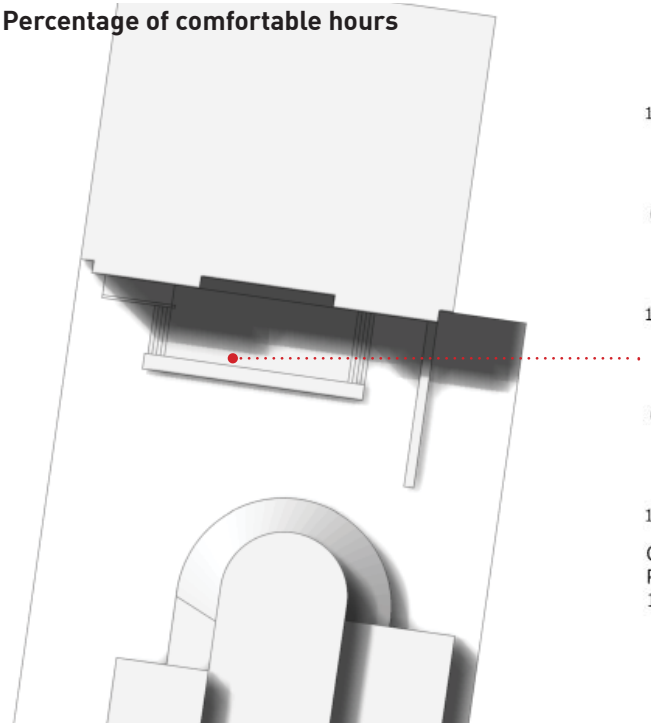
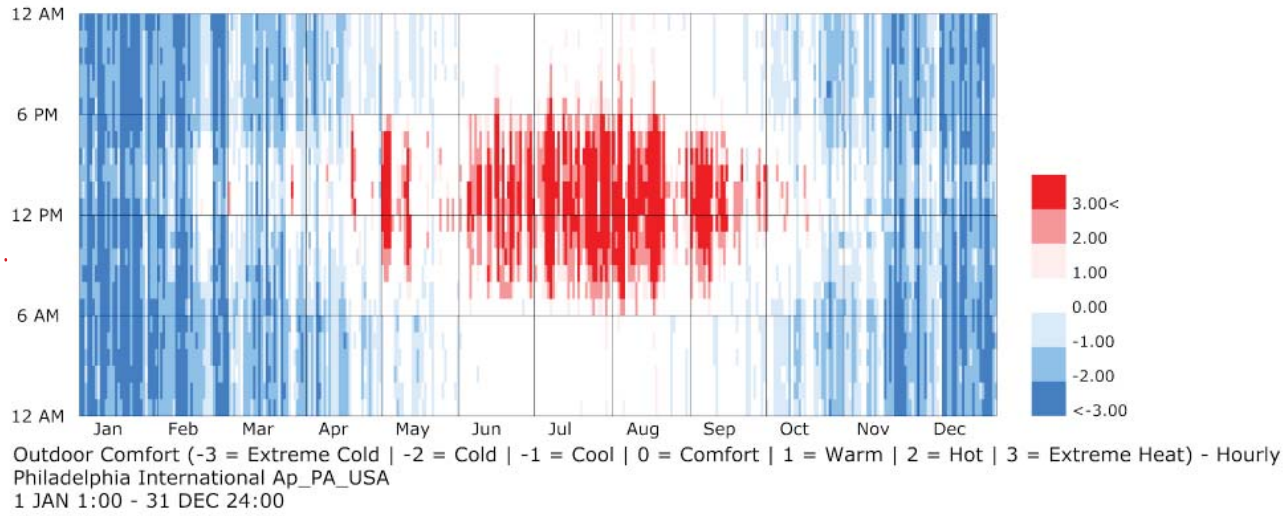
Percentage of comfortable hours





Analysis

- Can you achieve comfort for %100 of the time?

- No.Firstly, the cold stress condition could hardly be improved with outdoor passive design; Secondly, when the temperature gets really high in summer, blocking radiation heat from sun wouldn't help much to make people feel comfortable.

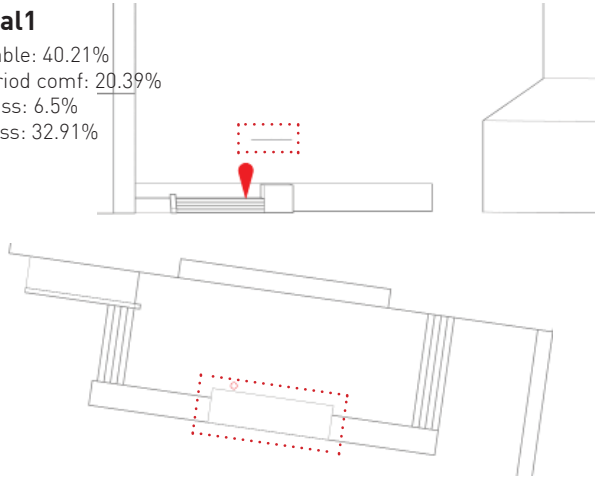
- What is the highest possible percentage of comfortable hours that you can achieve with passive design strategies?

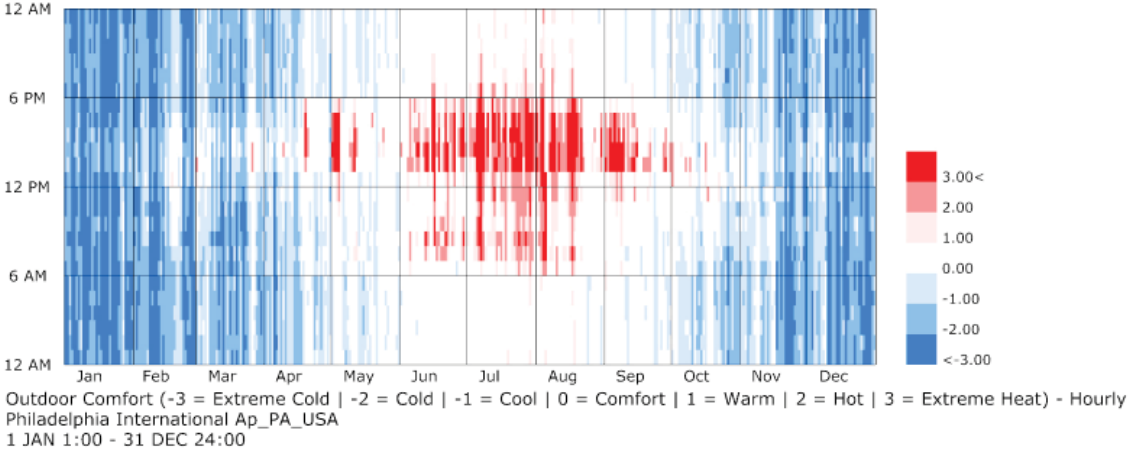
- According to the following experiments, the highest percentage I could achieve is 42.26%.

Sirui Chen

Proposal1

Comfortable: 40.21%
Short period comf: 20.39%
Heat stress: 6.5%
Cold stress: 32.91%

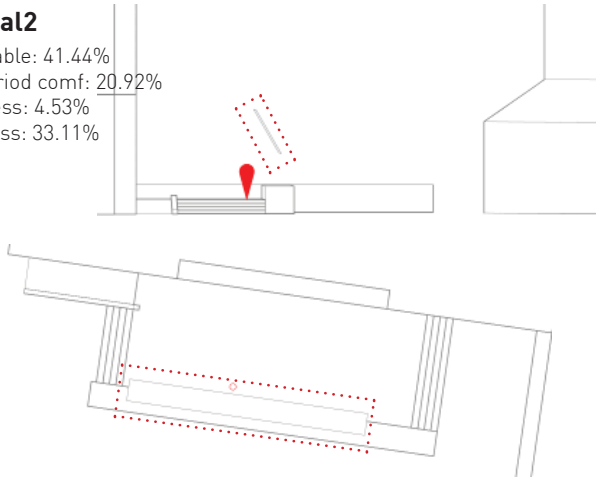


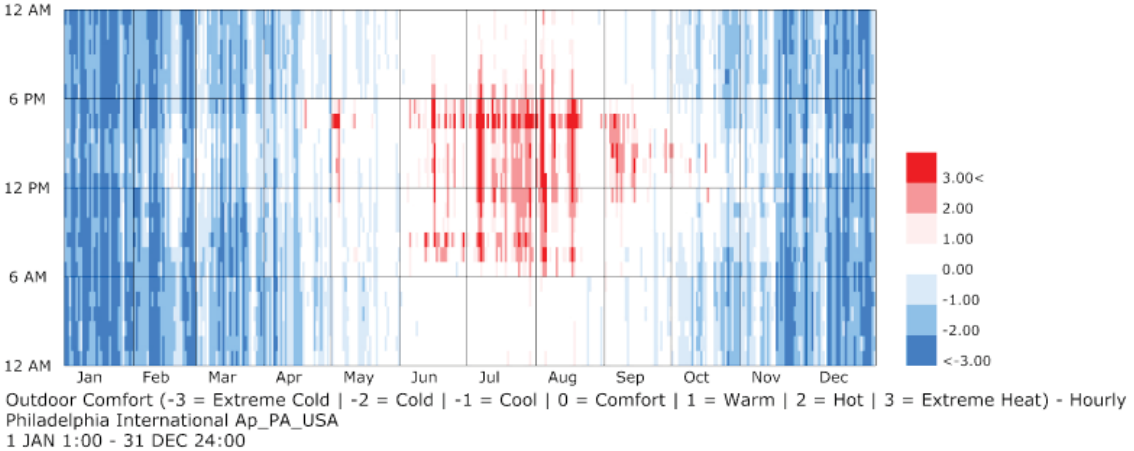


Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Proposal2

Comfortable: 41.44%
Short period comf: 20.92%
Heat stress: 4.53%
Cold stress: 33.11%

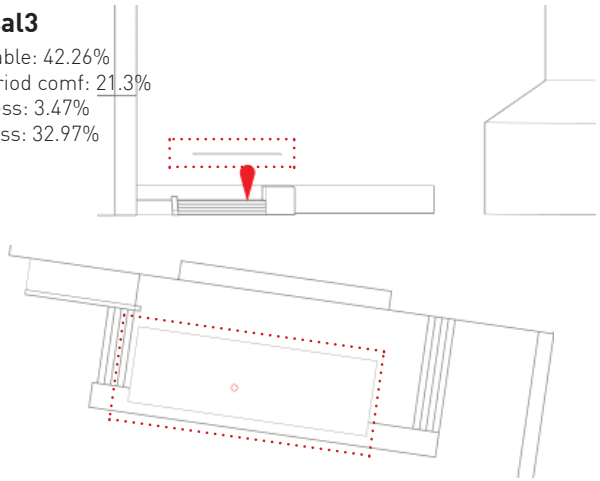


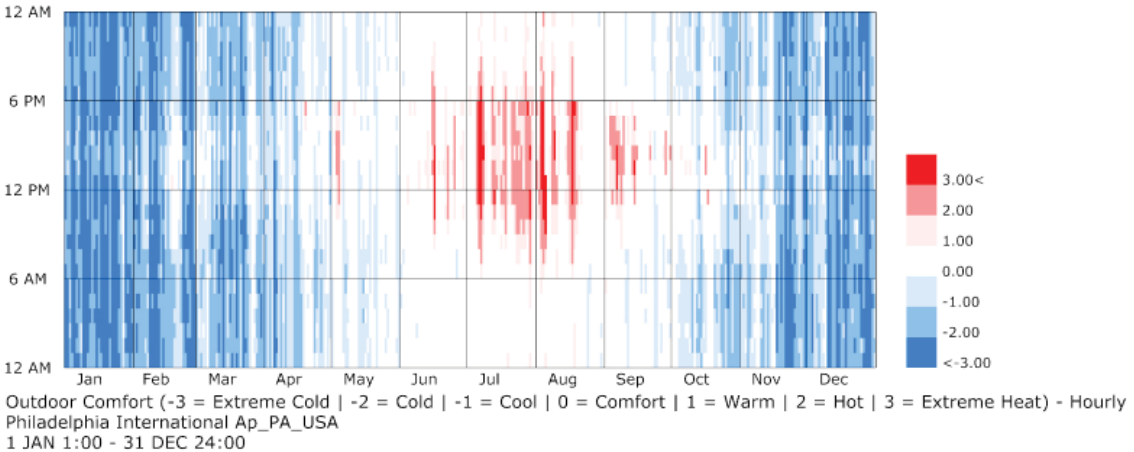


Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Proposal3

Comfortable: 42.26%
Short period comf: 21.3%
Heat stress: 3.47%
Cold stress: 32.97%





Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00