

Technical Environmental Systems

Piacenza Campus

prof:

B.Najafi

STUDIO VACCHINI ARCH. Palestra di Losone, Switzerland

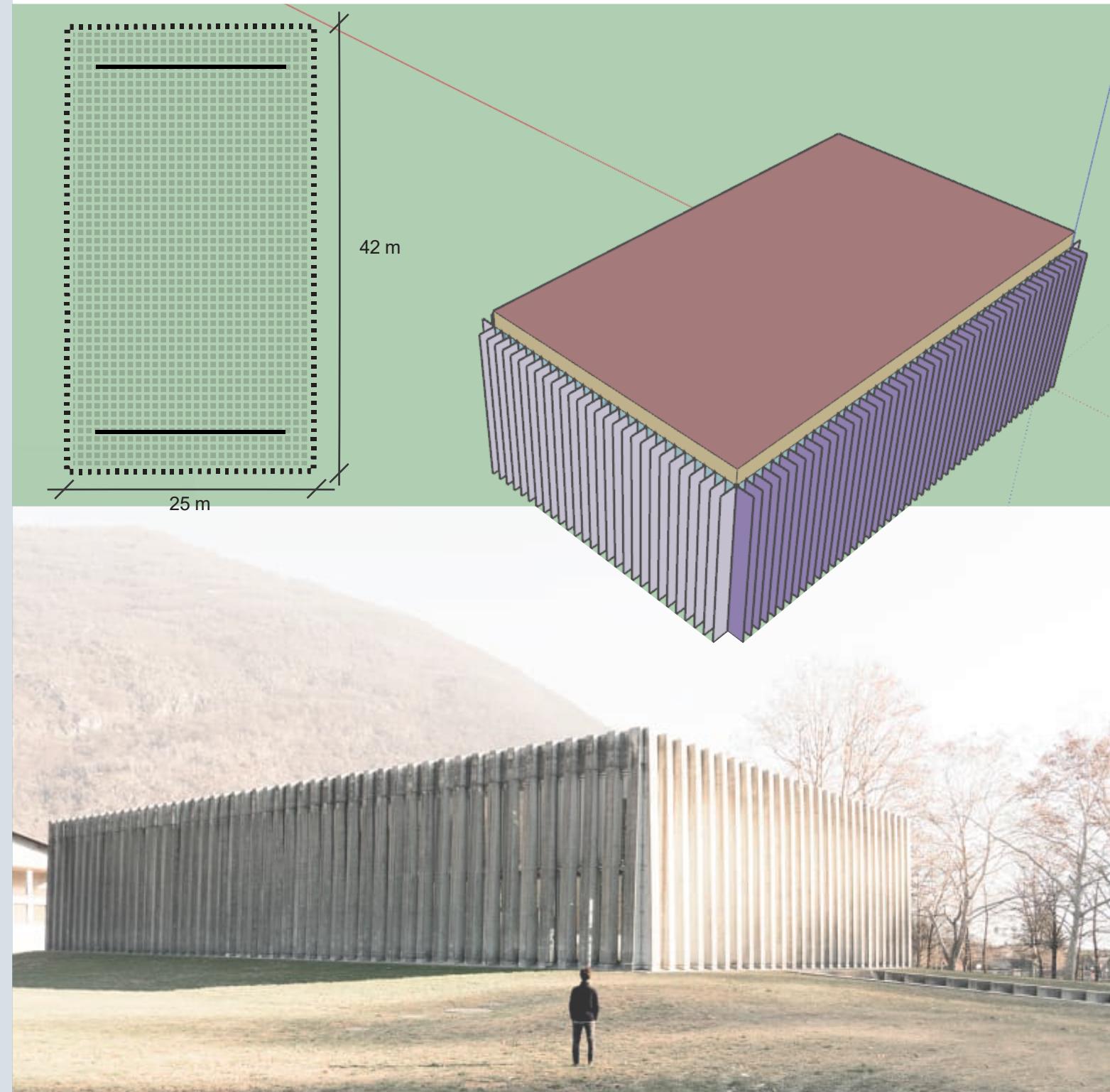
Case study

group members:

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Savinetti, Simone	10542075
Torres Pérez, Fernando	10662842



POLITECNICO
MILANO 1863



CITIES' WEATHER INFORMATION

	<input type="checkbox"/>	<input type="checkbox"/> Apply to Selected	<input type="checkbox"/> Apply to Selected	<input type="checkbox"/> Apply to Selected
MEXICO CITY Ann Clg .4% Condns DB=>MWB	<input type="checkbox"/>	21	5	SummerDesignDay MEXICO CITY
MEXICO CITY Ann Clg .4% Condns DP=>MDB	<input type="checkbox"/>	21	5	SummerDesignDay
MEXICO CITY Ann Clg .4% Condns Enth=>MDB	<input type="checkbox"/>	21	5	SummerDesignDay winter: 4,1 °C
MEXICO CITY Ann Clg .4% Condns WB=>MDB	<input type="checkbox"/>	21	5	SummerDesignDay summer: 29 °C
MEXICO CITY Ann Htg 99.6% Condns DB	<input type="checkbox"/>	21	1	WinterDesignDay
MEXICO CITY Ann Htg Wind 99.6% Condns WS=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay
MEXICO CITY Ann Hum_n 99.6% Condns DP=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay
Milano-Linate Ann Clg .4% Condns DB=>MWB	<input type="checkbox"/>	21	7	SummerDesignDay MILAN
Milano-Linate Ann Clg .4% Condns DP=>MDB	<input type="checkbox"/>	21	7	SummerDesignDay
Milano-Linate Ann Clg .4% Condns Enth=>MDB	<input type="checkbox"/>	21	7	SummerDesignDay winter: -5 °C
Milano-Linate Ann Clg .4% Condns WB=>MDB	<input type="checkbox"/>	21	7	SummerDesignDay summer: 33 °C
Milano-Linate Ann Htg 99.6% Condns DB	<input type="checkbox"/>	21	1	WinterDesignDay
Milano-Linate Ann Htg Wind 99.6% Condns WS=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay
Milano-Linate Ann Hum_n 99.6% Condns DP=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay
Shiraz Ann Clg .4% Condns DB=>MWB	<input type="checkbox"/>	21	7	SummerDesignDay SHIRAZ
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Shiraz Ann Clg .4% Condns Enth=>MDB	<input type="checkbox"/>	21	7	SummerDesignDay
Shiraz Ann Clg .4% Condns WB=>MDB	<input type="checkbox"/>	21	7	SummerDesignDay winter: 1,8 °C
Shiraz Ann Htg 99.6% Condns DB	<input type="checkbox"/>	21	1	WinterDesignDay summer: 39 °C
Shiraz Ann Htg Wind 99.6% Condns WS=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay
Shiraz Ann Hum_n 99.6% Condns DP=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay

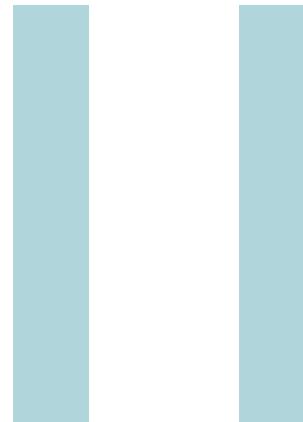
LAYERS

Single layer



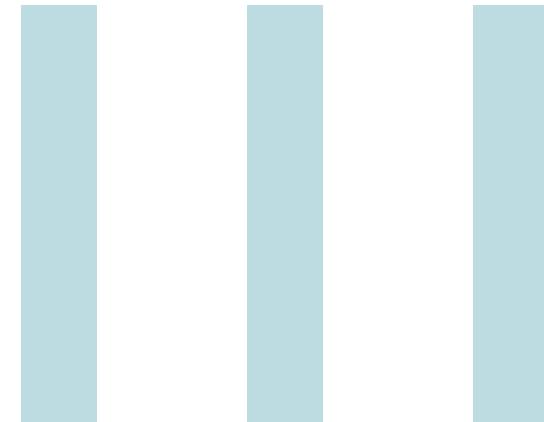
6 mm glass

Double layer



6 mm glass
13 mm air
6 mm glass

Triple layer



3 mm glass
13 mm argon
3 mm glass

U VALUES

5,778
W/m²K

2,67
W/m²K

1,624
W/m²K

CONCLUSIONS:

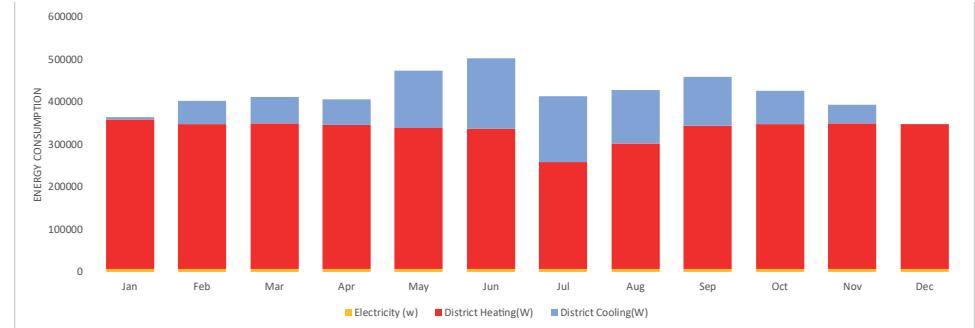
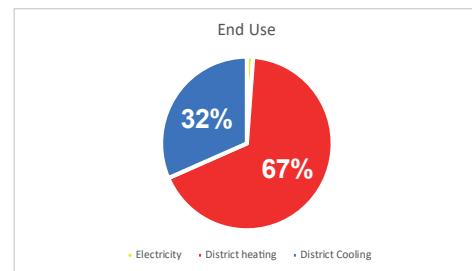
The smaller the **U** factor is, less amount of heat will be lost.
Even though the third case is more expensive,
it will be more convenient along time.

ENERGY CONSUMPTION

MILAN
BASE CASE
_Triple layer glass

Anual energy consumption:

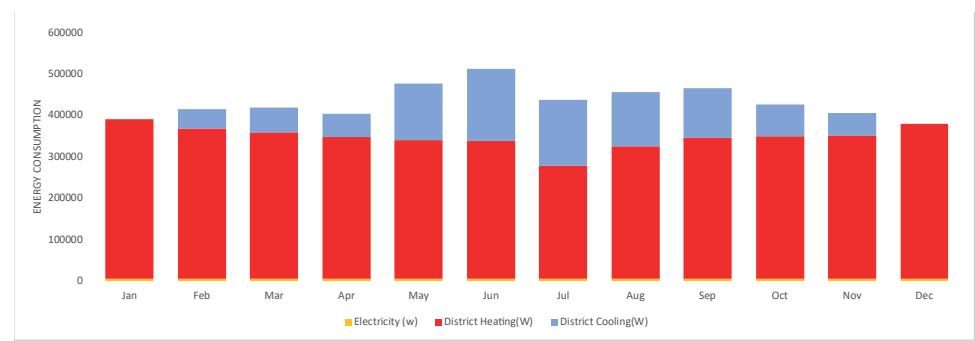
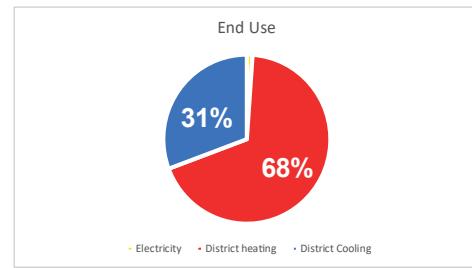
5 031 529 W



_Double layer glass

Anual energy consumption:

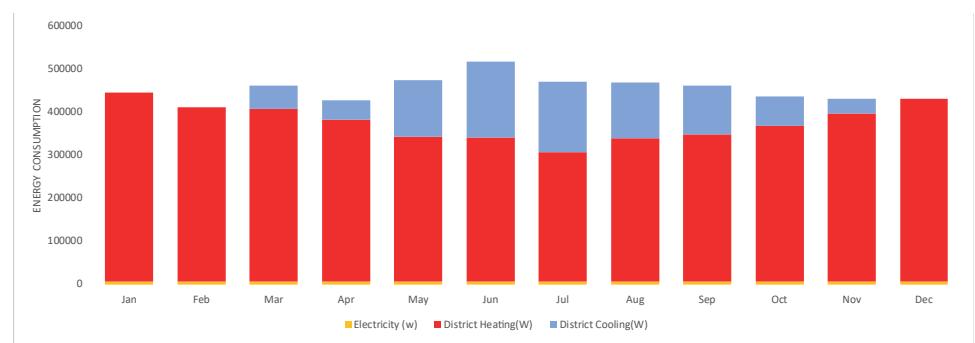
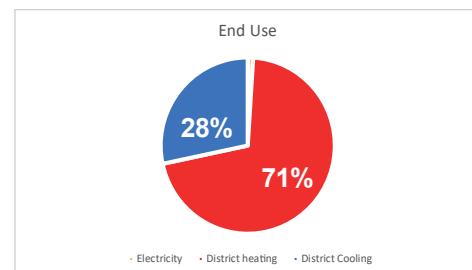
5 185 546 W



_Single layer glass

Anual energy consumption:

5 434 650 W



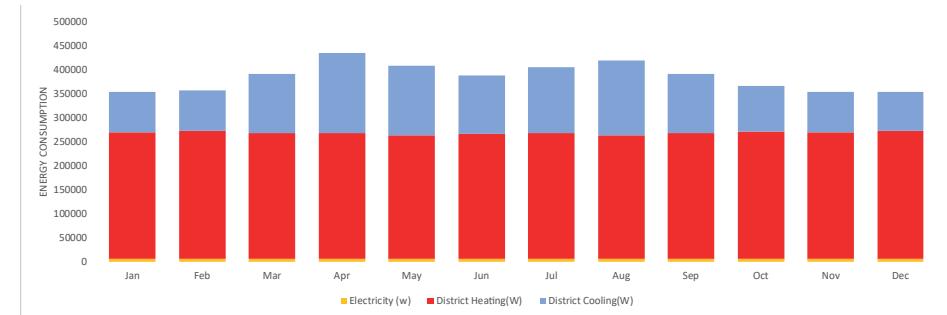
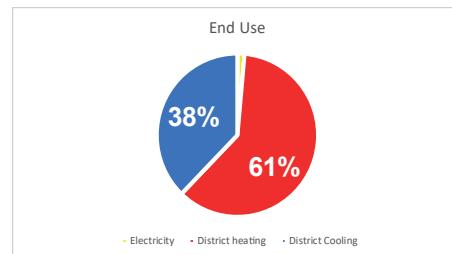
ENERGY CONSUMPTION

MEXICO CITY

_Triple layer glass

Anual energy consumption:

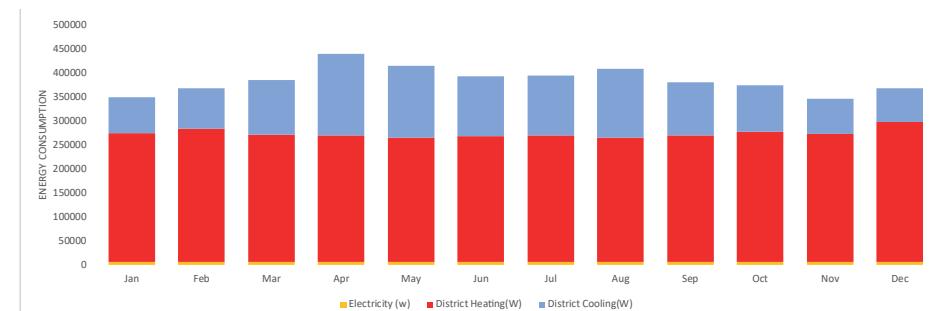
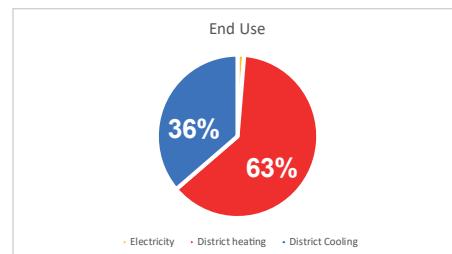
4 616 597 W



Anual energy consumption:

4 618 929 W

_Single layer glass



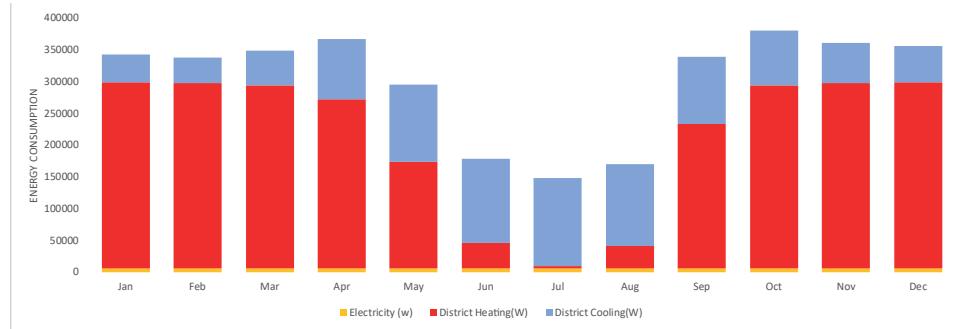
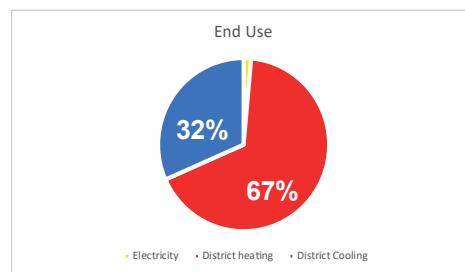
ENERGY CONSUMPTION

SHIRAZ

_Triple layer glass

Anual energy consumption:

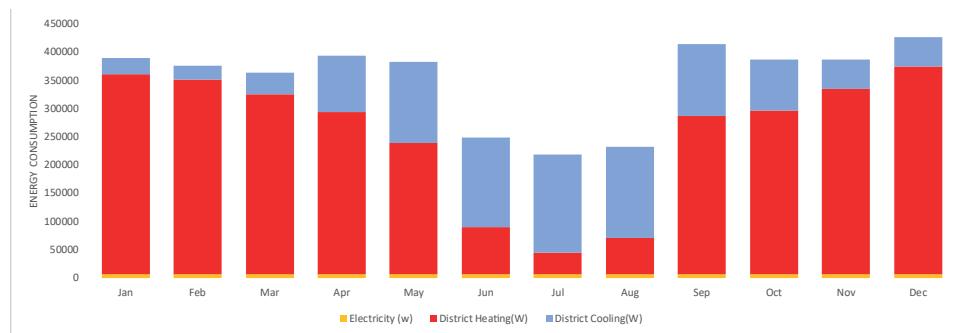
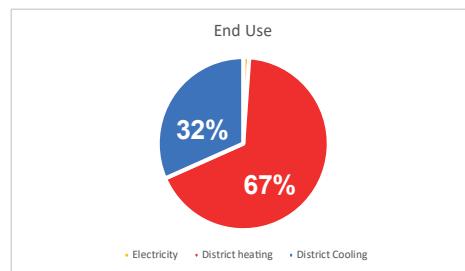
3 626 299 W



Anual energy consumption:

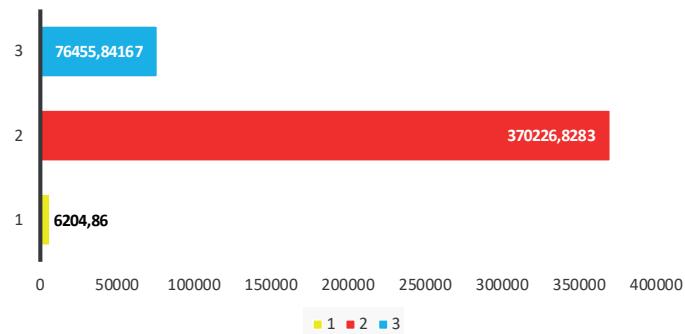
4 221 266 W

_Single layer glass

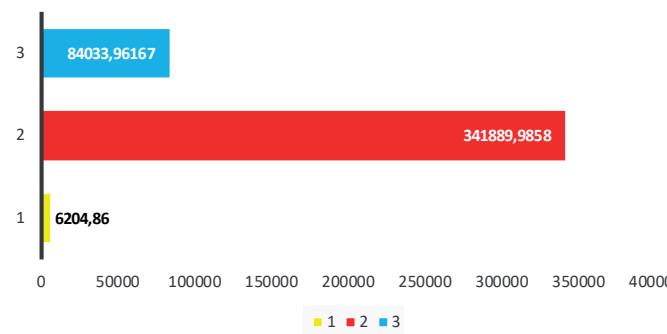


ANUAL ENERGY CONSUMPTION

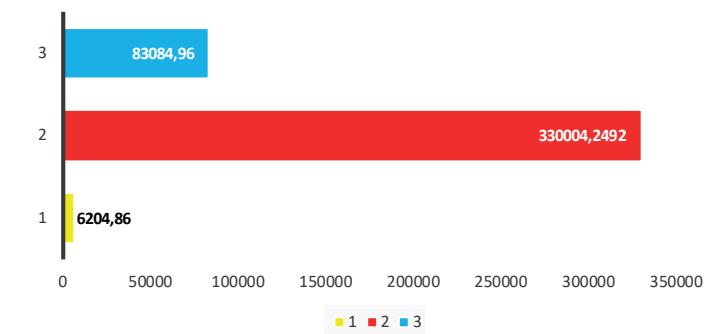
Milan case 1



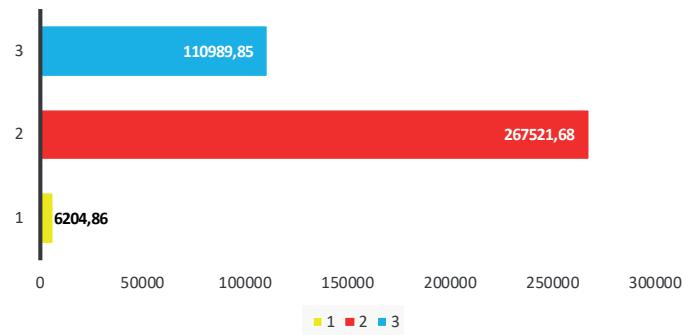
Milan case 2



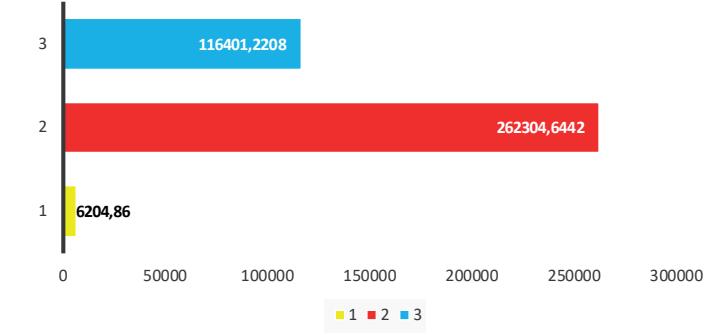
Milan case 3



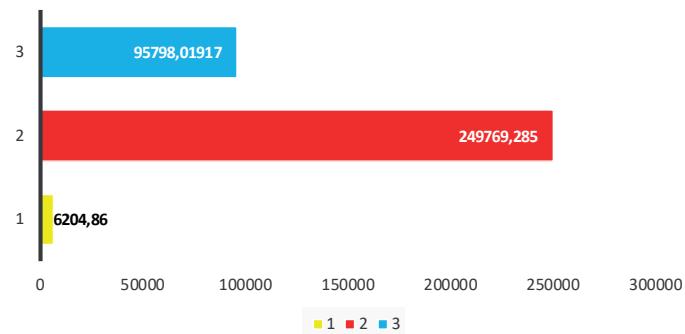
Mexico City case 1



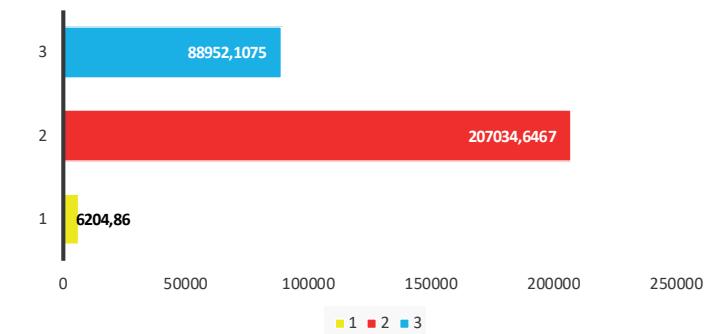
Mexico City case 3



Shiraz case 1



Shiraz case 3



CONCLUSIONS

The properties of the first case (single layer glass), in each city, can be improved by :

- _ Adding more layers of glass;
- _ Increasing the space between the layers of glass,
 but no more than 13 mm;
- _ Coating the external surface with a film.
- _ Changing the type of air between the glasses, in our case using Argon.

Even though the type of glass was improved, we can conclude that Milan is not an appropriate location to place a building with four glass facades.

The best city to locate such a building is a City with the climate conditions of a City such as Shiraz, Iran.