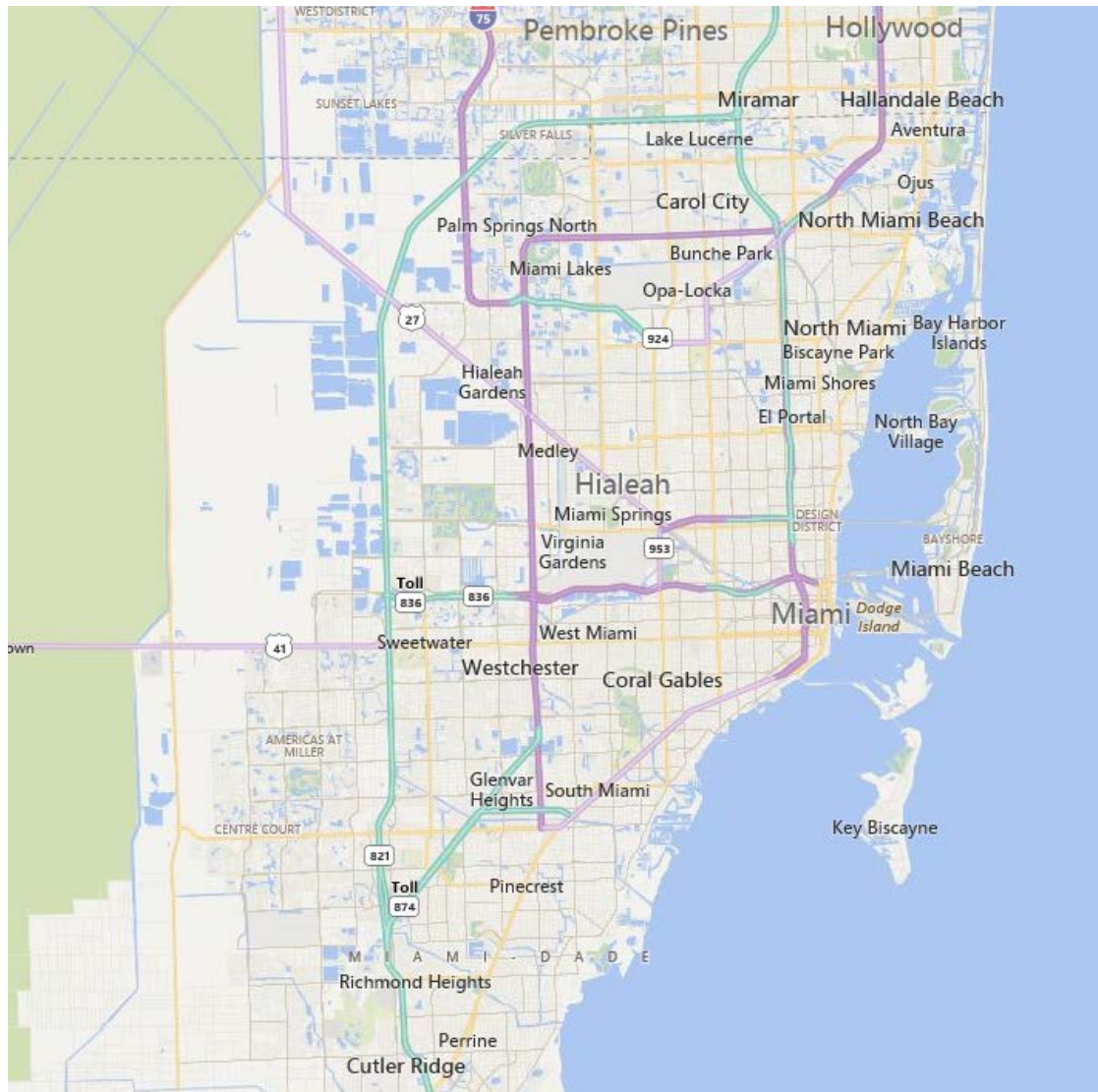


Climate Analysis Report- Miami

Location Information:



Data Monitoring Point: Miami International Airport

Latitude: 25.8

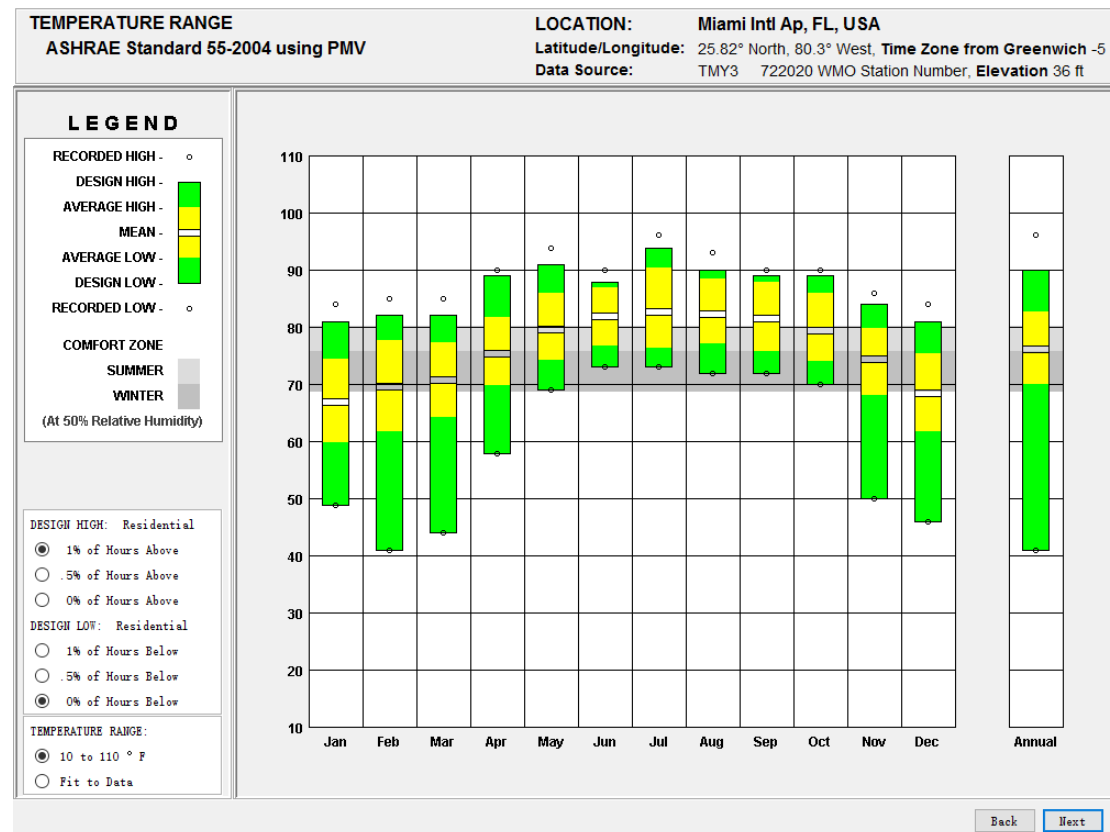
Longitude: -80.3

Altitude: 11

Time Zone: -5

Temperature Range:

Summertime in Miami, monthly average temperature reaches 80 degrees Fahrenheit, and average high temperature reaches 90 degrees Fahrenheit. Average temperatures of winter time are generally fine.



Temperature Range Chart

Psychrometric Chart:

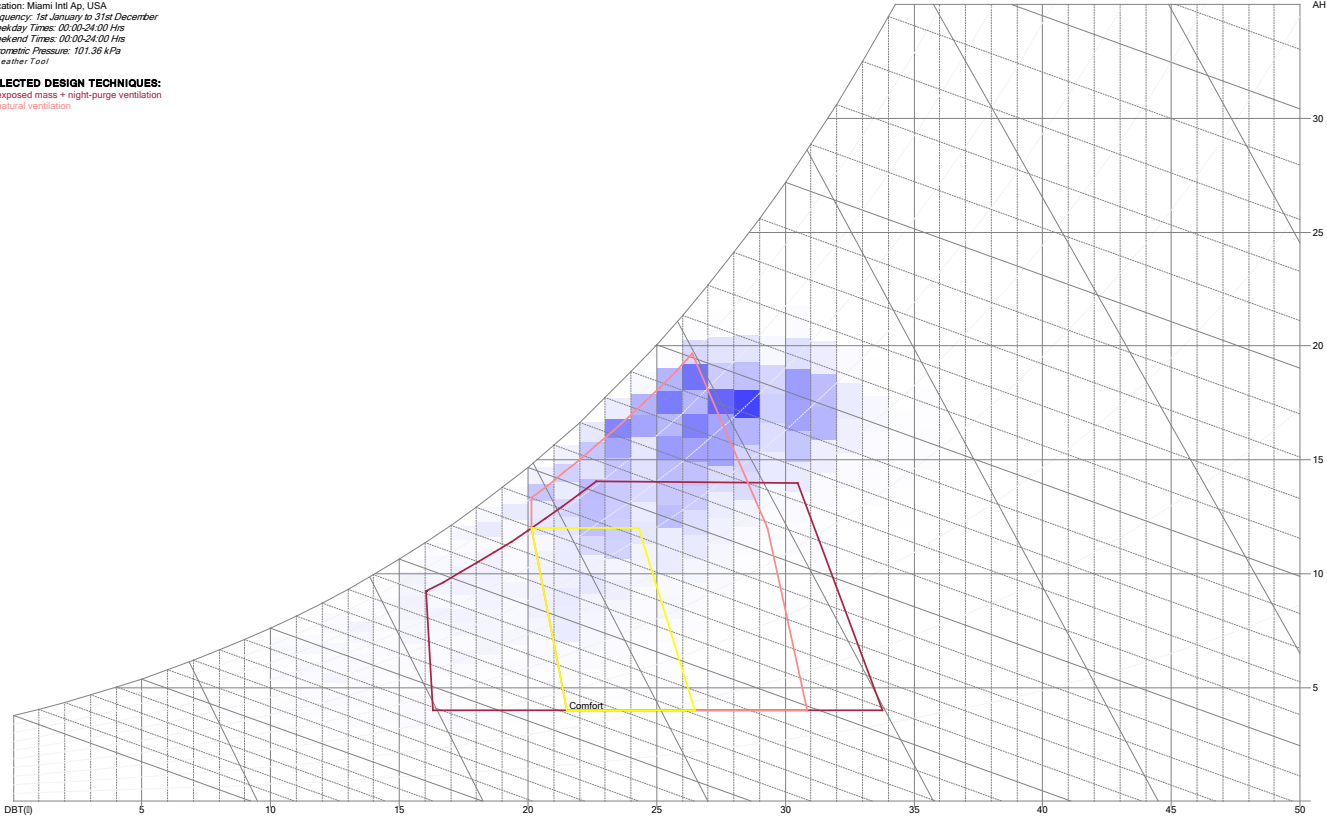
Observing annual data plotted on the psychrometric chart, the most frequent weather type in Miami is hot and humid. Cooling and dehumidification are needed to be applied to indoor environment to increase indoor comfort hours. Nightpurge ventilation and natural ventilation are two effective design techniques to reduce indoor temperature, and an active system is needed for dehumidification.

By applying nightpurge ventilation and natural ventilation strategies, there is a significant comfort improvement (yellow: before, red: after) throughout year.

Psychrometric Chart

Location: Miami Intl Ap, USA
Frequency: 1st January to 31st December
Weekday Times: 00:00-24:00 Hrs
Weekend Times: 00:00-24:00 Hrs
Barometric Pressure: 101.36 kPa
?Weather Tool

SELECTED DESIGN TECHNIQUES:
1. exposed mass + night-purge ventilation
2. natural ventilation



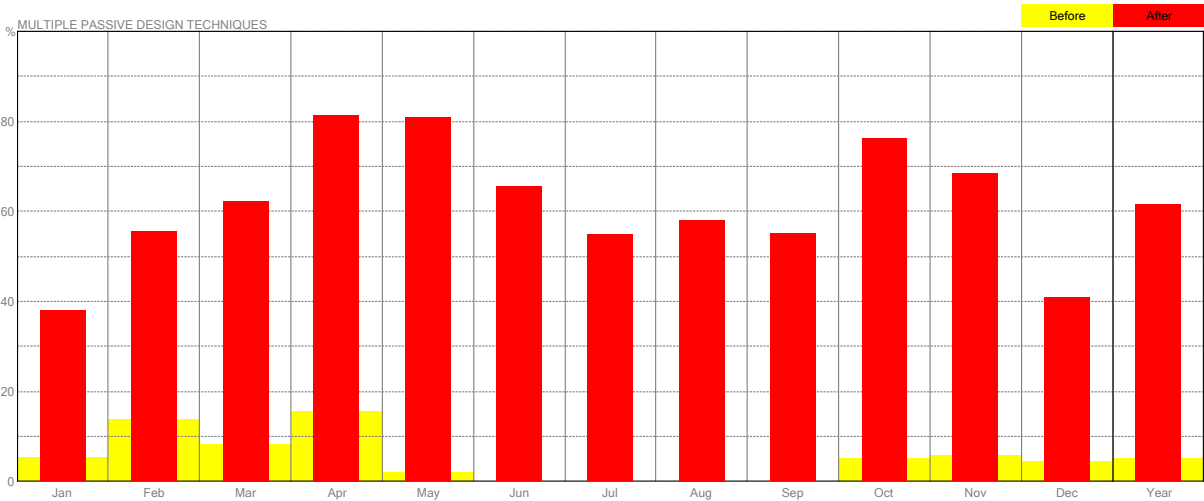
Psychrometric Chart

Comfort Percentages

NAME: Miami Intl Ap
LOCATION: USA
WEEKDAYS: 00:00 - 24:00 Hrs
WEEKENDS: 00:00 - 24:00 Hrs
POSITION: 25.87 -80.37
?Weather Tool

CLIMATE: Af
Tropical moist climate where precipitation occurs all year long.
Monthly temperature variation is less than 3 degrees Celsius.
Intense heating and humidity cause afternoon clouds almost every day.
Daily highs about 32° while night time temperatures average 22° .

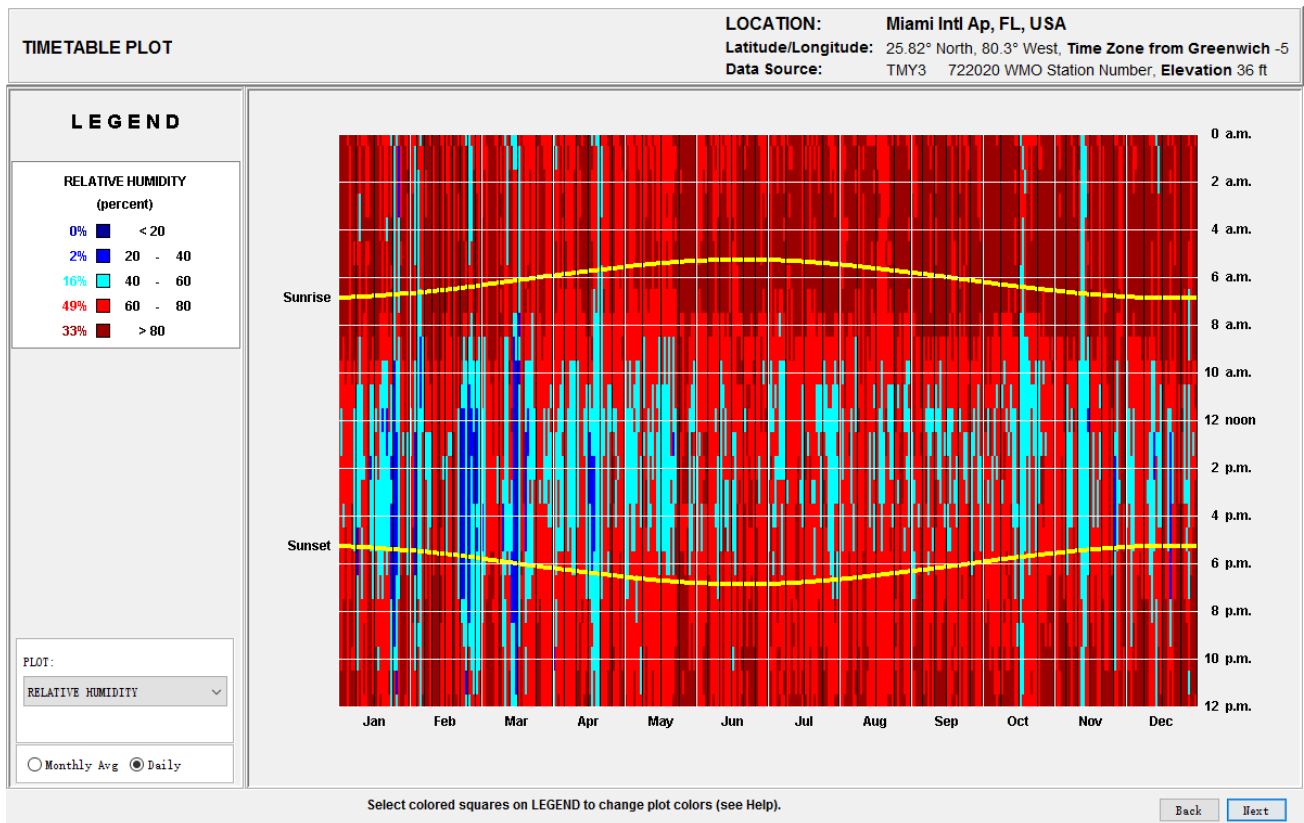
SELECTED DESIGN TECHNIQUES:
1. exposed mass + night-purge ventilation
2. natural ventilation



Improved Comfort Percentage Chart

Humidity Timetable Plot:

Take a closer look of humidity data, high relative humidity level concentrated before 8 am and after 8 pm throughout year, which means for a commercial use building, humidity level is relative in comfort range during general office hour.

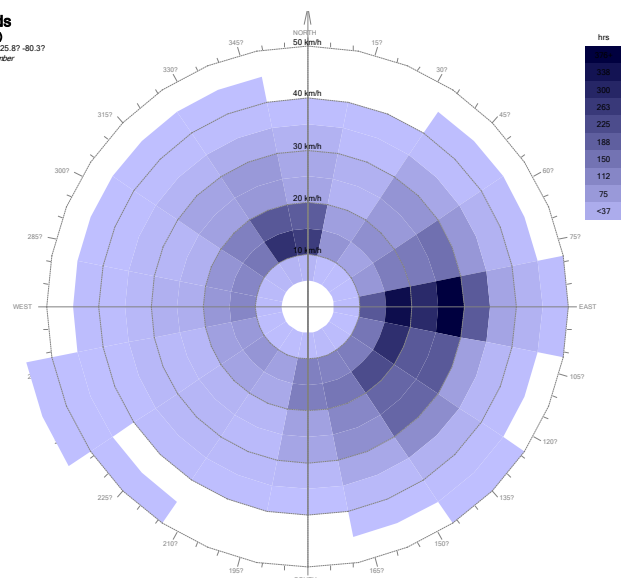


Annual Humidity Plot

Wind Rose Chart

In Miami, prevailing wind comes from east in general. But during winter time, wind comes from north side with wind velocity: 20 km/h (5.5 m/s) and average wind temperature 15-20 °C. This winter wind could be introduced into building to reduce indoor temperature during daytime.

Prevailing Winds
Wind Frequency (Hrs)
 Location: Miami Intl Ap, USA (25.87° -80.37°)
 Date: 1st January - 31st December
 Time: 00:00 - 24:00
 WWeather Tool

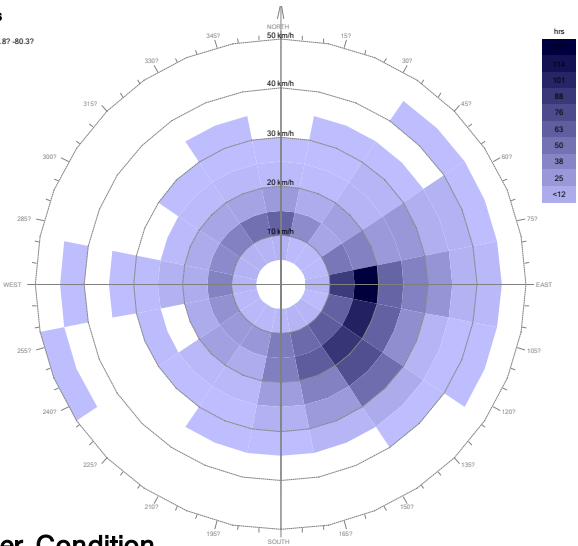


Annual Wind frequency

Prevailing Winds

Wind Frequency (hrs)

Location: Miami Intl Ap, USA (25.87° -80.37°)
Date: 1st June - 31st August
Time: 00:00 - 24:00
FW weather Tool

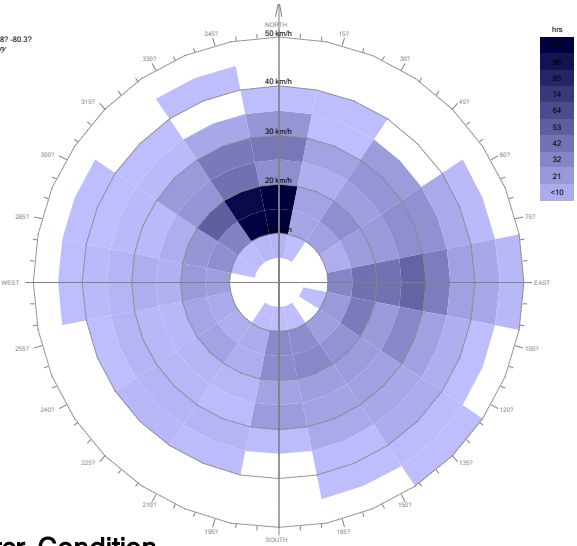


Summer Condition

Prevailing Winds

Wind Frequency (hrs)

Location: Miami Intl Ap, USA (25.87° -80.37°)
Date: 1st December - 28th February
Time: 00:00 - 24:00
FW weather Tool

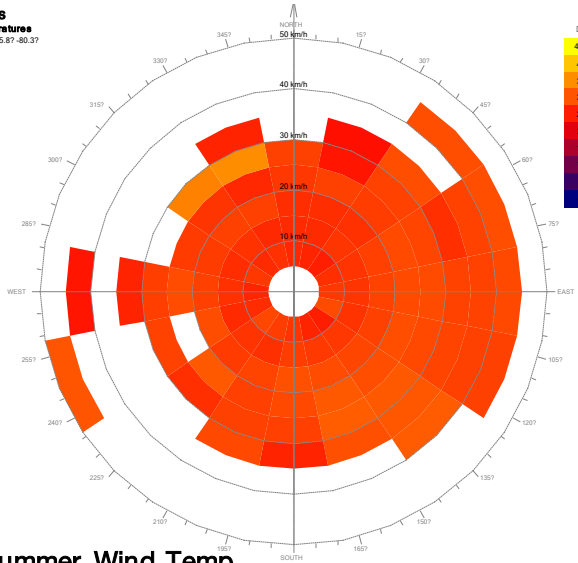


Winter Condition

Prevailing Winds

Average Wind Temperatures

Location: Miami Intl Ap, USA (25.87° -80.37°)
Date: 1st June - 31st August
Time: 00:00 - 24:00
FW weather Tool

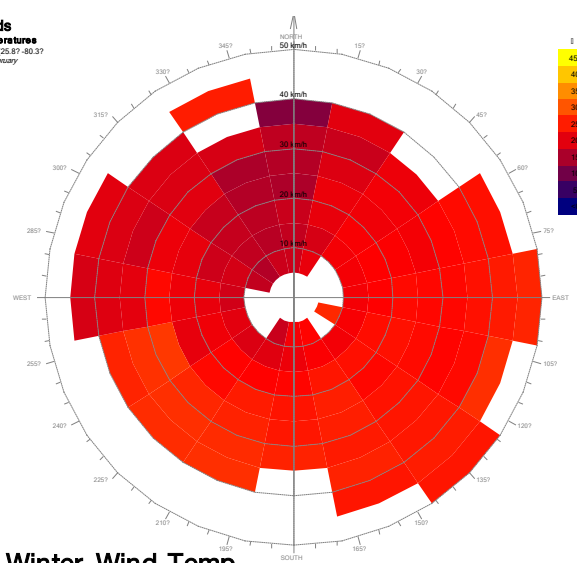


Summer Wind Temp.

Prevailing Winds

Average Wind Temperatures

Location: Miami Intl Ap, USA (25.87° -80.37°)
Date: 1st December - 28th February
Time: 00:00 - 24:00
FW weather Tool



Winter Wind Temp.

Passive Design Strategies:

1. Use operable windows to introduce natural ventilation to minimize air conditioning. Red bar in below chart represents improvements when natural ventilation applied.

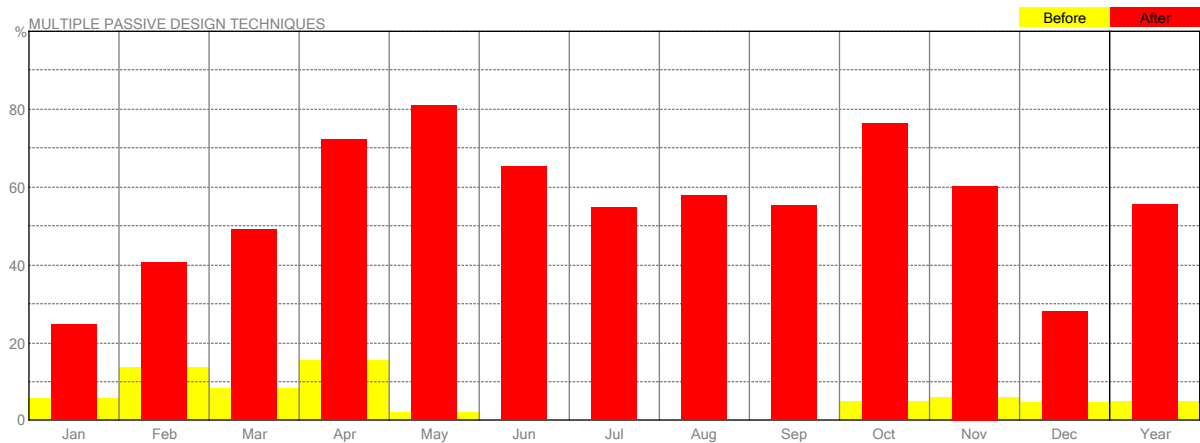
Comfort Percentages

NAME: Miami Intl Ap
LOCATION: USA
WEEKDAYS: 00:00 - 24:00 Hrs
WEEKENDS: 00:00 - 24:00 Hrs
POSITION: 25.87 -80.37
?Weather Tool

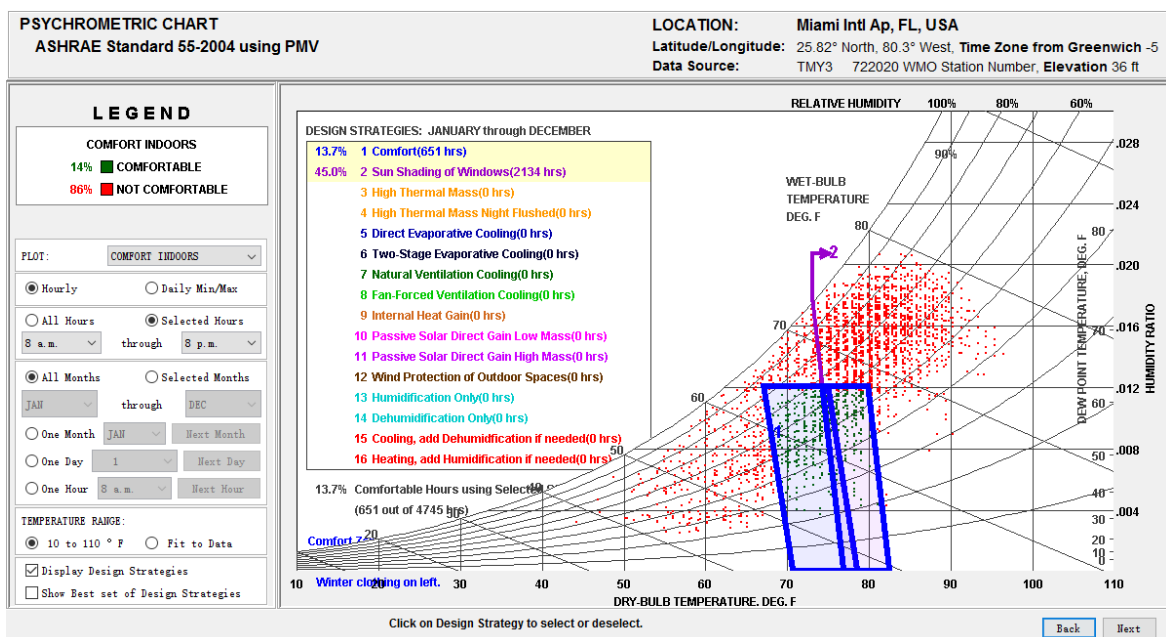
CLIMATE: Af

Tropical moist climate where precipitation occurs all year long.
Monthly temperature variation is less than 3 degrees Celsius.
Intense heating and humidity cause afternoon clouds almost every day.
Daily highs about 32! while night time temperatures average 22! .

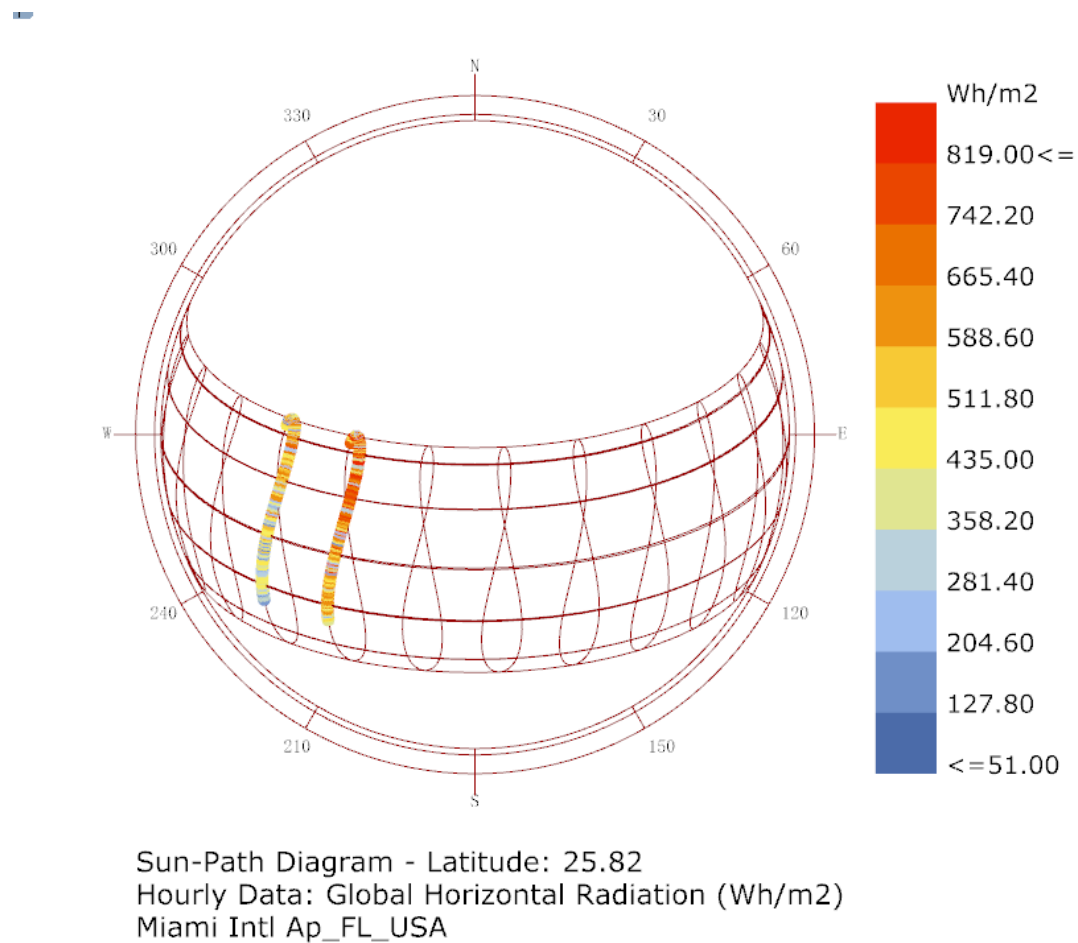
SELECTED DESIGN TECHNIQUES:
1. natural ventilation



2. Use shading devices to protect south facing windows from solar heat gain. Adding shading devices for windows could have 45% potential improvement of comfort.



3. Minimize west facing glazing to reduce afternoon heat gain. Graphic shows below represent global horizontal radiation from 2 pm – 4 pm, June – October.



Moving forward, what other data do you need from the client and/or the design team for the next steps of the analysis?

From client: Programs

From Design Team: Building Massing\Glazing % of each façade\ Zoning

How does climate change will affect your design recommendations?

Climate change will affect the first design recommendation, which is using natural ventilation. Rising outdoor temperature is one of main effect of climate change, which would reduce outdoor comfort hours, which further increase indoor active systems energy demand.