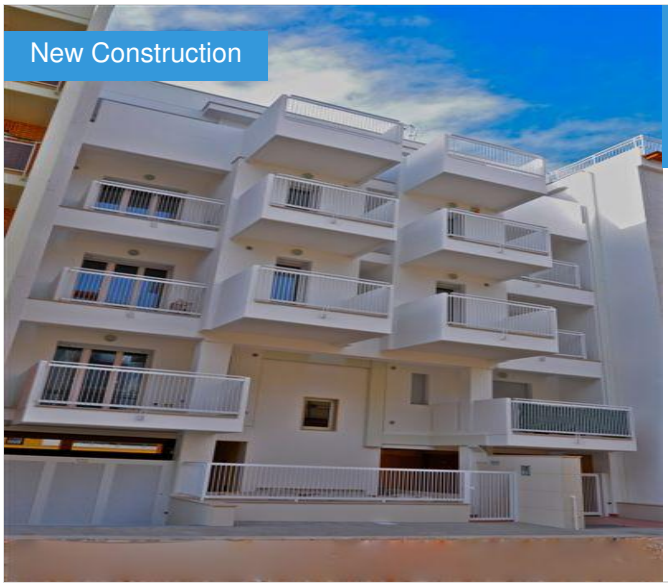
DOMUS SOLIS

by Antonio Stolfa / 2012-02-10 12:10:01 / Italia / 7449 / IT



Primary energy need :

17.04 kWhpe/m².anno

(Calculation method : UNI TS 11300)

ENERGY CONSUMPTION

Economical building *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building Type : Collective housing < 50m
Construction Year : 2011
Delivery year : 2011
Address 1 - street : Via degli Alcantarini 70010 CAPURSO (BA), Italia
Climate zone : [Csa] Interior Mediterranean - Mild with dry, hot summer.

Net Floor Area : 460 m² Superficie útil
Construction/refurbishment cost : 506 000 €
Cost/m2 : 1100 €/m²

General information

The building stands on a rectangular shaped lot of Alcantarini Street in East Capurso (BA), a newly urbanized area. The multi-storey building consists of 7 apartments (2 in class A and 5 class A+).

How the Building can improve quality of life in the city

To increase quality of life of people in the City we have been applying the following tools:

1. *1. appropriate localization of a building and therefore the analysis of the specific site where to build*
2. *2. technical solutions implemented during construction.*

Domus solis is low energy consumption building and therefore is characterized by reduced emission of CO2, harmful to the environment. Domus solis residents are sensitive to environmental issues and aware about the economic and social implications.

Localization

The building was located at the east side of Capurso, nearby a new area of urbanization. Specifically it is part of a street block and it completes the development plan of the City of this specific urban area. The area were the building was located is now completely urbanized and few steps away from the center of the City. This site is served by a local public transportation service (bus) and it is completely served by sewer network, power, drinkable water and, and natural gas utilities. The external surface overlooking the building has an extension of 250 sq. mt. In this area there is a garden (green area) and a slip road to a basement accessible from via Degli Alcantarini. To refine the external part of the building local essences were planted.

Project ideas to minimize environmental impact of the building

Isolation of shell – The building, designed for residential housing, measures 280 sq mt on plant. It is composed by: a basement for car parking (garage) and private lots of cellars. Pilotis floor dedicate to external car parking lots. First, second, third and fourth floors for residential apartments. Flat roof to technological appliances and systems. The building roof is flat. The load bearing structure was built with a frame of reinforced concrete (pillars and girders). The structural part of the garret was built with latero-cement. External vertical walls were built using mono-block systems with high thermic resilience. The choice of using this system for perimetric walls was made to convey transpiration, thermic insulation, lightness and easiness of installation. Therefore we selected a special mono-block composed by hydrates of calcium silicate, lime, sand, cement with 42,5 cm thickness with thermic transmittance of 0,20 W/sq. mt K. The main benefit is low thermic conductivity along with a reduced specific gravity and good displacement performance during summer seasons. In addition to this, the thin microporous structure of the blocks made it highly breathable and easy to craft. The blocks modeling and smoothing were much easier thanks to the of this material usage. Last but not least, the block composition made from natural and recyclables materials was compliant with the choice of using ecologic materials to lower environmental impact. Removal of thermal bridges was obtained by using extruded eps materials specifically with the intrados of the first floor garret. Instead, an harmless material from bio-architectural and microbiological point of view was employed to build beams and pillars, with thermo insulating features – mineral – monolithic, composed by a base of hydrates of calcium silicate, lime, sand, cement, water, additives to improve porosity (porosity > 95% in volume).

System Efficiency: the heating comes with radiant features, built-in floor, centralized and operating with 02 condensing boilers of 35 Kw each, powered by natural gas (metano) and one accumulation boiler with 800 liters capacity. The thermoregulation system is managed independently by each housing unit considering the internal and external temperatures measured on the outside part of the building. The system is provided with electronic devices to switch on/off the heating up to 14 times during one week allowing to constantly adjust the average temperature of the environment 24 hours a day.

The heating system adjustment is provided by warmth counters, circulator and diverter valves. Warmth is delivered through radiant panels installed under floors. Production and distribution of warm sanitary water is provided through combined boilers (heating + sanitary warm water). Water adduction network centralized with re cycling system.

***Utilization of Renewable resources:** the thermal solar system to produce sanitary warm water is centralized and powered by solar panels and condensation boilers. The photovoltaic system releases 2,82 KWp power and works in parallel with the electric power network to exchange the energy produced.*

Rainwater recovery: The building is provided with a rainwater recovery system to drain water from the building roof and convey it to a 50 m3 tank for re-usage. Re-cycled waters are totally used for toilet waste. Therefore it is not used for this purpose drinkable water provided by the City network. The outside part of the building is not completely available to gardens due to the limited space available and other restrictions coming from public needs (part is dedicated to urban roads and the other part to the building car parking ramp). Covered surface is characterized by light colors and high reflection coefficient.

Data reliability

Self-declared

Stakeholders

Stakeholders

Function : Contractor

Gruppo Stolfa edilizia s.a.s.

amministrazione@gruppostolfaedilizia.it

http://www.gruppostolfaedilizia.it/

Function : Thermal consultancy agency

Ing. Giulio Madaro

C.so Vittorio Emanuele, 73 70010 Sammichele di Bari (BA)

Function : Construction Manager

Arch. Adriano Ambriola

Via Labriola, 18 70010 Capurso (BA)

Contracting method

Build and sell construction

Owner approach of sustainability

The Stolfa Edilizia Group was founded with perspective to the welfare mission oriented to a better quality of life. The attention to the consumption of primary sources has led the company to adopt environmentally sustainable systems and to design criteria for a significant savings on home management, providing: environmental protection, health, lower consumption of non-renewable energy, reduction of pollutant discharges, use of local resources. With this policy, the group has already built the residential complex La Stella, in Capurso (BA). The company believes that this way of building will be and should be the criterion to which all builders should be underpinned in short-time, for the broad consensus among buyers, and for the regulatory support of the EPBD Directive.

Architectural description

The 4 floors residential building, with a basement floor, placed in Capurso (BA), is 280 m² per plan and it is adjoining two other residential buildings. It is constitued by a basement floor with garage boxes and cellars; pilotis floor for external car places; first floor, second floor, third floor and fourth floor for dwellings, flat roof for technological systems.

Energy

Energy consumption

Primary energy need : 17,04 kWhpe/m^2.anno

Primary energy need for standard building : 52,39 kWhpe/m^2.anno

Calculation method : UNI TS 11300

Breakdown for energy consumption :
4061 for heating 12.982 for hot water production

Envelope performance

Envelope U-Value : 0,20 W/m^2K

More information :
The structure of the building is in reinforced concrete frame with brick and concrete floors. The vertical external walls are made with the high thermal performance monobloc system. The desire to use the single block for the construction and constitution of the vertical envelope, with properties of breathability, thermal insulation, light weight and ease of installation, leds to the choice of blocks in calcium silicate hydrates, lime, sand, cement. The blocks thickness is 42.5 cm with thermal transmittance of 0.20 W/m² K. In addition to having a low thermal conductivity, it has a specific weight that guarantees good performance of phase shift (15.9 h) in the summer months. In addition, the microporous structure of the end blocks, in addition to making the material highly breathable, it allows a simple and easy processing. The elimination of thermal bridges has been addressed through the use of extruded material in eps with regard to the intrados of the floor of the first floor. The covering surface is characterized by light color and high reflection coefficients. The windows are made with wooden frames and double glazing with argon gas cavity.
Windows and doors have a PVC profile mm. 72.00 frame with 7 rooms and triple glazing with low emissivity double chamber containing argon gas sealed with polyurethane foam impregnated with self-expanding up to 45 mm.

Building Compactness Coefficient : 0,20

Indicator : n50

Air Tightness Value : 0,30

Renewables & systems

Systems

Heating system :

- Condensing gas boiler
- Low temperature floor heating

Hot water system :

- Condensing gas boiler
- Solar Thermal

Cooling system :

- Reversible heat pump

Ventilation system :

- Natural ventilation

Renewable systems :

- Solar photovoltaic
- Solar Thermal

Environment

GHG emissions

GHG in use : 3,43 $KgCO_2/m^2$/anno

Methodology used :
Software: Termus

Water management

Consumption from water network : 500,00 m^3

Consumption of grey water : 154,00 m^3

Consumption of harvested rainwater : 154,00 m^3

The intervention provides for a rainwater collection system that uses the flat roof as capturing surface. An underground tank of 50 cubic meters is installed for the storage and the reuse of stormwater. Retreived rainwaters are used entirely for the discharge of the toilet. Is therefore not used for the purpose of drinking water from the municipal water network.

Products

Product

Product category :

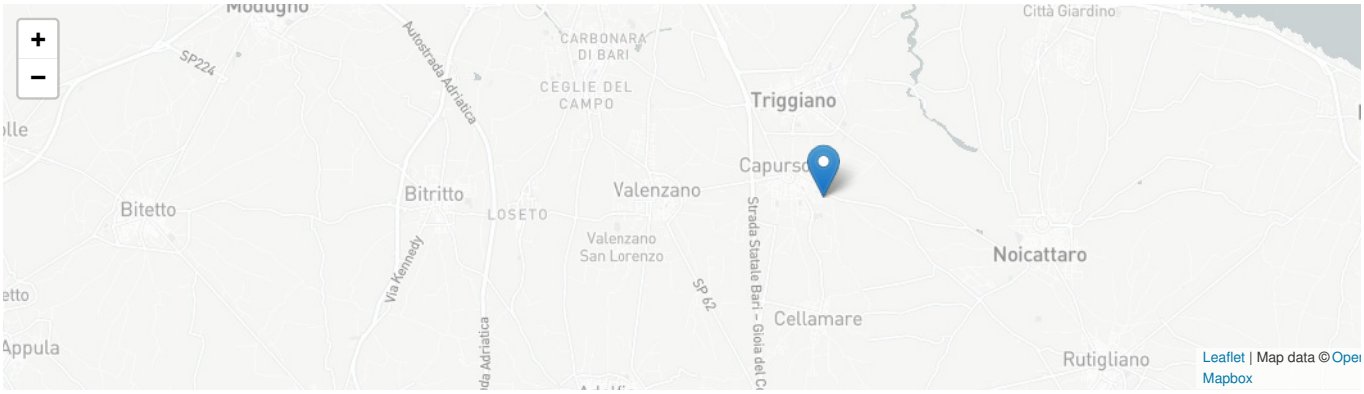
Costs

Construction and exploitation costs

Renewable energy systems cost : 32 000,00 €

Urban environment

The building stands on a rectangular shaped lot of Alcantarini Street in East Capurso (BA), a newly urbanized area. In particular, it is part of a block and it rises to completion of a development plan of an urban grid. The area of intervention is now completely urbanized within a little walking distance from the city center. The site is near a line of local public transport and it is fully served by sewer, electricity, water and gas. In the area there are a green area and an access ramp to the basement from Via Degli Alcantarini. For the arrangement of the external areas has been provided the planting of trees.



Date Export : 20230412133307