



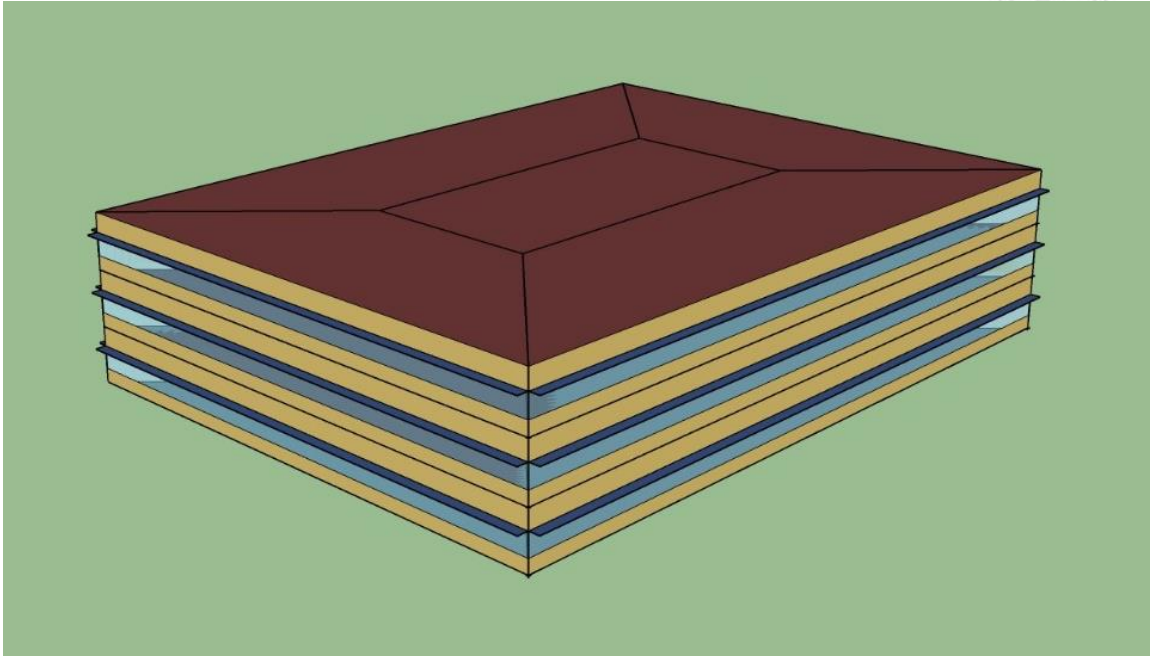
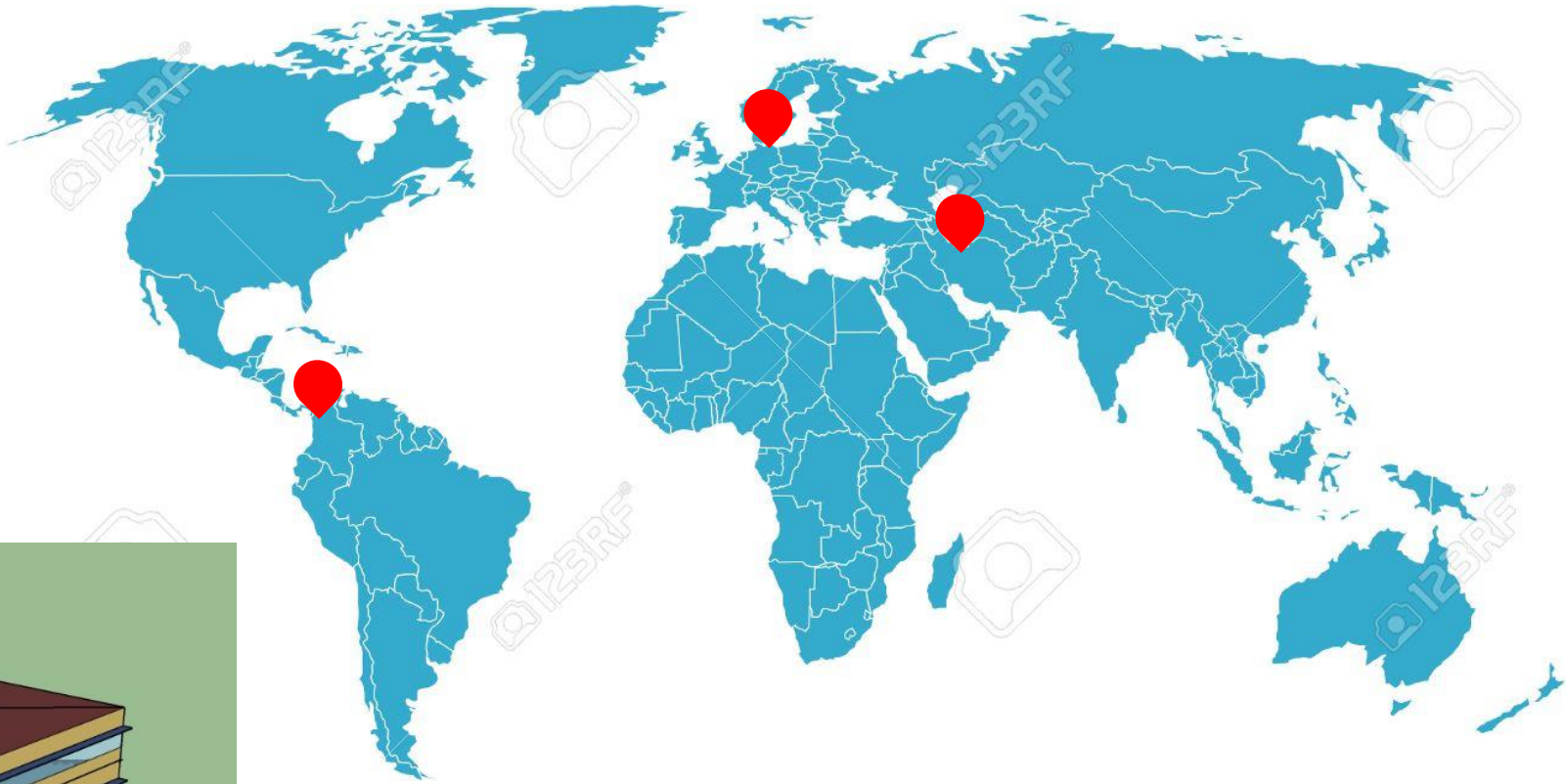
POLITECNICO
MILANO 1863

TECHNICAL ENVIROMEN SYSTEM

GROUP T17

City locations

- TEHRAN (IRAN)
- BOGOTA (COLOMBIA)
- COPENHAGEN (DENMARK)

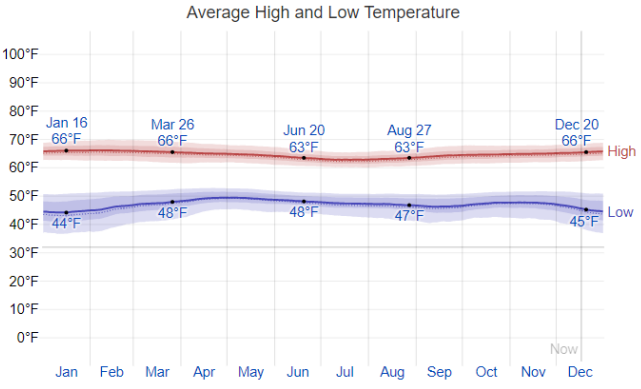


Building Details

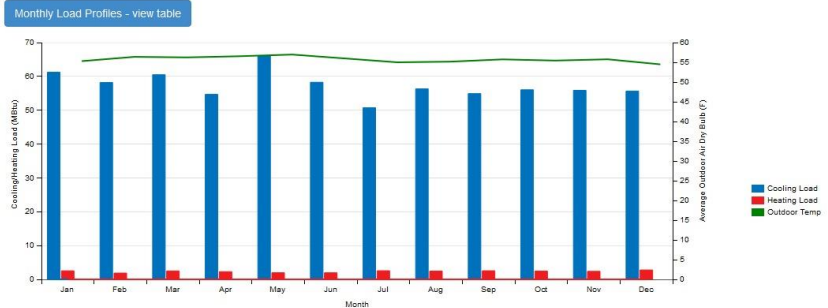
- Three floor building
- Commercial
- 3meter height each floor



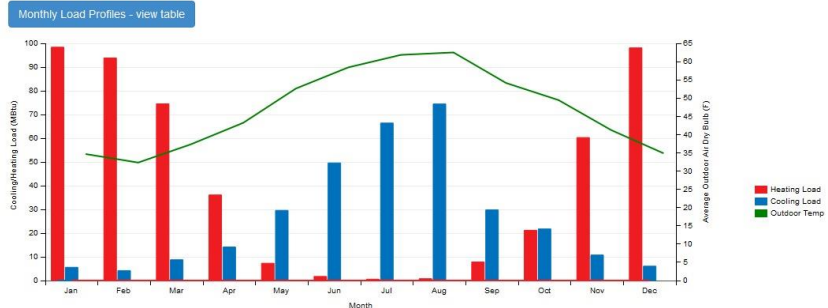
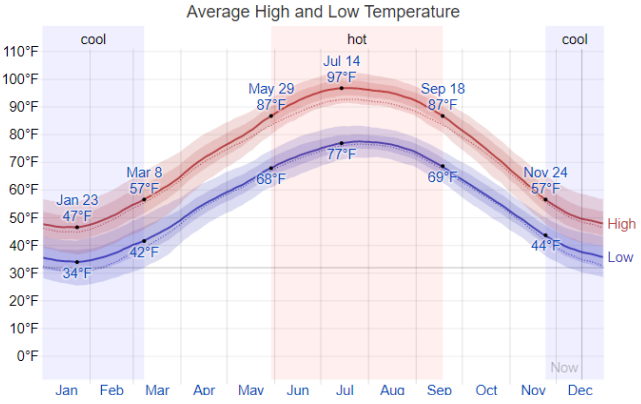
BOGOTA (COLOMBIA)



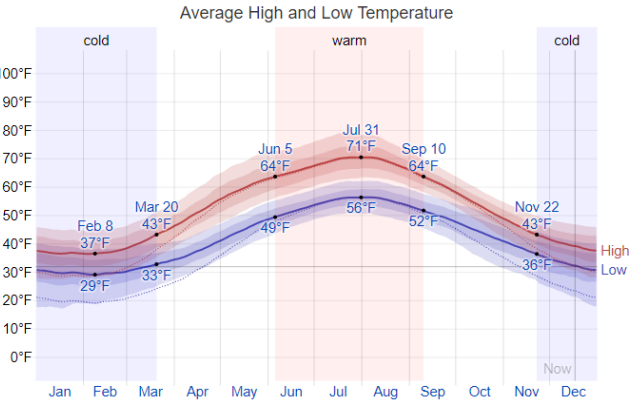
HVAC Load Profiles



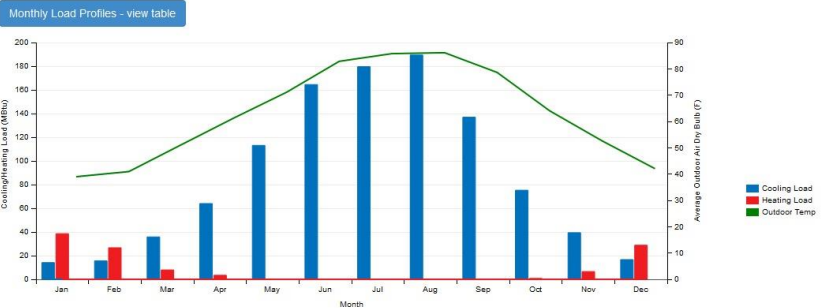
COPENHAGEN (DENMARK)



TEHRAN (IRAN)



HVAC Load Profiles



BOGOTA (COLOMBIA)

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	2090.64	580.73	580.73
Net Site Energy	2090.64	580.73	580.73
Total Source Energy	5100.52	1416.81	1416.81
Net Source Energy	5100.52	1416.81	1416.81

COPENHAGEN (DENMARK)

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	2201.19	611.44	611.44
Net Site Energy	2201.19	611.44	611.44
Total Source Energy	6491.74	1803.26	1803.26
Net Source Energy	6491.74	1803.26	1803.26

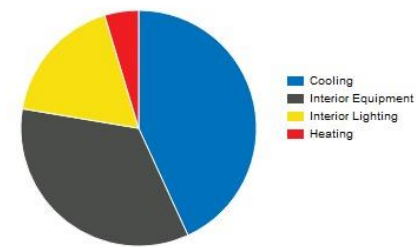
TEHRAN (IRAN)

Site and Source Energy

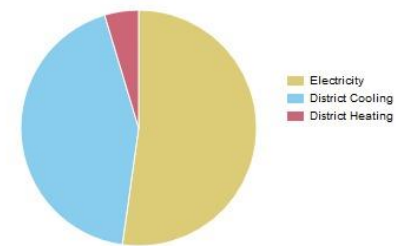
	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	2555.48	709.85	709.85
Net Site Energy	2555.48	709.85	709.85
Total Source Energy	5819.45	1616.51	1616.51
Net Source Energy	5819.45	1616.51	1616.51



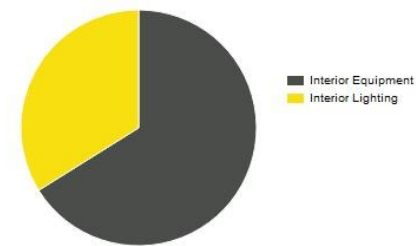
TEHRAN (IRAN)



Energy Use - view table

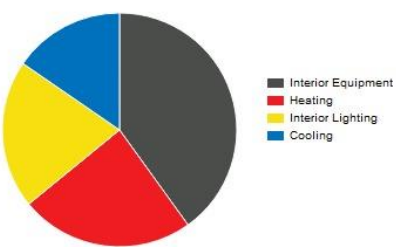


EUI - Electricity - view table

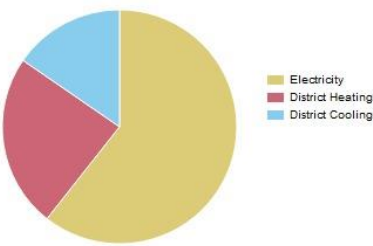


EUI - Gas - view table

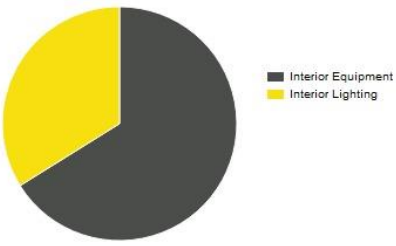
COPENHAGEN (DENMARK)



Energy Use - view table

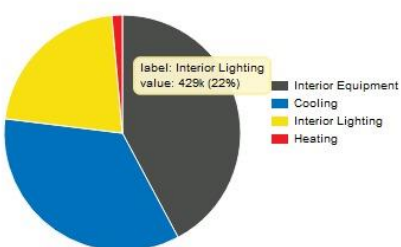


EUI - Electricity - view table

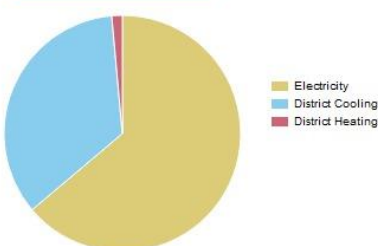


EUI - Gas - view table

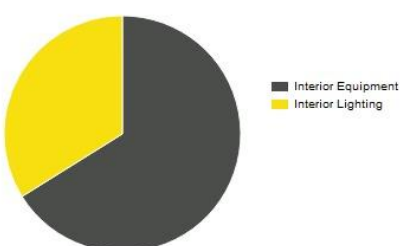
BOGOTA (COLOMBIA)



Energy Use - view table



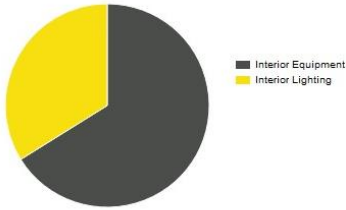
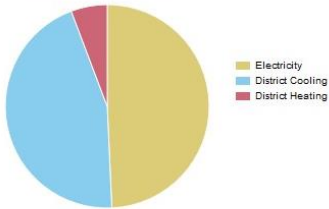
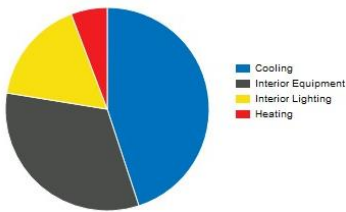
EUI - Electricity - view table



EUI - Gas - view table

TEHRAN
WALL MATERIAL

Stucco + concrete+ gypsum



Utility Bills/Rates
No Data to Show for Utility Bills/Rates

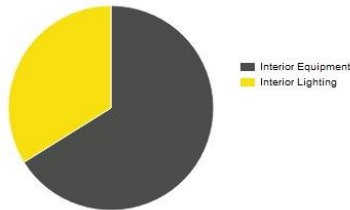
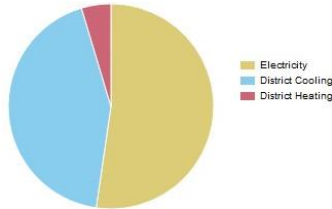
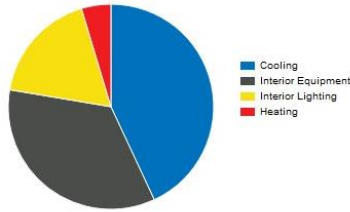
Envelope

Base Surface Construction			
Construction	Net Area (ft²)	Surface Count	R Value (ft²·h/Btu)
001-out team design	8,268	12	1.33
ASHRAE 189.1-2009 ExtRoof EAD ClimateZone 1	12,917	5	19.95

Sub Surface Construction			
Construction	Area (ft²)	Surface Count	U-Factor (Btu/h·ft²·°F)
ASHRAE 189.1-2009 ExtIndoor ClimateZone 1	5,512	12	

End Use - view table	
End Use	Consumption (kBtu)
Heating	147,405
Cooling	1,154,119
Interior Lighting	428,574
Exterior Lighting	0
Interior Equipment	836,079
Exterior Equipment	0
Fans	0
Pumps	0
Heat Rejection	0
Humidification	0
Heat Recovery	0
Water Systems	0
Refrigeration	0
Generators	0

Stucco + concrete + isolation + gypsum



Utility Bills/Rates
No Data to Show for Utility Bills/Rates

Envelope

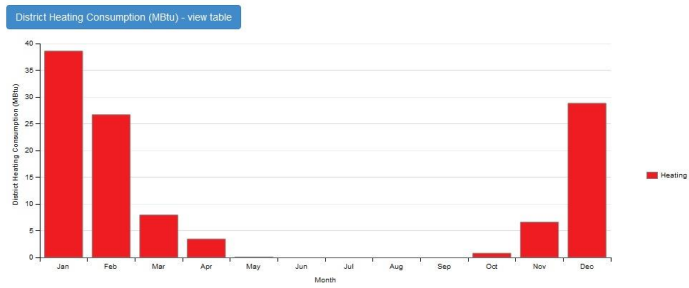
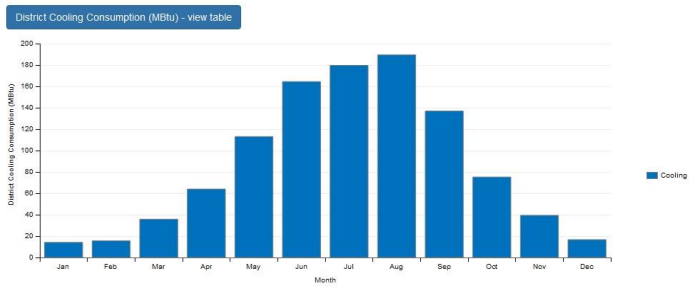
Base Surface Construction			
Construction	Net Area (ft²)	Surface Count	R Value (ft²·h/Btu)
001-out team design	8,268	12	1.33
ASHRAE 189.1-2009 ExtRoof EAD ClimateZone 1	12,917	5	19.95

Sub Surface Construction			
Construction	Area (ft²)	Surface Count	U-Factor (Btu/h·ft²·°F)
ASHRAE 189.1-2009 ExtIndoor ClimateZone 1	5,512	12	

End Use - view table	
End Use	Consumption (kBtu)
Heating	111,909
Cooling	1,041,528
Interior Lighting	428,574
Exterior Lighting	0
Interior Equipment	836,079
Exterior Equipment	0
Fans	0
Pumps	0
Heat Rejection	0
Humidification	0
Heat Recovery	0
Water Systems	0
Refrigeration	0
Generators	0

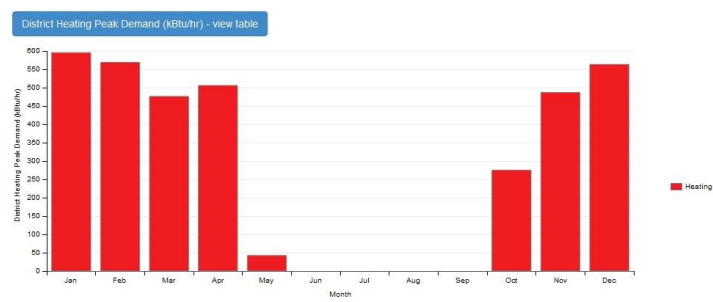
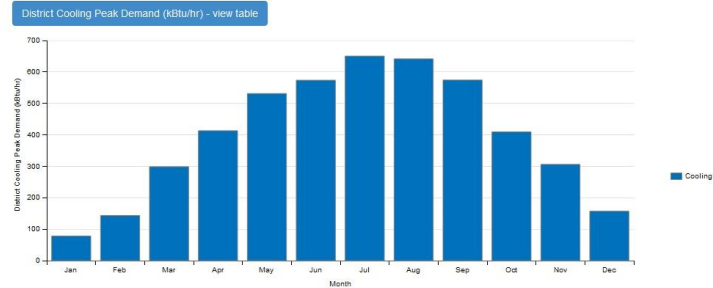
Wall 1

default



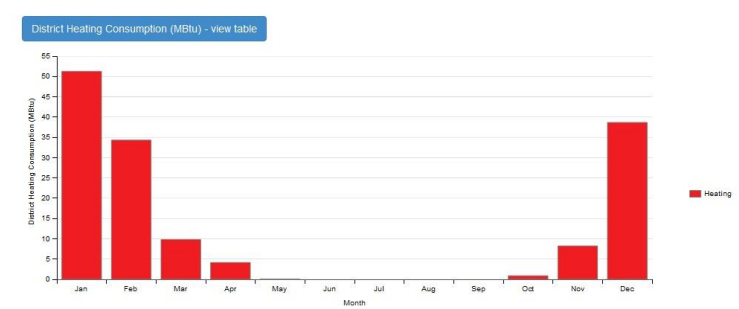
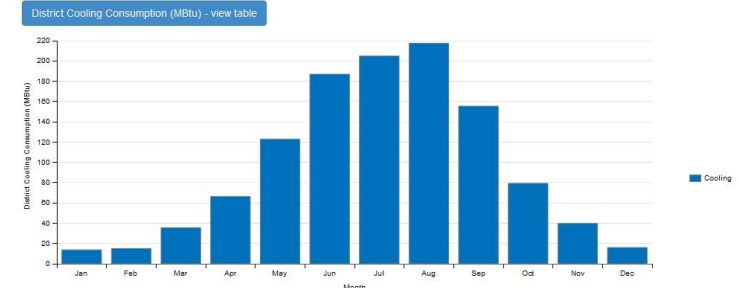
Wall 2

Stucco + concrete+ gypsum



Wall 3

Stucco + concrete + isolation + gypsum



Tehran –Iran (Base)

$$U_{overall\ wall\ 01} = \frac{1}{R_{overall}}$$

Base => U – Value
≈ 0.0318

Base Surface Constructions			
Construction	Net Area (ft²)	Surface Count	R Value (ft²·h·R/Btu)
ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 1	12,917	5	19.96
ASHRAE 189.1-2009 ExtWall Mass ClimateZone 1	8,268	12	5.76

1IN Stucco

8IN Concre HW

Wall Insulat 1311

1/2IN Gypsur

Drag From Librarv

1IN Stucco

8IN Concre HW

1/2IN Gypsur

Drag From Librarv

1IN Stucco

8IN Concre HW

G05 25mm wood

I01 25mm insulat

1/2IN Gypsur

Drag From Librarv

Tehran –Iran (V1)

$$U_{overall\ wall\ 01} = \frac{1}{R_{overall}}$$

V1 => U – Value
≈ 0.13

Base Surface Constructions			
Construction	Net Area (ft²)	Surface Count	R Value (ft²·h·R/Btu)
00-exwall our team	8,268	12	1.33
ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 1	12,917	5	19.96

Tehran-Iran (V2)

$$U_{overall\ wall\ 01} = \frac{1}{R_{overall}}$$

V2 => U – Value
≈ 0.02

Base Surface Constructions			
Construction	Net Area (ft²)	Surface Count	R Value (ft²·h·R/Btu)
001-our team design	8,268	12	7.09
ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 1	12,917	5	19.96