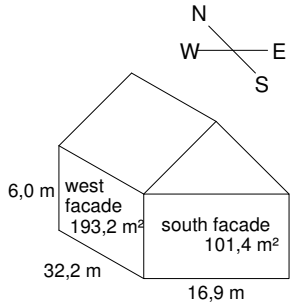
CASAnova

Data sheet (1):

Geomerty:

Length (North-South):	16,9 m
Width (West-East):	32,2 m
Height (without roof):	6,0 m
Number of floors:	2
Deviation from South direction (west positive):	-45 °
Useful area:	870,7 m²
Air volume	2612,1 m³
A/V - value	0,51 1/m
Facade North/South:	101,4 m²
Facade West/East	193,2 m²

Sketch:



Insulation:

U value walls:	
North:	0,28 W/(m² K)
South:	1,20 W/(m² K)
East:	0,10 W/(m² K)
West:	0,28 W/(m² K)
Absorption coefficient of the walls:	0,5
Upper floor towards:	partly insulated roof
U value upper floor:	0,21 W/(m² K)
Lower floor towards:	outside air
U value lower floor:	0,21 W/(m² K)
Door area:	2,9 m²
U value door	1,40 W/(m² K)
Heat bridges:	ignore heat bridges

Building:

Interior temperature:	20,0 °C
Limit of overheating:	27,0 °C
Natural ventilation (infiltration):	0,00 1/h
Mechanical ventilation:	0,60 1/h
Heat recovery (only mech. ventilation):	98 %
efficiency factor of air conditioning:	0,5 kWh(cool)/kWh(electr.)
Internal Gains:	18,5 kWh/(m^2 a)
Kind of indoor walls:	medium construction
Kind of outdoor walls:	light construction

Climate:

Climatic data:	Milano (Italia)

Data sheet (2):

Windows

North:

Windows area:	5,1 m²
Fraction of windows area at the facade:	5,0 %
Kind of windows:	others
U value glazing:	1,00 W/(m² K)
U value frame:	1,00 W/(m² K)
g value glazing:	0,36
Fraction of frame:	8,0 %
Shading:	5,0 %

South:

Windows area:	69,0 m²
Fraction of windows area at the facade:	68,0 %
Kind of windows:	others
U value glazing:	1,00 W/(m² K)
U value frame:	1,00 W/(m² K)
g value glazing:	0,36
Fraction of frame:	8,0 %
Shading:	5,0 %

East:

Windows area:	23,2 m²
Fraction of windows area at the facade:	12,0 %
Kind of windows:	others
U value glazing:	1,00 W/(m² K)
U value frame:	1,00 W/(m² K)
g value glazing:	0,36
Fraction of frame:	8,0 %
Shading:	5,0 %

West:

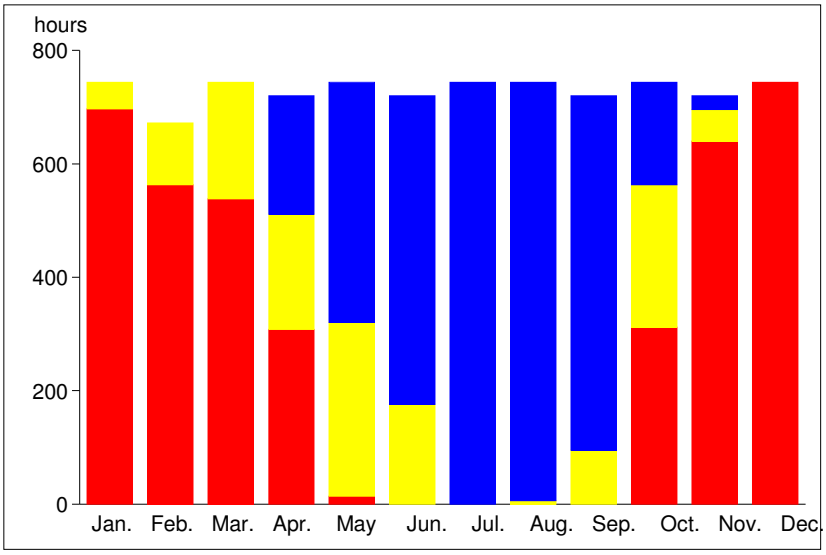
Windows area:	52,2 m²
Fraction of windows area at the facade:	27,0 %
Kind of windows:	others
U value glazing:	1,00 W/(m² K)
U value frame:	1,00 W/(m² K)
g value glazing:	0,36
Fraction of frame:	8,0 %
Shading:	5,0 %

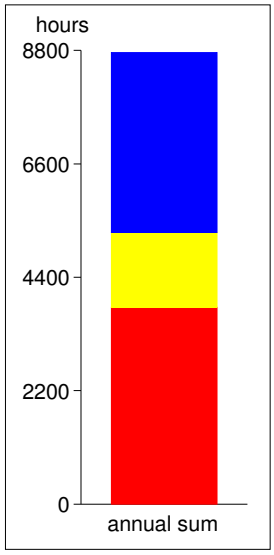
Energy:

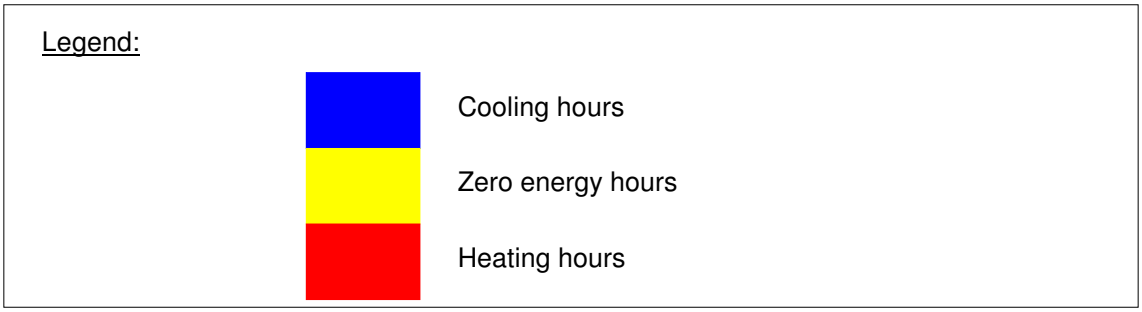
Heating system:	soil heat pump, buffer storage and distribution inside the thermal zone
Heat transfer / system temperature:	underfloor heating (switch difference : 1K), system temperature: 35/28°C
Source of energy:	electricity

Output: Heating and cooling hours

	Heating hours in h	Zero energy hours in h	Cooling hours in h
January	697	47	0
February	563	109	0
March	538	206	0
April	308	203	209
May	14	306	424
June	0	176	544
July	0	0	744
August	0	6	738
September	0	95	625
October	312	251	181
November	640	56	24
December	744	0	0
Total in h	3816	1455	3489
Total in %	43,6	16,6	39,8

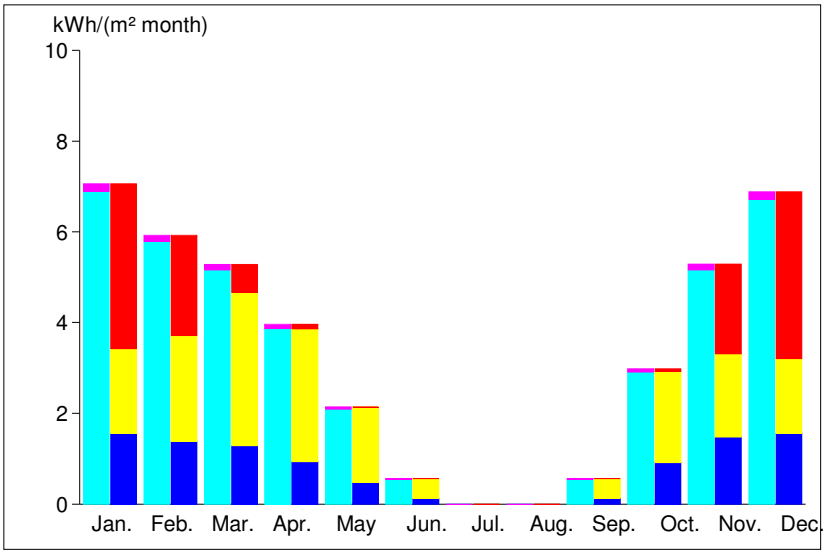


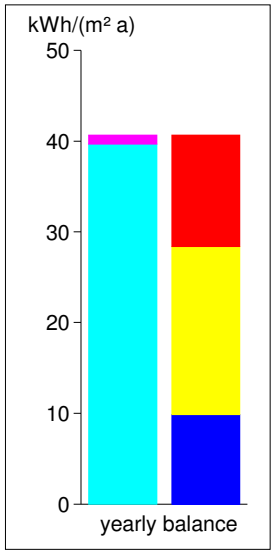


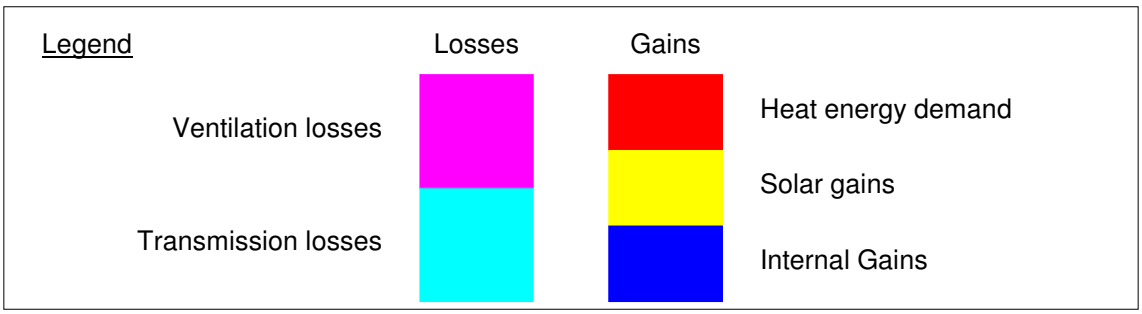


Output: Heat balance

	Transmis-sion losses in kWh/m²	Ventilation losses in kWh/m²	Total heat losses in kWh/m²	Internal gains in kWh/m²	Solar gains in kWh/m²	Usability factor	Heat energy demand in kWh/m²
January	6,9	0,2	7,1	1,6	1,9	0,99	3,6
February	5,8	0,1	5,9	1,4	2,3	0,97	2,2
March	5,2	0,1	5,3	1,3	3,4	0,82	0,6
April	3,9	0,1	4,0	0,9	2,9	0,61	0,1
May	2,1	0,1	2,1	0,5	1,7	0,31	0,0
June	0,5	0,0	0,6	0,1	0,4	0,08	0,0
July	0,0	0,0	0,0	0,0	0,0	0,00	0,0
August	0,0	0,0	0,0	0,0	0,0	0,00	0,0
September	0,5	0,0	0,6	0,1	0,4	0,09	0,0
October	2,9	0,1	3,0	0,9	2,0	0,58	0,1
November	5,2	0,1	5,3	1,5	1,8	0,97	2,0
December	6,7	0,2	6,9	1,6	1,6	0,99	3,7
Total (absolute) in kWh/a	34556	827	35384	8570	16128		10686
Total (specific) in kWh/(m² a)	39,7	0,9	40,6	9,8	18,5		12,3

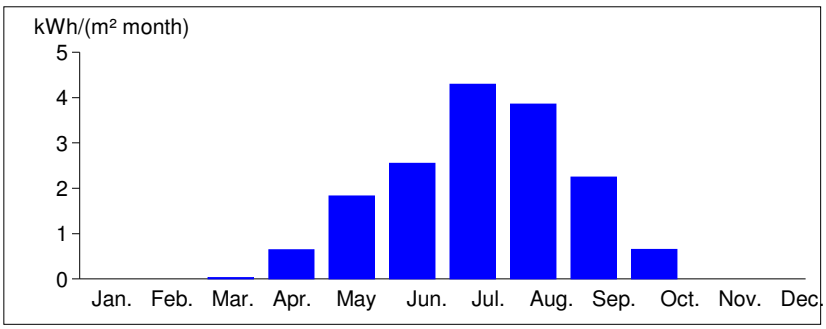


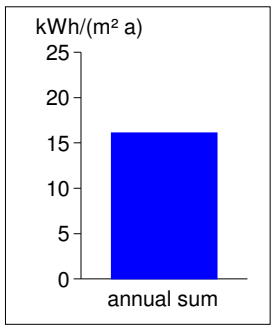


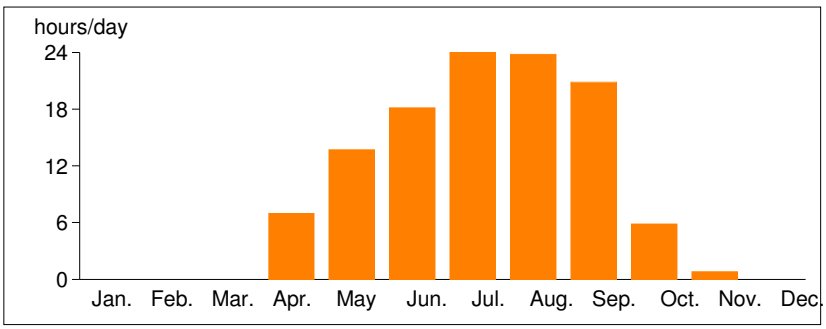


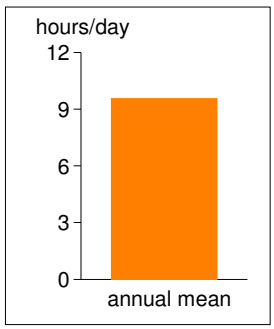
Output: Cooling balance

	Cooling demand in kWh/m²	Overheating (hours per day)	Cooling degree hours in Kh
January	0,0	0,0	0,0
February	0,0	0,0	0,0
March	0,0	0,0	0,0
April	0,6	7,0	643,8
May	1,8	13,7	2784,8
June	2,5	18,1	3363,3
July	4,3	24,0	7053,4
August	3,9	23,8	6803,1
September	2,2	20,8	3499,4
October	0,7	5,8	742,7
November	0,0	0,8	40,9
December	0,0	0,0	0,0
Mean value / yearly sum	16,1	0,4	24931,4









Legend:

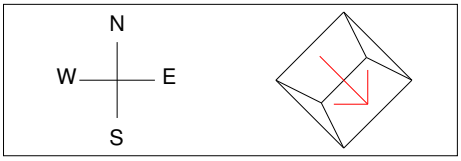
Cooling demand
in kWh / m²

Monthly average of overheated
in hours per day

Output: Balance of windows

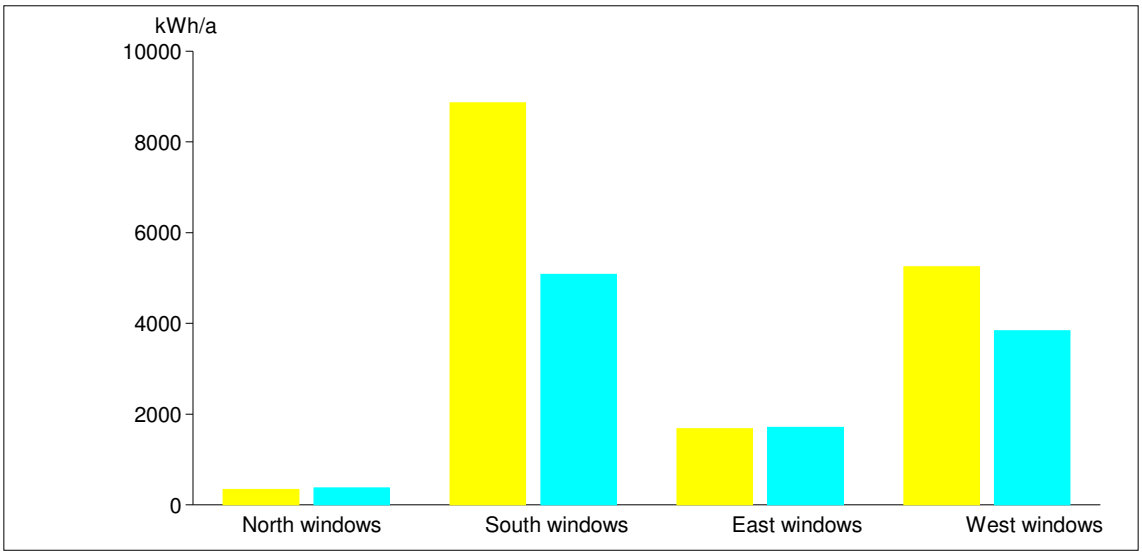
Orientation:

Deviation from South direction: 45 ° to East



Gains / losses:

	North in kWh/a	South in kWh/a	East in kWh/a	West in kWh/a	Total in kWh/a
Usable solar Gains	335,5	8865,1	1678,1	5249,0	16127,6
Transmission losses of windows	373,3	5077,3	1707,2	3841,1	10998,9
Balance	-37,9	3787,8	-29,1	1407,9	5128,7



Legend:

Solar gains

Transmission losses of windows

Output: Primary and end energy demand for heating

Heat:

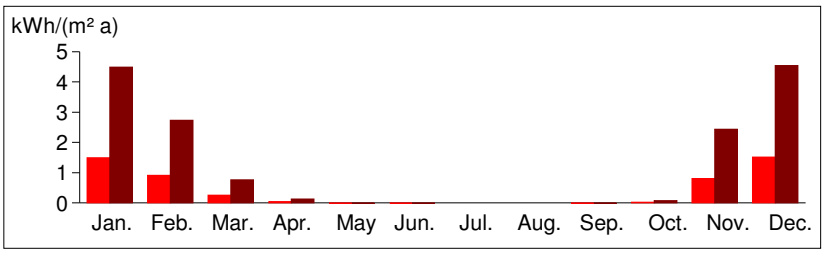
Heat energy demand:	12,3 kWh/(m² a)
Losses of the heat storage:	0,0 kWh/(m² a)
Heat losses from the distribution:	0,5 kWh/(m² a)
Looses at the transmission to the rooms:	1,1 kWh/(m² a)
Expense number of heat generation:	0,23
End energy demand electricity:	3,2 kWh/(m² a)

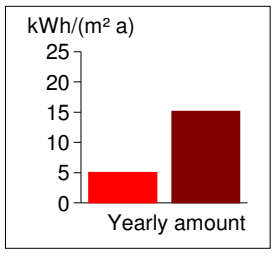
Auxiliary energy (electricity):

Auxiliary energy for heat generation:	1,0 kWh/(m² a)
Auxiliary energy for heat storage:	0,1 kWh/(m² a)
Auxiliary energy for heat distribution:	0,8 kWh/(m² a)
End energy demand auxiliary energy (electricity):	1,9 kWh/(m² a)

Primary energy factor electricity:	3,0
Primary energy demand electricity:	15,2 kWh/(m² a)

	End energy demand demand	Primary energy demand demand
January	1,5	4,5
February	0,9	2,7
March	0,3	0,8
April	0,0	0,1
May	0,0	0,0
June	0,0	0,0
July	0,0	0,0
August	0,0	0,0
September	0,0	0,0
October	0,0	0,1
November	0,8	2,4
December	1,5	4,5
Sum specific in kWh/(m² a)	5,1	15,2
Sum absolute in kWh/a	4400	13199





Legend:

End energy demand electricity

Primary energy demand electricity

Output: Primary and end energy demand for cooling

Efficiency factor air-conditioning: 0,5 kWh cooling / kWh electricity

	Cooling demand in kWh/m²	End energy demand cooling (electricity) in kWh/m²	Primary energy demand (electricity) in kWh/m²
January	0,0	0,0	0,0
February	0,0	0,0	0,0
March	0,0	0,1	0,2
April	0,6	1,3	3,9
May	1,8	3,7	11,0
June	2,5	5,1	15,3
July	4,3	8,6	25,8
August	3,9	7,7	23,1
September	2,2	4,5	13,5
October	0,7	1,3	3,9
November	0,0	0,0	0,0
December	0,0	0,0	0,0
Sum specific in kWh/(m² a)	16,1	32,2	96,6
Sum absolute in kWh/a	14022,2	28044,4	84133,1