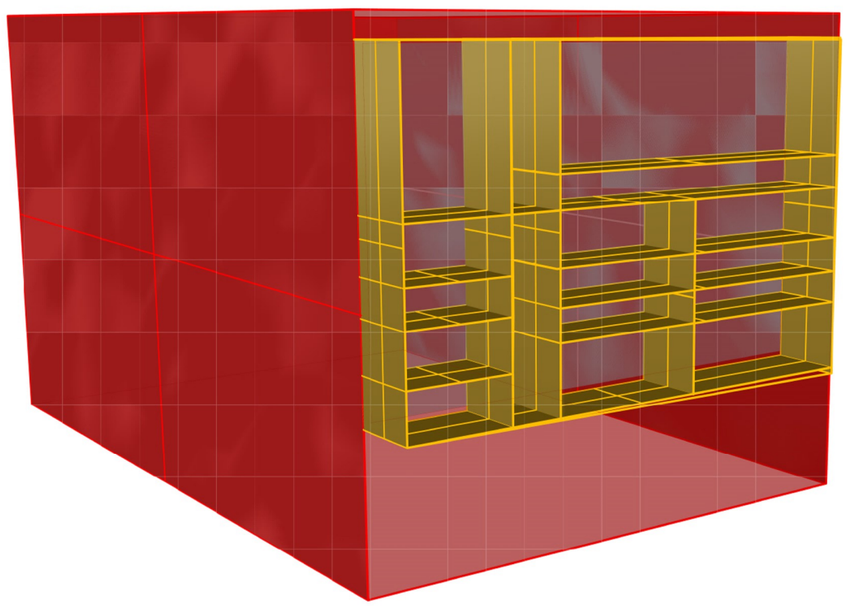
Integrated Energy and Lighting Model
and
Occupancy Schedule

Building Performance Simulation

Silmi Farah _ MEBD 17-18

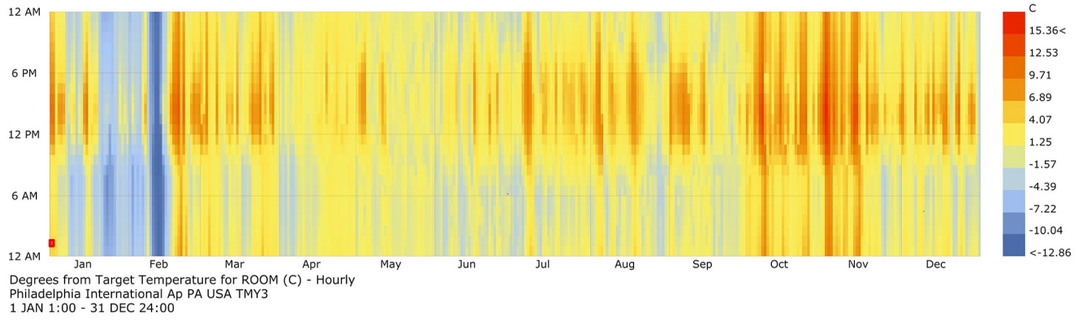


Room Thermal Condition with Ventilation and infliteration:

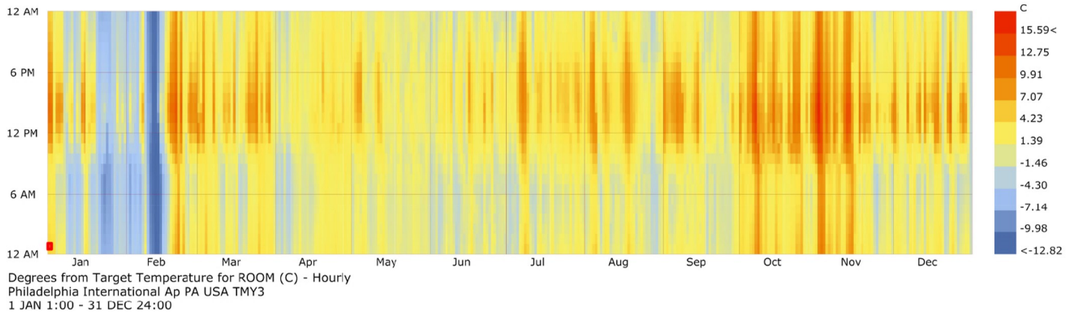
The mid-rise apartment shading was designed to minimse the energy load with maximum passive solutions. The opening is at the south so the solar reduction was the challenge which was partially resolved with shading and creating light shelf so it ensures uniform lighting. And solar gain in the winter was necessary as well.

But, the thermal comfort condition was still solved partially but ensuring a ventilation made a good solution for the design.

Change in occupancy: customised schedule affects slightly in energy model.



Degrees from Target Temperature for ROOM (C) - Hourly
Philadelphia International Ap PA USA TMY3
1 JAN 1:00 - 31 DEC 24:00



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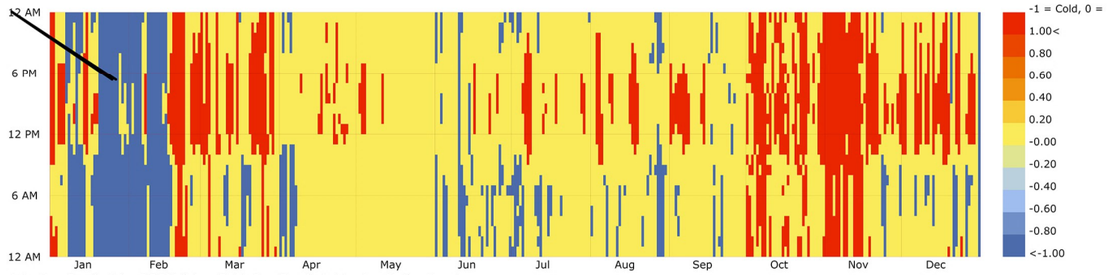
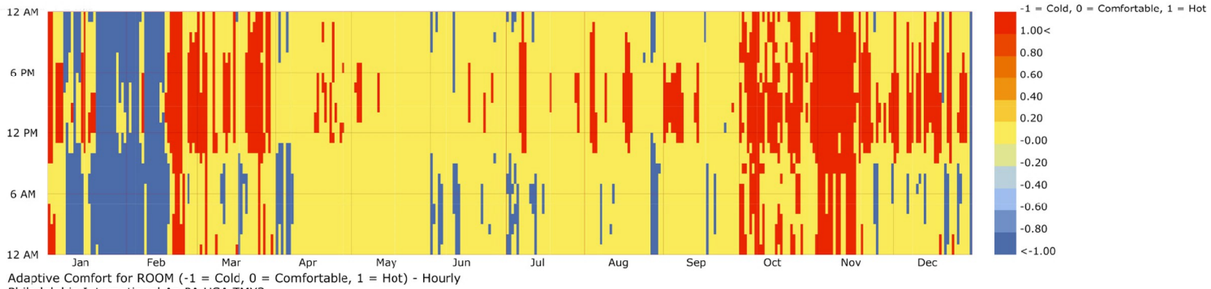


Adaptive Comfort for ROOM (-1 = Cold, 0 = Comfortable, 1 = Hot) - Hourly
Philadelphia International Ap PA USA TMY3
1 JAN 1:00 - 31 DEC 24:00



Adaptive Comfort for ROOM (-1 = Cold, 0 = Comfortable, 1 = Hot) - Hourly
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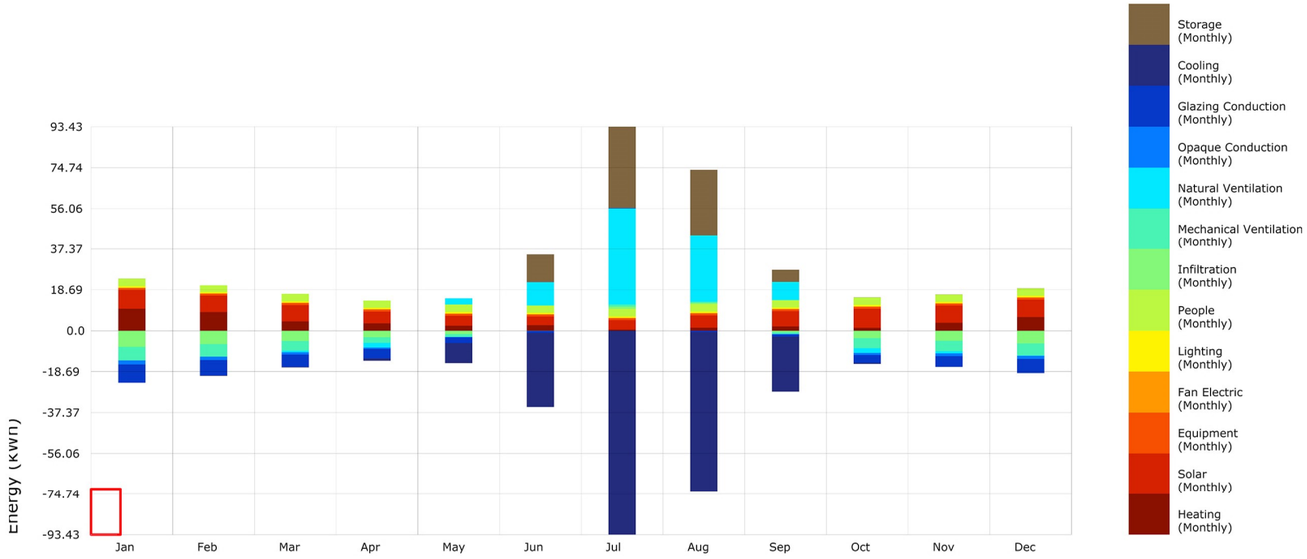
Before Occupancy change

After Occupancy change

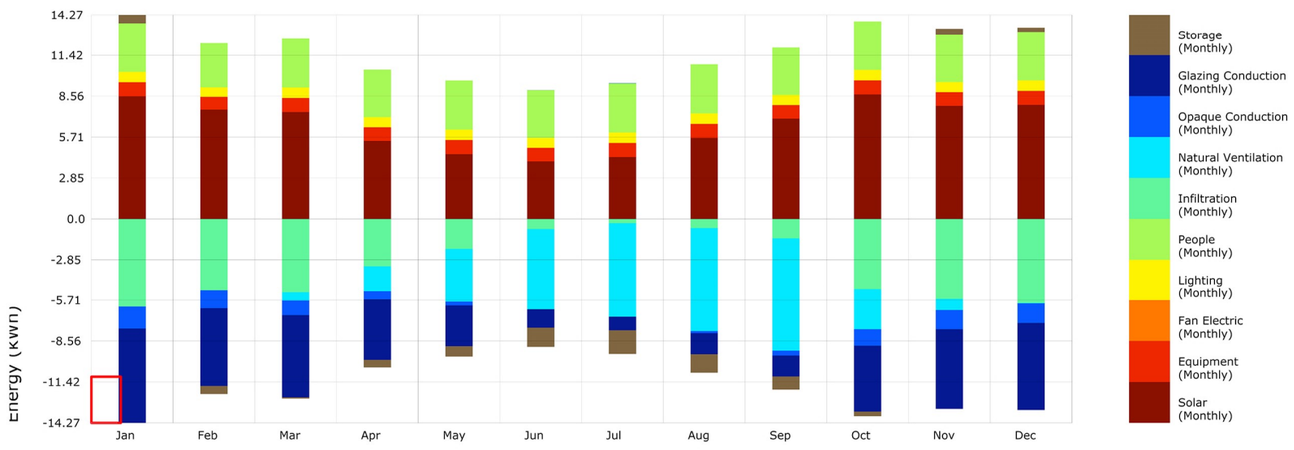
Energy Balance Calculation:
To check the heat transfers in the building I checked the energy balance chart again to check any significant heat gain and loss.

Also, I checked what would be the loads if without ventilation the room entirely depended on HVAC to check the ventilation heat transfer with windows.

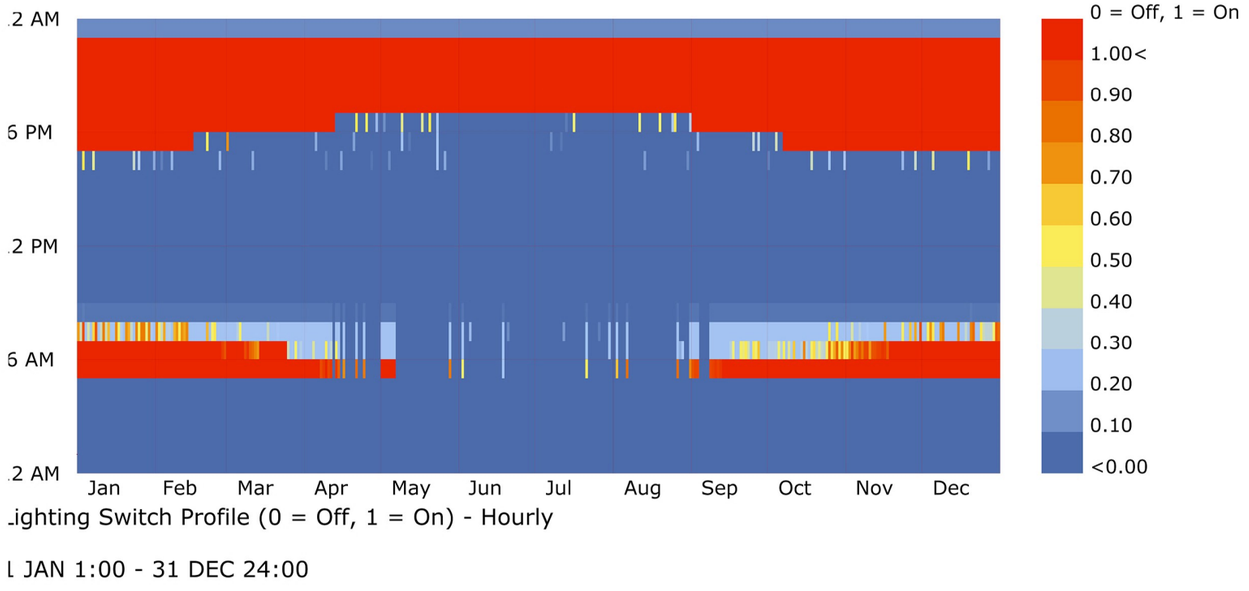
Electric LIghting Load of the Building was also checked in the integrated model



Test done with HVAC system



Entirely Passive system



Annual Electrical Lighting Load