804 kWh

With the addition of a
hypothetical 1M sun-shade.



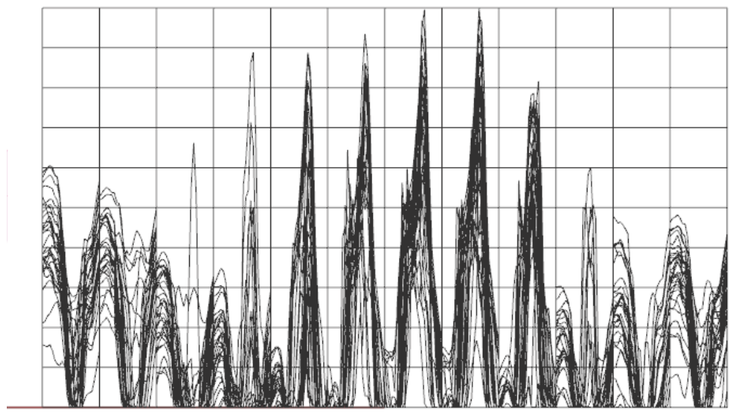


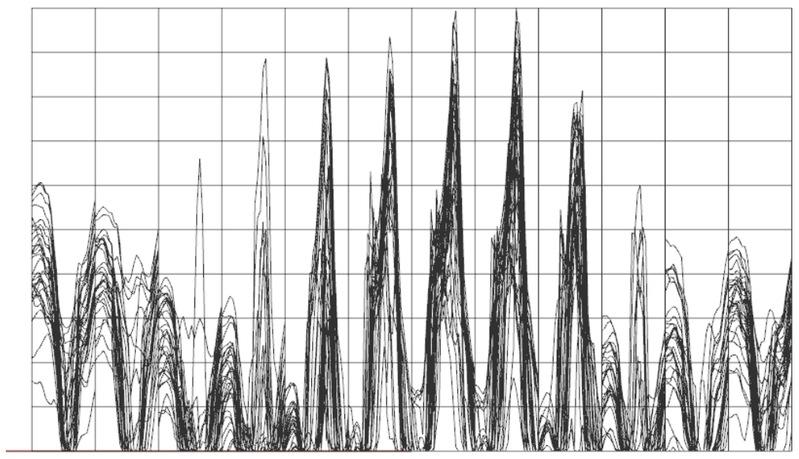
Total Cooling: 2153.921 kWh
Total Heating: 6036.145 kWh

TOTAL ANNUAL KWH
WITH RESPECT TO INSULATION

Observing the changes in the room's energy consumption due to the R-Values of its floor, roof, & walls.

R-Value:	R-Value:
Roof: 45 Walls: 17 Floor: 40	Roof: 30 Walls: 20 Floor: 30





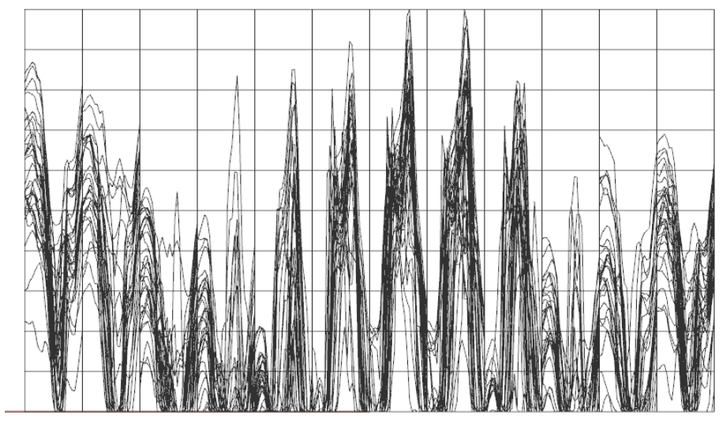
Total Cooling: 2589.97 kWh
Total Heating: 2848.71 kWh

Total Cooling: 2597.2 kWh
Total Heating: 2908.2 kWh

TOTAL ANNUAL KWH
WITH RESPECT TO WINDOWS

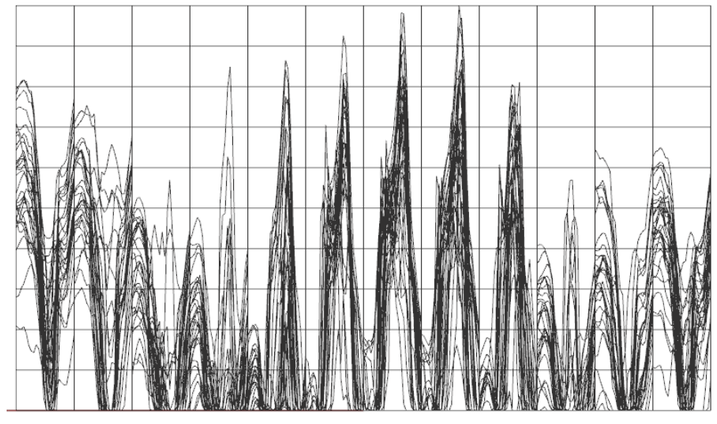
Observing the changes in the room's energy consumption due to the U-Values, SHGC, and Visual Transmittance of its windows.

U-Value: .25
SHGC: .35
Vis Tran: .55



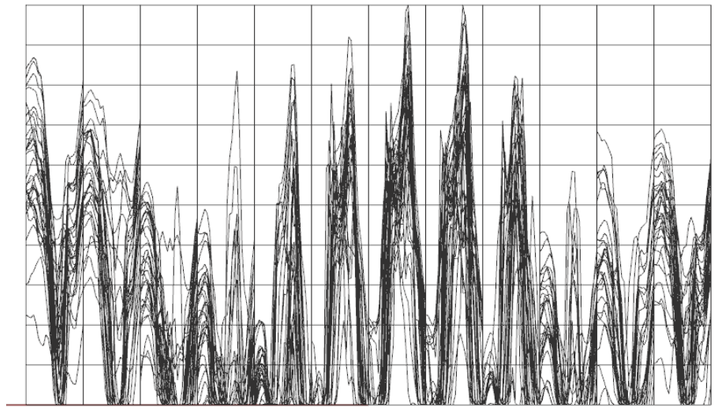
Total Cooling: 1831.57 kWh
Total Heating: 2632.54 kWh

U-Value: .35
SHGC: .45
Vis Tran: .75



Total Cooling: 1928.4 kWh
Total Heating: 2817.7 kWh

U-Value: .65
SHGC: .55
Vis Tran: .6



Total Cooling: 2153.78 kWh
Total Heating: 3346.00 kWh