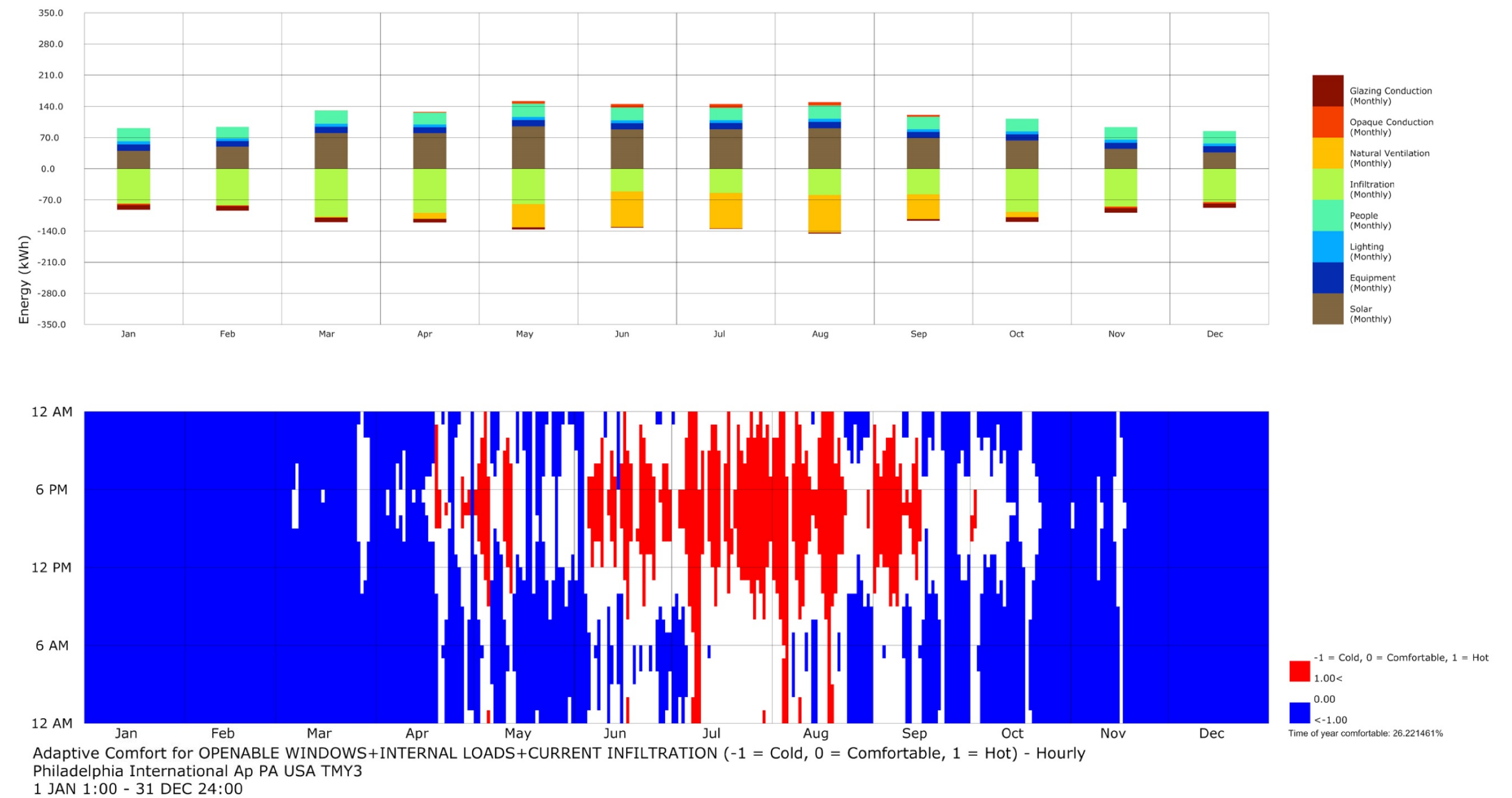


Energy Analysis: Existing Apartment

- The existing apartment has a brick masonry wall with a small window-to-wall ration which limits daylight.
- The windows are leaky and have a high amount of infiltration which makes the apartment cold in winter months.
- The amount of daylight from the windows is insufficient as shown in week 6.



Energy Analysis: Daylight Optimized

- The window-to-wall ratio was increased and an optimized shading device was designed for the apartment in week 7.
- If windows with lower infiltration are installed for this design then both the daylighting and thermal comfort of the apartment are improved.
- A comparison of the energy balance bar-graphs of the current apartment with that of the proposed improvements show that the energy gained from solar radiation is greater in the second case. The increase in heat gained from solar radiation is largely compensated by increased cooling through natural ventilation in summer and the percentage of the year that the apartment is comfortable increases by nearly 10%.
- This comparison demonstrates the advantage of treating the space as an “open system” as advocated by the likes of Moe and others¹ as long as the openness of the system is under the occupant’s control (and not a result of uncontrolled infiltration).

1. Moe, Kiel. 2014. Insulating Modernism: Isolated and Non-isolated Thermodynamics in Architecture. Basel: Birkhauser.

