Light S_Single Studio

in Los Angeles

CLIMATE ANALYSIS_LOS ANGELES

WEATHER FILE

USA_CA_Los.Angeles.Intl.AP.722950_TMY3

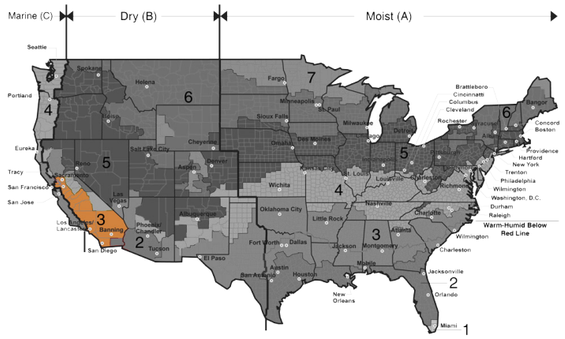
LATITUDE AND LONGITUDE

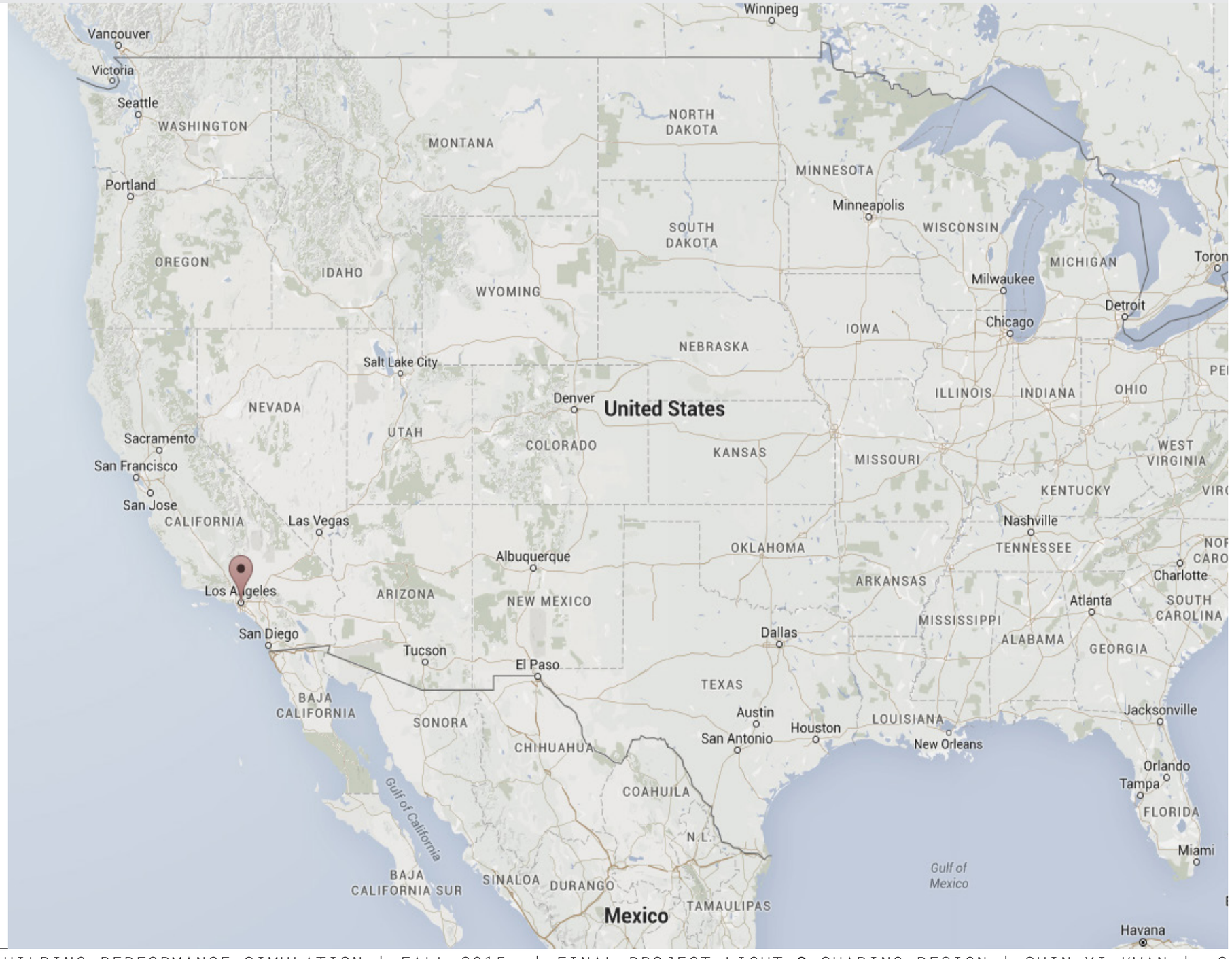
33.93° N, 118.4° W

CLIMATE ZONE_3B Warm-Dry

4500 < CDD50°F < 6300

(2500 < CDD10°C < 3500)





CLIMATE ANALYSIS_LOS ANGELES

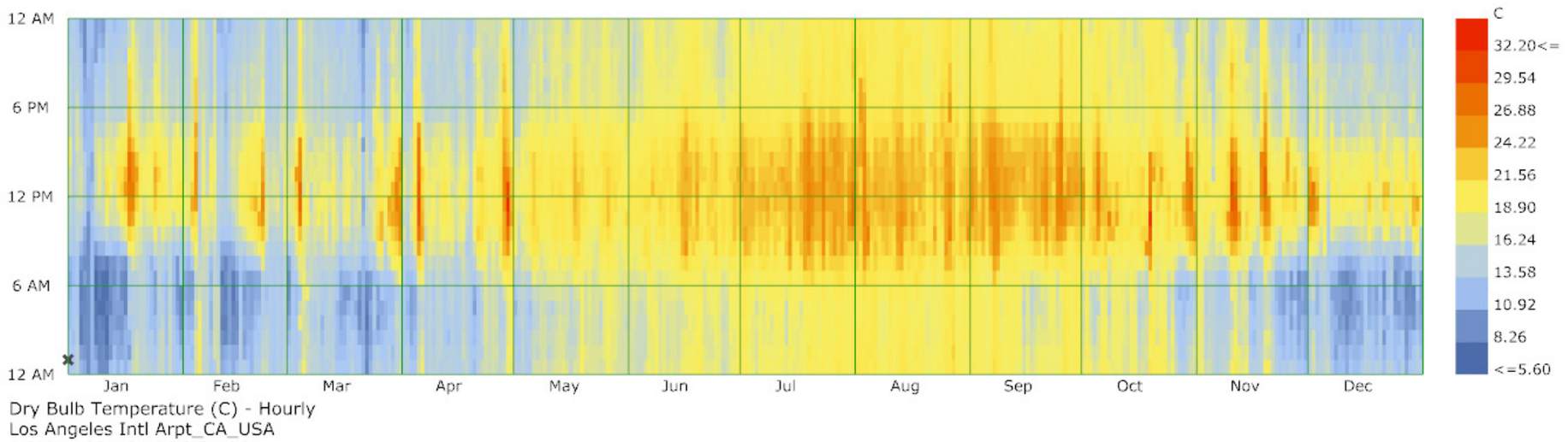
CLIMATE ZONE_3B Warm-Dry

4500 < CDD50°F < 6300

(2500 < CDD10°C < 3500)

ANNUAL DRY BULD TEMPERATURE

HIGH TEMPERATURE APPEARS IN SUMMER NOON WHILE LOW TEMPERATURE APPEARS IN WINTER LATE NIGHT AND EARLY MORNING.



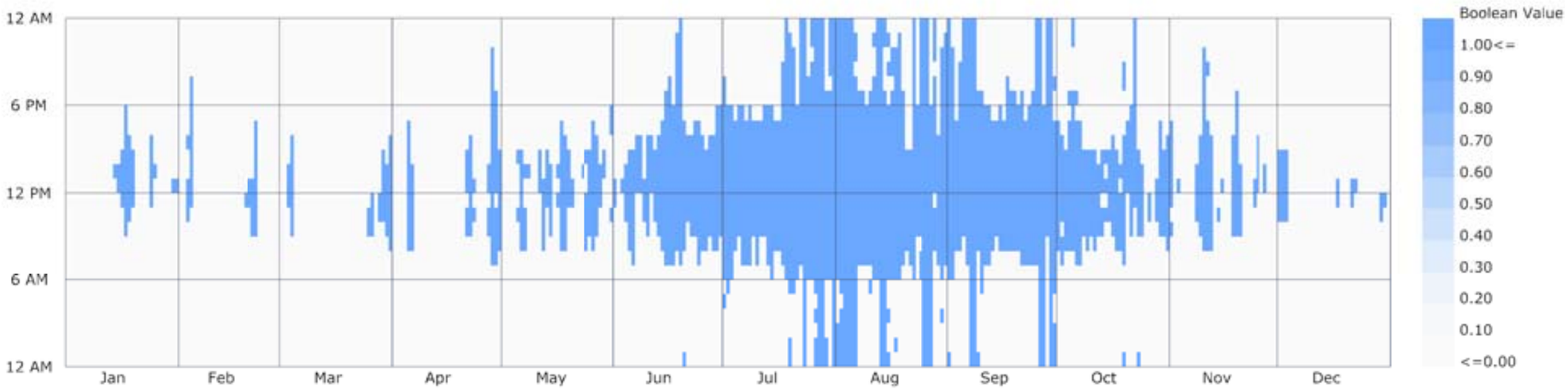
Dry Bulb Temperature (C) - Hourly
Los Angeles Intl Arpt_CA_USA
1 JAN 1:00 - 31 DEC 24:00

COMFORTABLE HOURS OF A YEAR

OUTDOOR COMFORT(UTCI)

MOST OF THE COMFORTABLE HOURS LAID IN BETWEEN JUNE TO OCTOBER WHEN TEMPERATURE RANGES BETWEEN 19-21 ^{0}C.

COMFORTABLE 1 ■
UNCOMFORTABLE 0 □

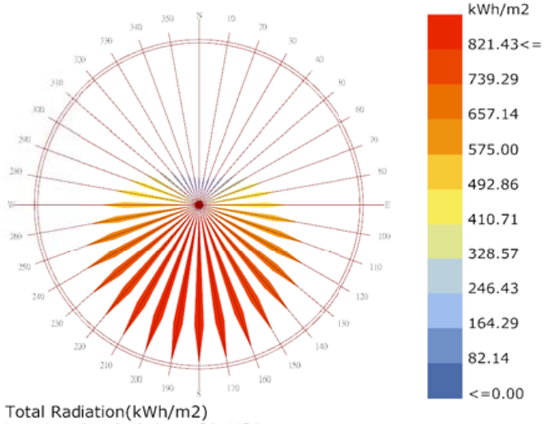


Comfortable Hours in Comfort Polygon (Boolean Value) - Hourly
Los Angeles Intl Arpt_CA_USA
1 JAN 1:00 - 31 DEC 24:00

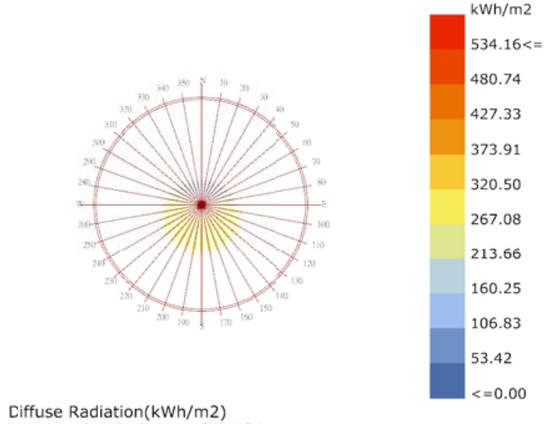
RADIATION ROSE_OCT TO MAY

SOLAR RADIATION COME FROM THE SOUTH DURING OCTOBER TO MAY.

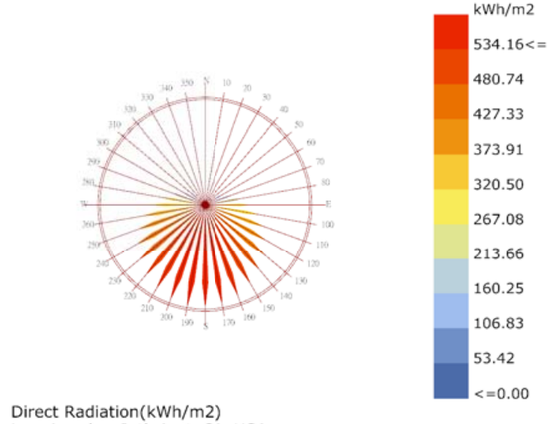
THE POTENTIAL ORIENTATION OF THE **BUILDING GLAZING FACADE** WILL BE **FACING SOUTH** TO ALLOW ENOUGH SOLAR HEAT.



Total Radiation(kWh/m2)
Los_Angeles_Intl_Arpt_CA_USA
1 OCT 1:00 - 31 MAY 24:00



Diffuse Radiation(kWh/m2)
Los_Angeles_Intl_Arpt_CA_USA
1 OCT 1:00 - 31 MAY 24:00

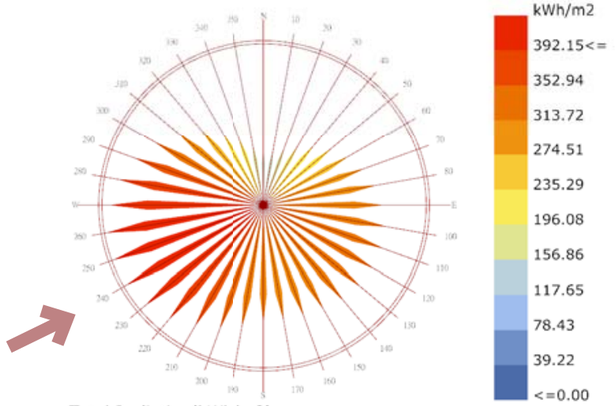


Direct Radiation(kWh/m2)
Los_Angeles_Intl_Arpt_CA_USA
1 OCT 1:00 - 31 MAY 24:00

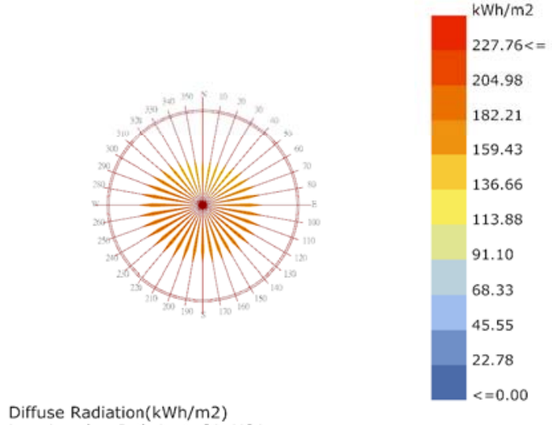
RADIATION ROSE_JUN TO SEP

SOLAR RADIATION COME FROM THE WEST DURING JUNE TO SEPTEMBER.

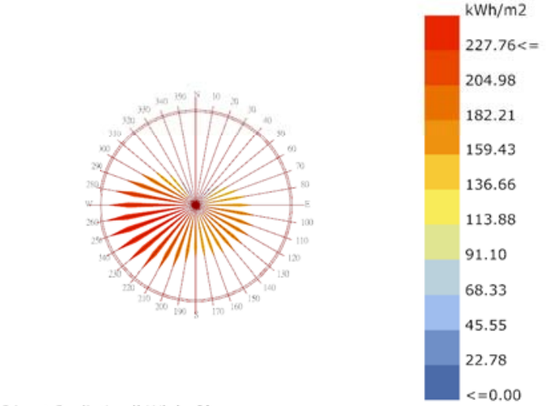
THE DESIGN STRATEGY FOR THE SHADING AIM TO **BLOCK THE DIRECT SUNLIGHT FROM WEST** IN SUMMER .



Total Radiation(kWh/m2)
Los_Angeles_Intl_Arpt_CA_USA
1 JUN 1:00 - 30 SEP 24:00

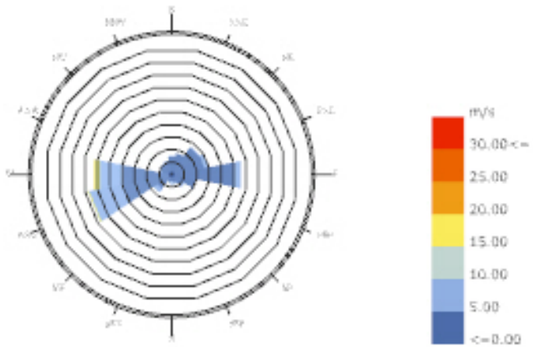


Diffuse Radiation(kWh/m2)
Los_Angeles_Intl_Arpt_CA_USA
1 JUN 1:00 - 30 SEP 24:00



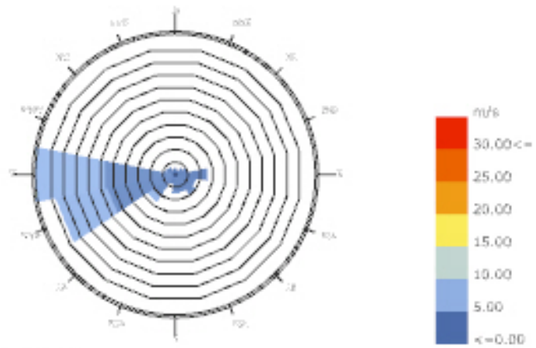
Direct Radiation(kWh/m2)
Los_Angeles_Intl_Arpt_CA_USA
1 JUN 1:00 - 30 SEP 24:00

WIND ROSE_FOUR SEASON



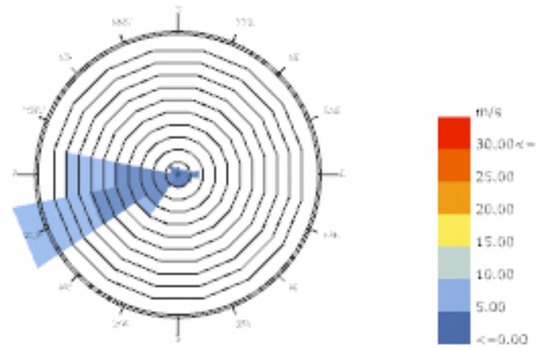
Wind-Rose
Los Angeles Intl Arpt_CA_USA
1 JAN 1:00 - 31 MAR 24:00
Hourly Data: Wind Speed (m/s)
Calm for 10.46% of the time = 226 hours.
Each closed polyline shows frequency of 2.6%. = 56 hours.

WINTER



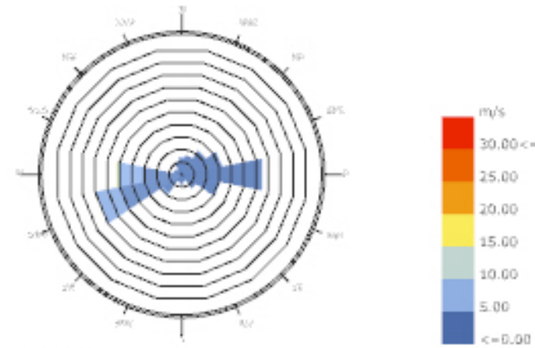
Wind-Rose
Los Angeles Intl Arpt_CA_USA
1 APR 1:00 - 30 JUN 24:00
Hourly Data: Wind Speed (m/s)
Calm for 9.11% of the time = 199 hours.
Each closed polyline shows frequency of 2.6%. = 56 hours.

SPRING



Wind-Rose
Los Angeles Intl Arpt_CA_USA
1 JUL 1:00 - 30 SEP 24:00
Hourly Data: Wind Speed (m/s)
Calm for 11.23% of the time = 248 hours.
Each closed polyline shows frequency of 2.6%. = 57 hours.

SUMMER



Wind-Rose
Los Angeles Intl Arpt_CA_USA
1 OCT 1:00 - 31 DEC 24:00
Hourly Data: Wind Speed (m/s)
Calm for 6.25% of the time = 135 hours.
Each closed polyline shows frequency of 2.6%. = 57 hours.

FALL

VENTILATION CAN BE APPLY
IN SUMMER. THE DESIGN STRATEGY
WILL BE PROVIDING OPENINGS TOWARD
SOUTHWEST.

BASE-CASE ASSESSMENT

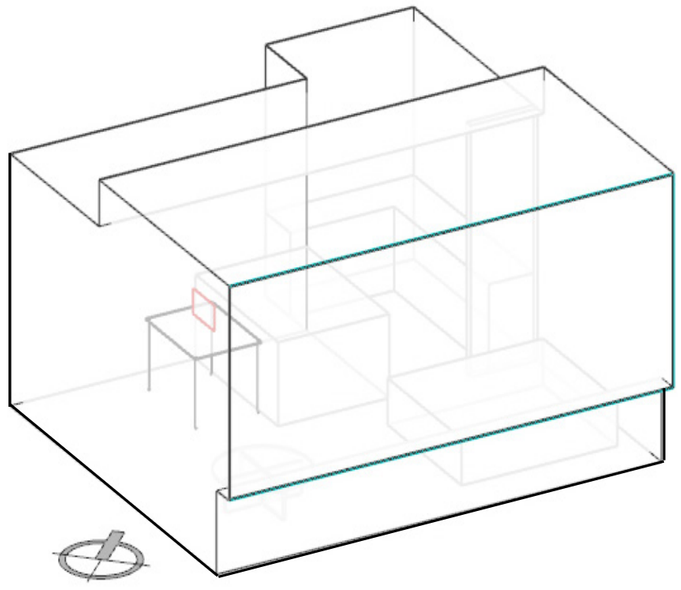
PROJECT DESCRIPTION

_THE BASE CASE IS AN UNVENTILATED AND HIGHLY INSULTATED ONE STORE STUDIO.

_5M IN DEPTH, 6M IN WIDTH AND 3.2M IN HEIGHT.

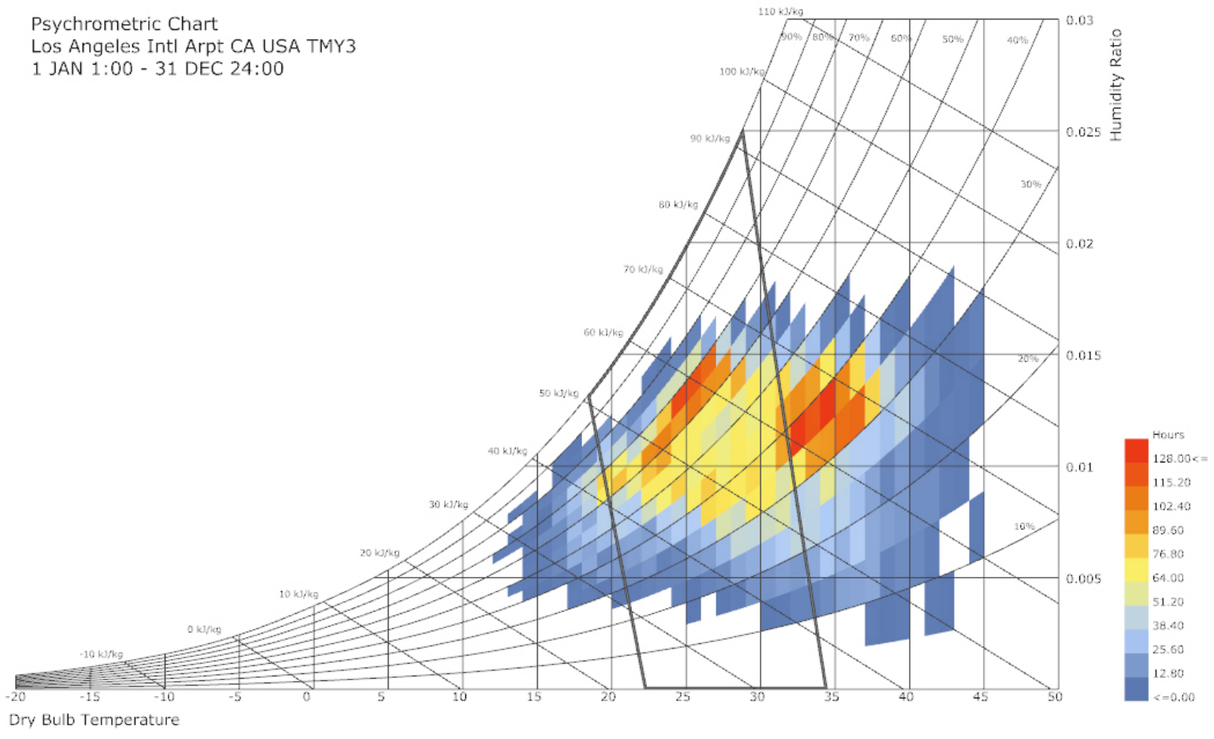
_2.3M X 6M GLAZING FACING SOUTHEAST.

_USE AS A SINGLE STUDIO WHERE OCCUPANTS MIGHT WORK AT HOME DURING DAY TIME.



PSYCHROMETRIC CHART

64.37% TOTAL COMFORT PERCENTAGE
35.63% MAJORITY OF UNCOMFORTABLE TIME ARE TOO HOT.



BASE-CASE ASSESSMENT

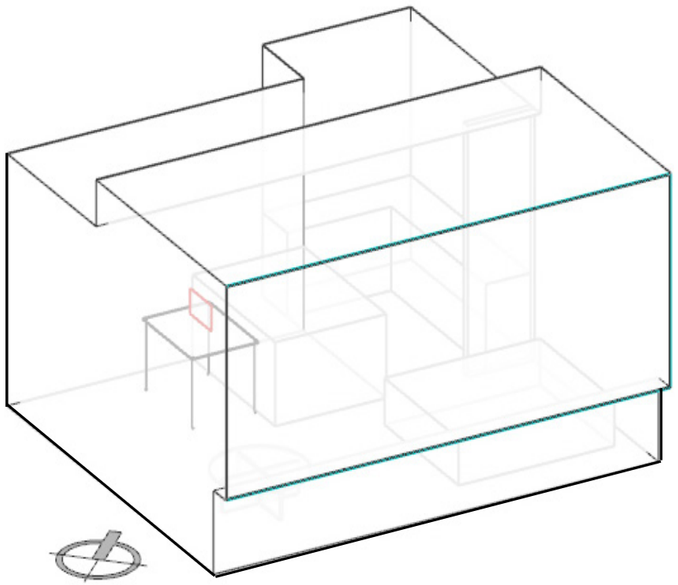
ANNUAL PERCENT OF TIME COMFORT

PMV COMFORT MODEL

18.95%

ADAPTIVE COMFORT MODEL

29.89%



SOLAR
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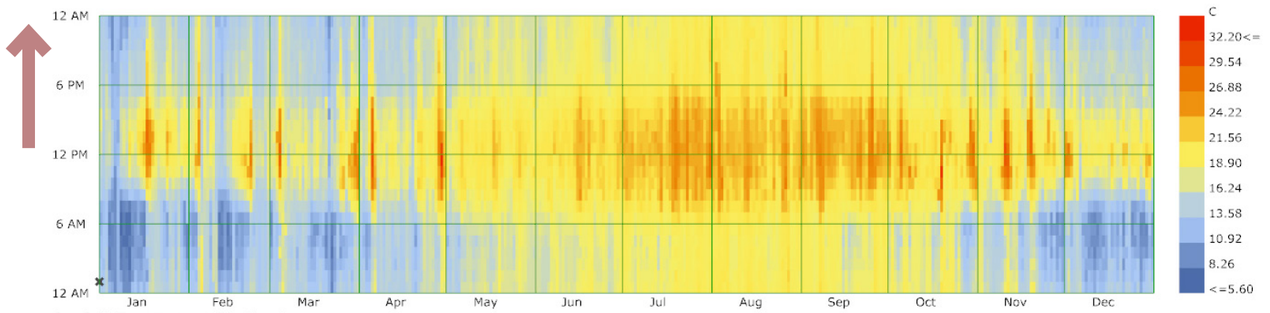
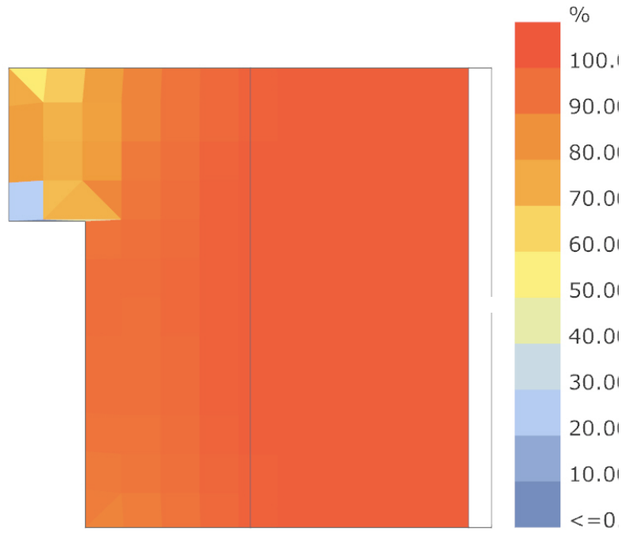


BASE-CASE ASSESSMENT

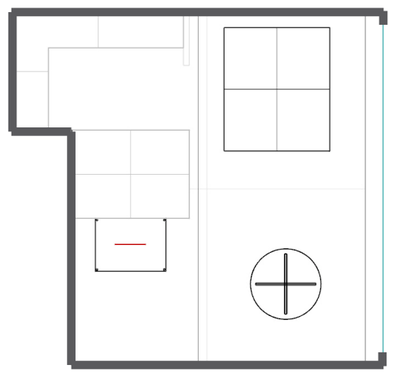
ANNUAL DAYLIGHT AUTONOMY

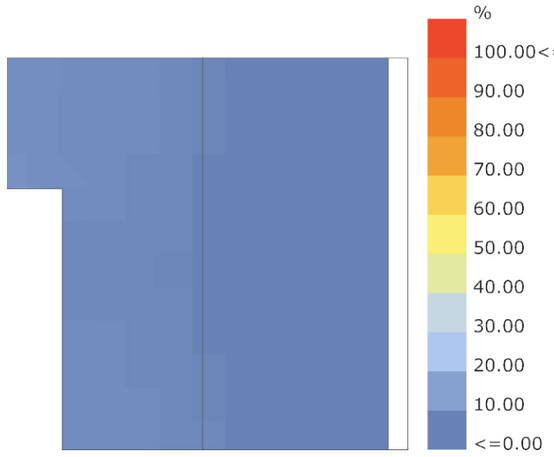
SPATIAL DAYLIGHT AUTONOMY (sDA)_**97.06%**
(LEED standrad_above 55%)

THE RESULT SHOWS THAT ABOUT 50% OF THE TIME THE SENSOR 1/2 IS WITHIN MORE THAN 2000LUX AROUND THE WINDOW.

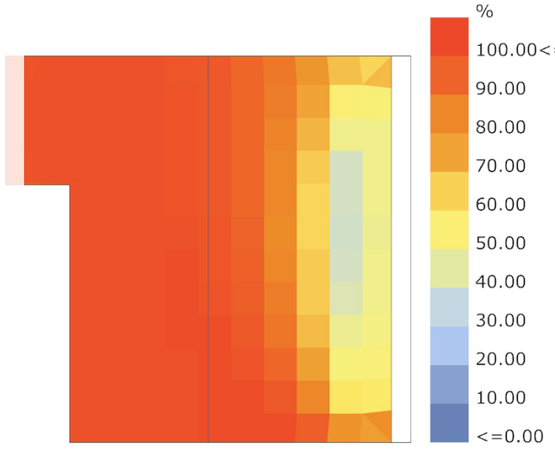


DAYLIGHT AUTONOMY(300lux)

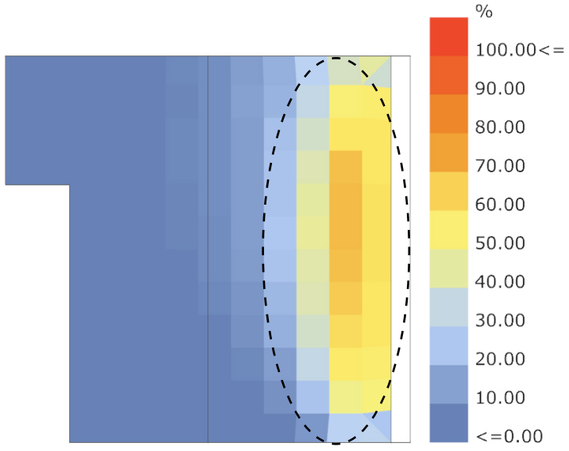




UDLI 0-100

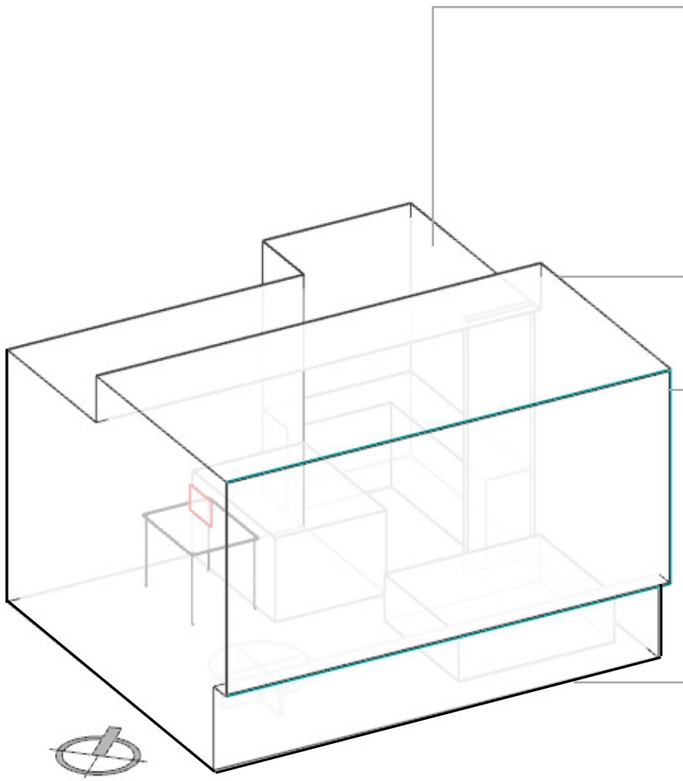


UDLI 100-2000



UDLI more than 2000

CONSTRUCTION MATERIAL SELECTION

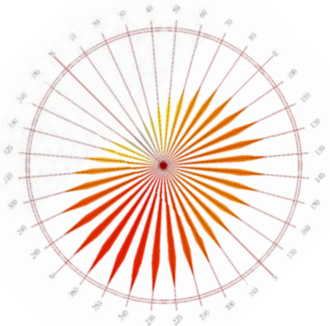


ASHRAE 189.1-2009climate zone3 standrad_

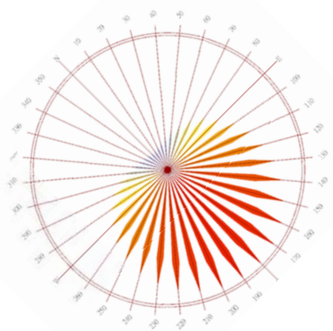
Exwall:	R-value(SI) 1.54	1IN Stucco 8IN Concrete HW Wall Insulation [36] 1/2IN Gypsum
Exroof:	R-value(SI) 4.36	Roof Membrane Roof Insulation [21] Metal Decking
Window:	R-value(SI) 0.16	Theoretical Glass [202]
Floor:	R-value(SI) 5.01	1/2IN Gypsum AtticFloor Insulation 1/2IN Gypsum

DESIGN PROPOSALS

ORIENTATION OF THE BUILDING

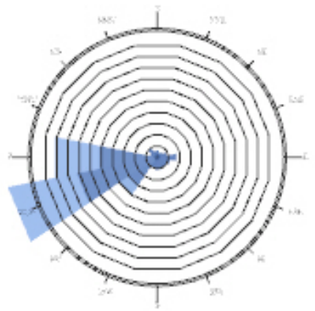


RADIATION ROSE_SUMMER

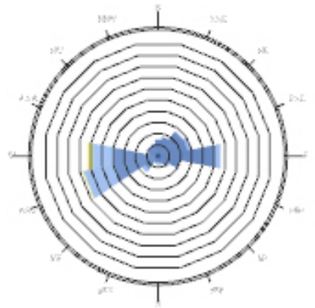


RADIATION ROSE_OCT TO MAY

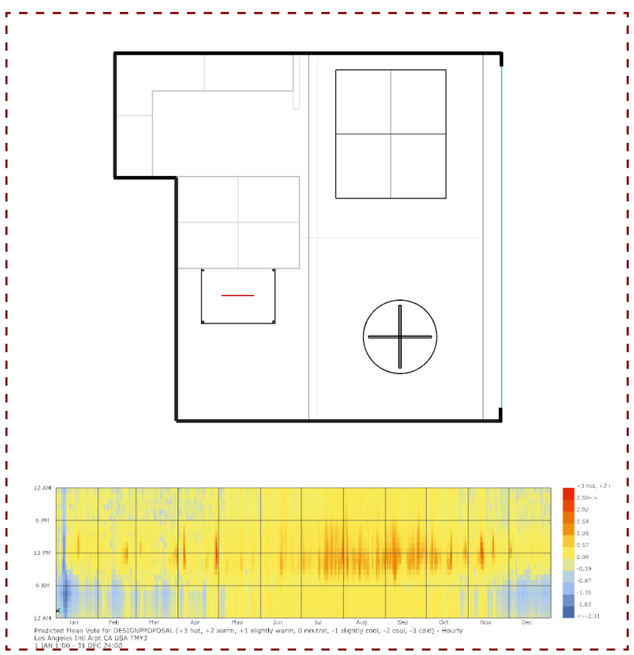
+ADD NATURAL VENTILATION TO ENERGY SIMULATION



WIND ROSE_SUMMER



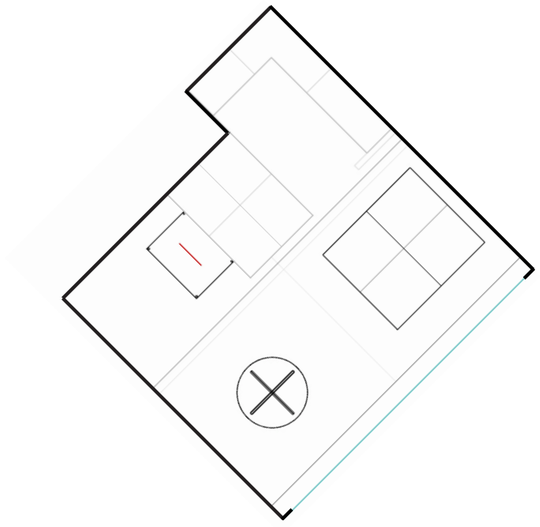
WIND ROSE_WINTER

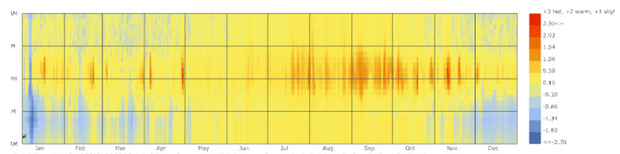


WINDOW FACING ES

PMV COMFORT 81.08

ADAPTIVE COMFORT93.62

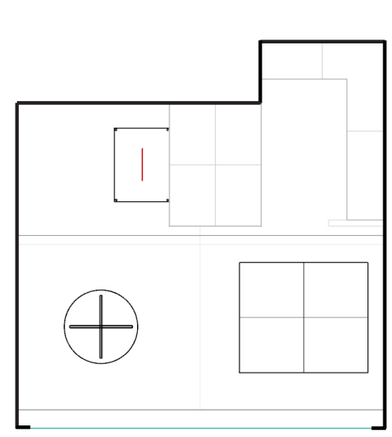


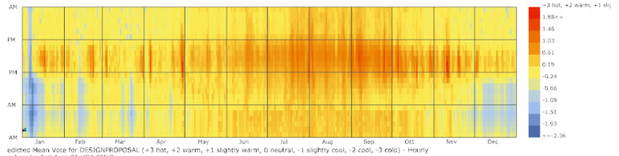


WINDOW FACING S

PMV COMFORT 80.68

ADAPTIVE COMFORT 92.79

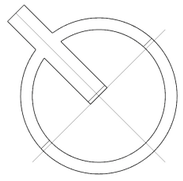




WINDOW FACING SW

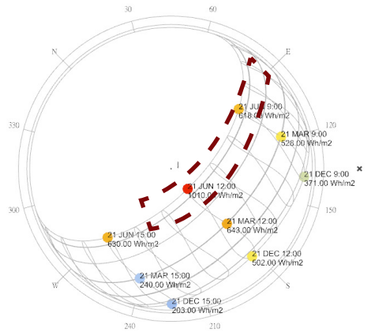
PMV COMFORT 77.68

ADAPTIVE COMFORT 91.49

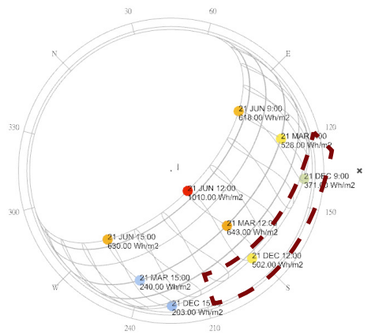


DESIGN PROPOSALS

SHADING LOCATION ASSESSMENT

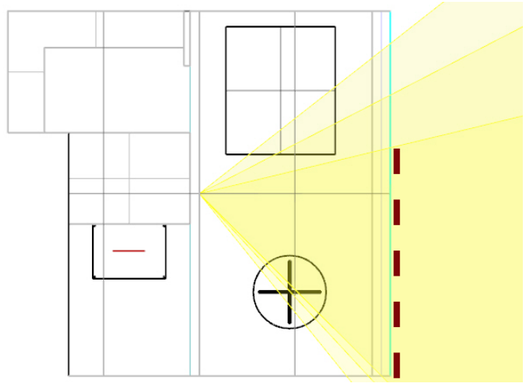


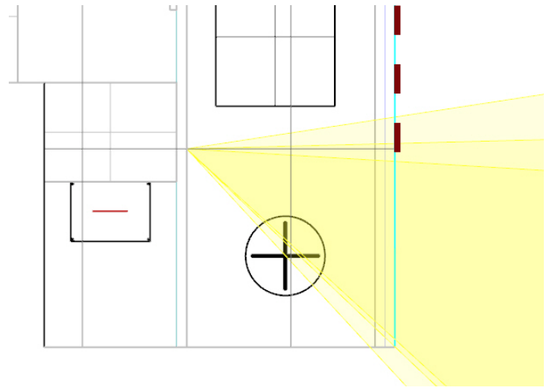
SUNPATH_JUL AUG SEP
9AMTO12PM



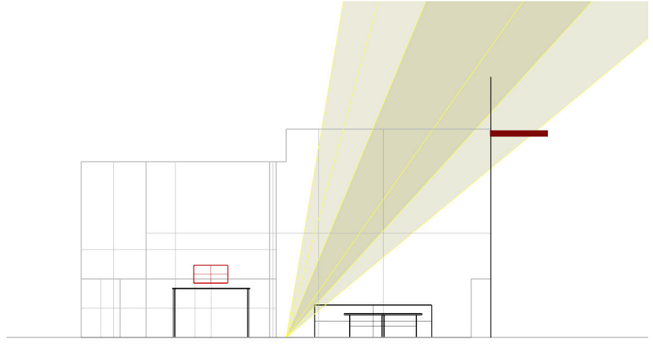
SUNPATH_DEC JAN FEB
9AMTO12PM

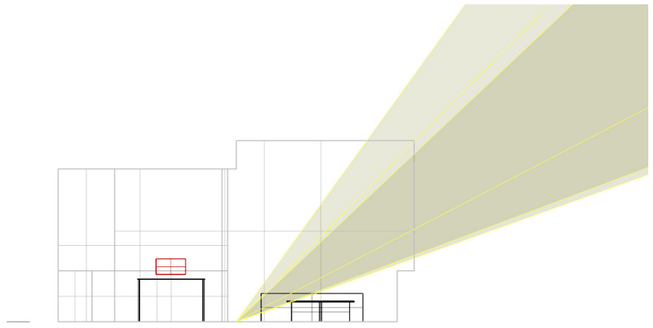
TOP VIEW



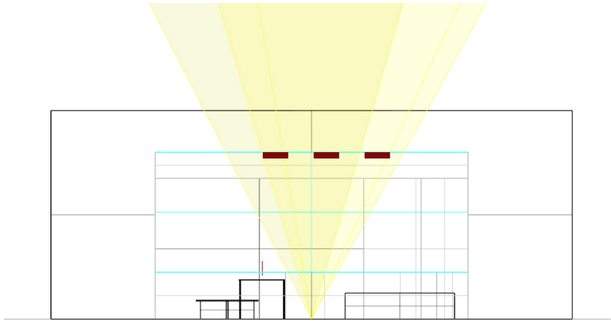


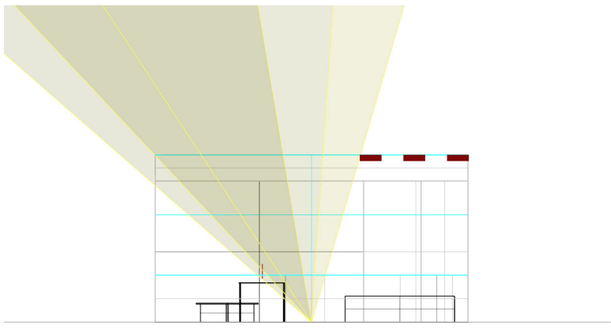
SIDE VIEW





FRONT VIEW

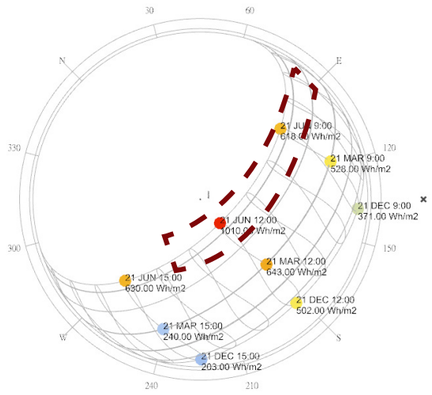




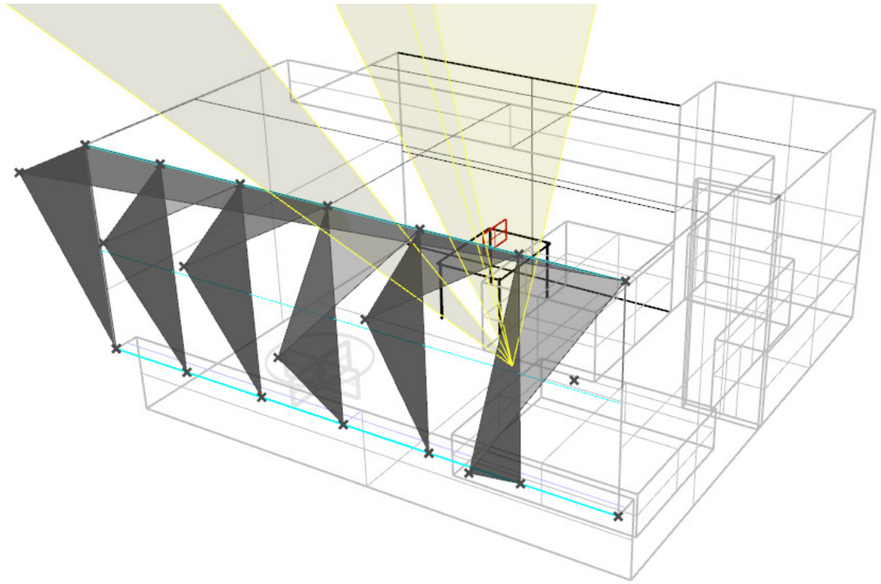
AREA TO SHADED

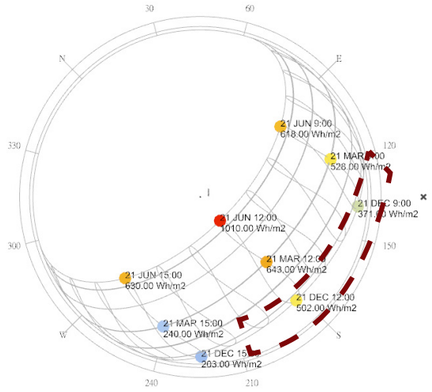
SHADING PROPOSALS

THE FORM OF THE SHADE IS GENERATED FROM AVOIDING THE HIGH ANGLE DAYLIGHT IN SUMMER AND ALLOWING LOW ANGLE DAYLIGHT DURING WINTER.

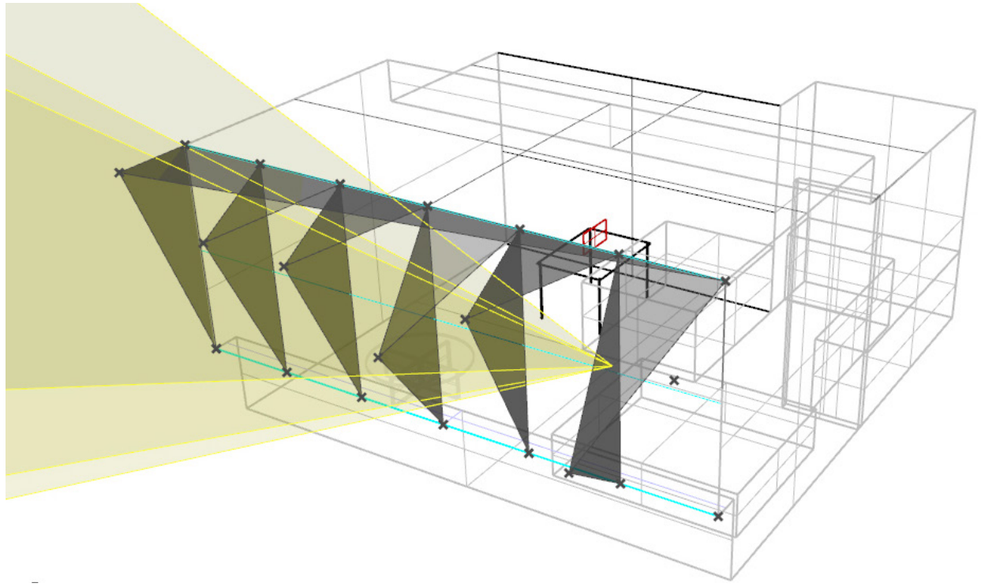


SUNPATH_JUL AUG SEP
9AMTO12PM



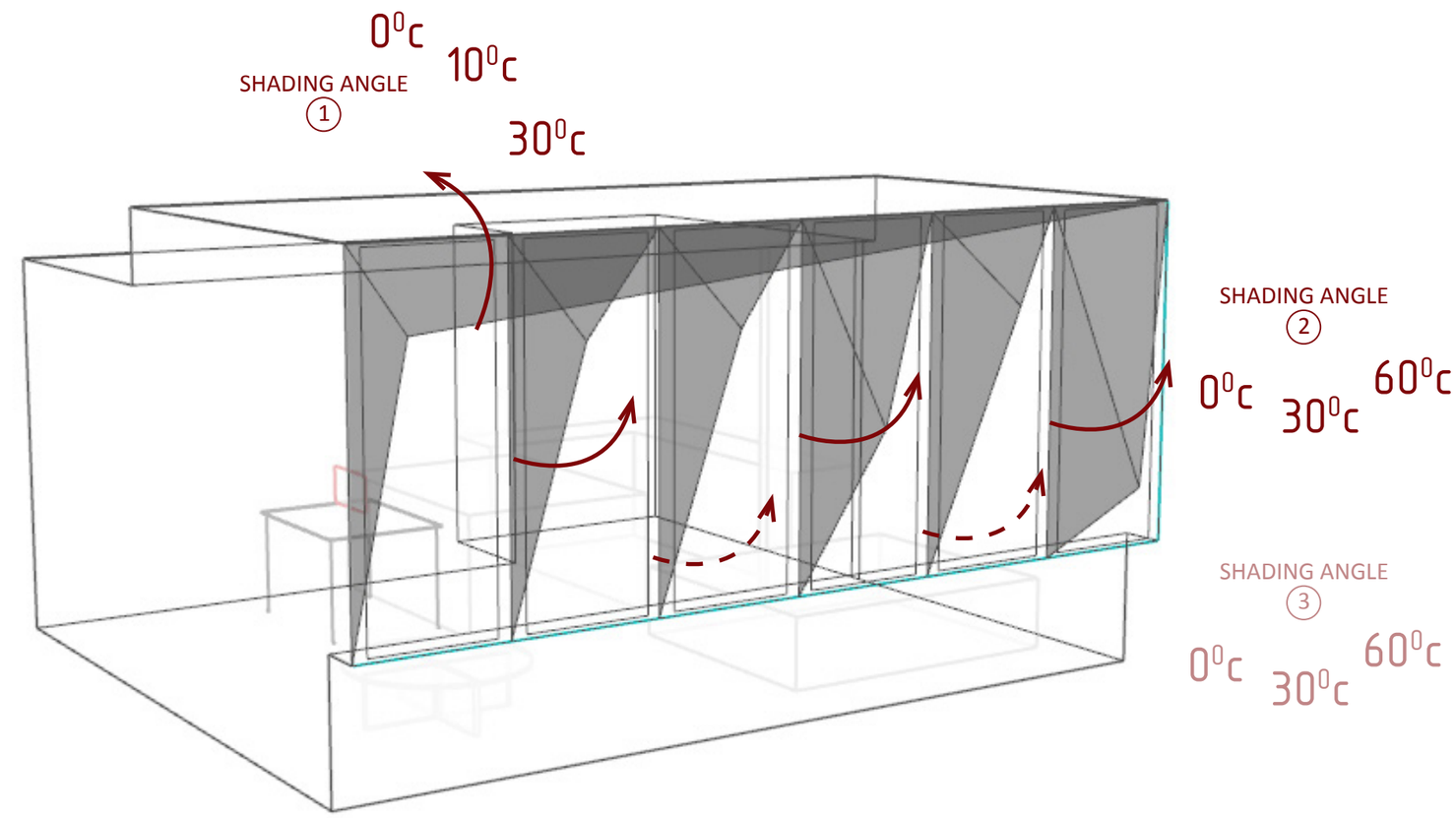


SUNPATH_DEC JAN FEB
9AMTO12PM



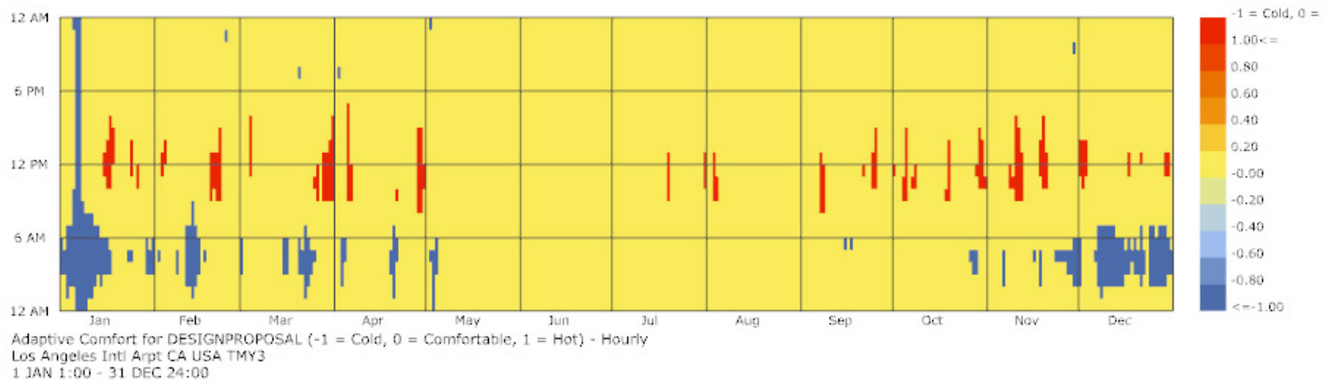
ADJUSTABLE SUN VISOR

THE FORM OF THE SHADE IS GENERATED FROM AVOIDING THE HIGH ANGLE DAYLIGHT IN SUMMER AND ALLOWING LOW ANGLE DAYLIGHT DURING WINTER.

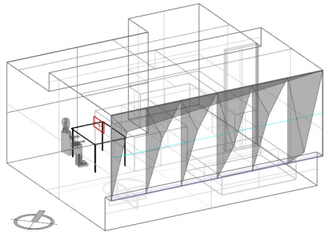


WINDOW FACING ES
WITH VENTILATION
ADAPTIVE COMFORT

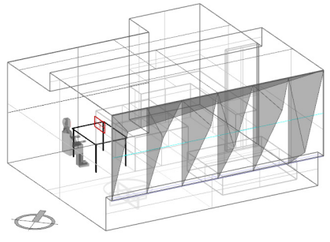
93.62



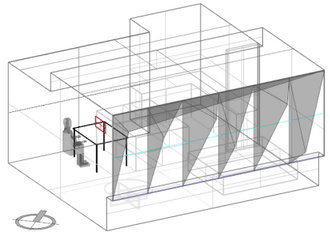
COMFORT PREFORMANCE OF MULTI SHADING-ANGLE COMBINATION



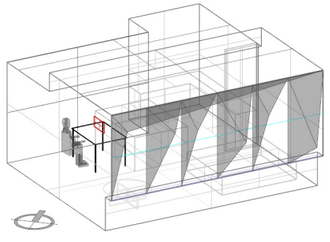
PMV 85.53
ADAPTIVE 94.62



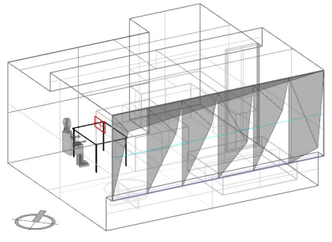
PMV 85.77
ADAPTIVE 94.53



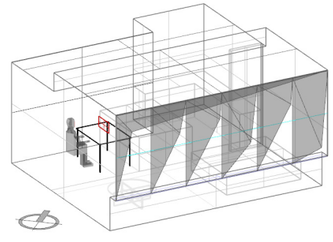
PMV 85.60
ADAPTIVE 94.57



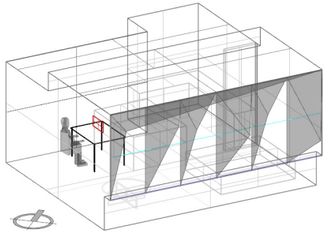
PMV 85.47
ADAPTIVE 9450



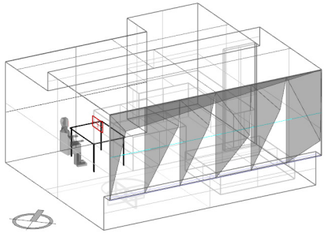
PMV 85.65
ADAPTIVE 94.41



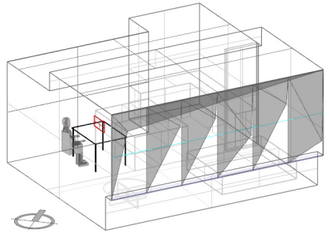
PMV 85.41
ADAPTIVE 94.44



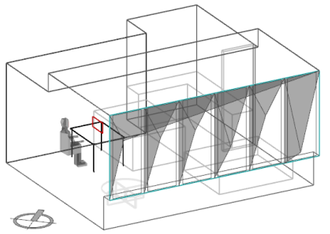
PMV 85.41
ADAPTIVE 94.45



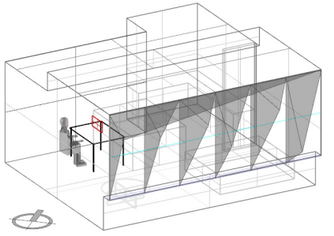
PMV 85.26
ADAPTIVE 94.29



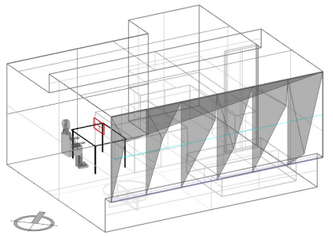
PMV 85.14
ADAPTIVE 94.63



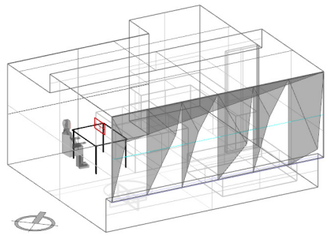
PMV 85.66
ADAPTIVE 94.49



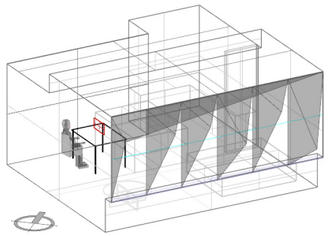
PMV 85.09
ADAPTIVE 94.47



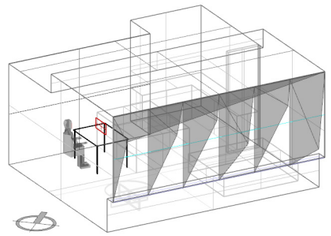
PMV 85.77
ADAPTIVE 94.52



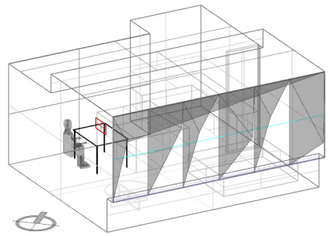
PMV 85.45
ADAPTIVE 94.54



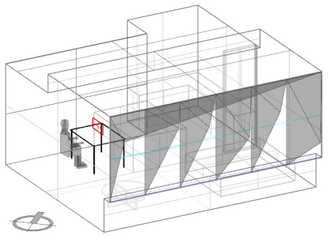
PMV 85.44
ADAPTIVE 94.42



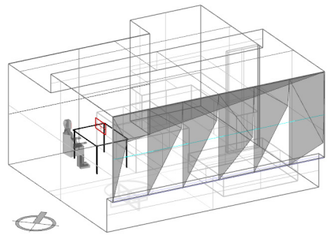
PMV 85.74
ADAPTIVE 94.46



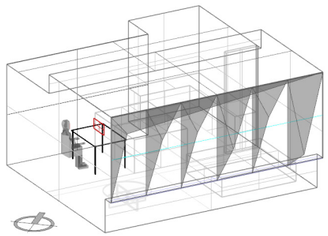
PMV 85.41
ADAPTIVE 94.38



PMV 85.31
ADAPTIVE 94.24

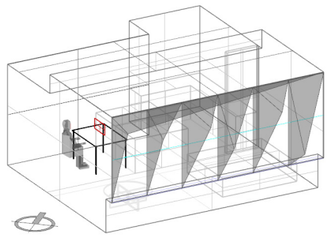


PMV 85.92
ADAPTIVE 94.55



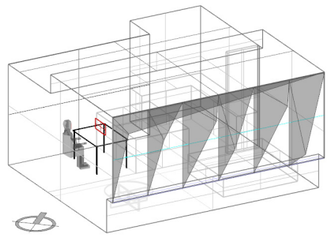
PMV 85.53
ADAPTIVE 94.62

sDA 75



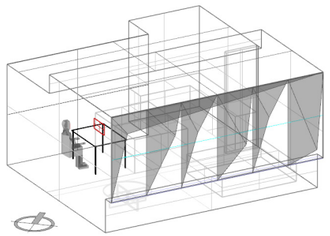
PMV 85.77
ADAPTIVE 94.53

sDA 73.53



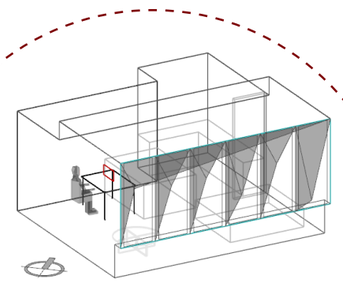
PMV 85.60
ADAPTIVE 94.57

sDA 60.29



PMV 85.47
ADAPTIVE 9450

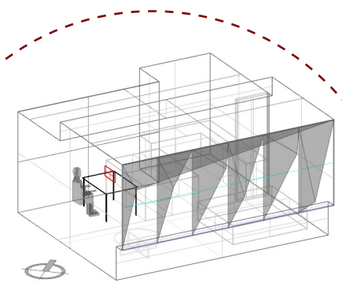
sDA 70.59



PMV 85.66
ADAPTIVE 94.49

sDA 75

BEST COMFORT PREFORMANCE



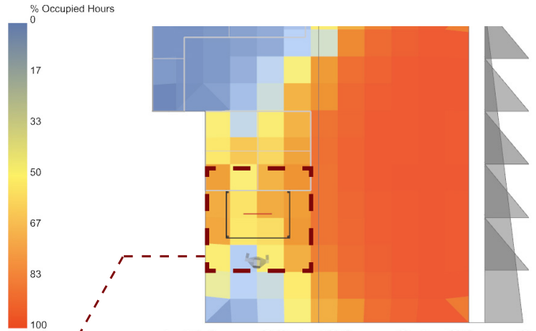
PMV 85.77
ADAPTIVE 94.52

sDA 60.29

BEST sDA PREFORMANCE
2nd BEST PREFORMANCE

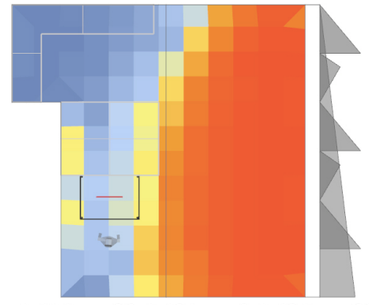
+90% WINDOW TO WALL RATIO TO FIT THE SHADING CONSTRUCTION

SLIGHTLY HIGHER COMFORT PREFORMANCE & sDA
BETTER WORKING CONDITION



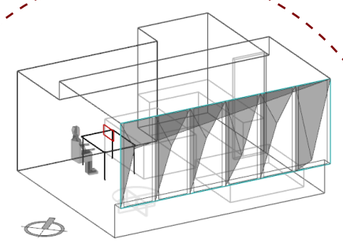
shd1Ang_30shd2Ang_0shd3Ang_0

DAYLIGHT AUTONOMY



shd1Ang_30shd2Ang_0shd3Ang_60

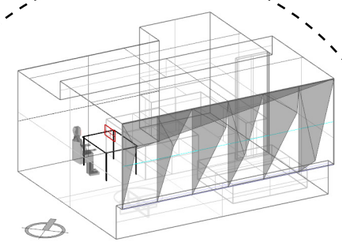
DAYLIGHT AUTONOMY



PMV 87.20
ADAPTIVE 95.29

sDA 71.3%

SHADING ANGLE1_30
SHADING ANGLE2_ 0
SHADING ANGLE3_ 0



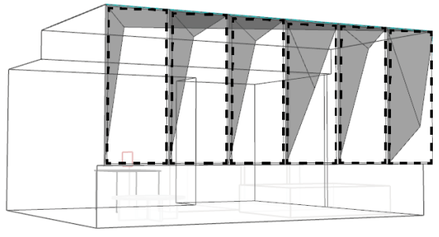
PMV 87.08
ADAPTIVE 95.12

sDA 55.9%

SHADING ANGLE1_30
SHADING ANGLE2_ 0
SHADING ANGLE3_60

ADJUST WINDOW TO WALL RATIO TO LOWER SPATIAL DAYLIGHT AUTONOMY TO 55-60%

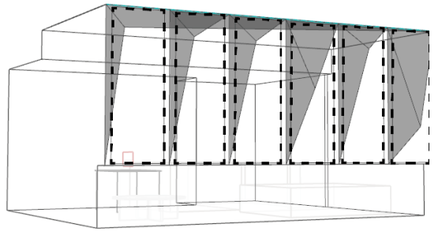
WWR 90%



PMV 87.20
ADAPTIVE 95.29

sDA 71.3%

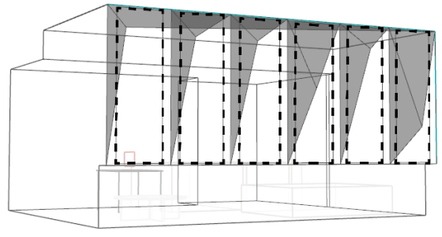
WWR 80%



PMV 87.99
ADAPTIVE 96.10

sDA 60.29%

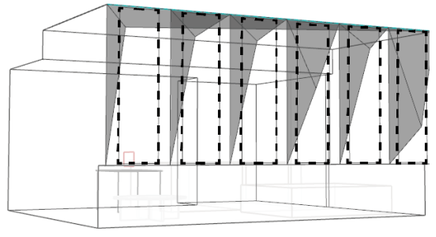
WWR 70%



PMV 89.29
ADAPTIVE 96.75

sDA 51.47%

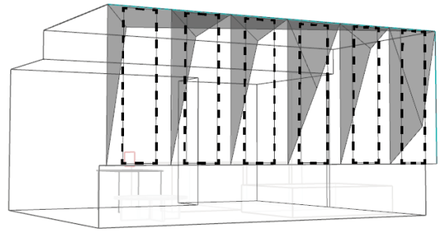
WWR 60%



PMV 90.49
ADAPTIVE 97.52

sDA 44.12%

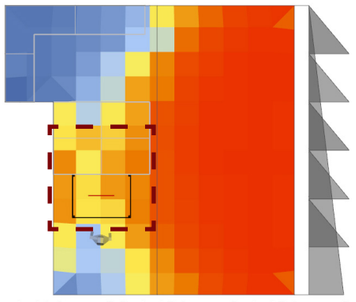
WWR 50%



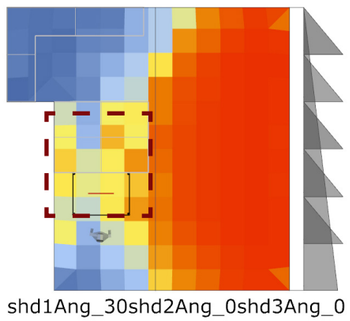
PMV 91.28
ADAPTIVE 97.89

sDA 36.76%

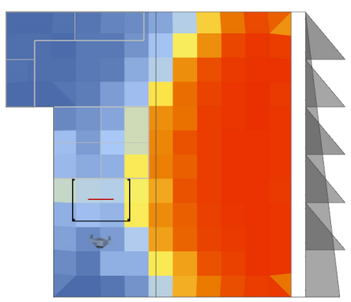
DAYLIGHT AUTONOMY



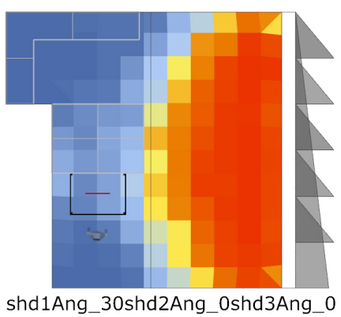
shd1Ang_30shd2Ang_0shd3Ang_0



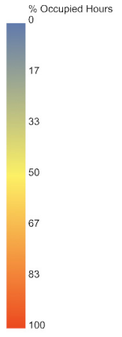
shd1Ang_30shd2Ang_0shd3Ang_0



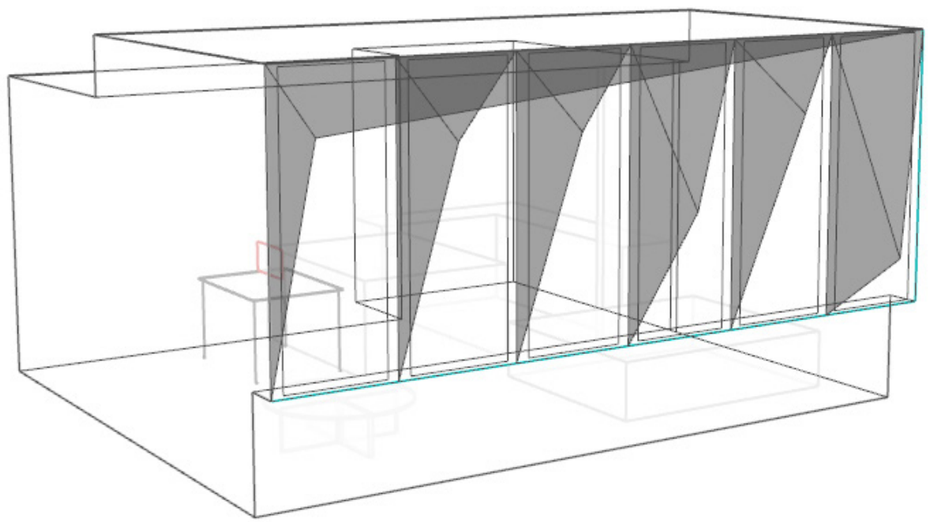
shd1Ang_30shd2Ang_0shd3Ang_0



shd1Ang_30shd2Ang_0shd3Ang_0

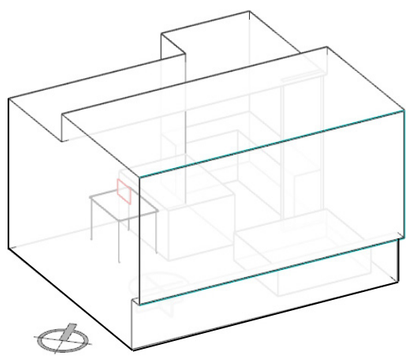


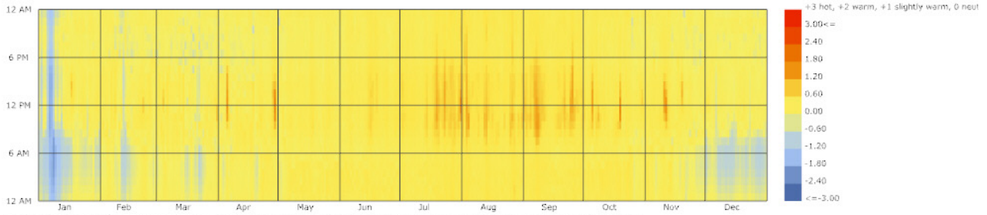
CONCLUSION



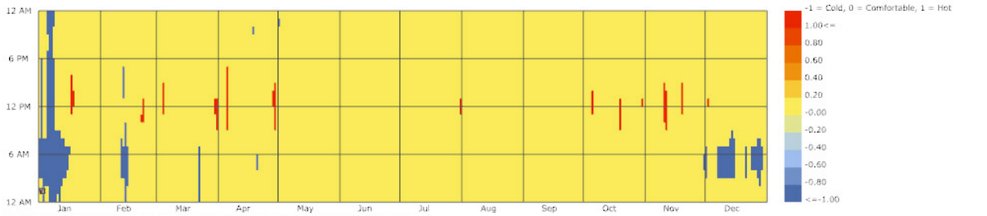
WWR 80%
SHADING ANGLE1_30
SHADING ANGLE2_ 0
SHADING ANGLE3_ 0

PMV	87.99
ADAPTIVE	96.10
sDA	60.29%

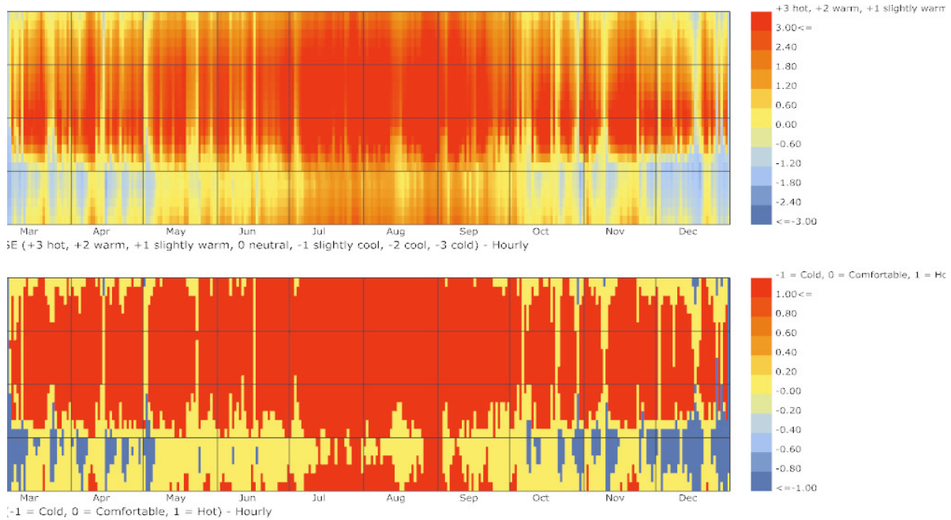




PMV COMFORT MODEL

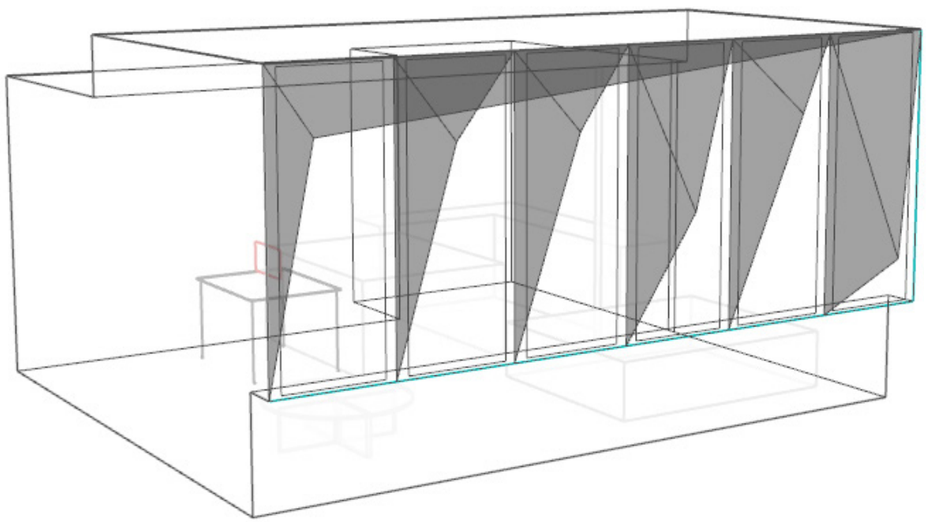


ADAPTIVE COMFORT MODEL



BASECASE COMFORT MODEL

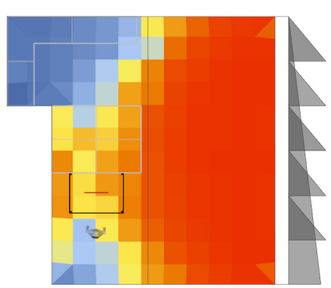
CONCLUSION



WWR 80%
SHADING ANGLE1_30
SHADING ANGLE2_ 0
SHADING ANGLE3_ 0

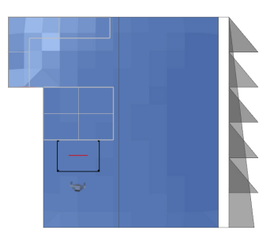
PMV	87.99
ADAPTIVE	96.10
sDA	60.29%

DAYLIGHT AUTONOMY(300lux)



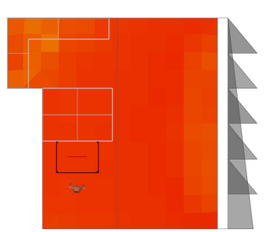
shd1Ang_30shd2Ang_0shd3Ang_0

UDLI 0-100



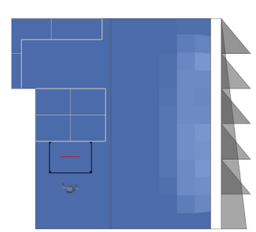
shd1Ang_30shd2Ang_0shd3Ang_0

UDLI 100-2000

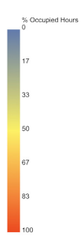


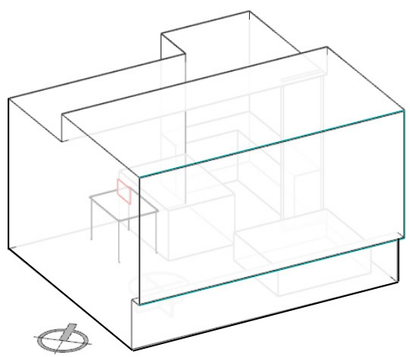
shd1Ang_30shd2Ang_0shd3Ang_0

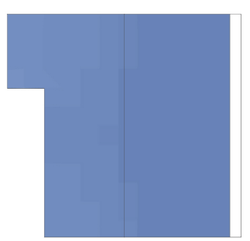
UDLI 2000-up

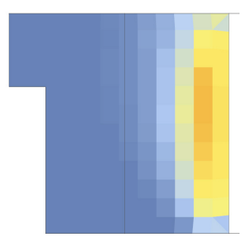


ıd1Ang_30shd2Ang_0shd3Ang_0





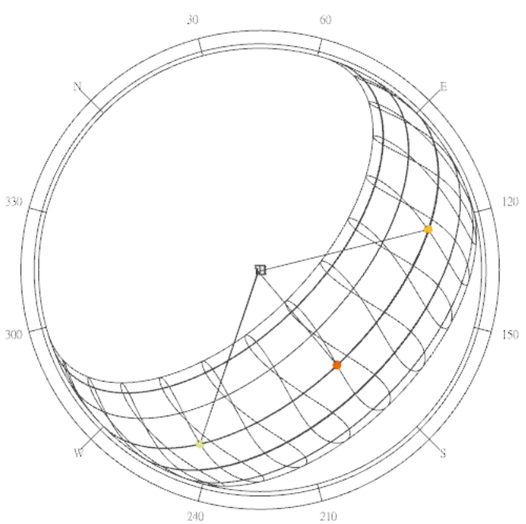




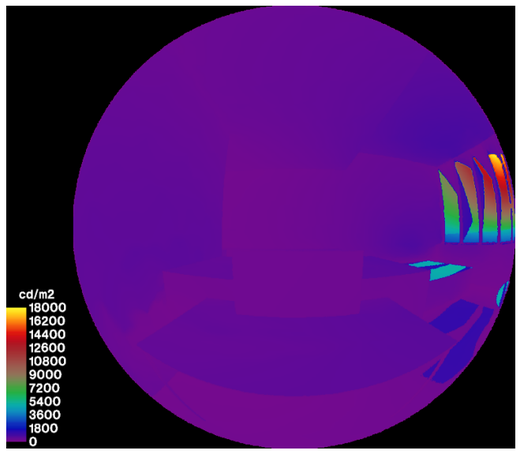
BASECASE COMFORT MODEL

CONCLUSION

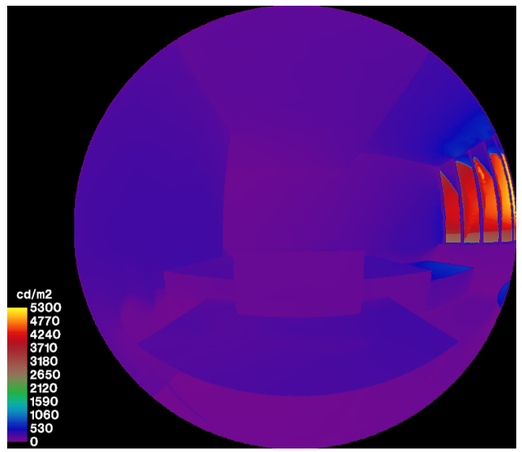
PICK ONE DAY IN SUMMER TO CHECK GLARE DURING WORKING TIME



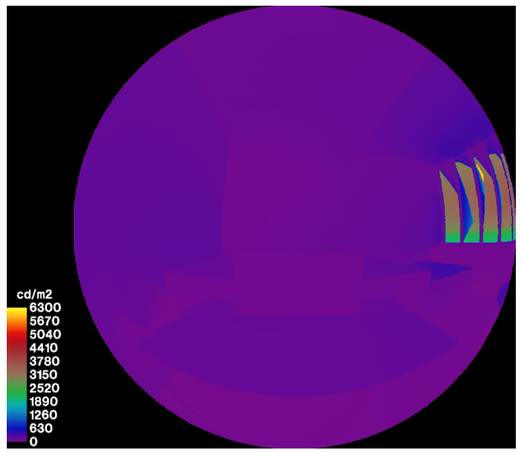
Sun-Path Diagram - Latitude: 33.93
21 SEP
Hourly Data: Global Horizontal Radiation (Wh/m2)
Los Angeles Intl Arpt_CA_USA



9AM



12PM

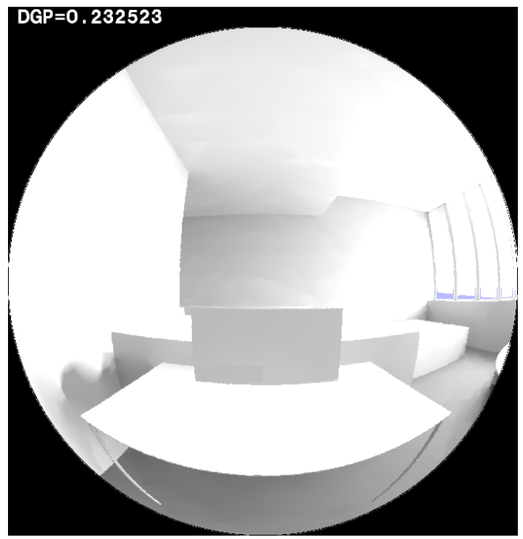


15PM

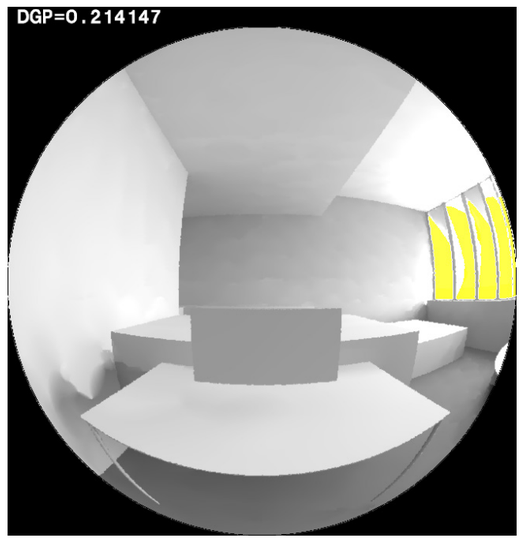
GLARE ANALYSIS IN SEPTEMBER 21

DGP LOWER THAN 0.35

9AM



12PM



15PM