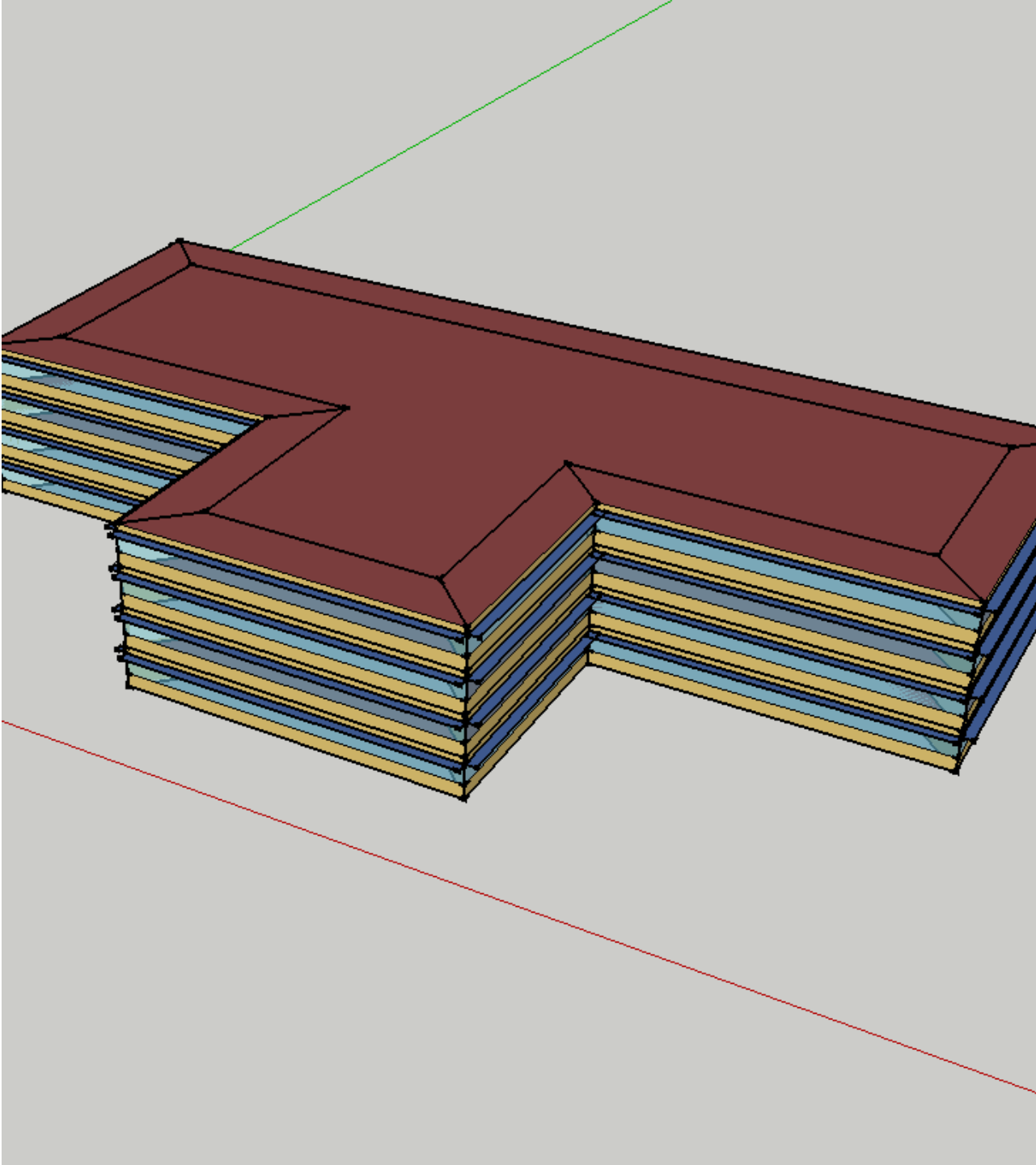


• Group W21

Bahrami Negin
Kouhkan Hamed
Nafisi Poor Pedram



●
Function: Office

Area: 9200 Sqm

Floors: 4
●

Milan

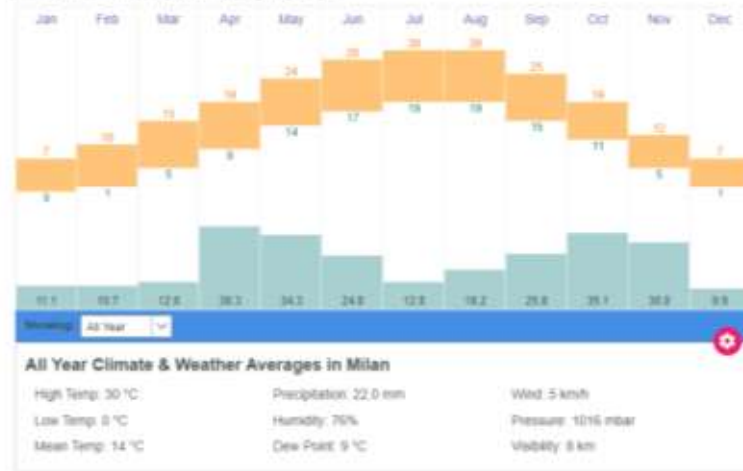
- Case 1
- Materials Used:
 - 1IN Stucco
 - 8IN Concrete
 - Wall Insulation
 - ½ Gypsum



Annual Weather Averages Near Milan

Averages are for Milan / Linatic, which is 7 kilometers from Milan.

Based on weather reports collected during 1965-2015.



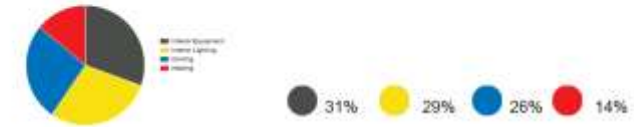
Weather Data

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m ²]	Energy Per Conditioned Building Area [MJ/m ²]
Total Site Energy	3946.41	426.64	426.64
Net Site Energy	3946.41	426.64	426.64
Total Source Energy	10541.86	1139.66	1139.66
Net Source Energy	10541.86	1139.66	1139.66

Annual Overview

End Use	Consumption [kWh]
Heating	524.143
Cooling	888.080
Internal Lighting	1,054,748
External Lighting	0
Internal Equipment	1,182,078
External Equipment	0
Fans	0
Pumps	0
Hot Water Dist.	0
Humidification	0
Hot Recovery	0
Water Systems	0
Refrigeration	0
Overhead	0



Annual Overview

Energy plus result

Milan

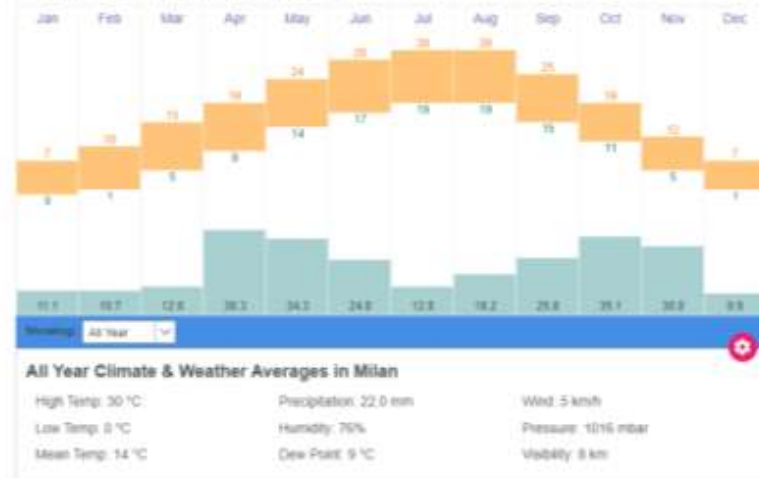
- Case 2
- Materials Used:
 - Wood G05 25mm



Annual Weather Averages Near Milan

Averages are for Milan / Limbic, which is 7 kilometers from Milan.

Based on weather reports collected during 1965-2015.



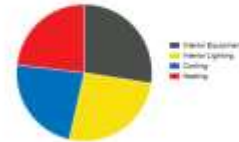
Weather Data

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	4385.62	474.12	474.12
Net Site Energy	4385.62	474.12	474.12
Total Source Energy	12188.68	1317.70	1317.70
Net Source Energy	12188.68	1317.70	1317.70

End Use - new table

End Use	Consumption (kBtu)
Heating	862,584
Cooling	900,000
Interior Lighting	1,054,745
Exterior Lighting	0
Interior Equipment	1,142,019
Exterior Equipment	0
Fans	0
Pumps	0
Heat Rejection	0
Humidification	0
Heat Recovery	0
Water Systems	0
Refrigeration	0
Generators	0



Energy Use - new table



Annual Overview

Energy plus result

Milan

- Case 3
- Materials Used:
 - M11 100MM
lightweight Concrete
 - ½ Gypsum



Annual Weather Averages Near Milan

Averages are for Milan / Linate, which is 7 kilometers from Milan

Based on weather reports collected during 1995-2015



All Year Climate & Weather Averages in Milan

High Temp: 30 °C	Precipitation: 22.0 mm	Wind: 5 km/h
Low Temp: 0 °C	Humidity: 76%	Pressure: 1016 mbar
Mean Temp: 14 °C	Dew Point: 9 °C	Visibility: 8 km

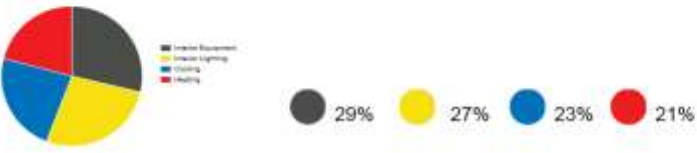
Weather Data

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	4204.34	454.52	454.52
Net Site Energy	4204.34	454.52	454.52
Total Source Energy	11655.08	1260.01	1260.01
Net Source Energy	11655.08	1260.01	1260.01

Annual Overview

End Use	Consumption (kWh)
Heating	855,767
Cooling	621,902
Interior Lighting	1,084,743
Exterior Lighting	0
Interior Equipment	1,142,510
Exterior Equipment	0
Fans	0
Pumps	0
Heat Rejection	0
Humidification	0
Heat Recovery	0
Water Systems	0
Refrigeration	0
Generators	0



Annual Overview

Energy plus result

Shiraz

Materials Used:

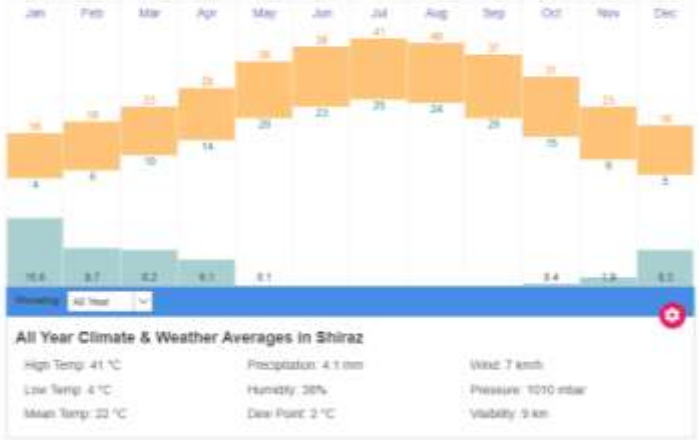
- 1IN Stucco
- 8IN Concrete
- Wall Insulation
- ½ Gypsum



Annual Weather Averages Near Shiraz

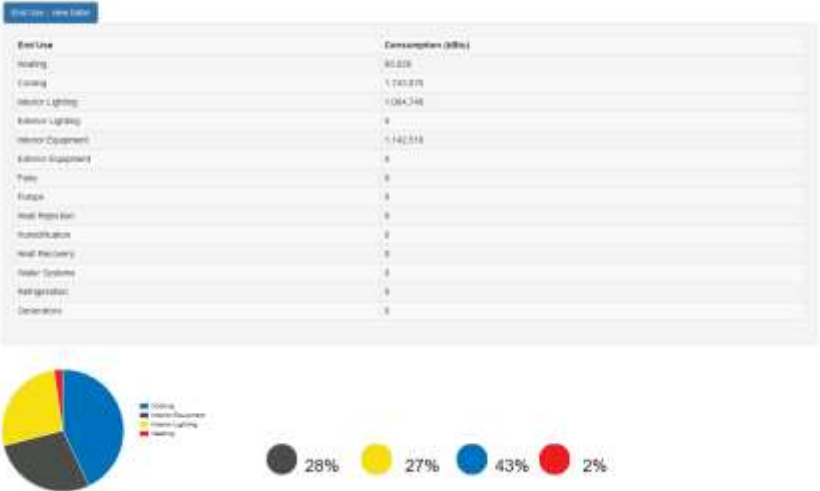
Averages are for Shiraz, which is 10 kilometers from Shiraz.

Based on weather reports collected during 1985-2015.



Weather Data

Annual Overview



Annual Overview

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	4287.93	463.56	463.56
Net Site Energy	4287.93	463.56	463.56
Total Source Energy	9739.07	1052.87	1052.87
Net Source Energy	9739.07	1052.87	1052.87

Energy plus result

Dublin

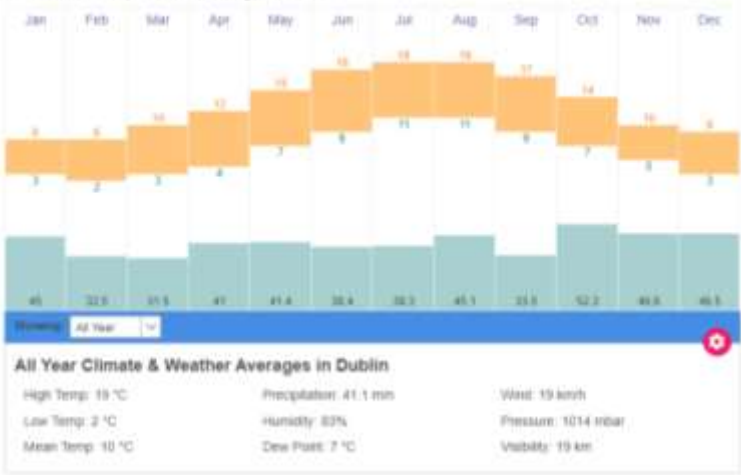
Materials Used:

- 1IN Stucco
- 8IN Concrete
- Wall Insulation
- ½ Gypsum



Annual Weather Averages Near Dublin

Averages are for Dublin Airport, which is 10 kilometers from Dublin.
Based on weather reports collected during 1985-2015.



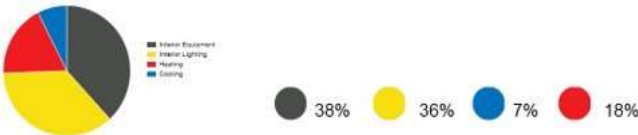
Weather Data

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	3155.96	341.18	341.18
Net Site Energy	3155.96	341.18	341.18
Total Source Energy	9749.40	1053.99	1053.99
Net Source Energy	9749.40	1053.99	1053.99

Annual Overview

End Use	Consumption (kBtu)
Heating	530,587
Cooling	224,310
Interior Lighting	1,054,748
Exterior Lighting	0
Interior Equipment	1,142,518
Exterior Equipment	0
Fans	0
Pumps	0
Heat Rejection	0
Humidification	0
Heat Recovery	0
Water Systems	0
Refrigeration	0
Generators	0



Annual Overview

Energy plus result

Comparison Table

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Group W21

City	Interior Equipment	Interior Lighting	Cooling	Heating
Shiraz	28%	27%	27%	2%
Dublin	38%	38%	7%	18%
Milan (Case 1)	31%	29%	26%	14%
Milan (Case 2)	27%	26%	23%	23%
Milan (Case 3)	29%	27%	23%	21%

Wall Comparison and U Factor

Base case

Layer	Thickness	Conductivity
1IN Stucco	0.0253	0.6918
8IN Concrete HW	0.2033	1.7296
Wall Insulation	0.0337	0.0432
1/2IN Gypsum	0.0127	0.16

R values

1IN Stucco = 0.0366
8IN Concrete HW = 0.1175
Wall Insulation = 0.78
1/2IN Gypsum = 0.0794

$R_{total} = 0.0366 + 0.1175 + 0.78 + 0.0794 = 1.0135$

$U = 1/R_{total} = 1/1.0135 = 0.9867 \text{ w/m}^2 \text{ c}$

Comparison 1

Layer	Thickness	Conductivity
Wood G05 25mm	0.0254	0.15

R total = 0.169

$U = 1/0.169 = 5.917 \text{ W}$

Comparison 3

Layer	Thickness	Conductivity
Lightweight concrete M11 100mm	0.1016	0.53
1/2IN Gypsum	0.0127	0.16

R total = 0.271

$U = 1/0.271 = 3.69 \text{ W/}$

Thank You

