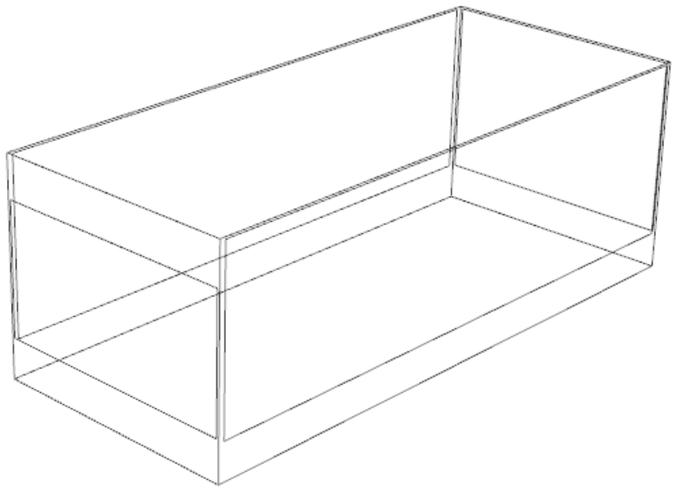
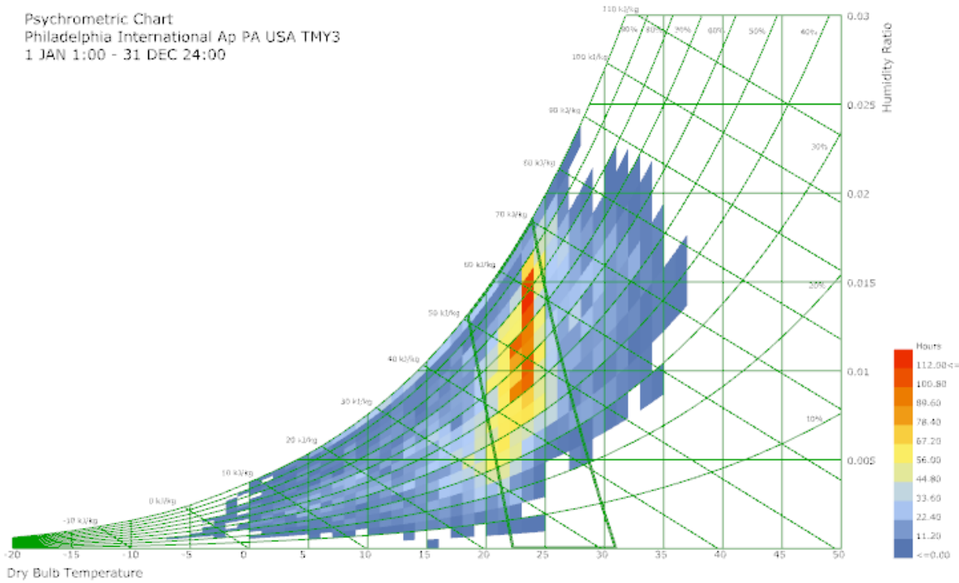
Energy Simulation

ARCH 753 Building Performance Simulation
Di Fan

Energy Simulation

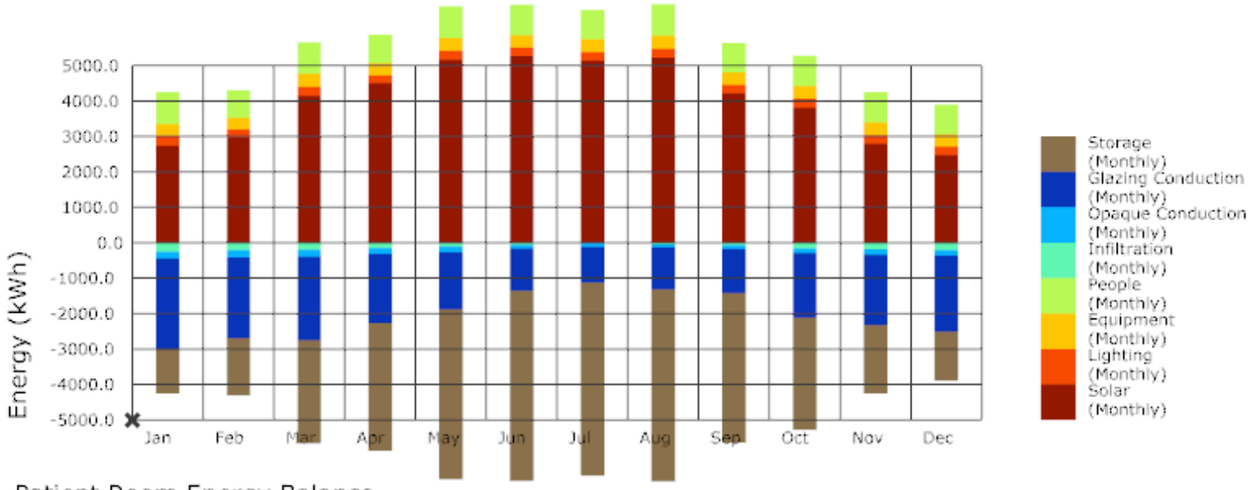




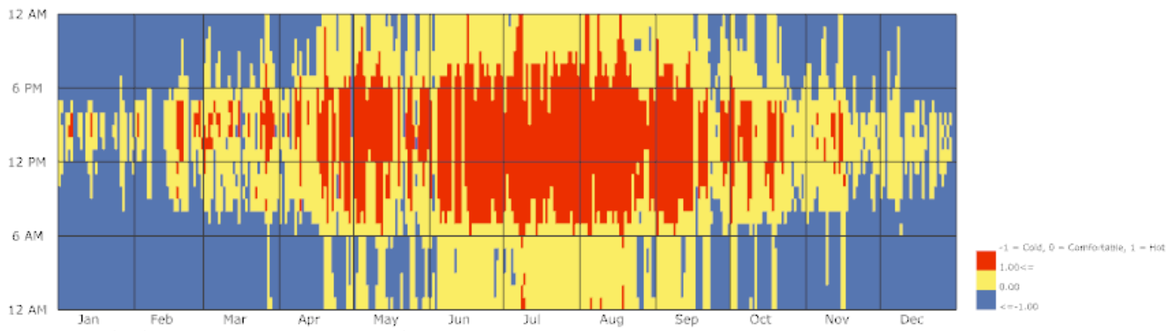
Comfortable (%): 38.47

Hot (%): 20.83

Cold (%): 40.7



Patient Room Energy Balance



Adaptive Comfort for ZONE_0_T (-1 = Cold, 0 = Comfortable, 1 = Hot) - Hourly
Philadelphia International Ap PA USA TMY3
1 JAN 1:00 - 31 DEC 24:00

From the Energy Balance chart, we could find that there is a large propotion of solar energy go into the room which result in many hot hours during the year, especially during summer time. Also, there is a big ratio of cold hours which may result as big ratio of glazing conduction. Thus, the first step is try to reducing the window ratio on all sides of the room,

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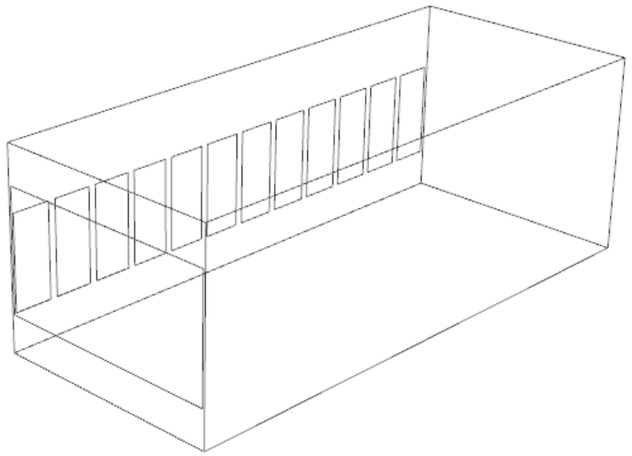
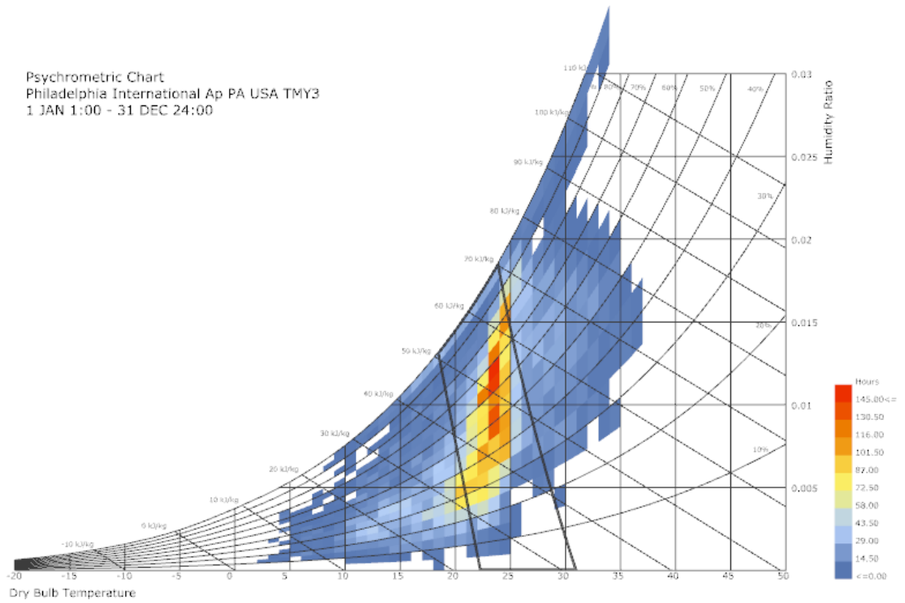
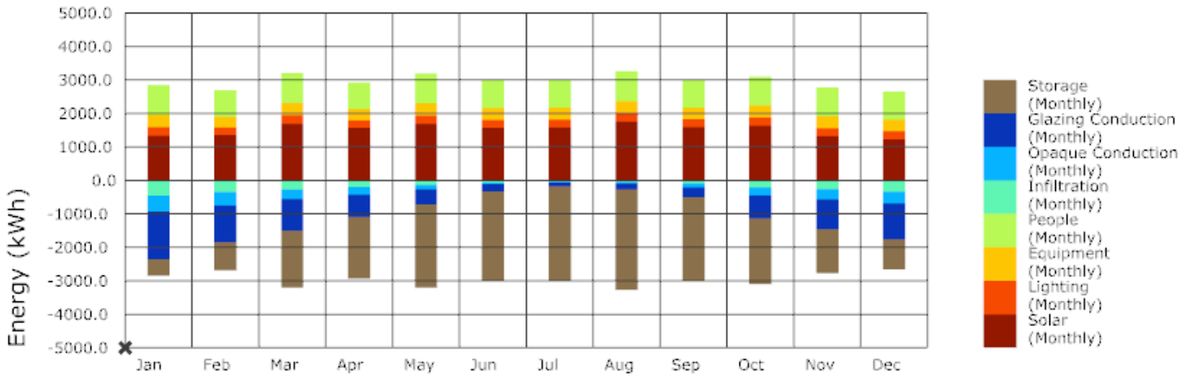




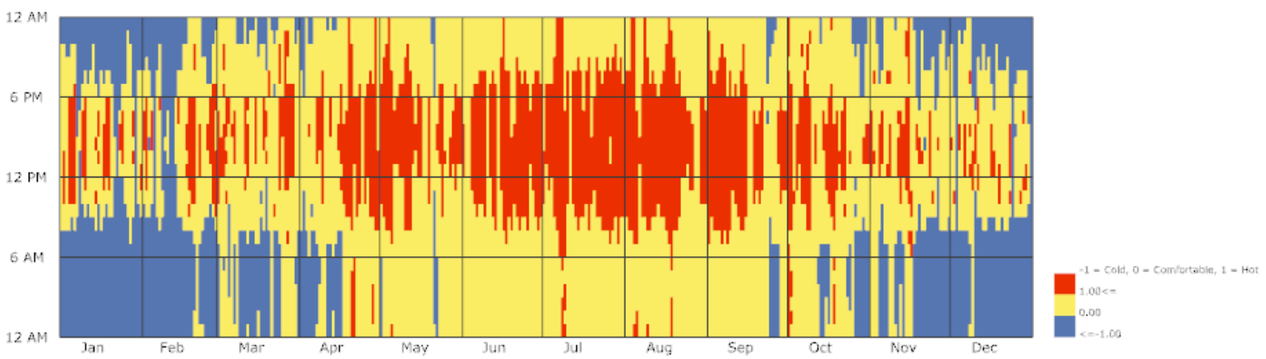
Comfortable (%): 54.61

Hot (%): 23.08

Cold (%): 22.31

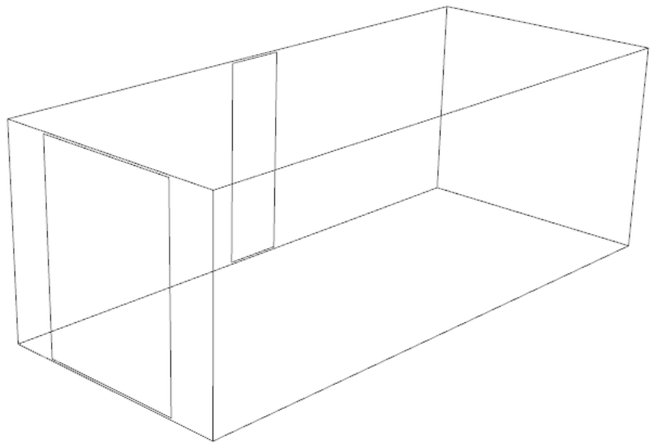


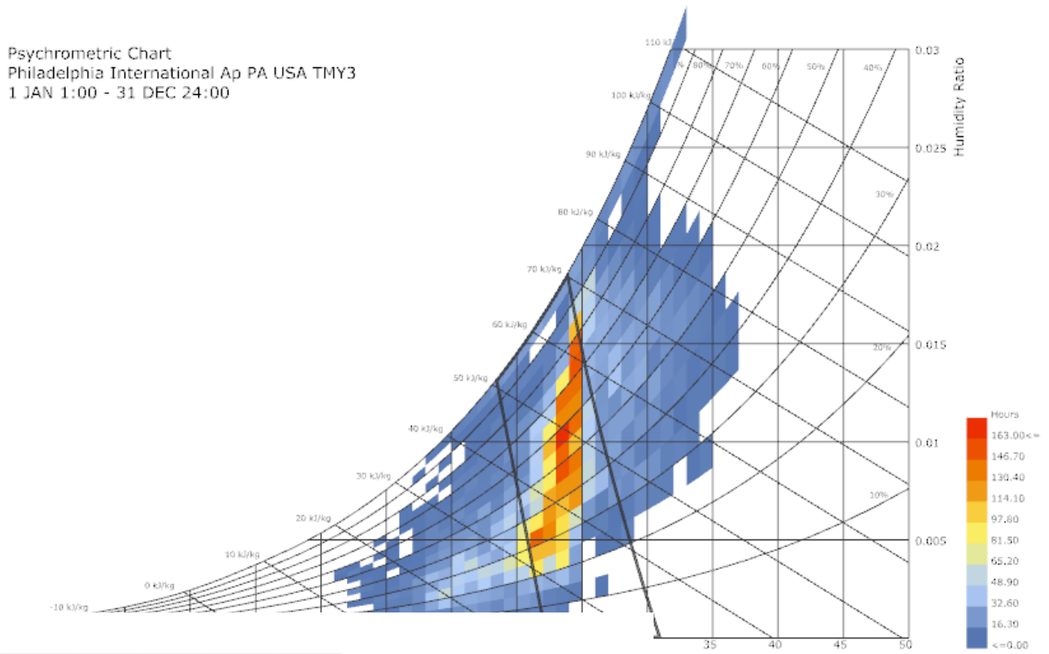
Patient Room Energy Balance



By reducing the ratio of wall to window on both south and west side of the room. The comportable ratio is increased by reducing the cold hour of the room.

Energy Simulation

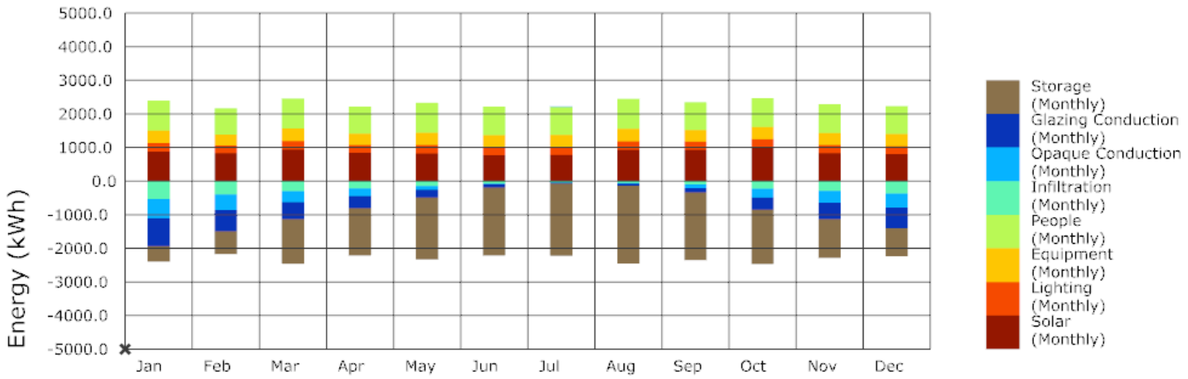




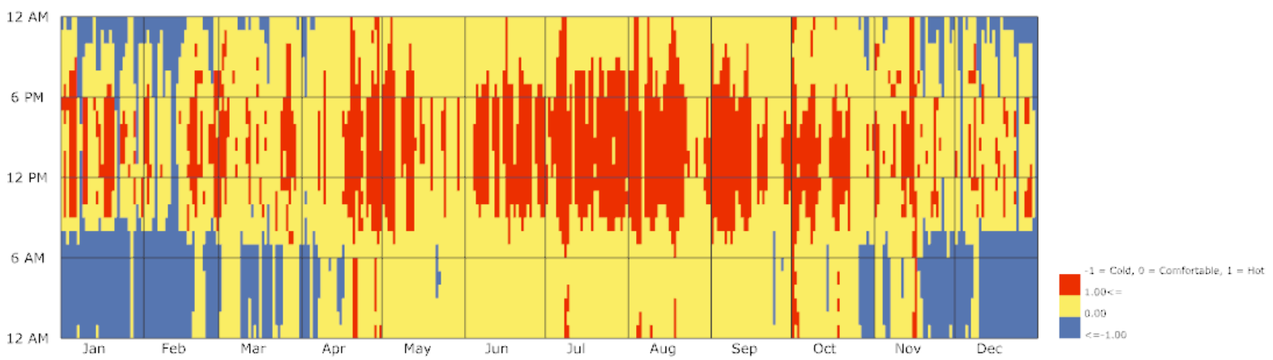
Comfortable (%): 61.46

Hot (%): 22.72

Cold (%): 15.82



Patient Room Energy Balance



Adaptive Comfort for ZONE_0_T (-1 = Cold, 0 = Comfortable, 1 = Hot) - Hourly
Philadelphia International Ap PA USA TMY3
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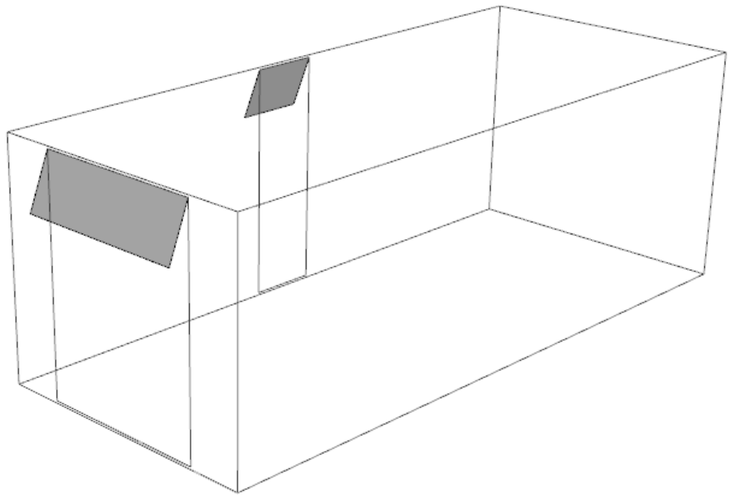
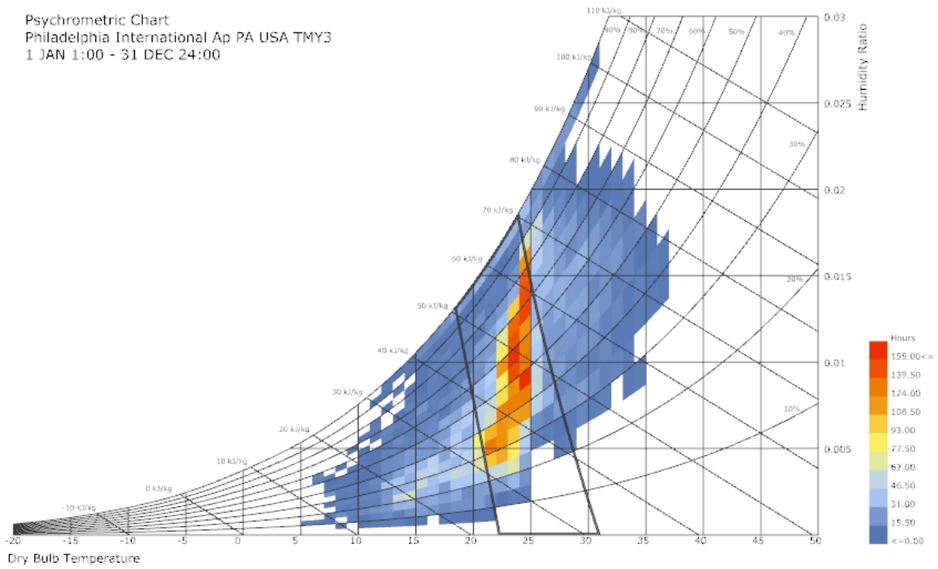
By reducing the ratio of wall to window on both south and west side of the room. The comportable ratio is increased by reducing the cold hour of the room. Next step would try to solve the hot condition by providing some shade.

Energy Simulation

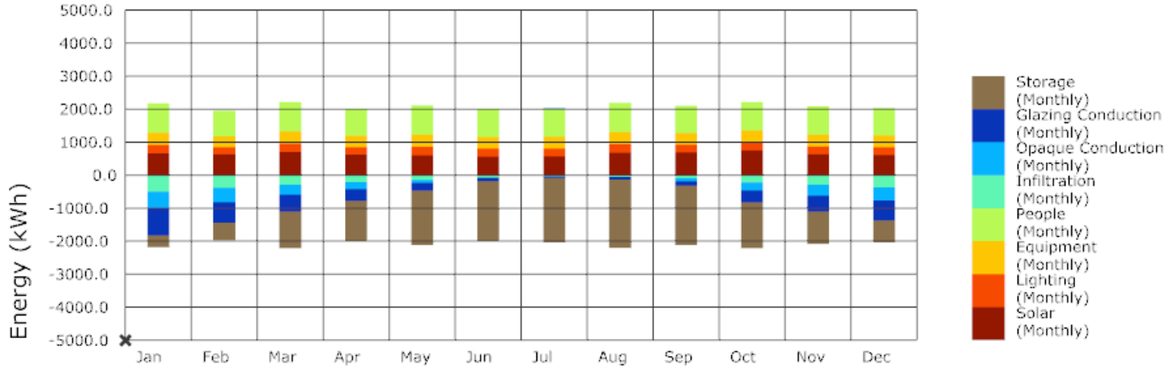




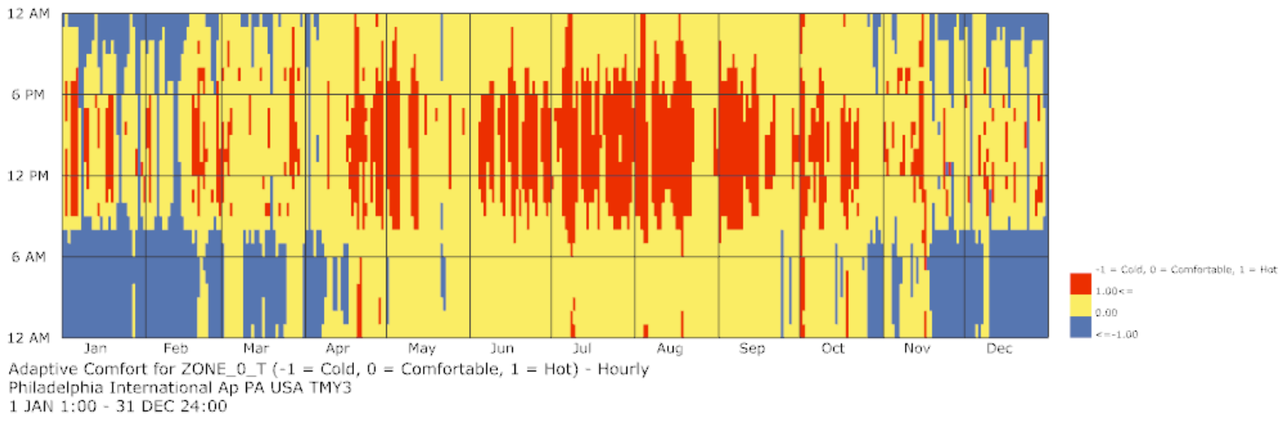
Comfortable (%): 63.92

Hot (%): 17.96

Cold (%): 18.13



Patient Room Energy Balance



By providing shades on south and west window, the comfortable ratio is increased in general. Basically, the hot hour is reduced by blocking solar radiation during the whole year. However, the cold hour is increased. Thus, providing the shades seasonally could futher increase the comfortable ratio of the room.

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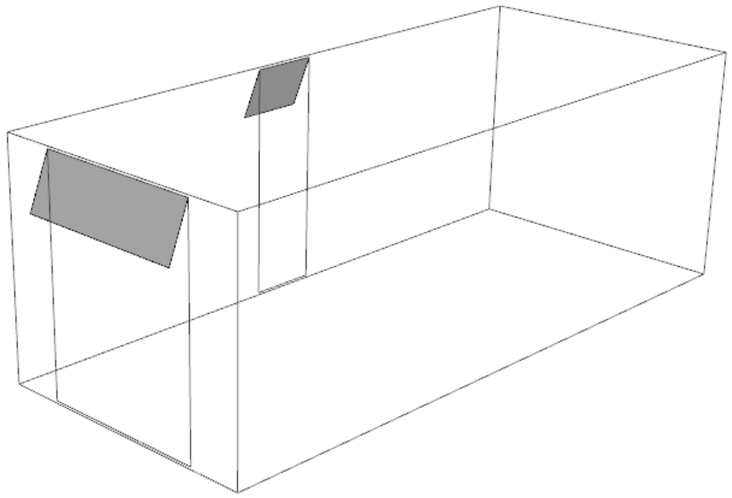
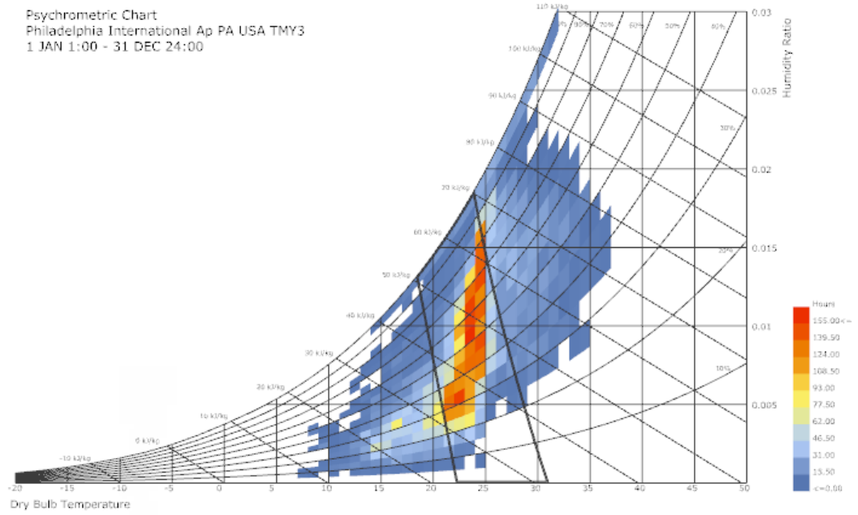
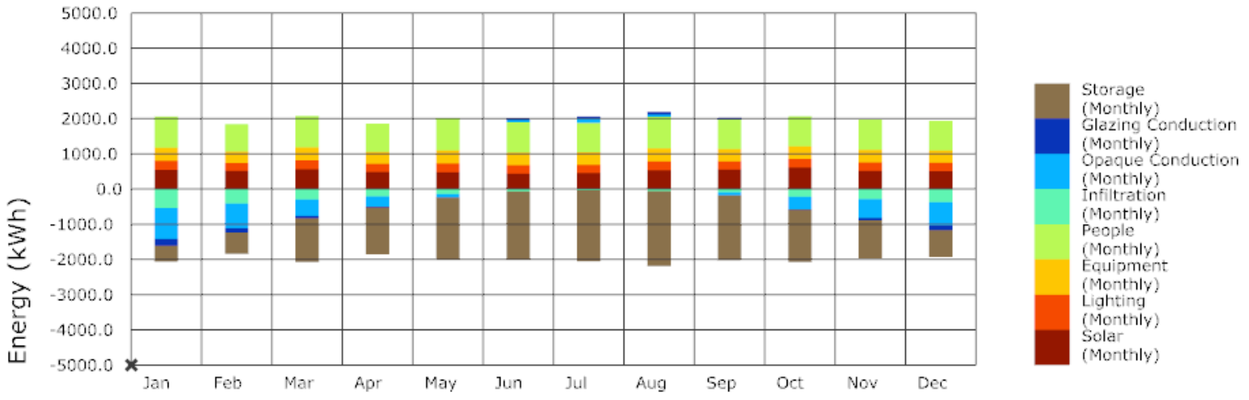




Comfortable (%): 64.62

Hot (%): 20.99

Cold (%): 14.38



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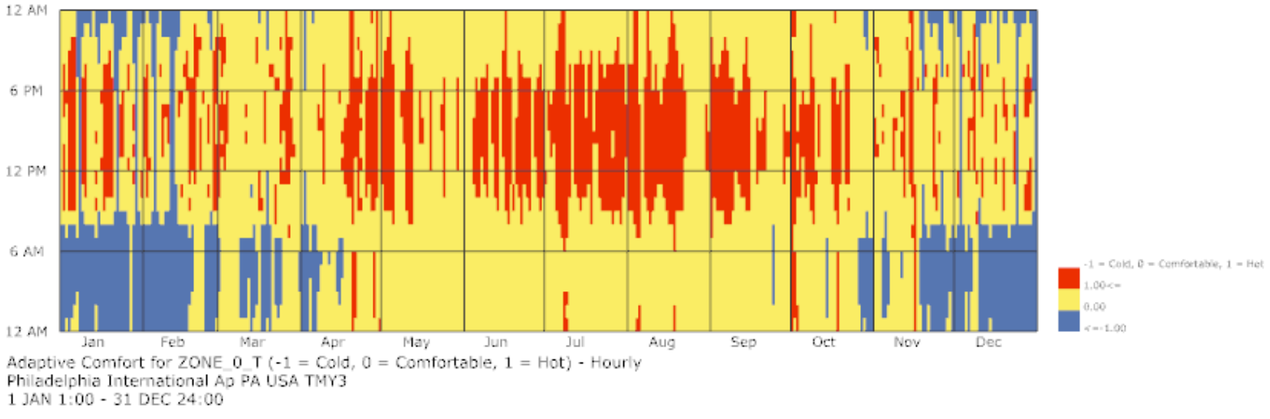

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By changing exterior window material to R0.7, SHGC 0.65. The comfortable hour of the room is increasd as the cold hour is greatly decreased.