Mexico City
Design Strategy Proposal

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ARCH-753
Building Performance Simulation

Mexico City

19°26 N, 99°8 W

Elevation 2,250 m (7,380 ft)

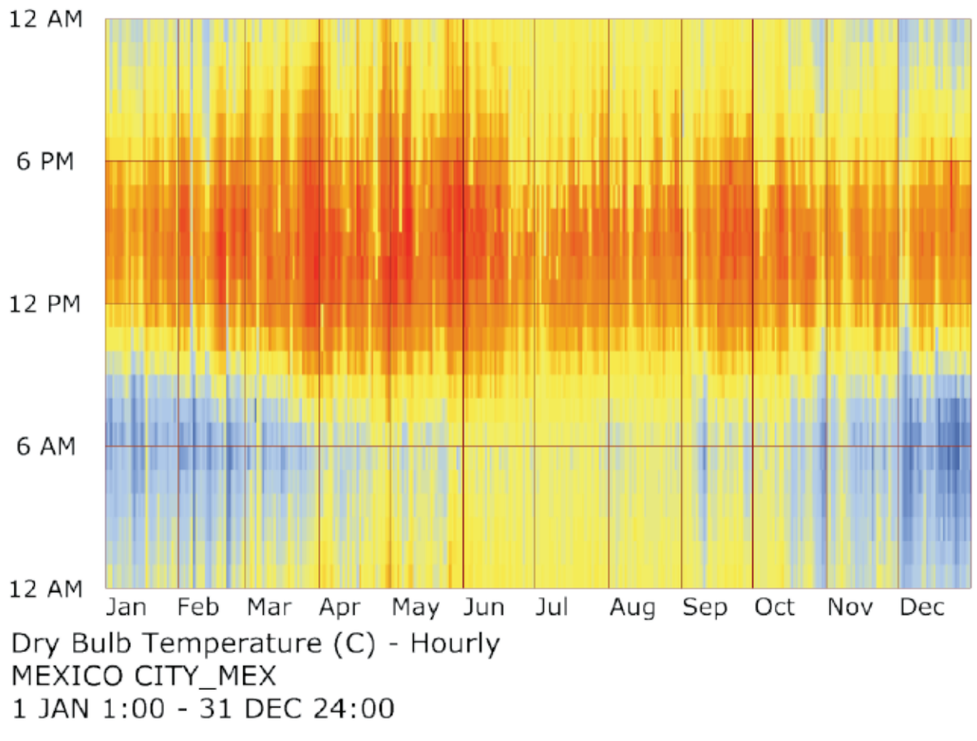
Temperate highland tropical climate with dry winters
is a type of climate characteristic of the highlands inside the tropics of Mexico. Winters are noticeable and dry, and summers can be very rainy. In the tropics, the rainy season is provoked by the tropical air masses and the dry winters by subtropical high pressure.

PASSIVE DESIGN STRATEGY 1

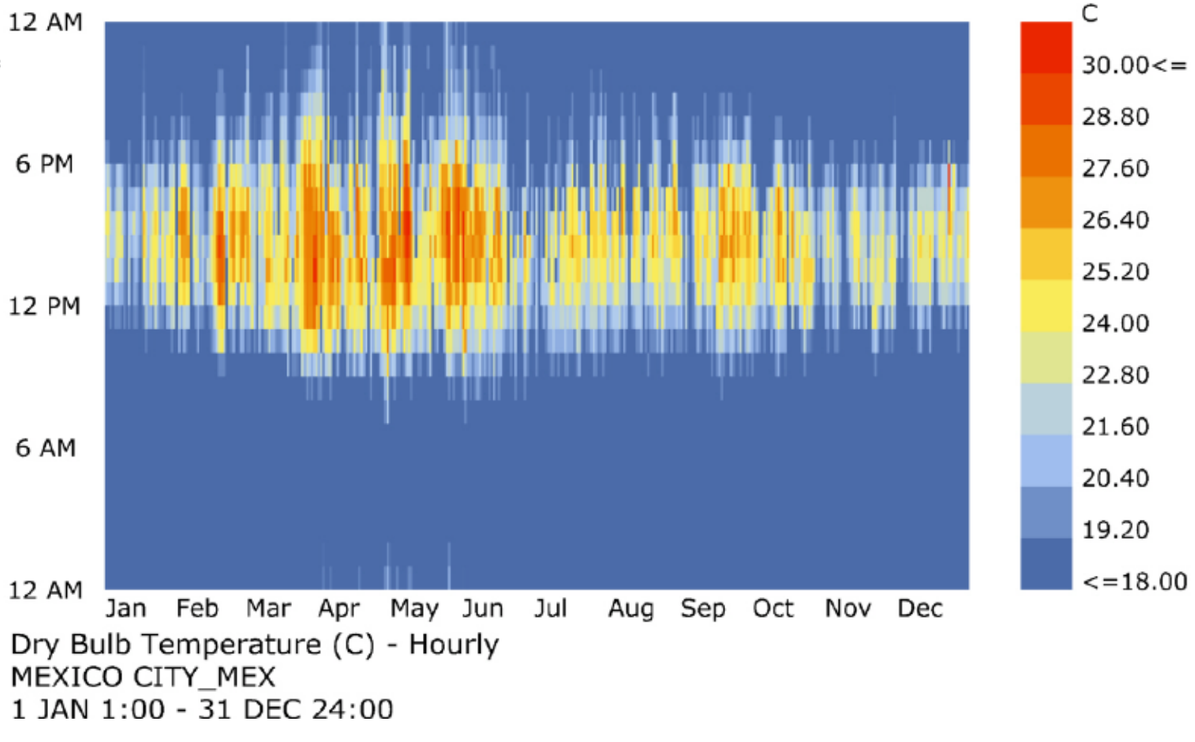
INTERNAL HEAT GAIN

To take the “energy conservation first” approach, one of the most basic idea is to radically minimize heat loss through effective heat retention, and maximize passive solar and internal heat gains. In our local climate, the sun can be used to provide a lot of the energy needed to heat a Passive House. Meanwhile, internal heat gains could provide an additional.

Temperature

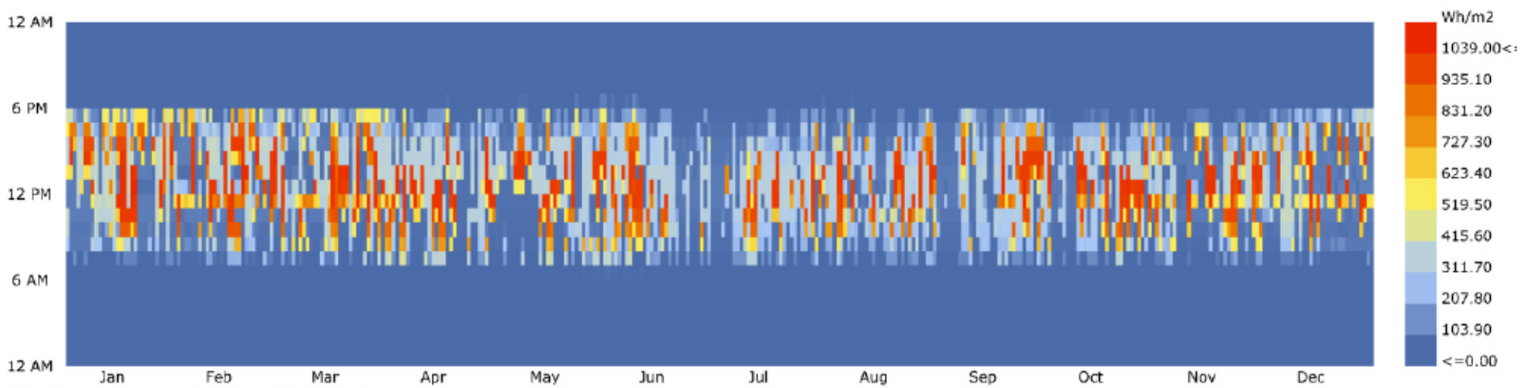


Dry Bulb Temperature (C) - Hourly
MEXICO CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

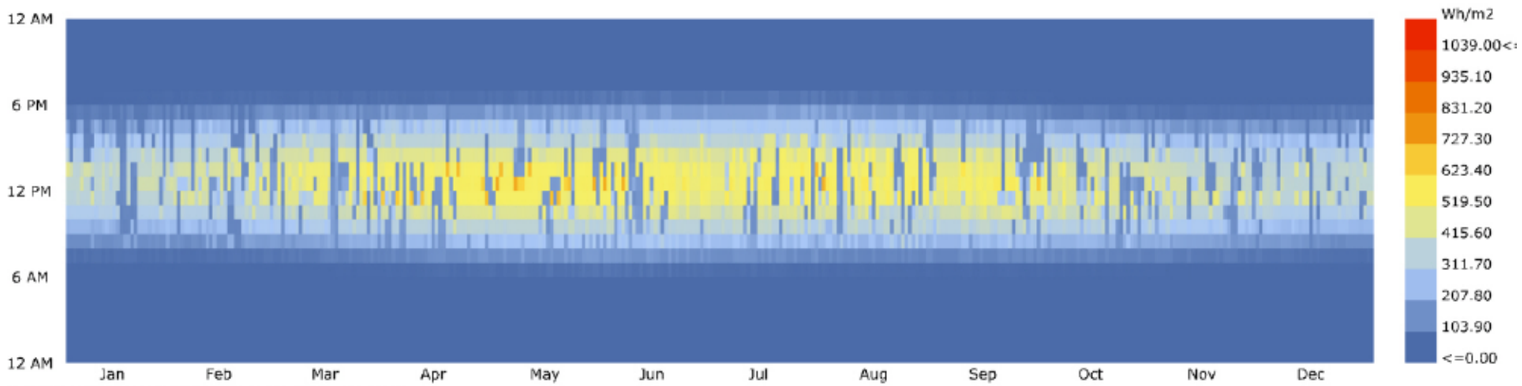


Dry Bulb Temperature (C) - Hourly
MEXICO CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

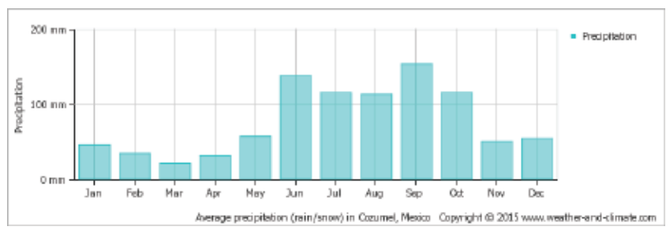
Solar Radiation



Direct Normal Radiation (Wh/m2) - Hourly
MEXICO CITY_MEX
1 JAN 1:00 - 31 DEC 24:00



Diffuse Horizontal Radiation (Wh/m2) - Hourly
MEXICO CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

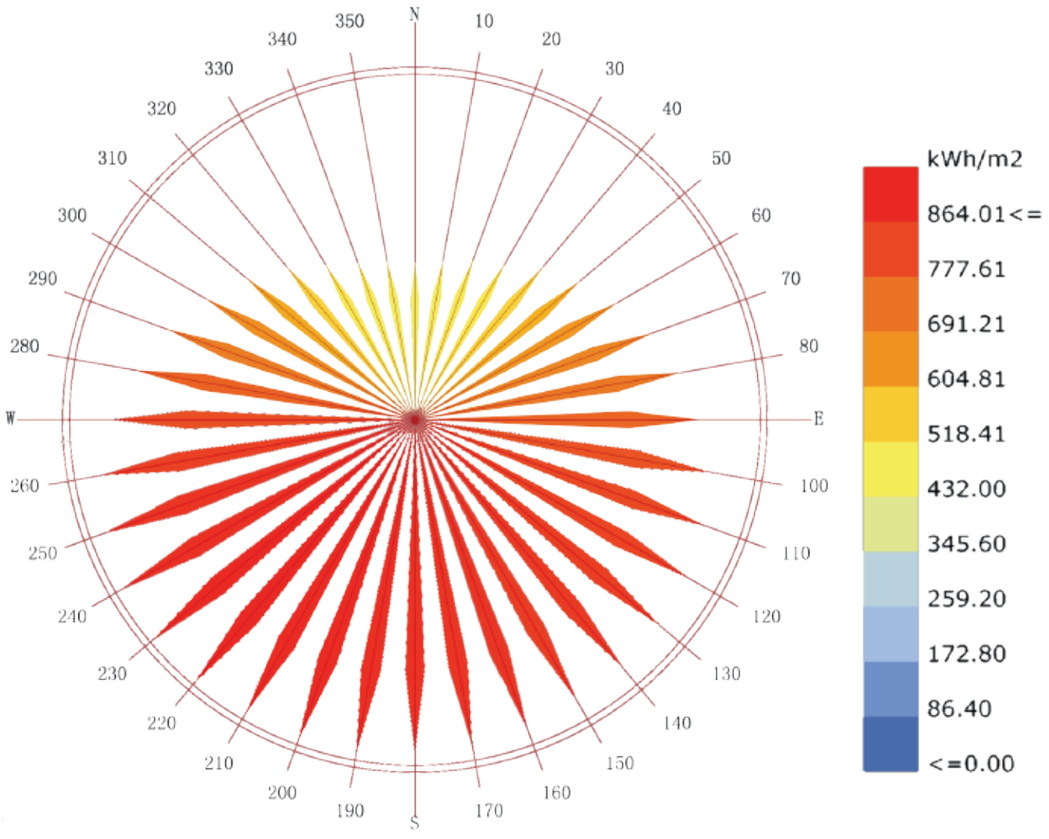


PASSIVE DESIGN STRATEGY 2

Desired Orientation

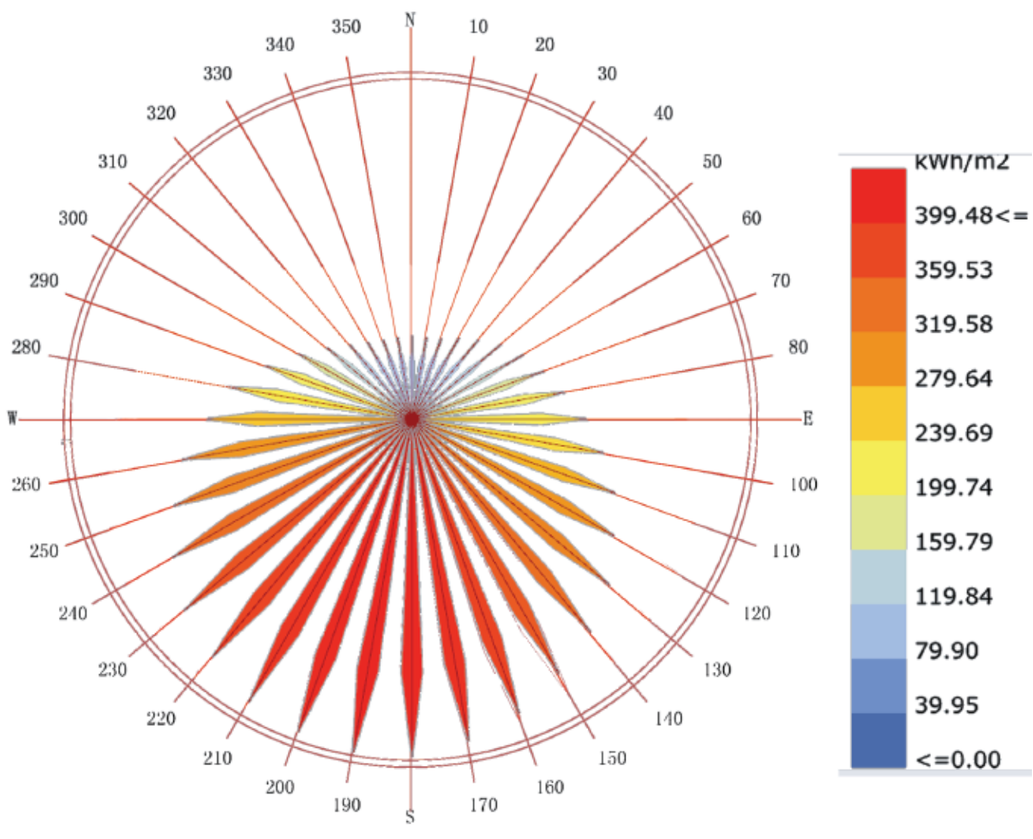
Energy from radiation can move into a window in the day time, and out of the same window at night. Solar heat gain can be significant even on cold clear days. Choices like low-E glasses and triple-pane windows enable the house to maintain a constant, comfortable temperature.

Year Round Radiation



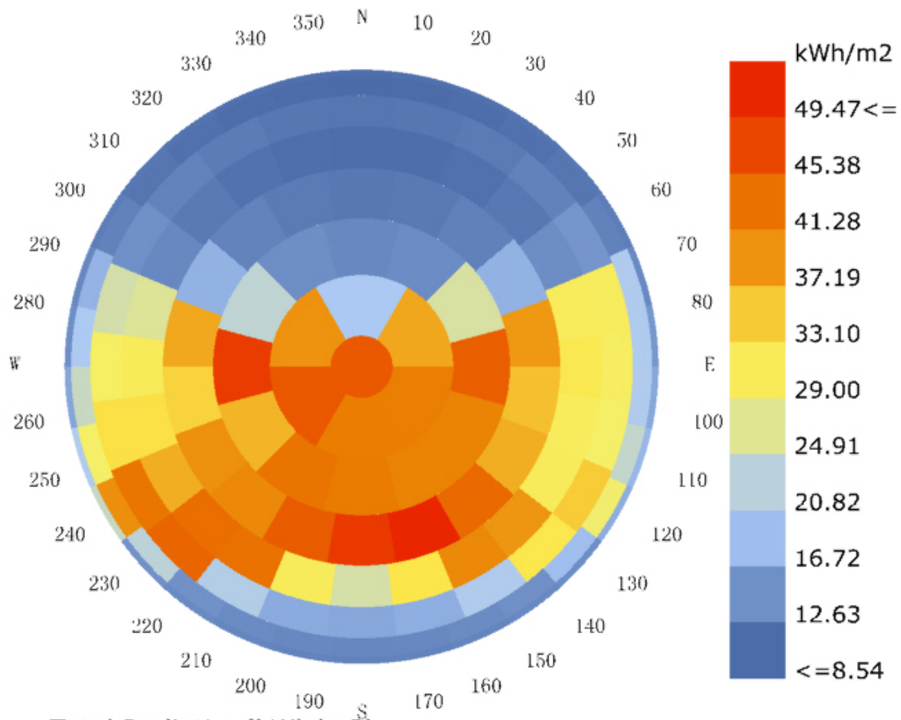
Total Radiation(kWh/m2)
MEXICO_CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

Winter Radiation



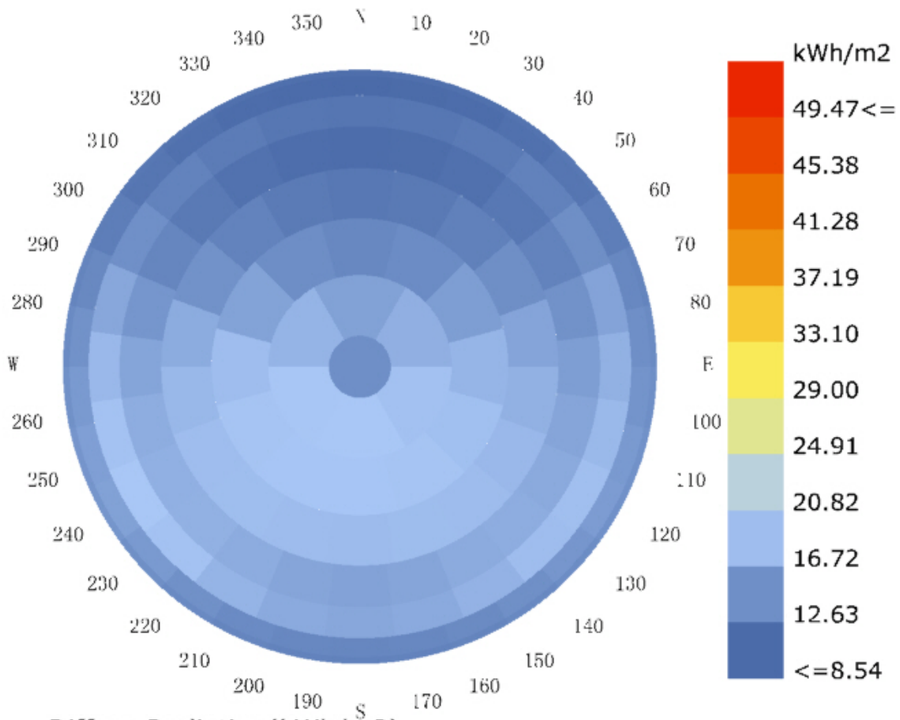
Total Radiation(kWh/m2)
MEXICO_CITY_MEX
1 NOV 1:00 - 28 FEB 24:00

Year Round Total Radiation



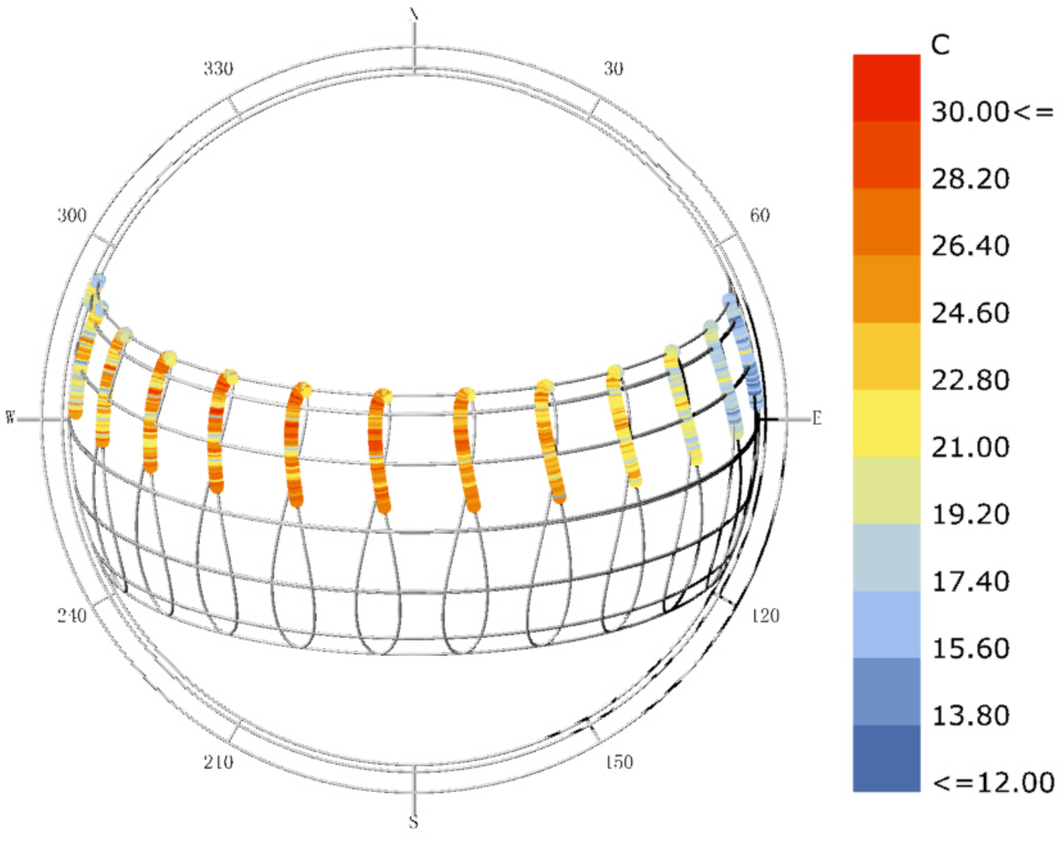
Total Radiation(kWh/m2)
MEXICO_CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

Year Round Diffuse Radiation

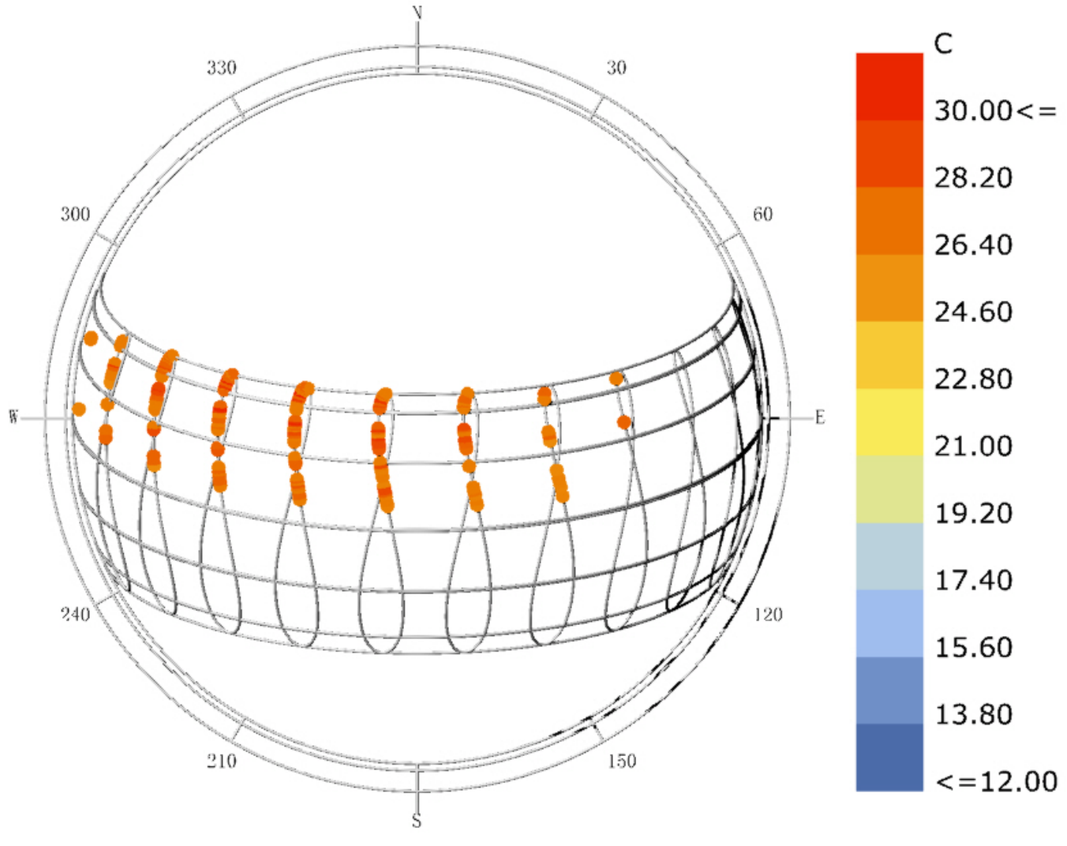


Diffuse Radiation(kWh/m2)
MEXICO_CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

Sun Path From April to June



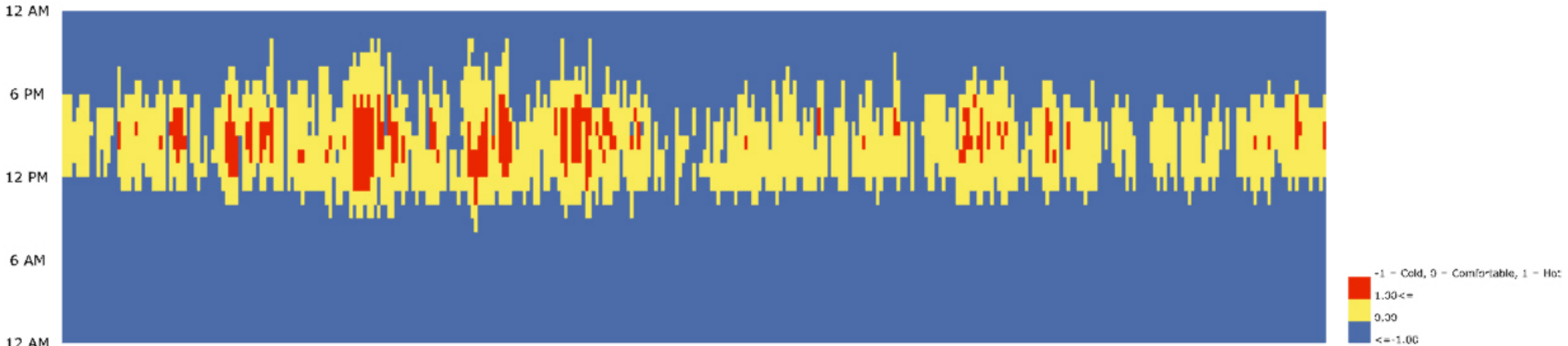
Sun-Path Diagram - Latitude: 19.43
Hourly Data: Dry Bulb Temperature (C)
MEXICO CITY_MEX



Sun-Path Diagram - Latitude: 19.43
Hourly Data: Dry Bulb Temperature (C)
MEXICO CITY_MEX

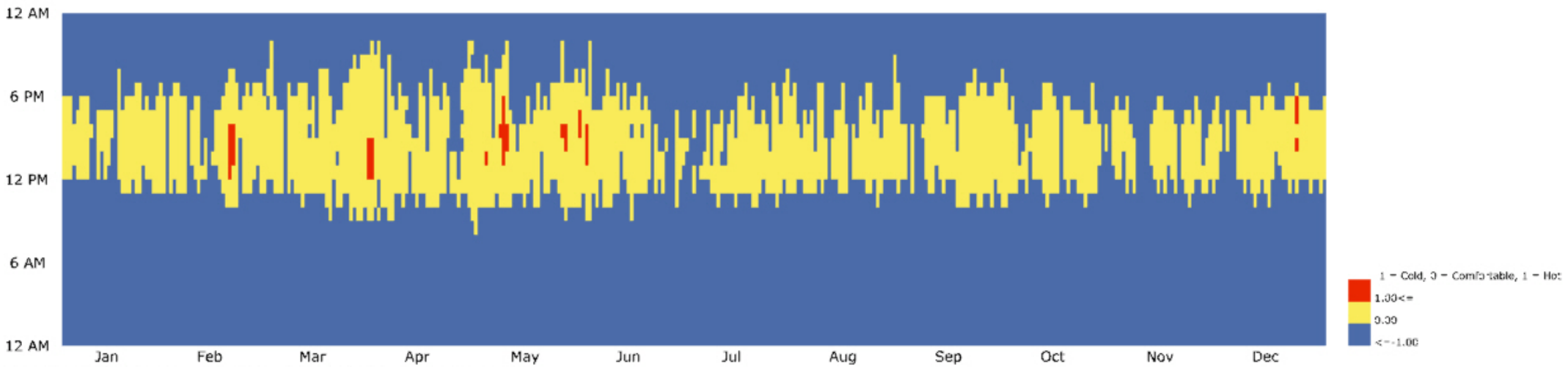
PASSIVE DESIGN STRATEGY 3

Natural Ventilation



Adaptive Comfort (-1 = Cold, 0 = Comfortable, 1 = Hot) - Hourly
MEXICO CITY MEX
1 JAN 1:00 - 31 DEC 24:00

Comfort Hours without Wind

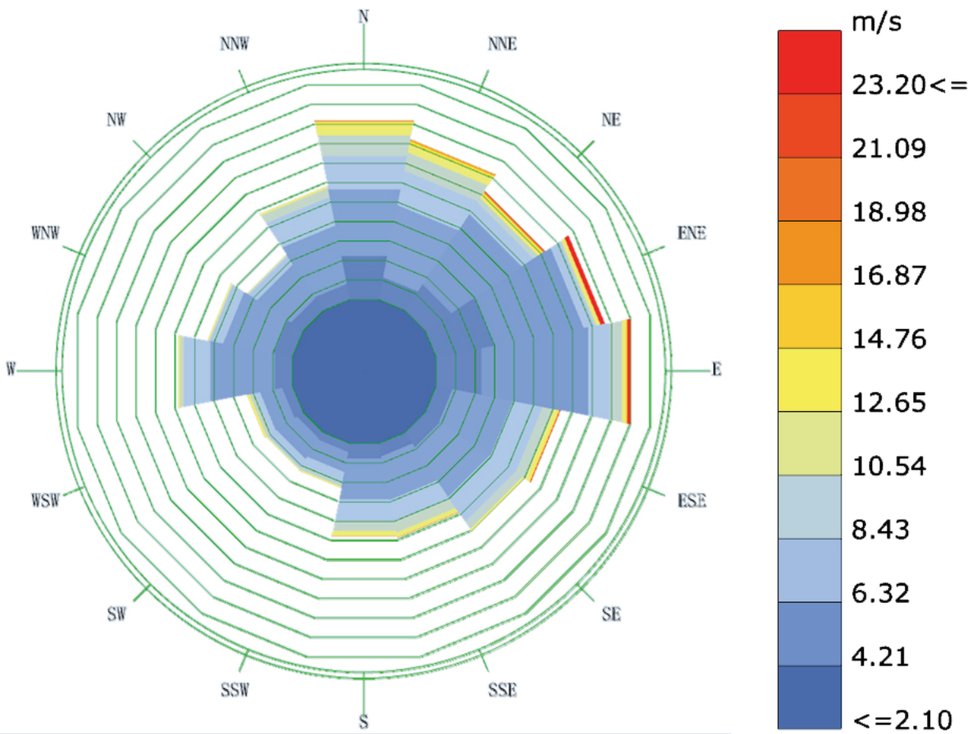


Adaptive Comfort (-1 – Cold, 0 – Comfortable, 1 – Hot) - Hourly
MEXICO CITY MEX
1 JAN 1:00 - 31 DEC 24:00

Comfort Hours with Wind

Natural ventilation uses natural outside air movement and pressure differences to both passively cool and ventilate a building. It can provide and move fresh air without fans. For warm and hot climates, it can help meet a building's cooling loads without using mechanical air conditioning systems. This can be a large fraction of a building's total energy use.
In Mexico City, the preferable wind that could be used for natural ventilation mainly comes from northeast to north.

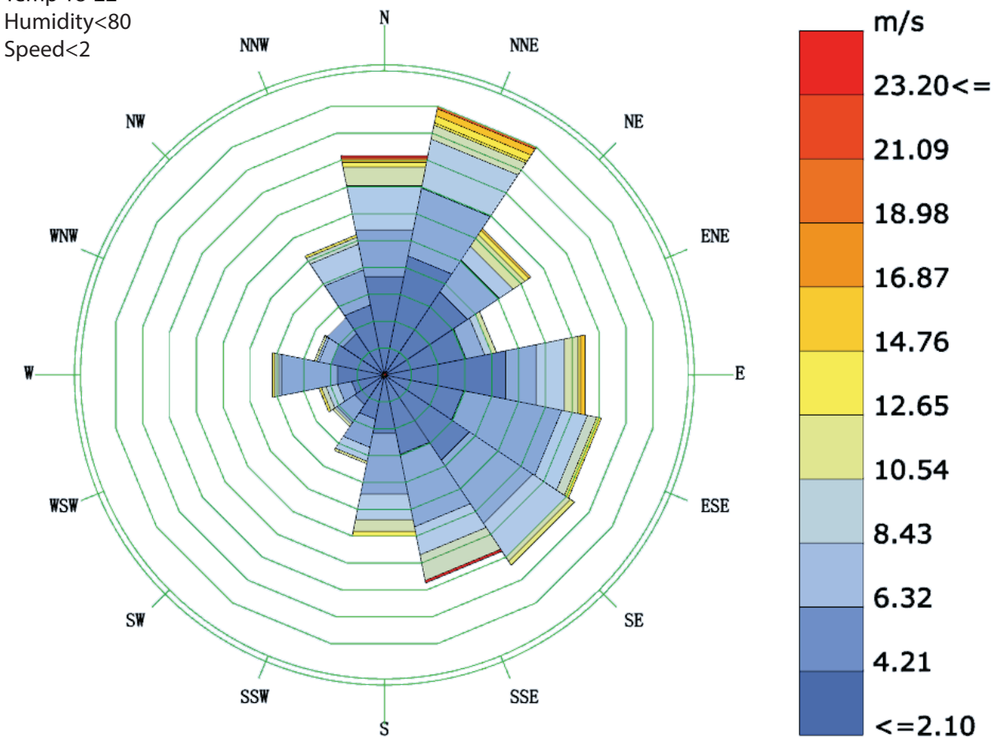
Year Round Wind Rose



Wind-Rose
MEXICO CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

Preferable Wind Direction

Temp 18-22
Humidity<80
Speed<2

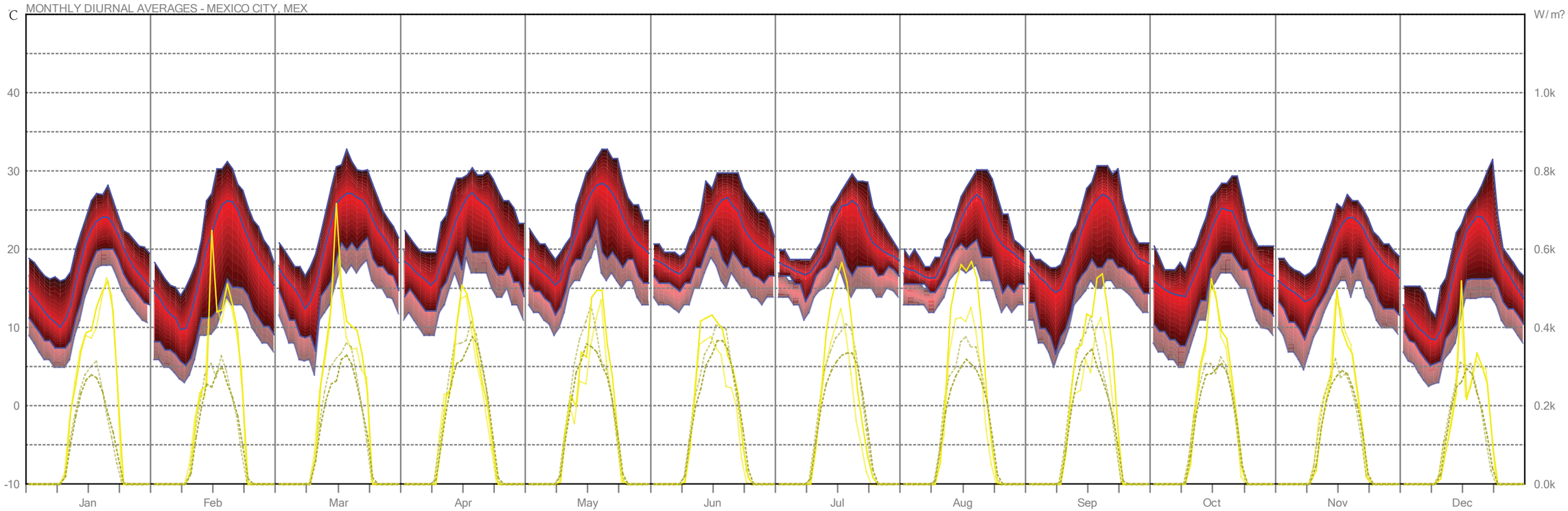


Wind-Rose
MEXICO CITY_MEX
1 JAN 1:00 - 31 DEC 24:00

FURTHER DATA REQUIRED

1 Site Specific weather data
2 Building Energy Loads (Thermal Loads)
3 Active time during a day.
4 Building geometry
5 Surrounding Buildings' geometry (for shading, ventilation, etc.)
6 Building construction material

CLIMATE CHANGE IN 2050



LEGEND

Comfort: Thermal Neutrality

Temperature	Direct Solar
Rel.Humidity	Diffuse Solar
Wind Speed	Cloud Cover