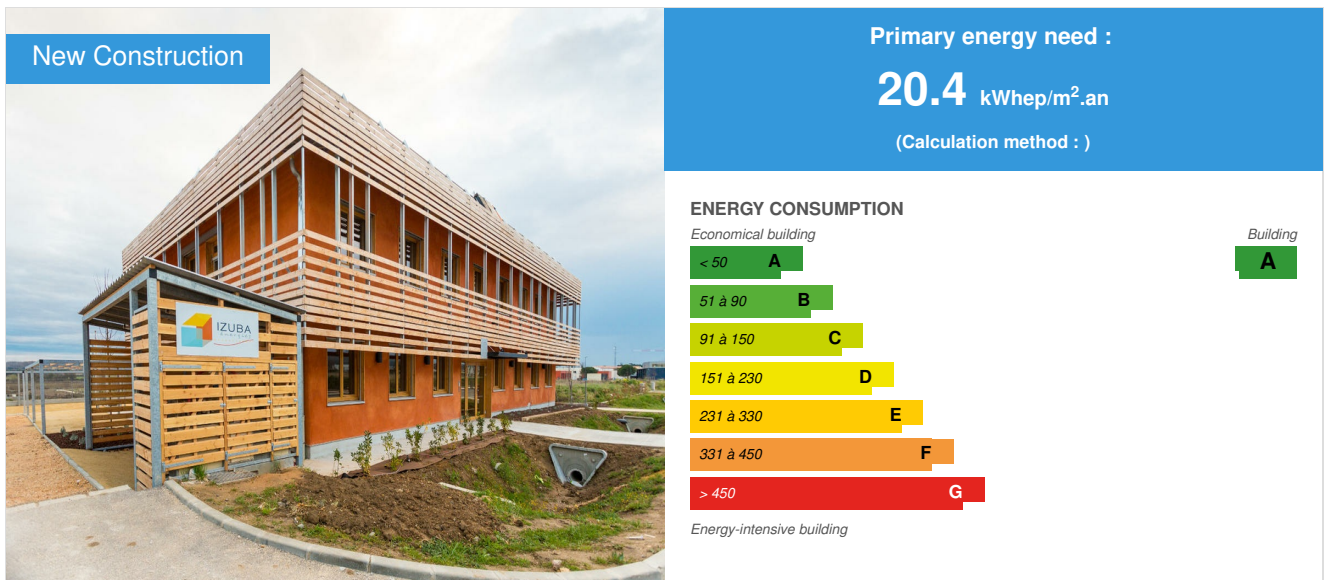


Izuba Energies Building

by Stéphane Thiers / 2016-06-09 10:15:03 / France / 11595 / FR



Building Type : Office building < 28m
Construction Year : 2015
Delivery year : 2015
Address 1 - street : 34690 FABRÈGUES, France
Climate zone : [Csa] Interior Mediterranean - Mild with dry, hot summer.

Net Floor Area : 453 m²
Construction/refurbishment cost : 934 000 €
Cost/m2 : 2061.81 €/m²

General information

Specialized in energy and environmental optimization of buildings, Izuba Energies develops and disseminates tools for the energy transition (studies, software, training). To cope with the development of its business, the company decided to build its headquarters and offices near Montpellier, on Ecoparc Fabrègues. This building reflects what IZUBA Energies supported since its creation in 2001: a "negawatt" energy approach with its 3 components (simplicity, efficiency and renewable energy), coupled with a comprehensive approach integrating hygrothermal comfort, gray energy components, user behavior, waste management, indoor air quality, the transport of employees... the realization of the Izuba Energies building embodies an exemplary achievement of its business plan and its expertise.

Sustainable development approach of the project owner

The goal was to build a positive energy building, using local bio-based materials, to reduce environmental impacts.

Architectural description

The architectural design, voluntarily sober, was based on bioclimatic principles: the building must adapt better to the Mediterranean climate to ensure occupant comfort.

In winter heating requirements are reduced to a minimum:

- The building has a simple shape and a good compactness, to limit loss surfaces.
- The main facade south favors solar gain in offices, the majority on this orientation. Storage facilities and service are positioned buffer space to the north.

- The choice of timber frame insulated with straw provides a very high level of insulation of the walls.

In summer, the envelope limit overheating by adopting the following principles:

- The building is equipped with fixed and mobile solar protection blocking direct sunlight while allowing solar gain in winter.
 - The thermal inertia, rather light wood frame is reinforced by interior partitions earth-straw and mud brick.
 - A natural night ventilation is made possible by the opening of swinging woodwork on two opposite sides of the building and glass transoms facing traffic.
- Circulations are lighted and ventilated by office doors and exterior doors at the end of the corridor, all glass and equipped with overhead transoms.

Building users opinion

The occupant satisfaction is generally very positive. The premises are considered light, with a healthy and warm atmosphere due to the presence of wood and earth. Thermal comfort is sometimes difficult to adjust to the individual sensitivity of the occupants (heating / cooling floor).

If you had to do it again?

The vast majority of products and systems implemented were satisfactory. The exception is the anhydrite screed left rough after sanding and applying a hard protective oil. Due to problems of tasks and premature wear corrective action is being studied to make the hard, impervious surface, while respecting the objective of air quality inside.

See more details about this project

<http://batiment.izuba.fr>

Stakeholders

Stakeholders

Function : Contractor

IZUBA énergies

Eduardo Serodio - eduardo.serodio@izuba.fr - 0467186221

<http://www.izuba.fr>

energy engineer - communications

Function : Construction Manager

Rigassi Architectes Associés

Mr Vincent Rigassi - vincent.rigassi@ra2.fr - 0476471172

<http://www.ra2.fr>

Function : Contractor

IZUBA énergies

Stéphanie Gautier - stephanie.gautier@izuba.fr - 0467184894

<http://www.izuba.fr>

energy engineer - responsible building project

Contracting method

Separate batches

Type of market

Table 'c21_luxembourg.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 20,40 kWh/m².an

Primary energy need for standard building : 135,00 kWh/m².an

Calculation method :

CEEB : 0.0001

Breakdown for energy consumption : Estimated energy balance before delivery:

- Heating: 2.0 kWhEF / m² / year
- Cooling: 0.8 kWhEF / m² / an
- Hot Water: 0.5 kWhEF / m² / year
- Ventilation: 4.6 kWhEF / m² / year
- Auxiliary: 0.5 kWhEF / m² / year
- Lighting: 2.7 kWhEF / m² / year
- Specific Electricity: 9.3 kWhEF / m² / year

Real final energy consumption

Real final energy consumption/m2 : 28,00 kWhEF/m².an

Real final energy consumption/functional unit : 705,00 kWhEF/m².an

Year of the real energy consumption : 2 015

Envelope performance

Envelope U-Value : 0,38 W.m⁻².K⁻¹

More information :

- Timber frame insulation straw
- Exterior wall: Up = 0.17 W / m²K. wood box / straw insulation 37cm of straw, earth plaster / straw (inside and outside)
- Roof: Up = 0.15 W / m²K. wood box / straw, straw insulation 37cm low
- Floor: Up = 0.16 W / m²K. concrete slab-on-grade, 11 cm extruded polystyrene
- Joinery: Up = 1.5 W / m²K. joinery wood double glazing 4/16/4 low emissivity argon
- Thermal bridge: Psi means building: 0.14 W / (m²SRT.K)

Building Compactness Coefficient : 0,64

Indicator :

Air Tightness Value : 0,80

Renewables & systems

Systems

Heating system :

- Geothermal heat pump
- Low temperature floor heating
- Fan coil
- Solar thermal

Hot water system :

- Solar Thermal

Cooling system :

- Geothermal heat pump
- Fan coil
- Floor cooling

Ventilation system :

- Natural ventilation
- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic
- Solar Thermal
- Heat Pump on geothermal probes

Renewable energy production : 317,00 %

Other information on HVAC :

Heating / cooling production: Heat pump Weishaupt WWP S 10 IBER

- Heat: 9.5 kW, COP 4.2

- Cold: 14.6 kW, EER 9.1

Transmitters: floor heating / cooling and fan convectors training room

ventilation dual flow ventilation Swegon Gold RX TOP maximum flow 1200 m3 / h

efficiency wheel exchanger: 81%

air tightness of the duct system: class C

ECS electro-solar water heater 200 liters,

1 solar thermal collector 2 m²

Lighting

Offices, training rooms and meeting: tubes T5 - 6 to 14 W / m²

Circulations and health: LED - 3-8 W / m²

Storage, server room: compact fluorescent lamps - 13 W / m²

photovoltaic production Total Power: 28.8 kWp - 88 modules Sunpower E20-327-COM average yield of 20.4%

Solutions enhancing nature free gains :

Orientation principale au sud pour bénéficier des apports solaires.

Smart Building

BMS :

Trend 963 Supervisor - Measurement of consumption and energy production in the post in 10 minutes of time - Visualization and control the heating, cooling and ventilation

Users' opinion on the Smart Building functions : The GTC system displays the operating states and control of HVAC installation. The interface is user-friendly and publicly accessible to thermic engineer of Izuba Energy team.

Environment

Urban environment

Land plot area : 1 036,00 m²

Built-up area : 26,00 %

The building is located within the Eco-Park Fabrègues, area still under construction, at the interface between a residential area and a rural area. A future extension of tram line allow the direct connection of the area from the center of Montpellier.

Products

Product

Timber frame insulation straw

Sud-Est Charpente

Route de Bonlieu 26 450 CLEON D'ANDRAN - 0475901534

<http://www.sudestcharpentes.com/>

Product category : Gros œuvre / Charpente, couverture, étanchéité

Leaning on the concrete slab of the ground floor, the building's wooden structure consists of bearing walls and internal devices on both sides of the road. These walls support the intermediate floor and roof. The bracing is provided by domestic OSB. The design has from the outset the choice of prefabrication of the timber frame as pedestals for the walls and roof.



Prefabrication workshop, conducted with manufacturing tools desktop, ensures improved ergonomics of work, greater precision in the cuts and assemblies as well as better treatment of airtightness .

earth plasters

Jolie Terre

Impasse des chênes – 30360 Martignargues - 0675529658

<http://www.jolieterre.fr/>

Product category : Second œuvre / Peinture, revêtements muraux

The company Jolie Terre implemented on our building a mix of design, made of earth extracted from a quarry near Uzès, a hundred kilometers from the site.

Its composition: sand, clay and plant fibers (mostly straw) was designed to meet the needs of sustainable protection of straw and implementation ease. Hygrothermal characteristics of the mixture make it an excellent ally of building straw

- indoors, it brings the inertia that could default do otherwise
- outdoor, good permeability to the diffusion of water vapor facilitates breathing wall and prevents condensation in the straw bale

The process used is the projection that makes the efficient implementation time and labor. A total of 36 tons of this mixture have been disposed on the building. As the external and domestic final report is quite satisfactory for the occupants.



Costs

Construction and exploitation costs

Total cost of the building : 1 106 000 €

Subsidies : 172 000 €

Health and comfort

Indoor Air quality

The hygroscopic and thermal qualities of wood and earth that is found in large quantities in local help to create a warm environment. The choice of natural materials, combined coatings with very low emissions, are the guarantee of perfect health air quality. Painting of walls and ceilings: Luc'O Satin, 0% VOC, Eco Flower Painting on wood: Biorox, VOC <5%, classification A + pipes on paint Tol Prim, Tol hydro shiny metals, classification A +

Comfort

Calculated thermal comfort : Simulation thermique dynamique sous Pleiades+Comfie. Objectif de limitation des durées d'inconfort à 40 heures occupées au delà de 28°C.

Carbon

GHG emissions

GHG in use : 31,50 KgCO₂/m²/an

Methodology used :

novaEquer ACV basis Ecoinvent 2010. Scope of study: building energy consumption (réglementaires and non-regulatory), water consumption, waste production, transport occupants. PV production is not removed.

GHG before use : 26,00 KgCO₂ /m²

Building lifetime : 50,00 année(s)

, ie xx in use years : 0.83

GHG Cradle to Grave : 1 775,00 KgCO₂ /m²

ACV novaEquer, 2010. See Ecoinvent base study area below (ACV)

Life Cycle Analysis

Material impact on GHG emissions :

190

Material impact on energy consumption : 950 066,00 kWhEP

Eco-design material : To limit the environmental impact of the manufacture of building materials and processing end of life, the design has largely favored bio-sourced materials, minimally processed and recyclable:

- Wooden frame insulated straw bale
- earth plasters , clay walls and straw wall in mud brick
- wood for exterior and interior joinery and furniture
- anhydrite screed sanded and oiled finished floor

Contest

Reasons for participating in the competition(s)

The Izuba Energies building was designed in a transverse approach integrating energy performance , comfort and environmental performance, which would compete in the categories " temperate climates and energy " and " Low Carbon ". We chose the category Low Carbon to highlight the selected constructive solutions: the timber frame, insulation, straw and earth plaster. These solutions were found to respond with relevance to all project design requirements.

Building candidate in the category



Bas Carbone



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