Climate Analysis Report

Building Performance Simulation

Guide :
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Submitted by :
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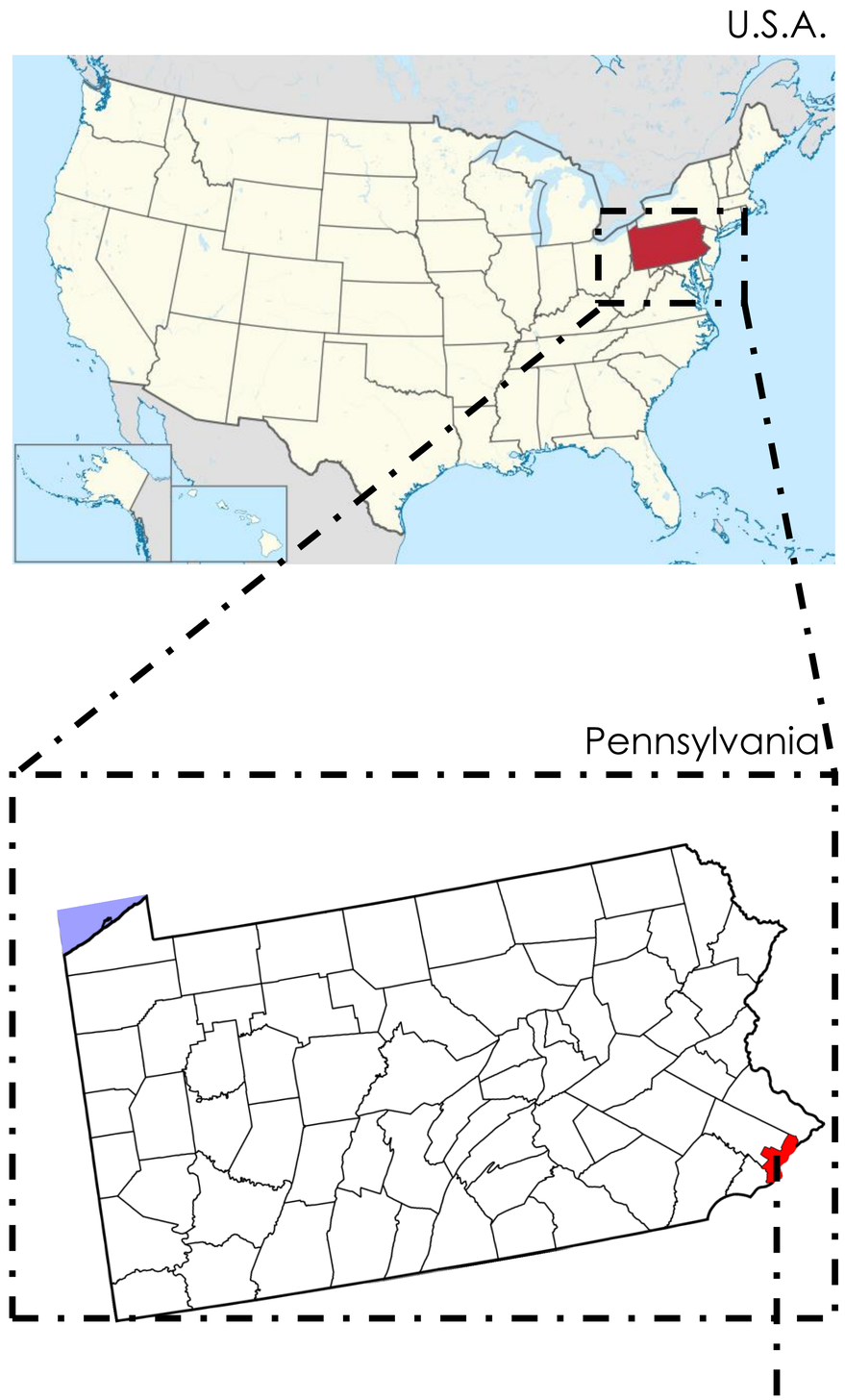
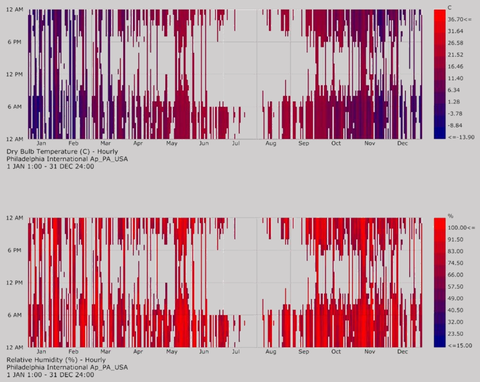
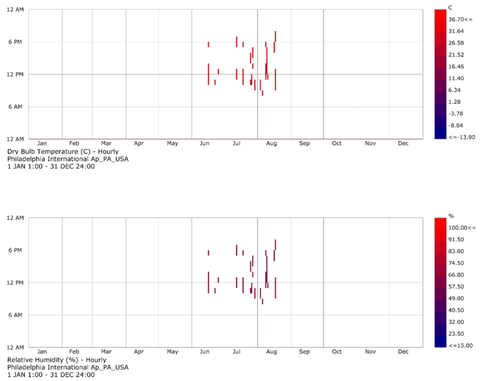
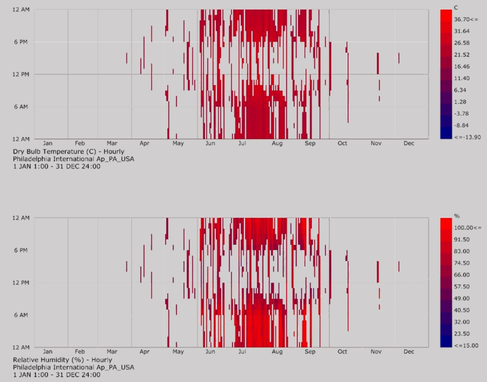
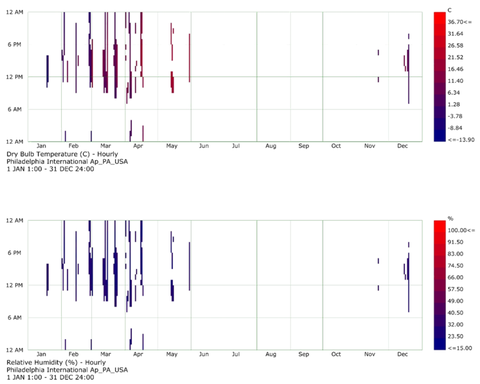
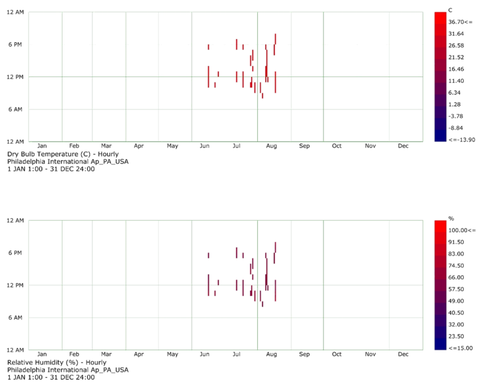
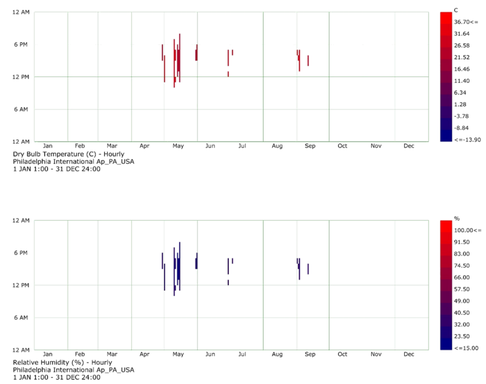
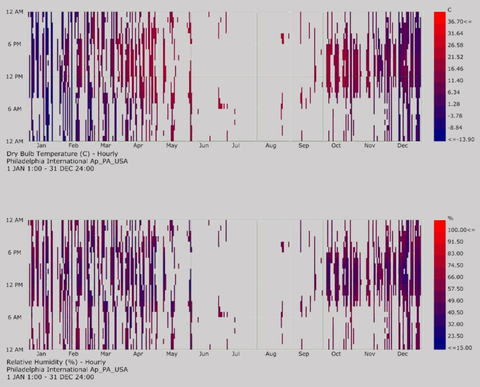
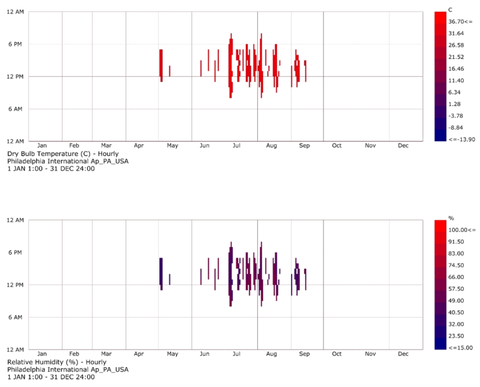
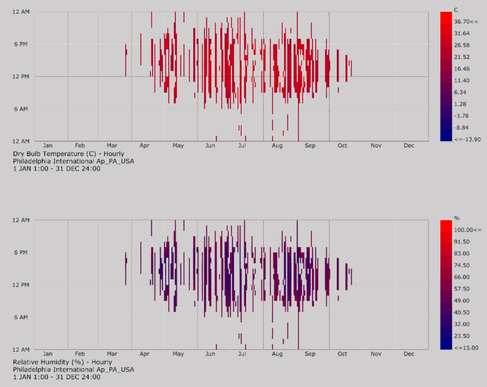


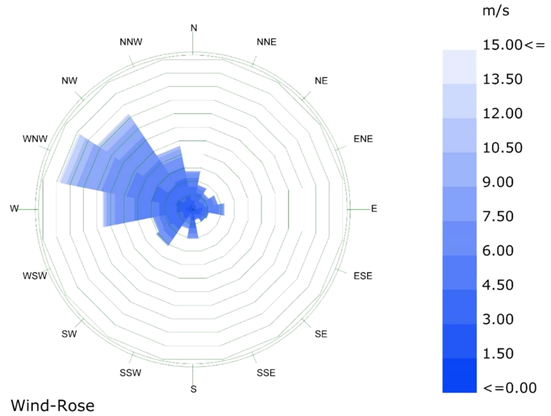
Philadelphia
39°57'N 75°10'W
Weather Station : Philadelphia International Airport
Data Source : TMY3

Relative Humidity \ Dry Bulb Temp.	Cold	Hot	Comfortable Temperature
Humid	 **Case I 42.4 %**	 .31 %	 **Case II 15.9 %**
Dry	 3.1 %	 .18 %	 .62 %
Comfortable Relative Humidity	 **Case III 24.7 %**	 2.47 %	 **Case IV 10 %**

The above table suggests the dominant climatic condition in Philadelphia is Cold and Humid , therefore the design strategies would be governed by these.

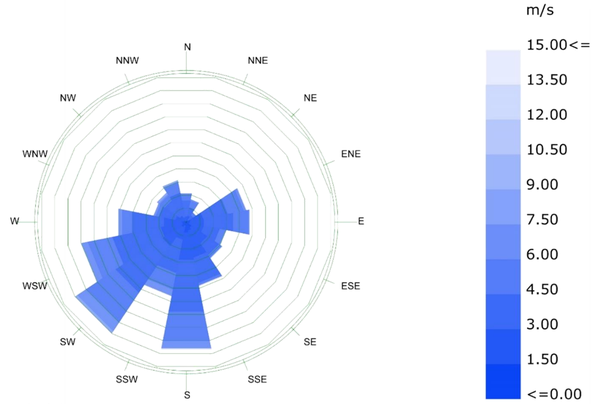
Wind rose Diagrams

Case I 42.4 %



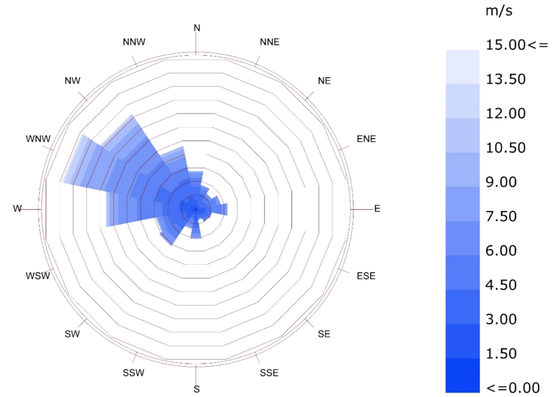
Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.50% of the time = 44 hours.
Each closed polyline shows frequency of 0.5%. = 40 hours.
... ...
Conditional Selection Applied:
20 >= Dry Bulb Temperature
and 30 <= Relative Humidity <= 60
2170.0 hours of total 8760.0 hours (24.77%).

Case II 15.9 %



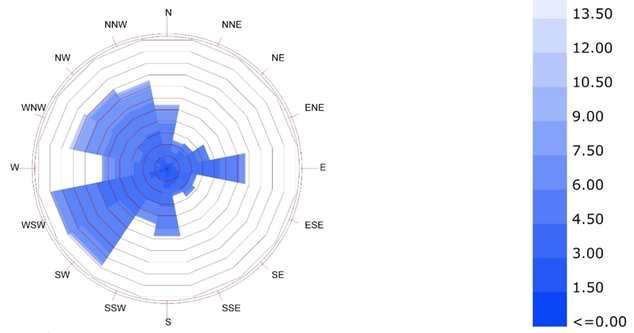
Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.24% of the time = 21 hours.
Each closed polyline shows frequency of 0.2%. = 19 hours.
... ...
Conditional Selection Applied:
20 <= Dry Bulb Temperature <= 30
and Relative Humidity >= 60
1428.0 hours of total 8760.0 hours (16.30%).

Case III 24.7 %



Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.50% of the time = 44 hours.
Each closed polyline shows frequency of 0.5%. = 40 hours.
... ...
Conditional Selection Applied:
20 >= Dry Bulb Temperature
and 30 <= Relative Humidity <= 60
2170.0 hours of total 8760.0 hours (24.77%).

Case IV 10 %



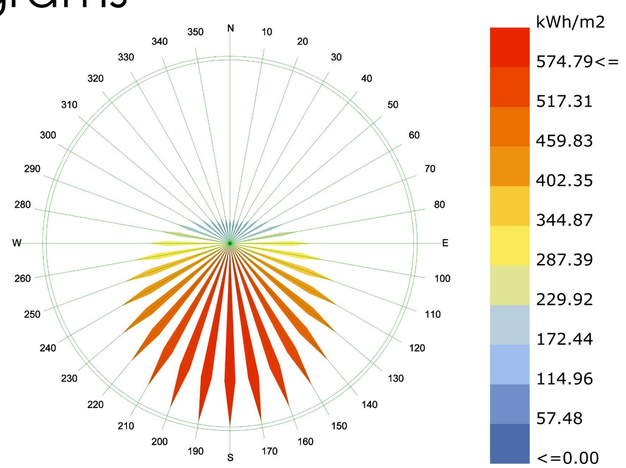
Wind-Rose
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 0.11% of the time = 10 hours.
Each closed polyline shows frequency of 0.1%. = 9 hours.
... ...
Conditional Selection Applied:
20 <= Dry Bulb Temperature <= 30
and 30 <= Relative Humidity <= 60
885.0 hours of total 8760.0 hours (10.10%).

Radiation rose Diagrams

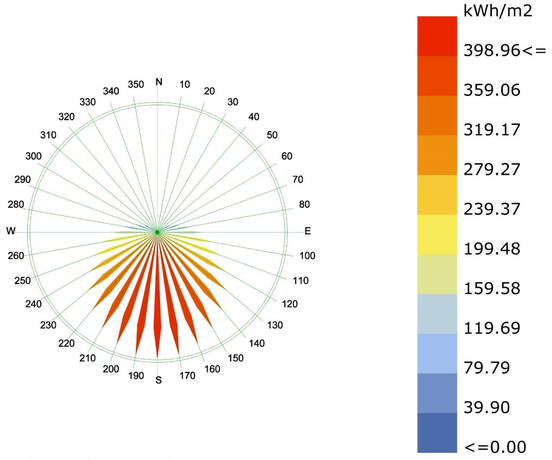
Case I 42.4 %

&

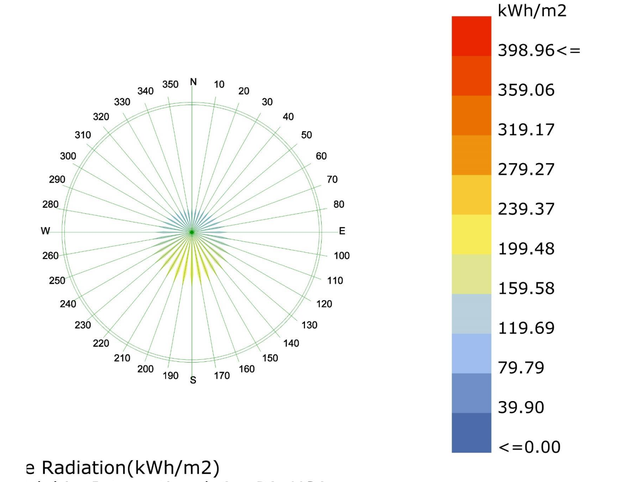
Case III 24.7 %



Total Radiation(kWh/m2)
Philadelphia_International_Ap_PA_USA
21 SEP 1:00 - 21 MAR 24:00



ect Radiation(kWh/m2)
ladelphia_International_Ap_PA_USA
SEP 1:00 - 21 MAR 24:00



e Radiation(kWh/m2)
elphia_International_Ap_PA_USA
P 1:00 - 21 MAR 24:00

Strategy I

As seen in the table Philadelphia is below comfortable temperature for 67% of the year therefore the air temperature needs to be increased, a common strategy to do this passively is to incorporate solar heat gains with high thermal mass materials.

Orientation : South Facing Building

Strategy II

As seen in Case I and Case III the temperature is low, therefore wind to be blocked from Northwest Direction.

For Case II the temperature is comfortable but humidity is high, therefore natural ventilation to be enhanced from Southwest Direction.

When Humidity is too high it can be decreased with the use of desiccants.