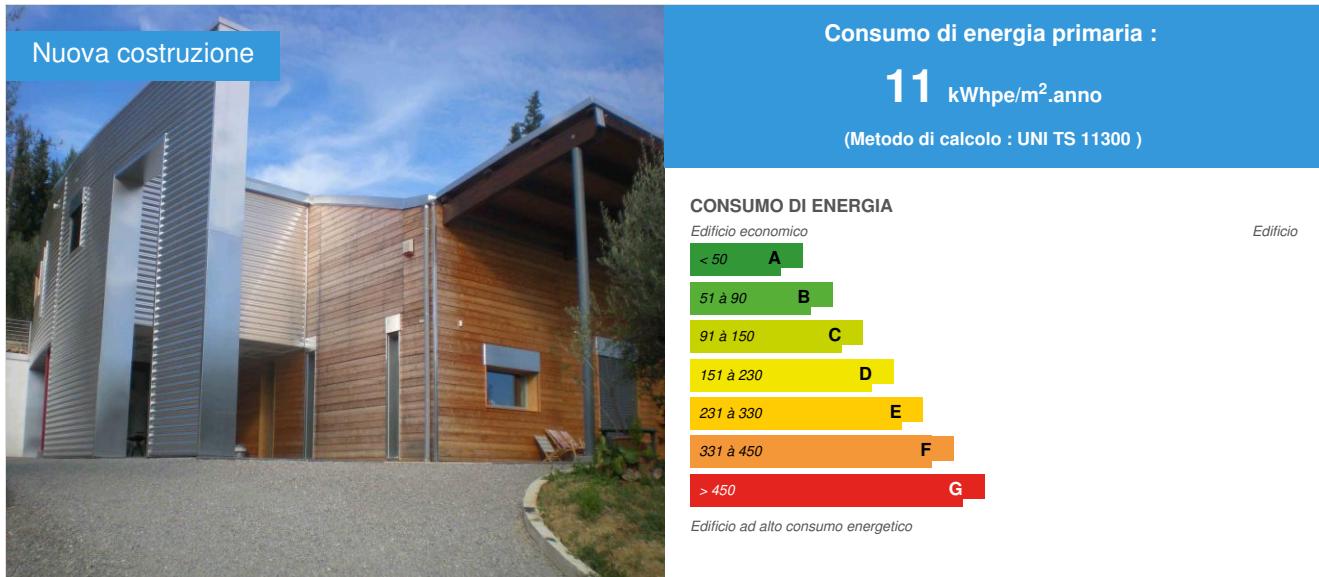


Sustainable passive house Fontana

da Francesco Masciarelli / 2014-02-20 10:28:48 / Italia / 2659 / IT



Tipo di edificio : Ville a schiera

Anno di costruzione : 2009

Anno di consegna :

N° - strada : Via Colli della Farnesina 15/E 06132 PERUGIA, Italia

Zona climatica :

Superficie utile calpestabile : 248 m² Other

Costo di costruzione/ristrutturazione : 100 €

Costi/m² : 0.4 €/m²

Certifications :



Descrizione

A Passivhaus construction in central Italy, a temperate zone categorized as having cold winters and hot summers, that provides energy savings and reduces environmental footprint in a region where the technological requirements are burdened by the obligation to mitigate risk from high seismic activity. The structure consists in a light and flexible steel and wood beam frame with reinforced concrete dividing walls arranged inside the thermally insulated core that provide additional mass contributing to the passive thermal accumulation. This complex structure guarantees the stability of the building and minimizes kinetic energy resulting from seismic activity and contemporary reduces the risk of damages to the airtight envelope. The project is based on the Passivhaus standard to optimize energy consumption, and relying on the Life Cycle Assessment (LCA) method to minimize the impact on the environment. The philosophy of the project. Conceptual: by reference to the use of the golden proportion or ratio as a base for the architectonic geometry of the building, and to the use of the principles of Feng Shui. Architectural: by reference to the use of contemporary and non-vernacular indoor and outdoor design and materials. Environmental: by reference to the use of natural (such as wood, wood wool, aluminum, steel and glass) and/or recycled/recyclable materials, water cycle management, preservation of the permeability of the external surroundings, relocation of centenarian olive trees, reuse of the digging material. Ecological: by reference to the use of a solo

ventilation system with heat recovery and subsoil heat exchanger both for heating and cooling, with a small contribution of a heat pump, passive strategies such as winter solar gain, summer solar protection, thermal solar system for domestic hot water (more than 80%), and photovoltaic panels to achieve energy independence with the use of solely self-produced renewable energy sources and such a main contribution to a real "close to zero" building end life environmental impact.

Maggiori dettagli sul progetto

http://www.passivhausprojekte.de/index.php?lang=en#k_2929

Attendibilità dei dati

Certificazione di terza parte

Stakeholders

Stakeholders

Ruolo : Committente

Maria Chiara Oddone

evax.snc@libero.it

Tipologia contrattuale

Costruzione in proprio

Approccio del proprietario alla sostenibilità energetica

The choice to build this sustainable passive house depends about ethic reasons, connected to the wish of reducing the environmental impact and the energy consumption in a country like Italy that import the main part of the energy that consumes, from the wish to minimize the management costs and from the wish to reach a very high level of indoor quality living, level that it is impossible to reach with conventional construction methods and techniques.

Descrizione architettonica

The architectural design is based on an holistic and interdisciplinary process of the place-architecture-envelope-mechanic system, implemented by passive energy gains and passive protection against energy dispersion and indoor summer overheating.

The choice of a contemporary design, the use of low environmental impact and non-vernacular materials, such as natural wood and aluminium, and the design of a structurally anti-seismic and extremely high energy

efficiency building with reduced operating costs, are parts of the requisites of the project.

The architectural setting makes use of the golden proportion or ratio (the golden number - $\phi \approx 1,61803$) as a base for the architectonic geometry of the building, and of the principles of Feng Shui.

A special attention paid to environment protection: relocation of dozens of centenarian olive trees; the choice of natural construction materials, mainly recyclable; the management of worksite waste; the reduction of drinking water consumption and rain water recycling; the preservation of the permeability of the external surroundings due to gravel or green surfaces, the reuse of digging materials; the minimization of the environmental impact.

Energia

Energy consumption

Consumo di energia primaria : 11,00 kWhpe/m².anno

Consumo di energia primaria del medesimo edificio costruito secondo gli standard minimi previsti dalla normativa vigente : 75,31 kWhpe/m².anno

Metodo di calcolo : UNI TS 11300

Consumo di energia finale : 50,00 kWhpe/m².anno

Performance dell'involucro

Trasmittanza : 0,19 W/m²K

Maggiori informazioni :

Exterior wall

Plasterboard, 25 mm [0,6 W/(mK)]

Air, 140 mm [0,759 W/(mK)]

OSB board, 18 mm [0,13 W/(mK)]

Insulation fiberboard, 280 mm [0,038 W/(mK)]

Wood, 24 mm [0,13 W/(mK)]

Airtightening layer, 3 mm

U-value = 0.119 W/(m2K)

Basement floor / floor slab

Gres paving, 14 mm [1,0 W/(mK)]

Concrete slab, 70 mm [1,8 W/(mK)]

Polystyrene Styrodur CS 30/35, 180 mm 0,033 W/(mK)]

Insulated concrete slab, 30 mm [0,093 W/(mK)]

Concrete slab, 50 mm [1,28 W/(mK)]

Insulation, 10mm [0,039 W/(mK)]

ribbed slab, 380 mm [1,655 W/(mK)]

Concrete slab, 100 mm [1,28 W/(mK)]

U-value = 0.151 W/(m2K)

Roof

Wood, 22 mm [0,13 W/(mK)]

Air tightening layer, 3 mm

insulation wood fiber, 280 mm [0,038 W/(mK)]

insulation fiberboard, 20 mm [0,046 W/(mK)]

U-value = 0.119 W/(m2K)

Windows

U w-value = 0.95 W/(m2K)

Glazing

different triple glazing

with two low-e-coatings and krypton filling

Spacer: inox spacer

Manufacturer: Saint Gobain

average

U g-value = 0.6 W/(m2K)

g -value = 51 %

Coefficiente di compattezza dell'edificio (fattore di forma s/v) : 0,67

Indicatore : n50

Indice di tenuta all'aria dell'involucro edilizio : 0,44

Fonti Rinnovabili e Impianti

Systems

Impianto di riscaldamento :

- Pompa di calore
- Altro
- Altro

Impianto di produzione di acqua calda sanitaria :

- Pompa di calore
- Solare termico

Impianto di raffrescamento :

- Pompa di calore reversibile
- Altro
- Altro

Impianto di ventilazione :

- Ventilazione notturna
- Raffrescamento gratuito
- Scambiatore di calore a doppio flusso

Sistemi per lo sfruttamento di fonti di energia rinnovabili :

- Solare fotovoltaico
- Solare termico
- Altro

Produzione di energia rinnovabile : 100,00 %

☒ Double flow cross heat exchanger integrated with Subsoil Heat Exchanger

Smart Building

Funzioni di Smart Building :

Building main performances management and control, for energy consumption reduction and indoor quality living and security increasing

Smartgrid :

Heating and cooling management and data control, electric load control, lighting solutions control, security control, PV production monitoring

Prestazioni ambientali

GHG emissions

Emissioni di Gas serra in fase di utilizzo : -9,29 KgCO₂/m²/anno

Metodologia utilizzata :

EPD 2007, Eco-indicator 99. In the utilization phase, occupants' energy consumptions and maintenance of materials for a lifetime of 70 years were taken into account.

Emissioni di Gas serra in fase di produzione e costruzione : 16,04 KgCO₂ /m²

Durata dell'edificio : 70,00 anno/i

Emissioni totali di Gas serra dell'edificio : 358,40 KgCO₂ /m²

EPD 2007 and Eco-indicator 99. The first one includes the characterization stage and the evaluation is carried out on six damage categories: Gross Energy Requirement (GER), Non-Renewable Energy consumption (NRE), Global Warming (GWP), Eutrophication (EP),

Life Cycle Analysis

Contribution assessment: comparison between two end-of-life scenarios, in terms of GER (a) and GWP100 (b)

Impatto dei materiali da costruzione sulle emissioni di gas serra :

319

Impatto dei materiali da costruzione sul consumo energetico : 225,00 kWhEP

Gestione delle acque

Consumo di acque meteoriche recuperate : 150,00 m³

Drinking water consumption reduction and reuse of rainwater for water closet and wash machine.

Rainwater container capacity approx 25 m3.

Qualità dell'aria interna

Double flow air ventilation system, integrated with Subsoil Heat Exchanger, with three layers of filter.

The air exchange, the minimization of thermal bridges and the removal of constructive imperfections, the the use of natural materials, contributes to reach a high level of indoor air quality, optimizes the thermo-hydrometric indoor performances and reduces the risks of the presence of air pollutants.

Prodotti

Prodotti

Double flow cross heat exchanger integrated with Subsoil Heat Exchanger with Subsoil Heat Exchanger

J.E. StorkAir (NL)

Categoria del prodotto : HVAC / Ventilazione, Raffrescamento

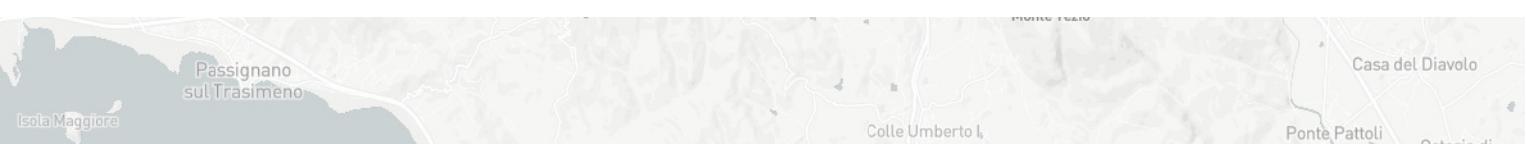
Ventilation for supply and extract air with heat recovery and subsoil heat exchanger for pre-heating and pre-cooling the intake air



Qualità della pianificazione urbana

Ambiente urbano

Bus stop approx 100 m.



Superficie totale dell'area di intervento : 1 700,00 m²

Superficie totale dell'edificio

Superficie totale dell'edificio : 20,00 %



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