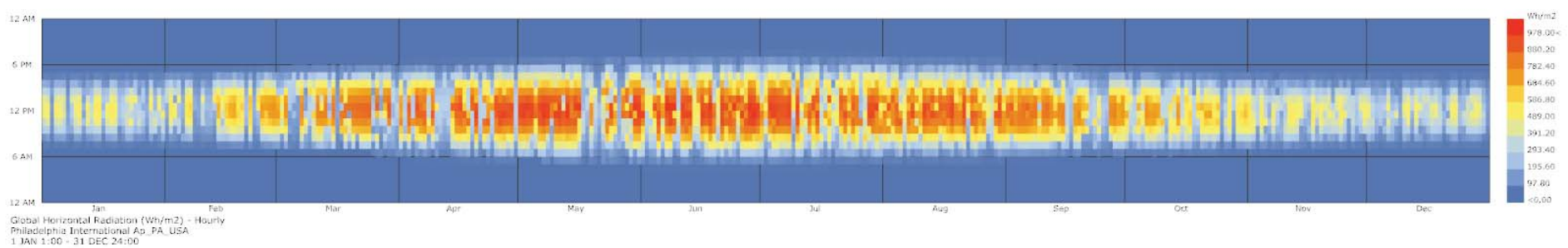
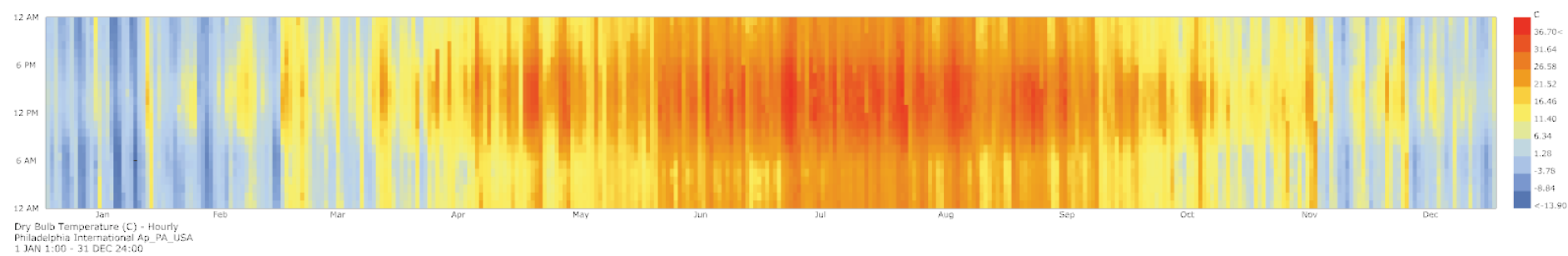
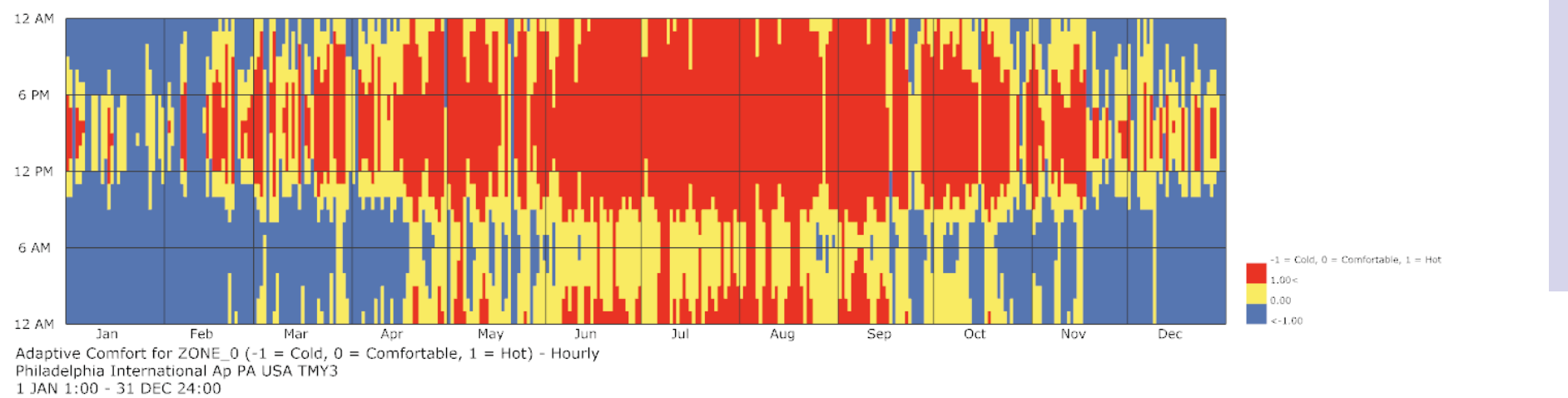


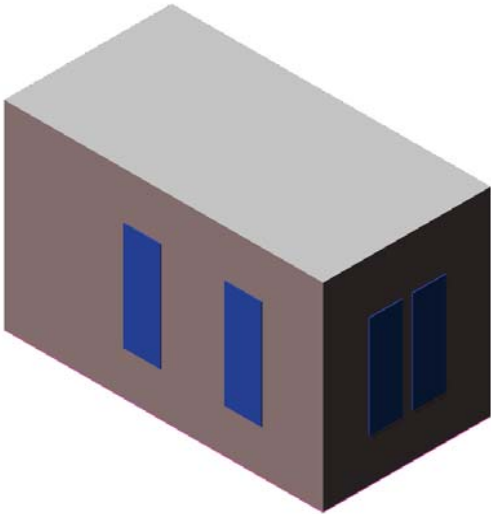
ENERGY BALANCE ANALYSIS

GRAHAM NELSON
NOVEMBER 13, 2017



GOALS AND TAKEAWAYS:

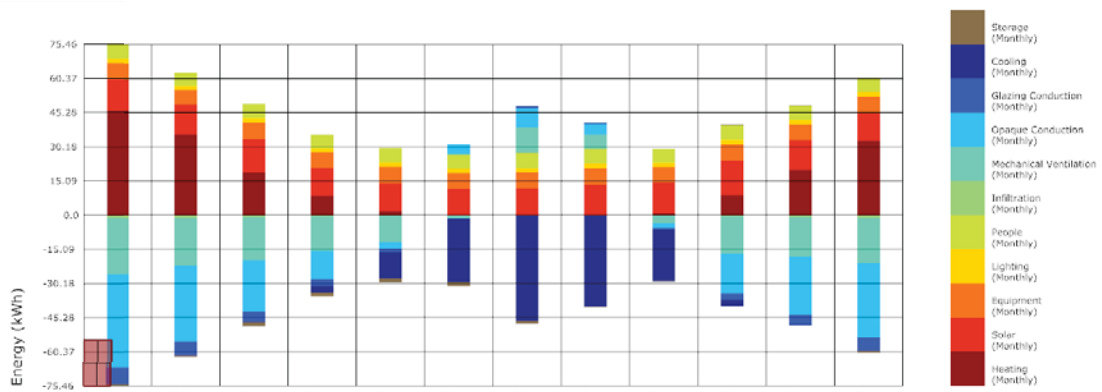
The goals of this analysis were to determine the primary factors affecting the environmental performance of a south-facing room in a 1915 Philadelphia row-house. These effects can be seen in the associated Energy Balance charts, and the variations due to certain factors. In this case, the Energy Balance relative to air changes per hour, number of occupants per square meter, U-Value of the windows, and R-Value of the exterior walls are of particular importance. The charts make it apparent how the space's environmental performance is improved with a reduction in the rate of air exchange and an increase in the number of persons per square meter.



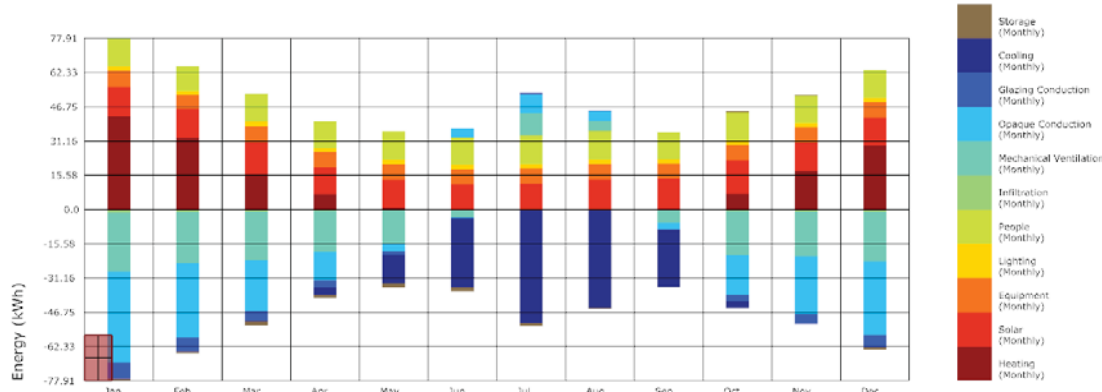
ENERGY BALANCE CHARTS

OCCUPANT VIS A VIS AREA ANALYSIS

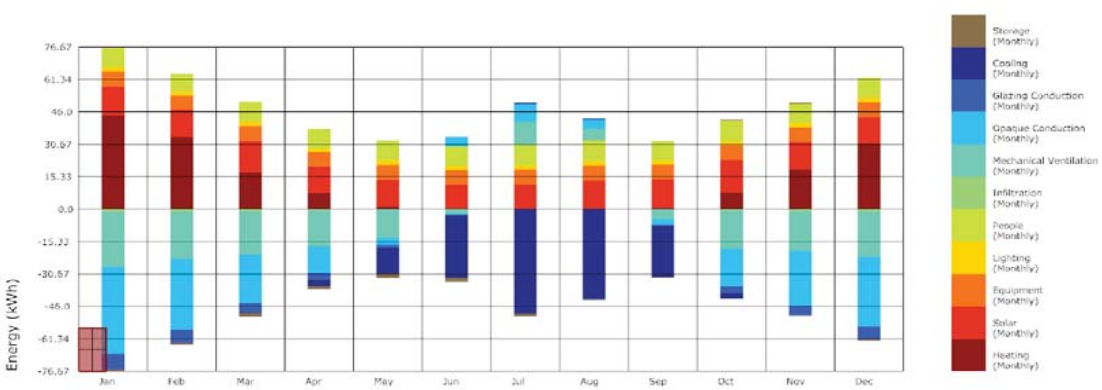
Observing the changes in the room's energy balance with respect to the density of its occupants.



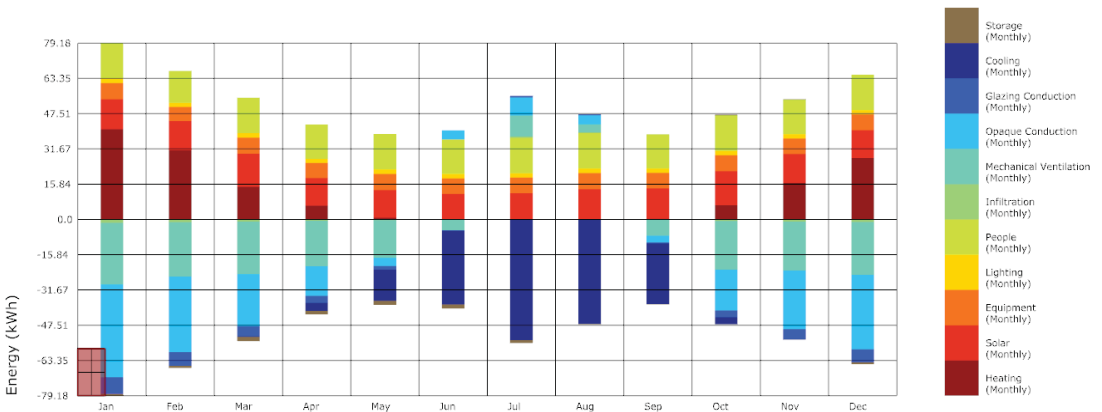
.1 Person/Meter



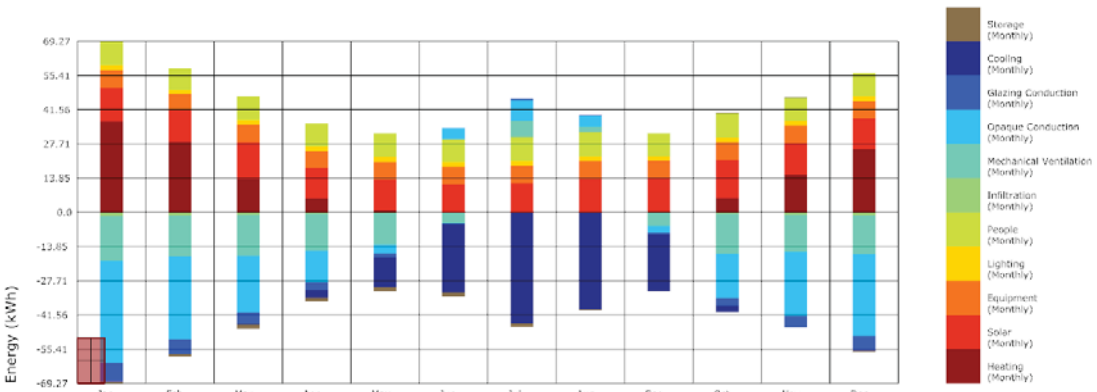
.2 Person/Meter



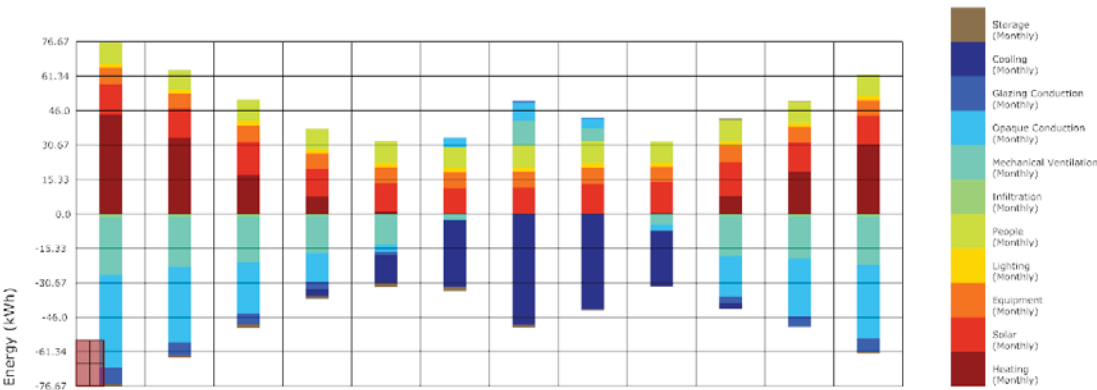
.1.5 Person/Meter



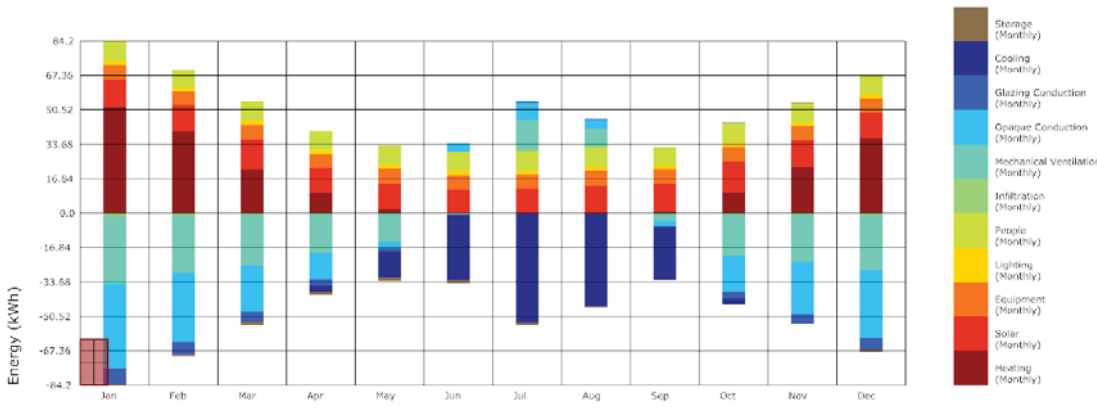
.25 Person/Meter



1 Air Change / Hour



1.5 Air Change / Hour

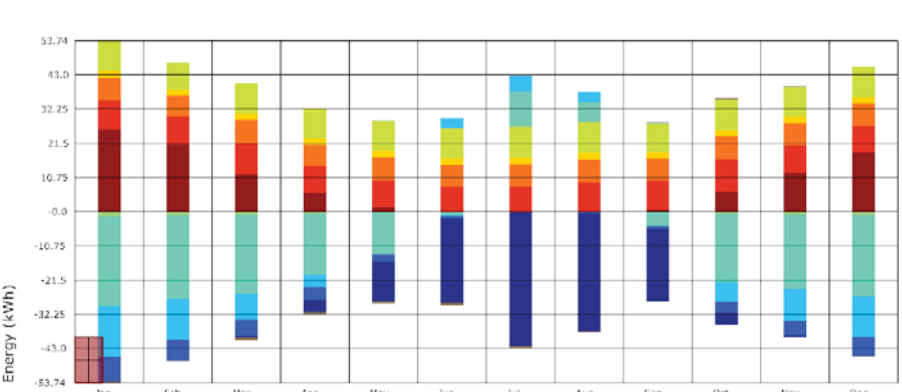


2 Air Change / Hour

ENERGY BALANCE CHARTS

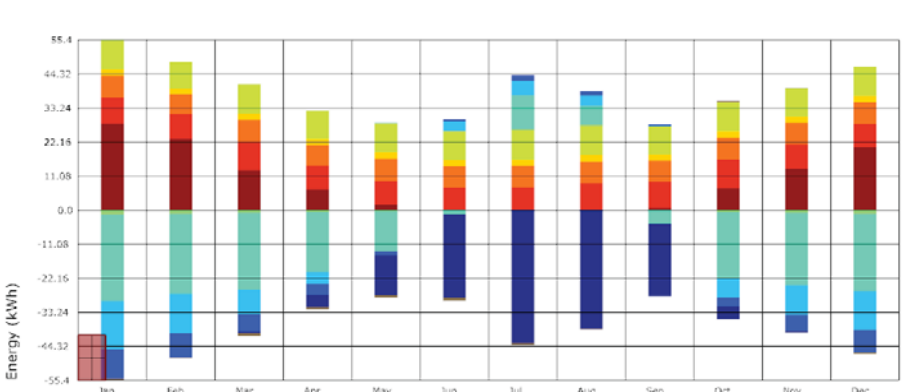
WITH RESPECT TO WALL TYPE AND INSULATION

Observing the changes in the room's energy balance due to different levels of wall insulation, Glazing U-Value, and SHGC.

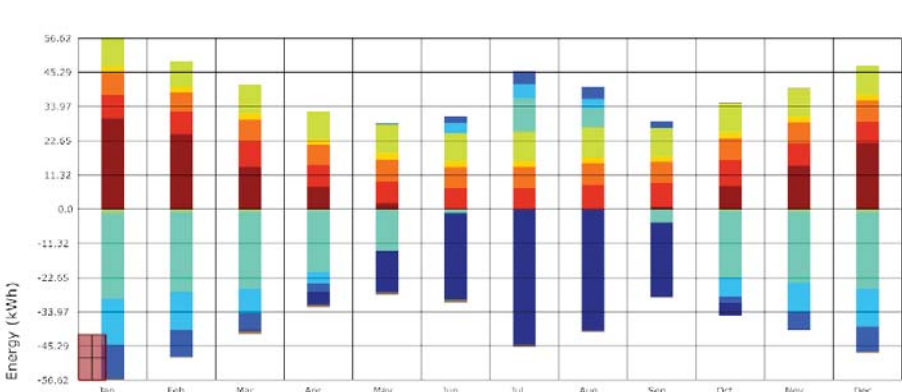


With:
Wall R-Value, 25
SHGC, .55
Visual Transmittance, .6

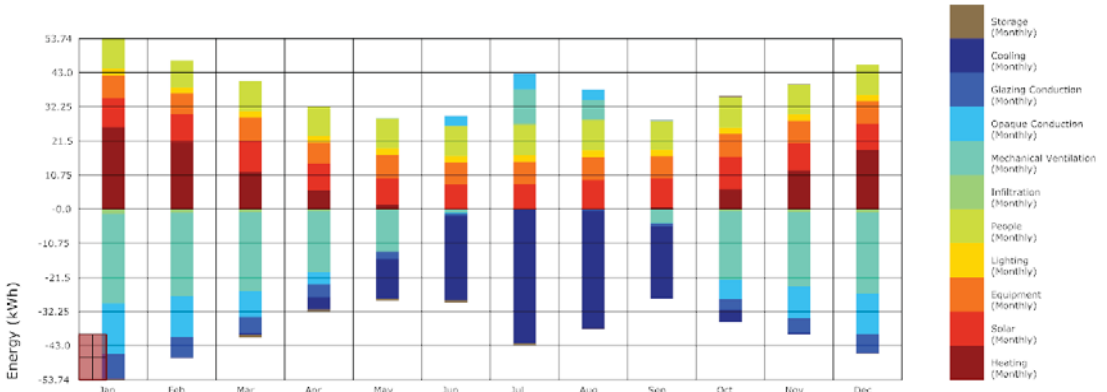
Window U-Value, .45



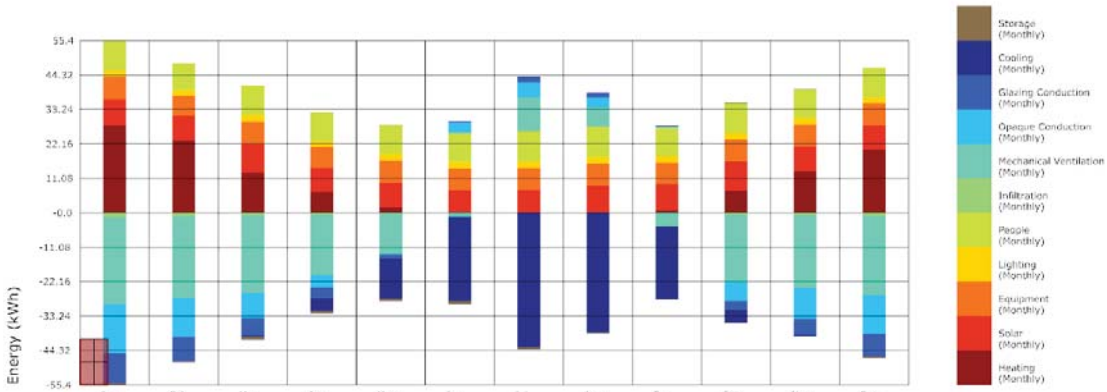
Window U-Value, .7



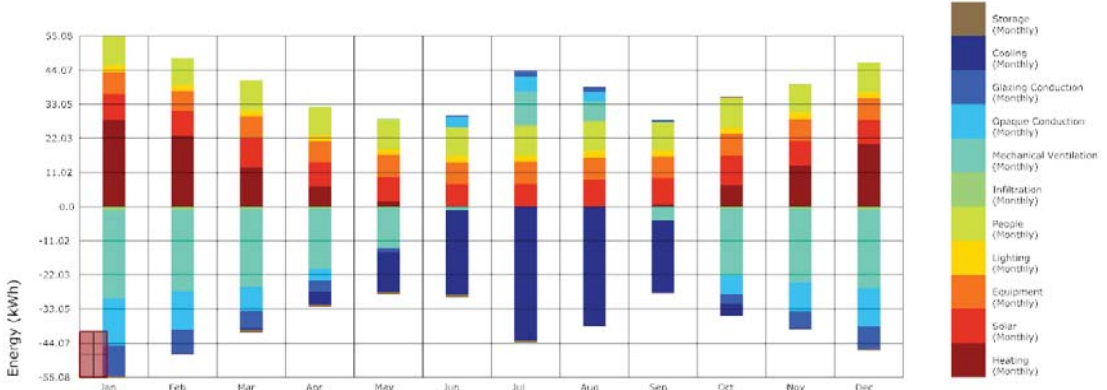
Window U-Value, .95



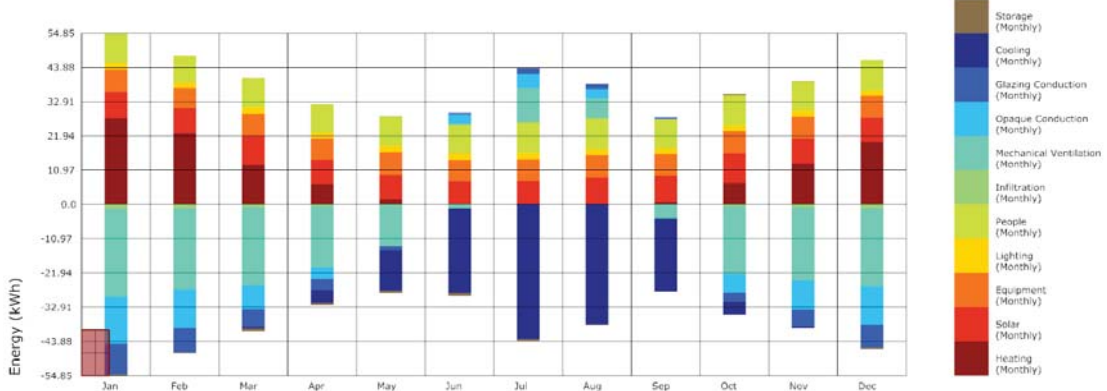
Wall R-Value, 20



Wall R-Value, 25



Wall R-Value, 30



Wall R-Value, 35

With:
Window U-Value, .65
SHGC, .55
Visual Transmittance, .6