

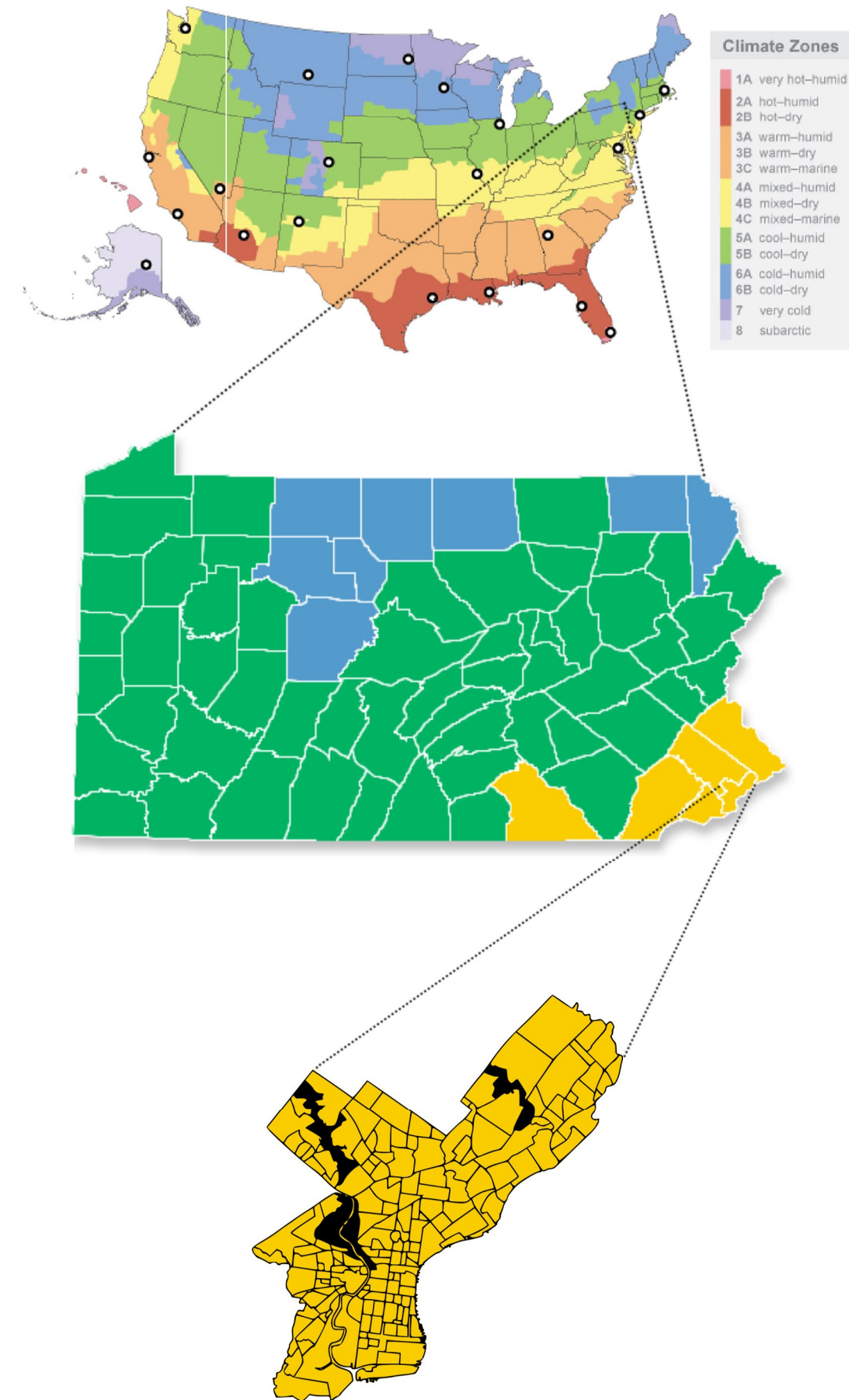
WEATHER DATA: Philadelphia International Ap,PA,USA,TMY3,
 LATITUDE: 39.87
 LONGITUDE: -75.23
 CDD: 1235
 HDD: 4759
 CLIMATE ZONE: 4A
 CHARACTERISTIC: MIXED-HUMID

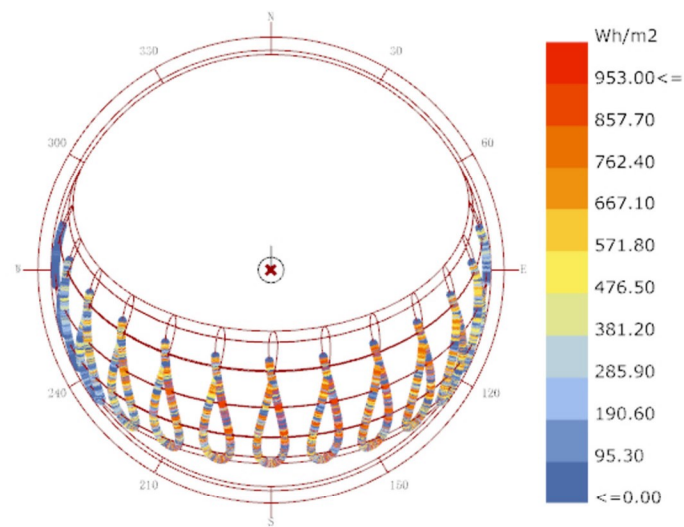
From the climate classification, The heat dregree days of philly is as much as four times than cool dregree days.
 The design strategy should focuss on the heating efficiency and thermal insulation.

Residential Prescriptive Requirements for Zone 1 (2009 IECC)

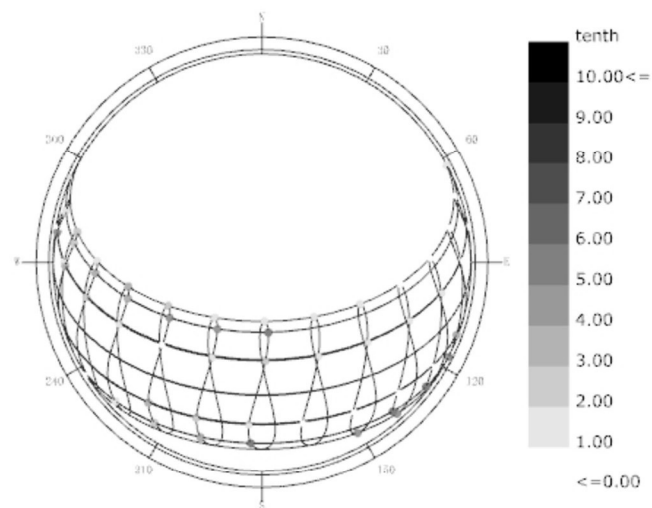
Ceiling R-value	38
Wood Frame Wall R-value	13
Mass Wall R-value ⁱ	5/10
Floor R-value	19
Basement Wall R-value ^c	10/13
Slab R-value ^d , Depth	10, 2 ft
Crawlspace Wall R-value ^c	10/13
Fenestration U-Factor ^b	0.35
Skylight U-Factor ^b	0.60
Glazed fenestration SHGC ^{b, e}	NR

<https://energycode.pnl.gov/EnergyCodeReqs/?state=Pennsylvania>

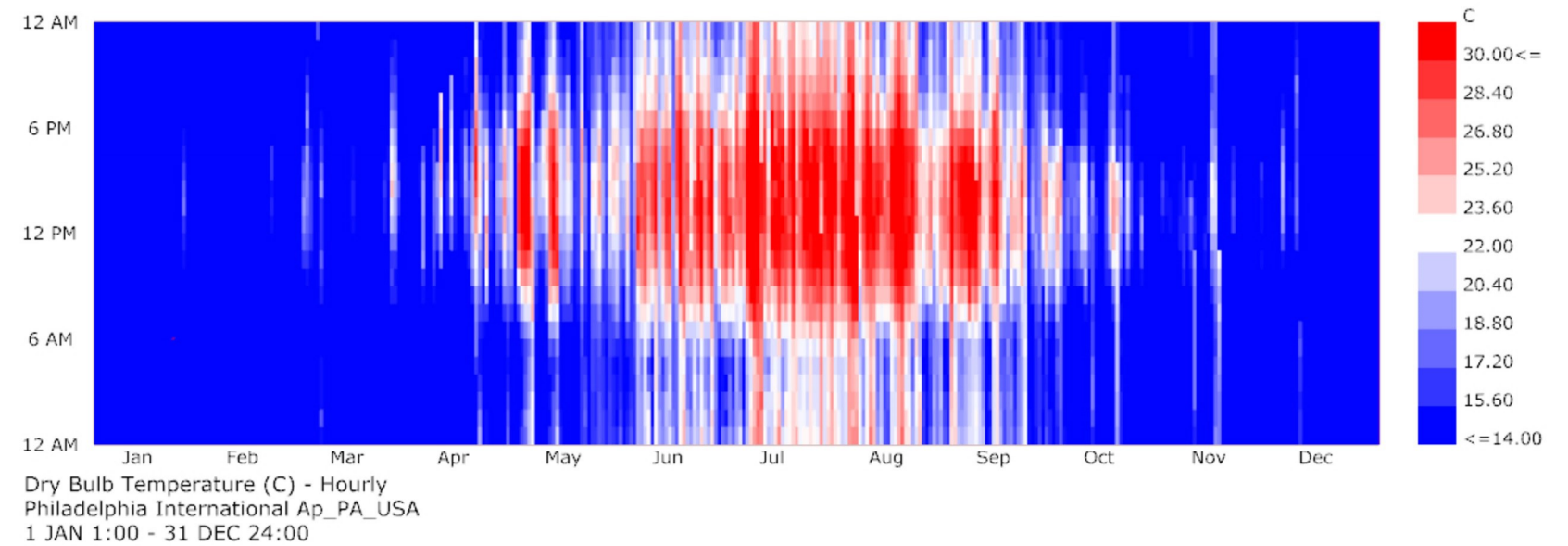
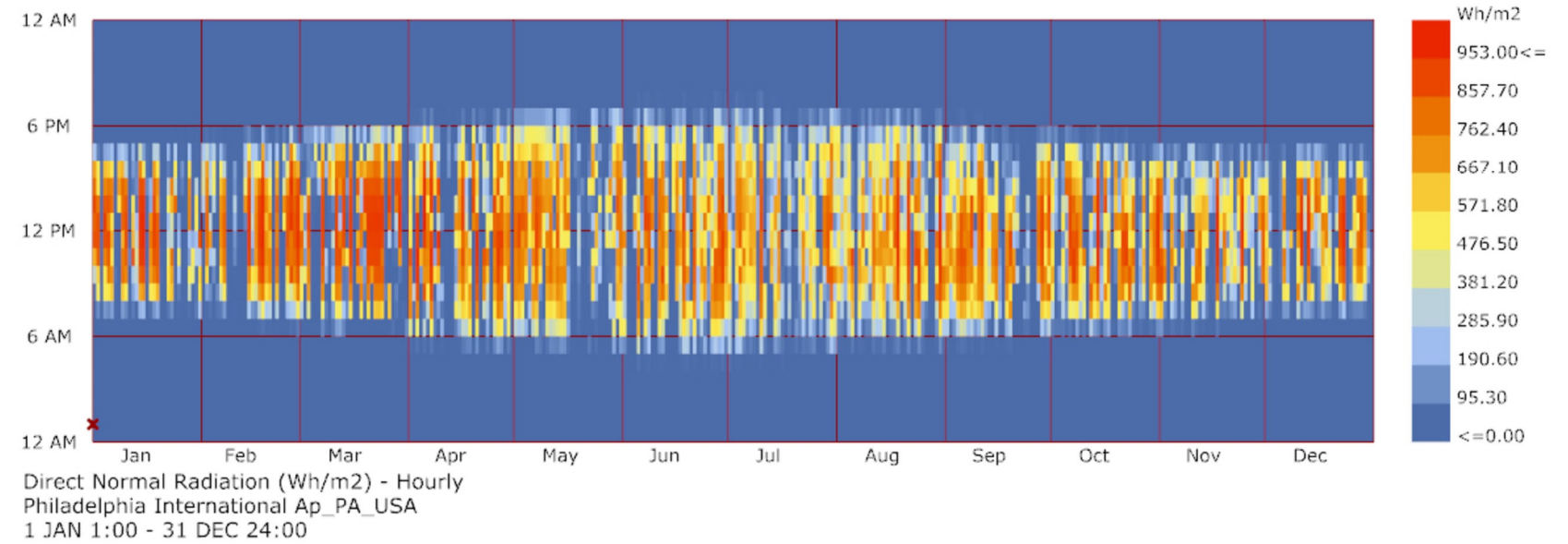




Sun-Path Diagram - Latitude: 39.87
Hourly Data: Direct Normal Radiation (Wh/m2)
Philadelphia International Ap_PA_USA

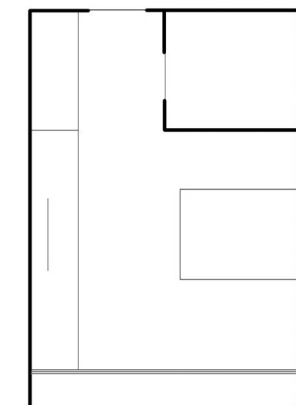
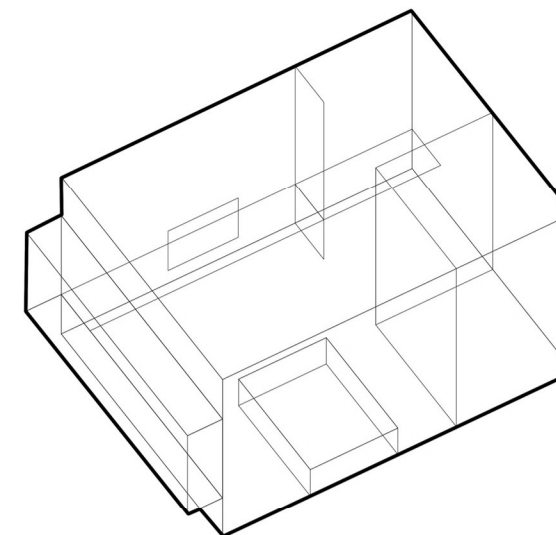


Sun-Path Diagram - Latitude: 39.87
Hourly Data: Total Cloud Cover (tenth)
Philadelphia International Ap_PA_USA
...
Conditional Selection Applied:
Total Cloud Cover < 6
54.0 hours of total 146.0 sun up hours(36.99%).



1. The orientatin of opening should be toward the south, Since the window face south can receive more radiation in the winter.
2. Use pv panels to stroe radiation during 9am-4am (unoccupied hour) , during this periods of time, the radiation rate is higher while the cloud cover is relative less.
3. Double glazing should be adopted in the window, since its high insulating performance can benefit in the cold winter.

1. Adaptable strategy, such as operable windows and removable louver should be employed because of the increasing tempreture in summer.



Area: 32 m2
Glazing area: 8.1 m2
Orientation Program: Midrise Apartment
Occupied Hour: 6 PM – 8AM