The School of the "Chat Perché" (France)

by Florence Devernay / 2023-01-10 00:00:00 / France / 1467 / FR

Primary energy need :

-34.9 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION

Economical building

Building

A

< 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 : School, college, university
Construction Year : 2021
Delivery year :
Address 1 - street : 1 Rue Pierre de Coubertin 56310 QUISTINIC, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 706 m²
Construction/refurbishment cost : 1 310 000 €
Cost/m2 : 1855.52 €/m²

General information

This school located in the town of Quistinic, was built in an integrated design process with future users, thus meeting their needs. With the aim of bringing together the facilities dedicated to children on the same site and pooling the spaces, the school was built as a continuation of the existing children's centre. Oriented around a central courtyard, the classes benefit from spaces common to both entities (school and centre), with a library and a motor skills room.

This equipment is built from biosourced materials, with an untreated wooden frame, chestnut cladding, straw and wood wool insulation, raw earth interior plaster and natural linoleum floors. This particular know-how has been enhanced thanks to participatory projects, in particular for insulation using straw bales and raw earth coatings.

The orientation of the building, the double flow ventilation, the solar protections and reinforced insulation make it possible to obtain a building with high performance, a low energy impact and few energy needs. Large openings to the south make it possible to optimize the contribution of heat and natural light, while solar protections protect the spaces from overheating. The large installation of photovoltaic panels on the roof allows to cover the electricity needs of this school.

Building users opinion

The feelings of the users can be summed up in the testimonies in the press of the director and her team, when they returned to the school:

"This is an exceptional start to the new school year: we are going to explain to the children the design of the school by involving the volunteers and professionals who have worked on this achievement. We will introduce them to the environment. Each window is located opposite a tree !"

"The imposing classrooms of 80m² each have tremendous light. A workshop shared between the classes allows experiments in science, arts, cooking, DIY, etc.). The location of the establishment is pleasant and soothing because we are surrounded by greenery and forest, which allows us to work on the environment."

The figures speak for themselves given this first observation, the numbers are up with 69 students.

If you had to do it again?

The COVID-19 pandemic has made it difficult to maintain the link with future users during the construction period. Initially, it was planned to continue the participatory approach during the construction site, by creating an observatory on site, which would later become a playground, which was made impossible.

A long period without direct exchanges put some distance between the participants and the project management team, but this was later made up for by organizing several open days adapted to different audiences (children, parents, partners...).

We retain this need to create a link from the design to the delivery of the equipment, in order to allow users to better accept new constructions.

See more details about this project

https://www.devernay-architectes.fr/batimentsbioclimatiques/ecole-le-chat-perch%C3%A9

Photo credit

Devernay Architectes

Stakeholders

Contractor

Name : Commune de Quistinic
Contact : M. Le Maire
https://www.quistinic.fr/

Construction Manager

Name : Florence Devernay
Contact : Florence Devernay - florence[a]devernay-architectes.fr
https://www.devernay-architectes.fr/

Stakeholders

Function :

KONSTRUKTIF

Stéphane Saltzmann

http://www.konstruktif.fr/
Wooden structure design office

Function : Thermal consultancy agency

BATITHERM CONSEILS

Guillaume TOBIE

https://www.batithermconseils.com/
Thermal and fluid studies

Function : Structures calculist

Acoustique et environnement nord ouest

Maxime CAUCHETEUX

Acoustic

Function : Company

Echopaille

Sébastien Chameroy

https://www.echopaille.fr/
Wood construction and straw insulation, exterior joinery

Contracting method

Other methods

Energy

Energy consumption

Primary energy need : -34,90 kWhep/m^2.an

Calculation method : RT 2012

Breakdown for energy consumption :

- Heating: 14.3
- Cooling: 0
- DHW: 2.2
- Lighting: 11.1
- Auxiliaries: 12.2
- Photovoltaic: -74.9

Real final energy consumption

Final Energy : -13,70 kWhef/m^2.an

Envelope performance

Envelope U-Value : 0,20 $W.m^{-2}.K^{-1}$

More information :
Strong insulation of opaque walls: thermal transmission coefficient Up < 0.15 W/m².K for walls, floors and roofs.

High performance glazed walls: thermal transmission coefficient Uw < 0.80 W/m².K for joinery.

Absence of thermal bridges: in addition to the specific performances of the opaque and glazed walls, the latter must be implemented in such a way as to avoid thermal bridges.

An airtight envelope: the building must benefit from an airtight envelope in order to limit infiltration (cold outside air inlets) responsible for energy overconsumption and to avoid exfiltration (hot air outlets loaded with moisture) resulting in condensation in the walls and thus degradation of the insulation and the frame.
The control was carried out in 2 stages. A Blower door test during the works and a second at the end of the works (official value). A maximum air change rate of 0.6 volumes per hour under 50 Pascals (n50) should be achieved.

Building Compactness Coefficient : 3,03

Indicator : EN 13829 - q50 » (en m3/h.m3)

Air Tightness Value : 0,30

Renewables & systems

Systems

Heating system :

- Electric radiator

Hot water system :

- Individual electric boiler

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic

Renewable energy production : 132,00 %

Other information on HVAC :
Ventilation : double-flow central CTA Gold RX 14

Installation of photovoltaic solar panels by Morbihan Energies

Smart Building

BMS :
Installation by the municipality of a GTB to manage the municipal buildings.

Environment

Risks

Hazards to which the building is exposed :

- Earthquake
- Snow weight

Risks measures put in place :

Sizing of structures according to the snow and seismic hazards of the site.

Urban environment

The school is located in a rural environment, on land on the edge of the forest. Pedestrian traffic is planned from the town center via gentle paths, crossing existing and valued sunken paths. Connections with school transport have been studied in order to offer a stop as close as possible to the entrance to the site, while securing pedestrian crossings.

The green spaces are managed by the technical services of the municipality, engaged in a Zero phyto approach since 2010. The fence of the site, made of chestnut fence, more durable and requiring no treatment.

Land plot area : 7 235,00 m^2

Built-up area : 15,12 %

Green space : 5 624,00

Products

Product

Straw

Isol'en Paille

contact[a]isolenpaille.fr

https://www.isolenpaille.com/

Product category : Finishing work / Partitions, insulation

Producers of straw bales in different sizes

This supplier allowed us to supplement the local production of straw on the site of the municipality for the realization of the project of the public school of Quistinic. The Echopaille company regularly trusts this supplier for its isolated straw bale projects.

Glued laminated timber (BLC)

MM Masterline

olsberg[a]mm-holz.com

https://www.mm-holz.com/en/

Product category : Structural work / Structure - Masonry - Facade

Wood wool

Steico

contact[a]steico.com

https://www.steico.com/fr/

Product category : Finishing work / Partitions, insulation

Biosourced insulation, construction systems for roofs, walls and floors

Easy to install, very high thermal performance

Wood joinery

Menuiseries Le Bodic

Menuiserie Le Bodic - Bieuzy-Lanvaux 56330 Pluvigner - Tél. : 02 97 56 01 76

https://www.menuiserie-le-bodic.com/

Product category : Structural work / Carpentry, cover, titghtness

High performance local wood joinery

Natural linoleum flooring

Forbo

Forbo Flooring Systems France - 63, rue Gosset BP 62717 51055 Reims Cedex - France

https://www.forbo.com/corporate/en-gl/

Product category : Finishing work / flooring

Marmoleum is a unique linoleum floor covering made from natural raw materials such as linseed oil, wood flour, limestone, resin and jute. Marmoleum has been recognized by organisations, third parties and independents: notably the Nordic Swan, Blue Angel and Nature Plus labels.
In addition, Marmoleum linoleum floors contribute to meeting the HQE, BREEAM or LEED certification procedures for buildings, or within the framework of a “bio-sourced building” label.

Ease of installation and long-term maintenance.

Costs

Construction and exploitation costs

Cost of studies : 152 220 €

Total cost of the building : 1 358 445 €

Subsidies : 800 000 €

Additional information on costs :

The photovoltaic panel installations were taken care of by Morbihan Energies

Circular Economy

Reuse : same function or different function

Batches concerned by reuse :

- Indoor joineries
- Outdoor joineries

For each batch : Reused Materials / Products / Equipments :

Exterior joinery: reuse of the 2 existing exterior joinery on the adjoining wall with the Childhood Centre.

Interior joinery: reuse of 18m² of chestnut cladding located on the north face of the Childhood Centre.

Field of use and material origin :

Exterior wood furnishings :

- Joinery 1 - Le Bodic joinery in chestnut reusing a 100x120cm tilt and turn leaf - triple glazed
- Joinery 2 - Le Bodic joinery in chestnut reusing a 100x120cm inward opening leaf – triple glazed

Interior woodwork: reuse of 18m² of chestnut cladding placed on the north face of the Childhood Centre, to create the interior paneling.

Health and comfort

Water management

Consumption from water network : 12,00 m^3

Water Consumption/m2 : 0.02

Water Consumption/Pupil : 0.14

Comfort

Temperature level :

Conventional interior temperature "Tic" = 33.7°C, lower than the reference TIC (37.6°C)

Carbon

Carbon sink

Local wood (regional and national), local straw (grown and harvested in the municipality), local soil

Initiatives promoting low-carbon mobility

Installation of electric charging stations in the bicycle shelter, promotion & securing of pedestrian circuits in the town, installation of occasional school transport on donkeys (“the ânibus”).

GHG emissions

GHG in use : 1,80 $KgCO_2/m^2/an$

Methodology used :
Calculations made with ThermACV version 1.5.12 of 04/24/2019
Calculations made with the Inies Base of 04/23/2019

GHG before use : 1 266,00 $KgCO_2$ $/m^2$

Building lifetime : 50,00 année(s)

, ie xx in use years : 703.33

Life Cycle Analysis

Contest

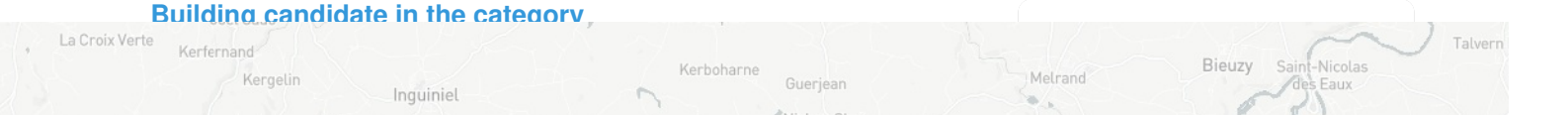
Reasons for participating in the competition(s)

Ce projet est situé dans la commune de Quistinic, engagée dans le développement durable depuis plusieurs années, à travers la revitalisation de son centre-bourg, et de la construction d’un Pôle Enfance Jeunesse en matériaux biosourcés en 2014, qui a été primé aux Trophées du Développement Durable. L’objectif est de créer un site dédié à l’enfance, autour du Pôle Enfance existant, permettant de mutualiser les besoins (bibliothèque, salle de sieste et salle de motricité).

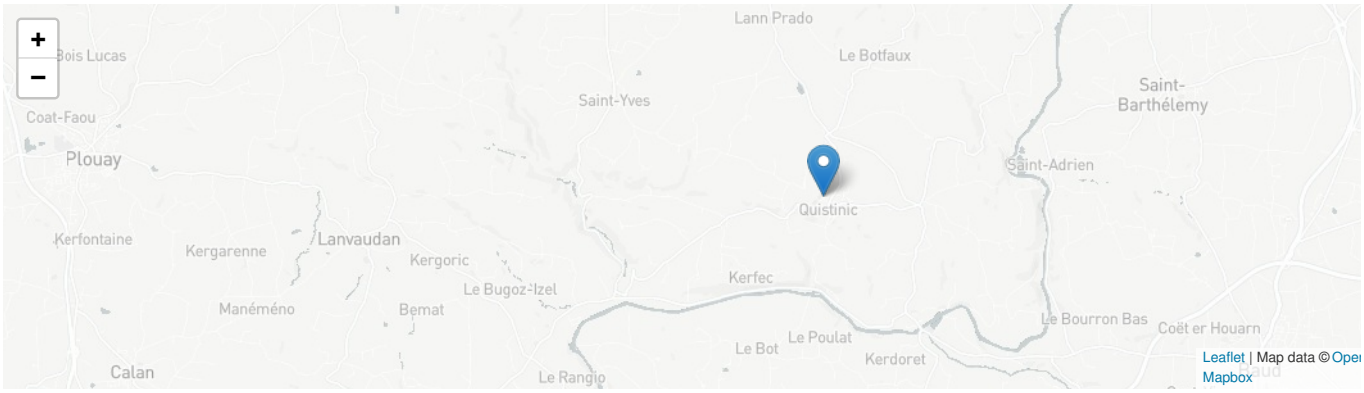
Ce projet collectif, impulsé par et pour les habitants, s’est déroulé de la conception (ateliers participatifs pour réaliser un programme ambitieux) à la réalisation (chantiers participatifs isolation paille et enduits terre) avec le soutien des futurs usagers.

Cette construction, où l’on prend conscience en faisant, sert d’outil pédagogique, depuis sa conception jusqu’à son usage quotidien, afin de sensibiliser ses usagers aux techniques de la construction durable.

Building candidate in the category



Prix du public



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