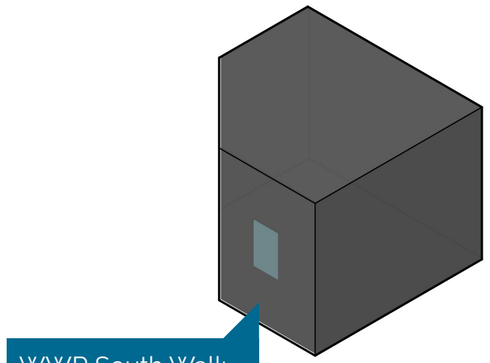
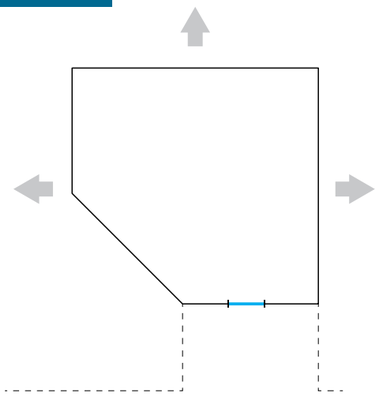
2144 Kater Street

Philadelphia, PA 19146





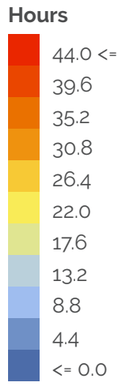
* *Not Modeled:*

- East parti wall
- Bathroom and hallway to the west
- Hallway/the rest of the house to the north

ANNUALLY this room is **comfortable only for 19%** of the time. The majority of the year (61%), the room is too cold. The simulation result is largely due to energy loss from infiltration, which, in the simplification of the modeling*, is presenting behaviour of a room situated as a singular entity in the round.

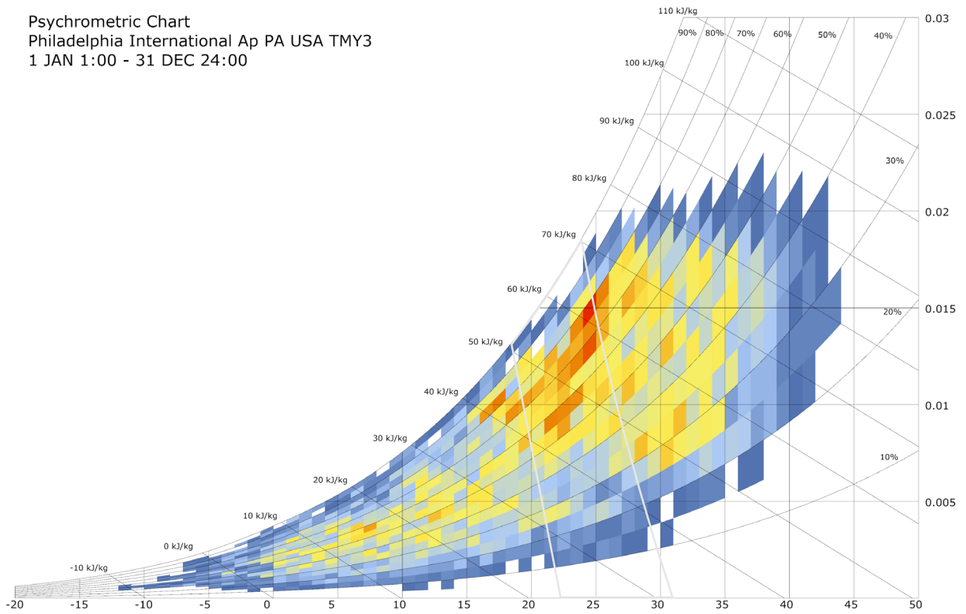
To reduce energy loss due to infiltration, the adjacent rooms can be added to the model or the wall construction can be adjusted. **Solar gain can be increased in the winter time** by increasing the WWR ratio on the south wall to increase comfort in the winter months but shading devices must be employed to reduce summer heat gain (as seen in the Adaptive Comfort chart).

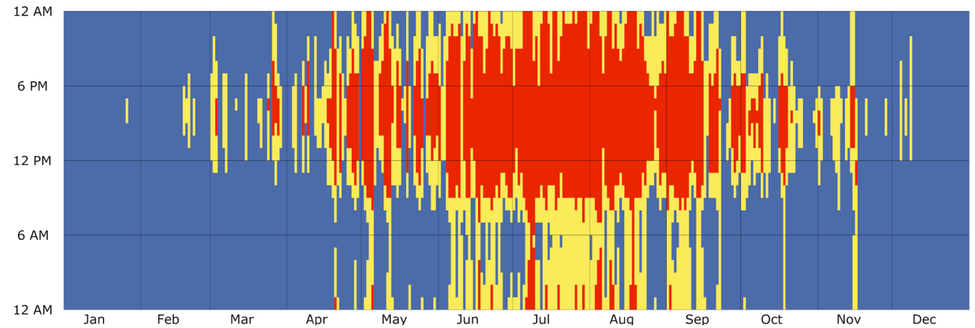
This model also is not taking account the internal loads of an office, although the single occupancy should not produce high internal load that will contribute to heating up the space.

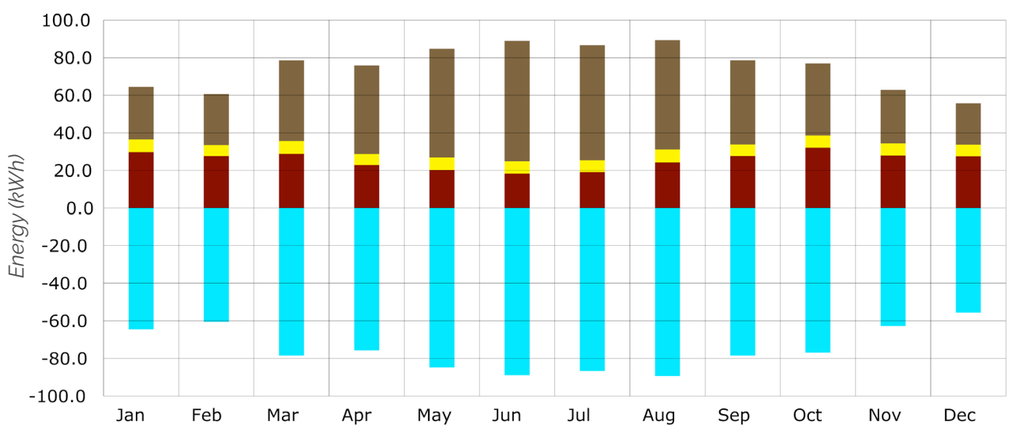


Adaptive Comfort

Base Energy Balance







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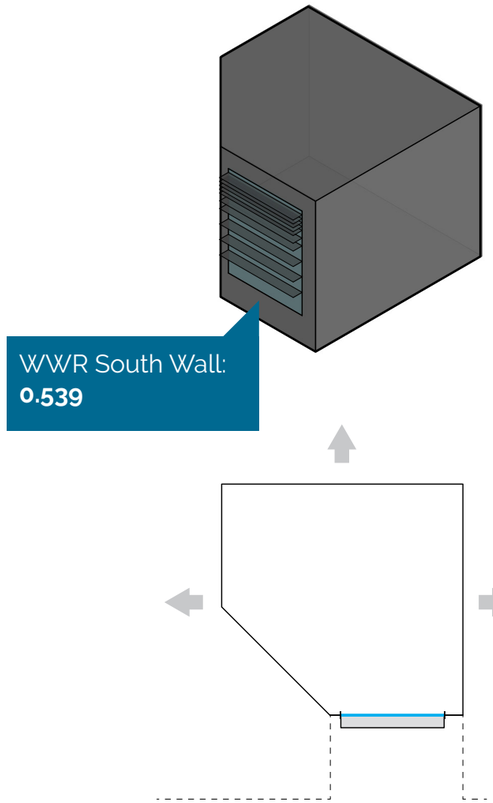

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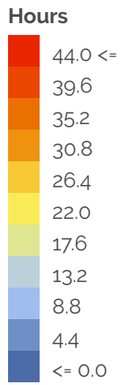
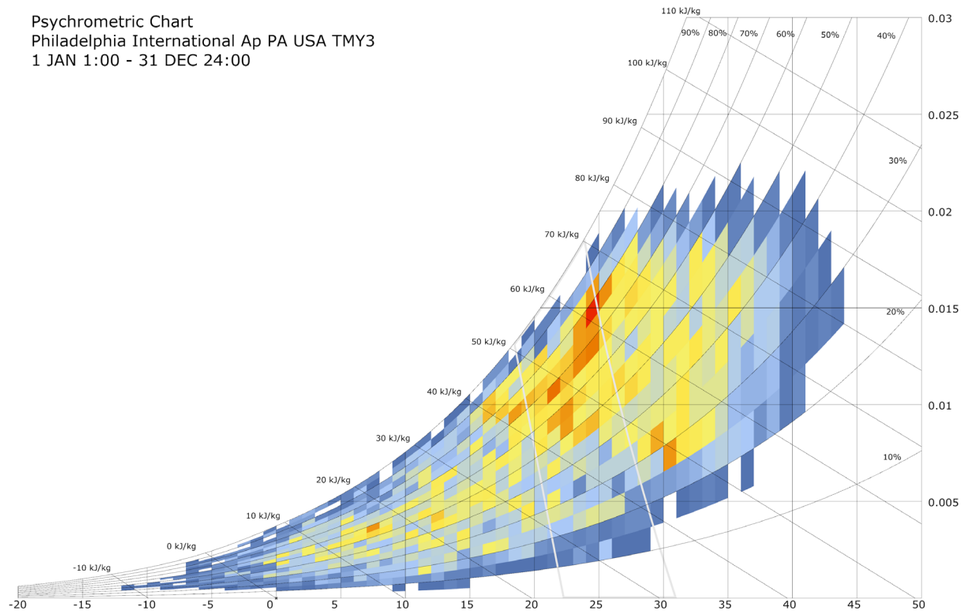
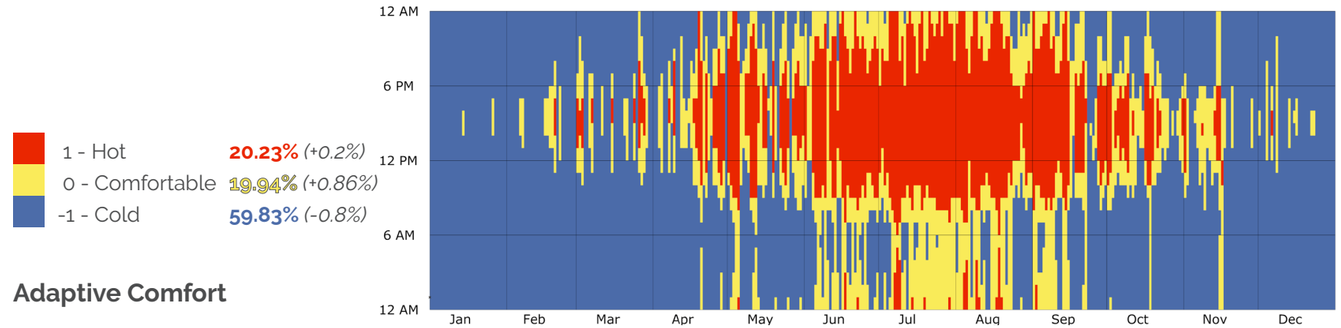
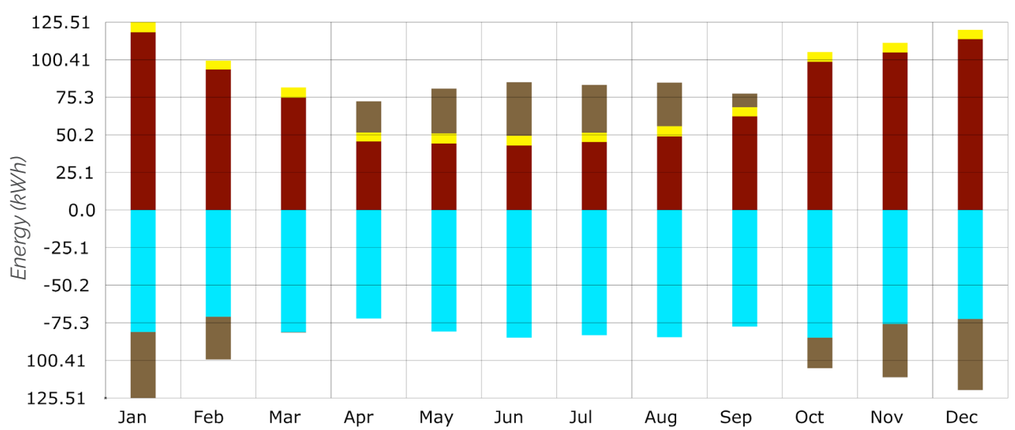






Adaptive Comfort

Base Energy Balance



THE ADJUSTMENT INCREASED THE ANNUAL COMFORT

by 0.89% to nearly 20% of the year. The amount of discomfort due to the cold is significant compared to the discomfort due to heat.

It became a priority to reduce discomfort due to the cold while maintaining (or increasing) the amount of comfortable days. The increase in glazing surface reduced energy loads in storage during the winter months. Energy loss due to infiltration incrased by approdimately 15 kWh but it is diminished as a trade off with an increase in solar heat gain (5-folds increase) in the winter months.

Adjustable internal shading can be applied to reduce solar heat gain the the summer months during the days when ventilation is not ideal (low wind speed and/or high humidity levels).

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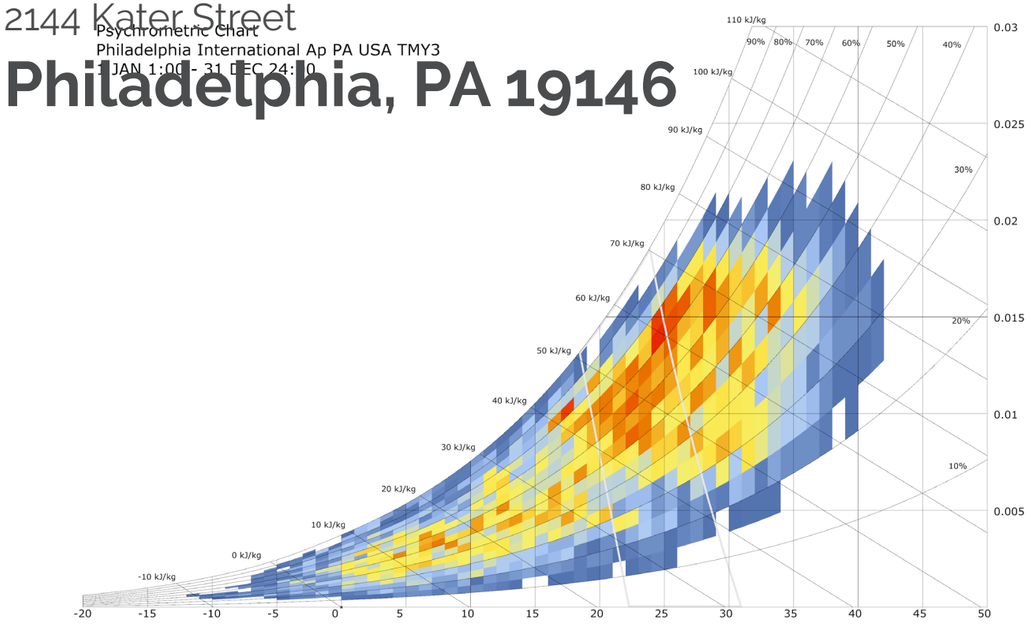
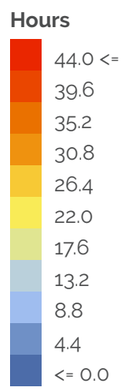
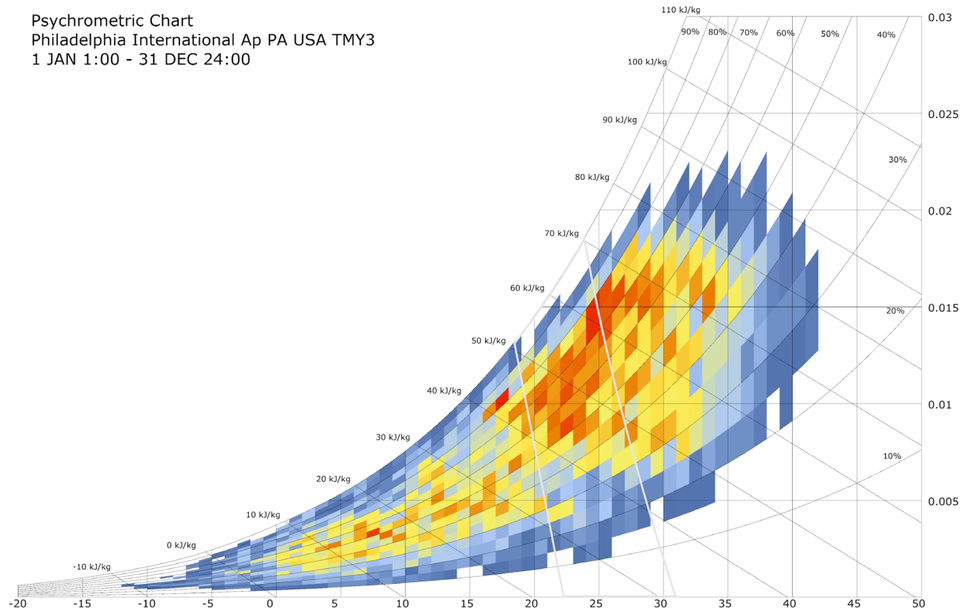
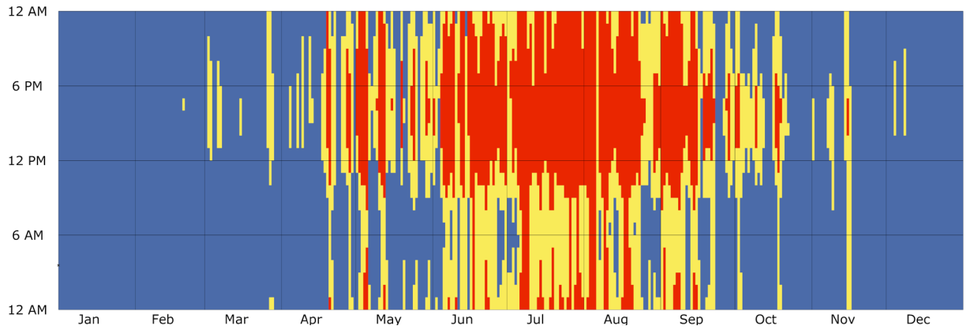


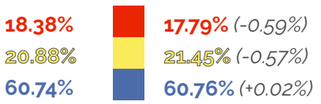
COMPARING

base case with context
versus altered case with context

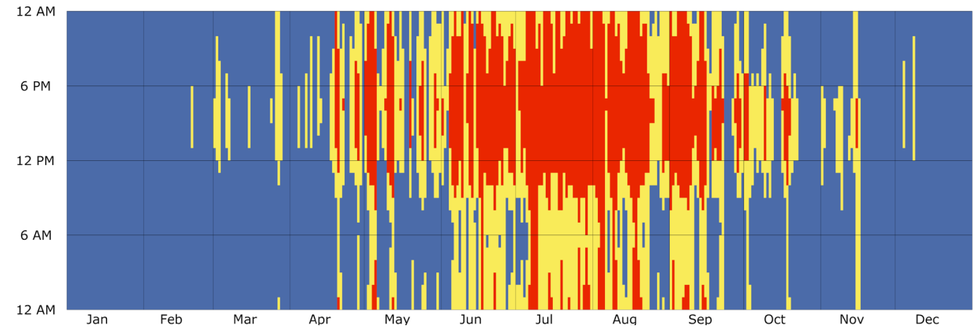


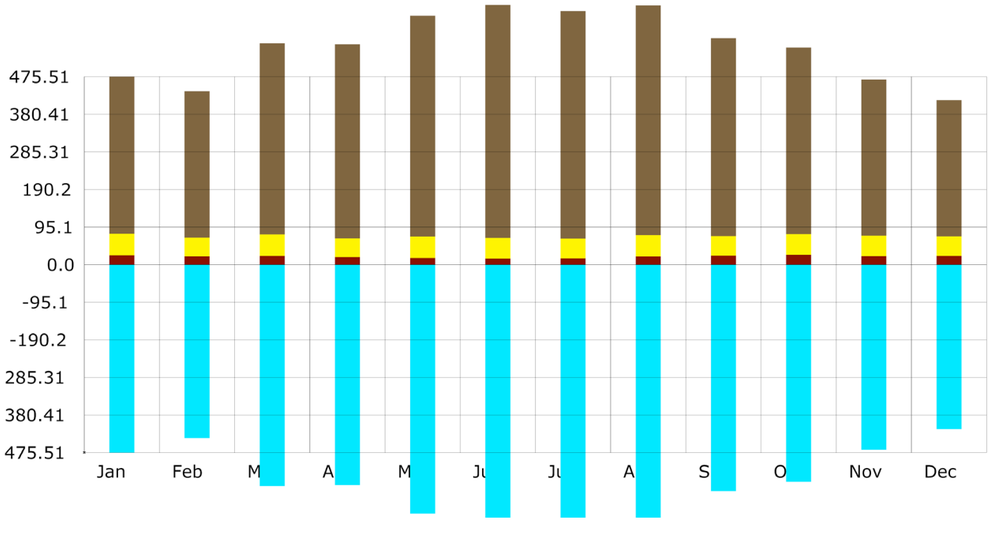






Adaptive Comfort





Base Energy Balance