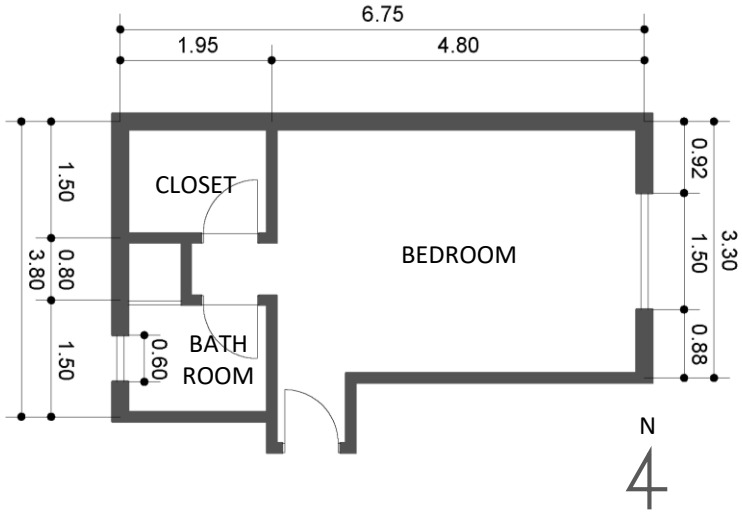
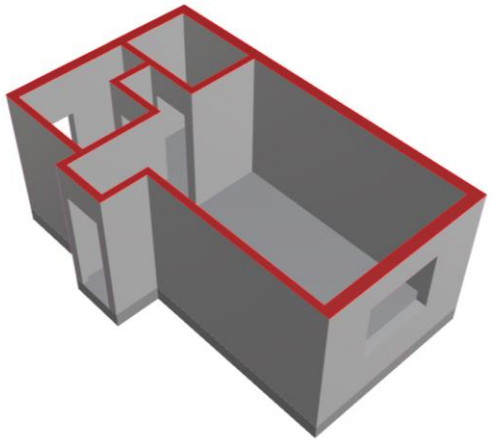
My Room is…

located in Ardmore, PA.
(6 miles from PennDesign)
spacious room,
But insufficient daylight.
window faces to East.

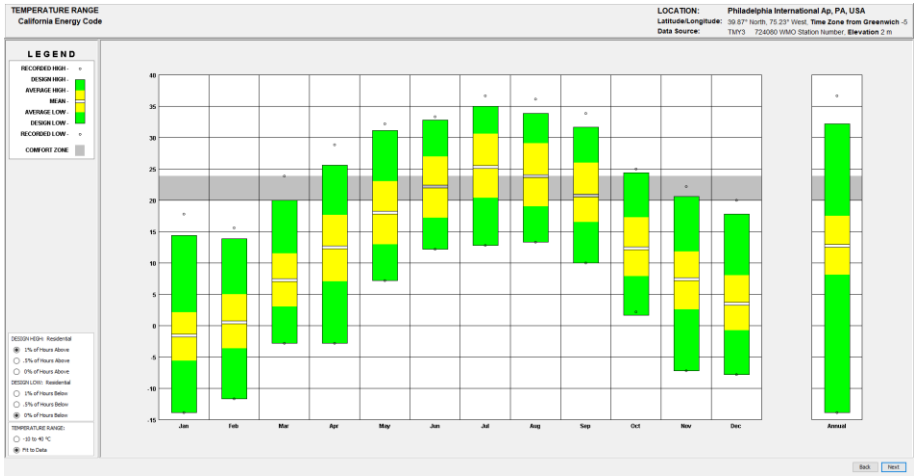


Floor Plan (Unit: m)



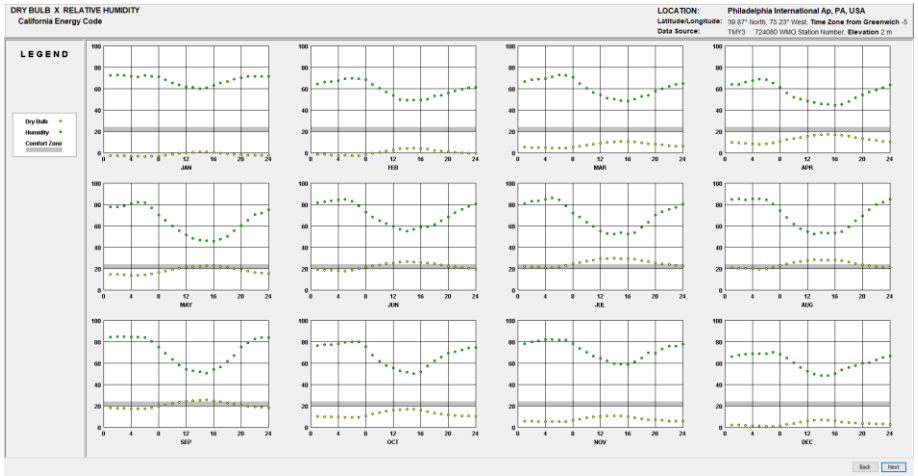
Floor Height: 3m

Philadelphia has…



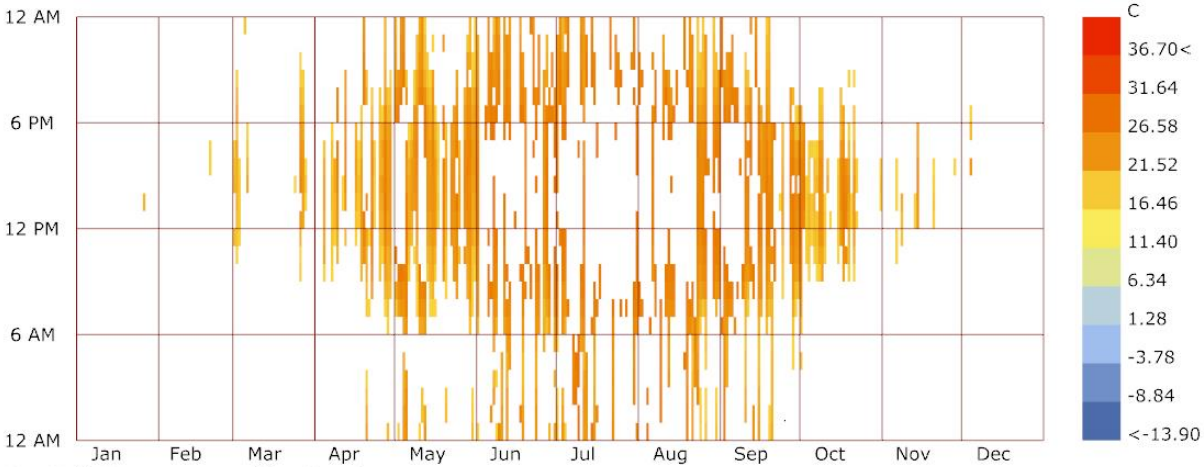
four distinctive seasons

Hottest month: 26°C (July)
Coldest month: 2°C (January)



Annual Relative Humidity on average is around 65%

I hope my room is always filled with sun light and breeze, so I would like to keep the windows as open as possible. Especially, I prefer the room temperature to be cooled down.



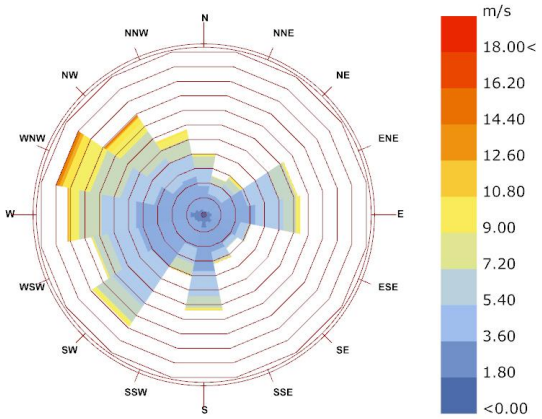
Dry Bulb Temperature (C) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Temperature 15 °C < a <26 °C
Relative Humidity b < 80%
Wind Speed c > 2m/s

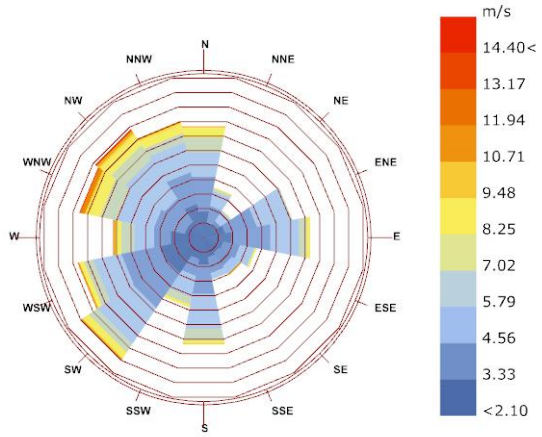
⇨

Optimum external environment setting and 18% of an annual optimum period can be found for indoor natural ventilation

As the result shown above, optimal environment is best created from May to October. It is important to consider the wind direction of this result if the natural wind direction is actively utilized since the main wind direction of this period changes as the right result.



Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 2.81% of the time = 246 hours.
Each closed polyline shows frequency of 1.0%. = 90 hours.



Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.00% of the time = 0 hours.
Each closed polyline shows frequency of 0.2%. = 15 hours
... ...
Conditional Selection Applied:
15 < Dry Bulb Temperature < 26
and Relative Humidity < 80
and Wind Speed > 2
1538.0 hours of total 8760.0 hours (17.56%).

1 Shading Strategy

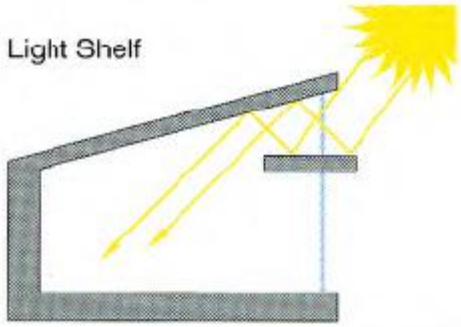
for stress-less wake up

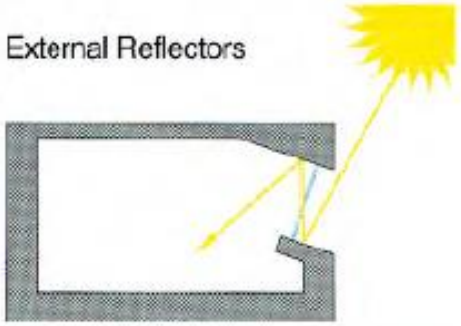
Too much of sun shine in the morning because the window is located on the east

2 Daylight Reflector

for fully sufficient daylight

The depth of the room is deep with only one window so the room is dark during the daytime.

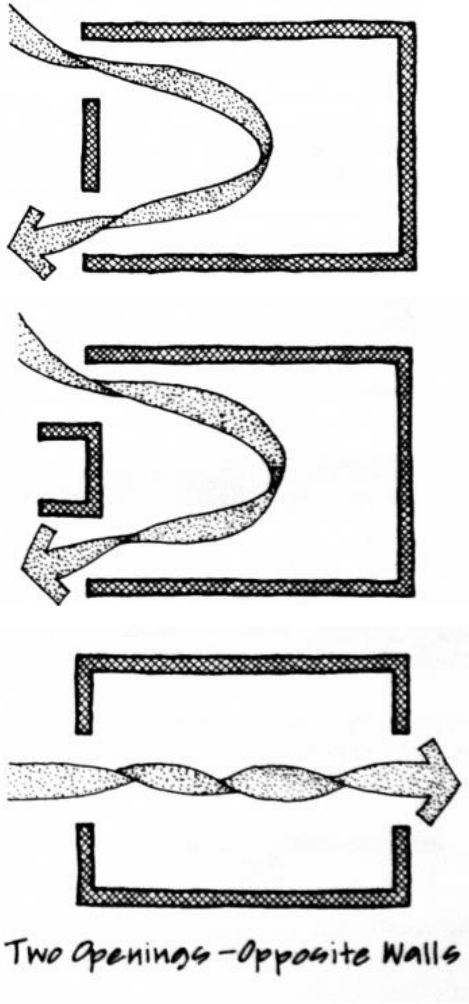




3 Natural Ventilation

for stress-less wake up

The natural ventilation of the room is not functioning properly with one window on the east side



How does climate change will affect your design recommendations?

Hot-humid climate

Hot-dry climate

Cold climate

The design totally depends on climate. As you can see the example house images above, climate can change not only the shape of building, but also materials. Every climate has its own design techniques. Changing climate is similar to changing the client of the project; thus, the analysis of the climate should be started from the beginning for a complete design.