

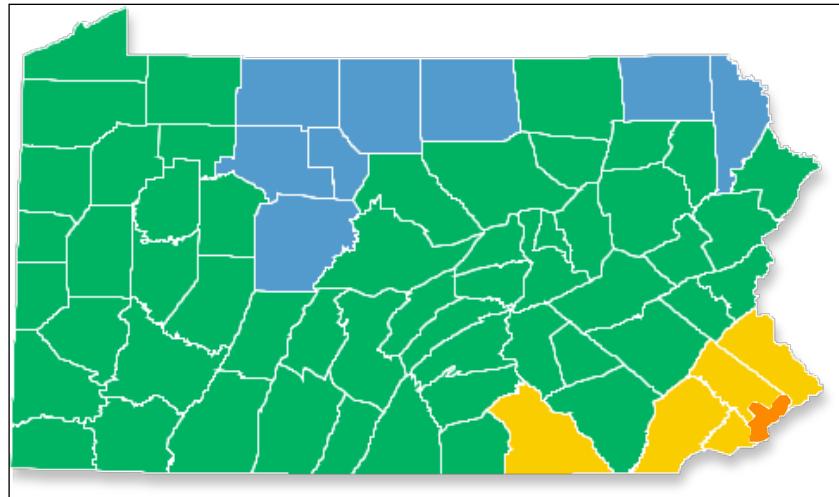
PHILADELPHIA, PENNSYLVANIA

Passive Design Strategies

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Arch 753 Building Performance Simulation
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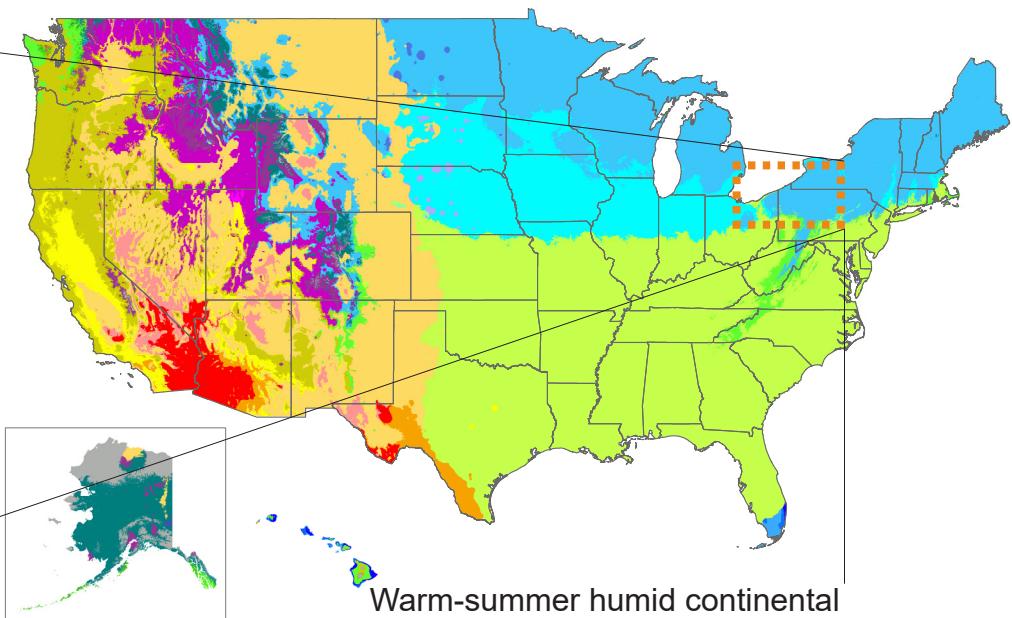
Climate in Philadelphia

IECC Climate Zone 4(except marine)



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
Crawlspacce Wall R-value c	10/13
Fenestration U-Factor b	0.35
Skylight U-Factor b	0.60
Glazed fenestration SHGC b, e	NR

Köppen climate types of the United States



Warm-summer humid continental & Humid subtropical

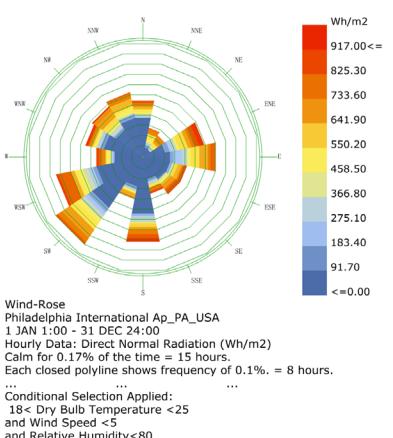
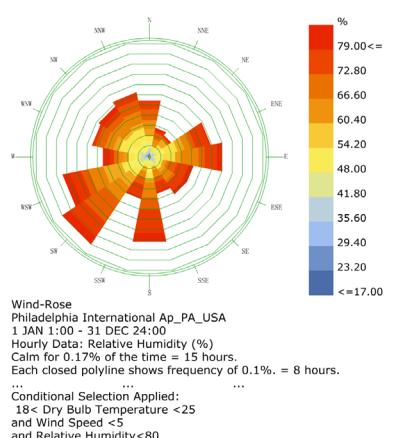
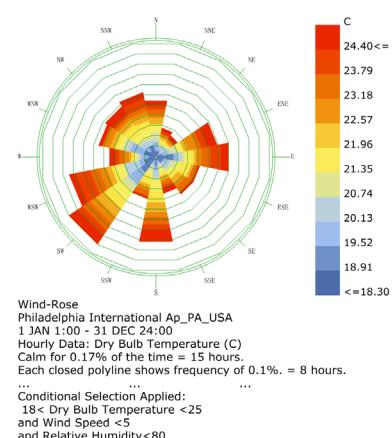
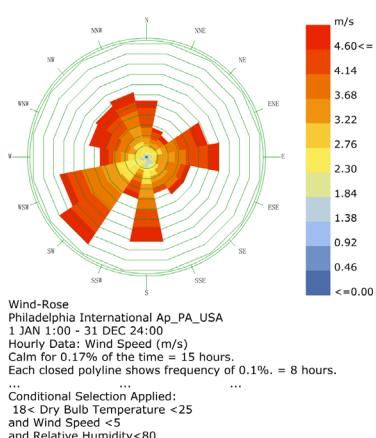
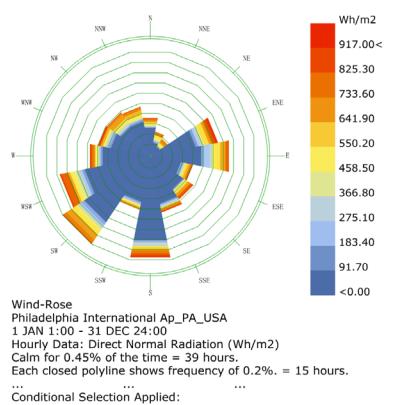
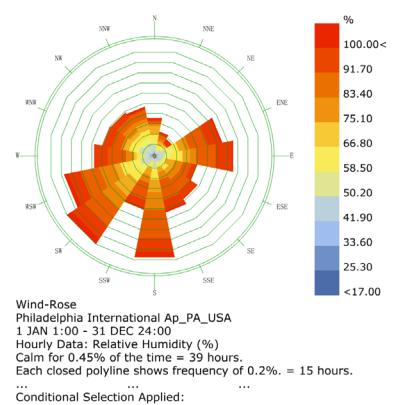
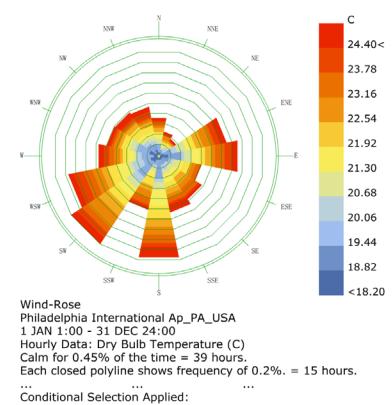
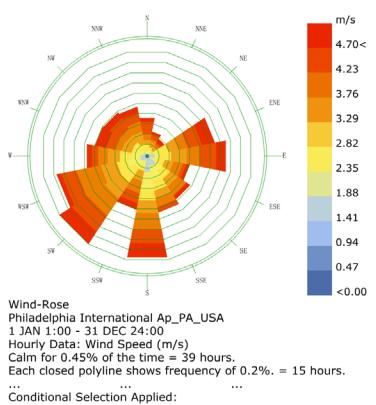
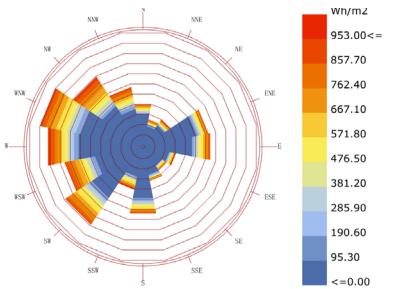
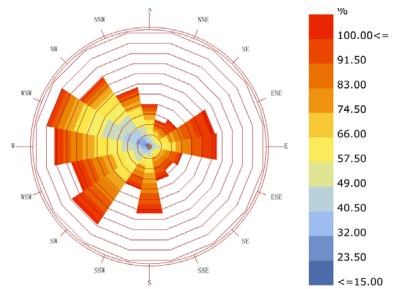
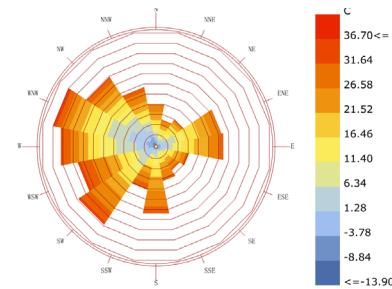
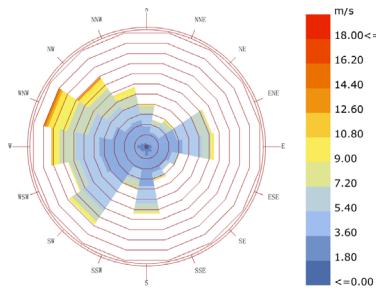
Köppen climate type

EF (Ice-cap)	Dsb (Warm-summer mediterranean continental)	Csa (Hot-summer mediterranean)
ET (Tundra)	Dsa (Hot-summer mediterranean continental)	BSk (Cold semi-arid)
Dfc (Subarctic)	Cfc (Subpolar oceanic)	BSh (Hot semi-arid)
Dfb (Warm-summer humid continental)	Cfb (Oceanic)	BWk (Cold desert)
Dfa (Hot-summer humid continental)	Cfa (Humid subtropical)	BWh (Hot desert)
Dwc (Subarctic)	Cwb (Subtropical highland)	Aw (Savanna)
Dwb (Warm-summer humid continental)	Cwa (Humid subtropical)	Am (Monsoon)
Dwa (Hot-summer humid continental)	Csc (Cold-summer mediterranean)	Af (Rainforest)
Dsc (Dry-summer subarctic)	Csb (Warm-summer mediterranean)	

*Isotherm used to distinguish temperate (C) and continental (D) climates is -3°C

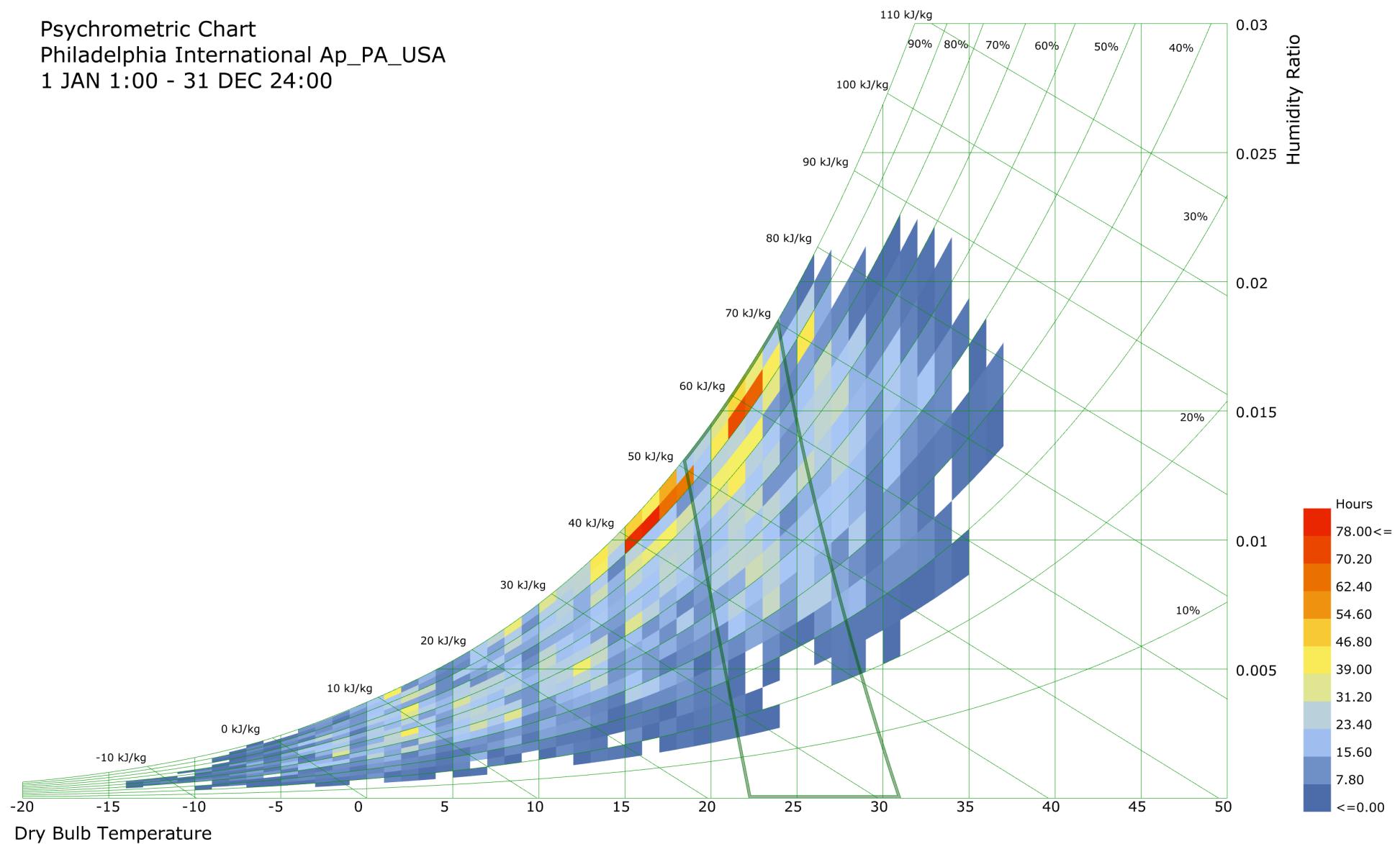
Data sources: Köppen types calculated from data from PRISM Climate Group, Oregon State University, <http://prism.oregonstate.edu>; Outline map from US Census Bureau

Windrose Diagrams



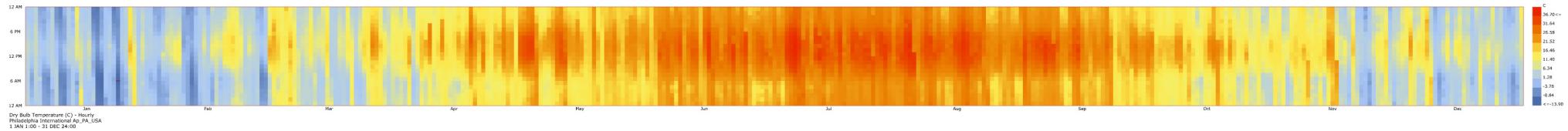
Default Psychrometric Chart

Psychrometric Chart
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

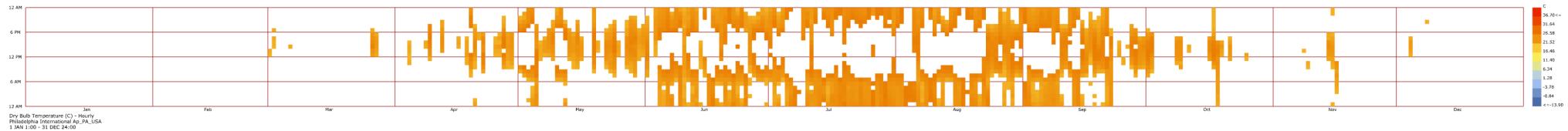


Temperature & Humidity

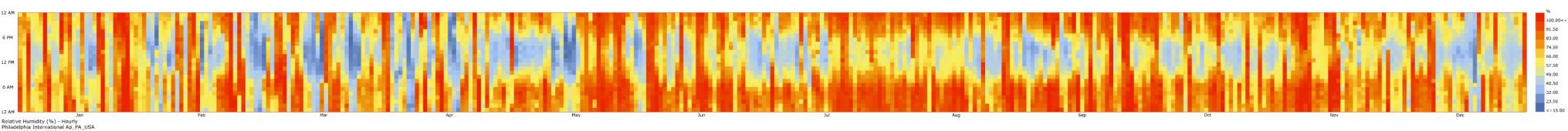
Temperature



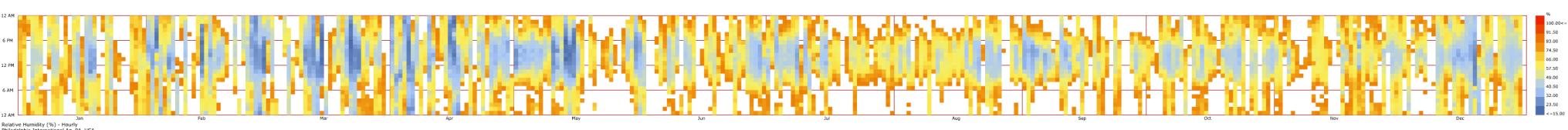
18 °C <t<25 °C



Humidity



h<80%



Potential Strategies

From the analysis of Typical Meteorological Year3 weather data of Philadelphia, several conclusion could be drawn.

Northwest is the direction of the prevailing wind.

Radiation is mainly from the south.

Philadelphia is hot in summer, and cold in winter.

April, September and October might be the most comfortable months of the year.

By default, 19.338% of the year is thermally comfortable. However, there are potential passive strategies to improve thermal comfort conditions.

- In summer northwest windows might be kept open to promote natural ventilation;
- In winter more solar radiance should be let in and absorbed;
- Insulation of enclosure should be enhanced for all times.