Kindergarten School of Grézieu-la-Varenne

by Tekhne Architectes / 2018-06-07 16:23:45 / France / 10689 / FR

Primary energy need :

73.5 kWhep/m².an

(Calculation method :)

ENERGY CONSUMPTION

Economical building — *Building*

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

Energy-intensive building

Building Type : Preschool, kindergarten, nursery
Construction Year : 2018
Delivery year : 2018
Address 1 - street : 69290 GREZIEU LA VARENNE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 810 m²
Construction/refurbishment cost : 3 697 000 €
Number of Children : 330 Children
Cost/m2 : 2042.54 €/m²

Proposed by :

General information

The building implements itself so as to be closer to the structuring axes of the site and to propose a frontage "strong and significant" in term of image, to open in the south on the courtyard, in arc of circle, to benefit from the bioclimatic orientation, for the optimization of the solar gains, the protection against the winds of the north of the spaces of recreations, an inscription in the vein of the North-South winds for the natural ventilation through, the comfort in hot season, and views of the great landscape, preserve a space to enlarge the school to the west and showcase the building in a "box" plant installed in the regulatory withdrawals to the north and development of an ecological corridor to the 'East.

The project articulates the two main functional entities of the program in two building blocks, which come in continuity of one another on an arc of circle: the school (10 classrooms, 2 rooms of motricity, auditorium, offices) and the kitchen with the dining room.

A south-west / northeast radiating axis supports a large pedestrian mall, underlined by the roof of the courtyard, connecting the new street and the parking lots to the foyer crossing the school, which leads north to the crossroads of the Greenway (to encourage and encourage this type of eco-friendly travel) with the access street.

This backbone of the project generates a co-visibility by its transparency to unify the equipment, both shot on the "heart island" in the south, but also open on its

north-east facade, the latter is not being not only a rear facade, but an elevation of representation of the institution in the village fabric, an "urban" facade.

The general concept of radiant equipment seeks to create an "inside" around the main access mall, for "village-school", composed of small volumes on a human scale.

This split architectural feature allows the building to be apprehended as a series of organically installed pavilions in a natural continuum, both north and south. It offers a scale architecture for children, while remaining compact at the level of the envelope to be energy efficient and economical.

The internal organization is simple and develops around a central circulating arc which serves: south side, the living areas and north side, the serving spaces. This circulation expands at the level of the class entrances, to form well-sized cloakrooms and out of the passing stream.

Rooms naturally lit naturally with adjustable solar protection (BSO)
Work on the thermal envelope of the building has reduced the energy needs of heating and lighting to meet the challenges of passive building.

Passive level achieved for the school part: heating requirements <15kWh / m2.an

Sustainable development approach of the project owner

The client attaches great importance to the environmental quality of this operation, which goes beyond simple regulatory levels for a large number of components. However, he does not consider HQE® certification because he prefers an environmental approach that best meets the challenges he has identified and limits administrative burdens.

Architectural description

The general concept of radiant equipment seeks to create an "inside" around the main access mall, for "village-school", consisting of small volumes on a human scale.

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The internal organization is simple and develops around a central circulation in an arc of circle which serves:

- South side, the living areas: classrooms, - North side, the serving areas: activity rooms, cleaning rooms, offices and meeting rooms, technical rooms. This circulation expands at several points: - at the entrance hall at the center of this distribution, - at the level of the class entrances, to form well-sized cloakrooms and out of the flow.

The writing of the two main elevations is differentiated according to the orientations: - in the south, large windows taking advantage of the sunshine and the landscape, are equipped with large overflowing frames that allow sun protection in summer (complete with blinds) . The facades of the volumes are clad in dark panels that contrast with the wooden cladding of the interior of the frames, thus protected against differentiated aging.

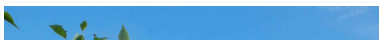
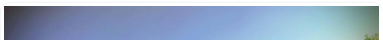
- to the north, more measured bays punctuate the facade of "representation" along the Greenway and the path of the Voyageurs; the latter is dressed with vertical wooden cleats, which are painted on their re-entrant slice: this treatment provides a dynamic and changing perception of volumes, depending on the walk of the observer. The colors that follow each other are never perceptible in their entirety but always in a sequence of gradients studied according to a color chart. In doing so, we offer a facade "moving " and kinetic equipment along the route of many visitors using its tracks, both fun, joyful but refined. At the level of the kitchen / restaurant, the two writings meet, giving this body of building the function of signal of entry of the site.

Building users opinion

The building is just delivered. The occupants have not yet returned to the building.

See more details about this project

http://www.tekhne-architectes.com/projet_archi/ecole-communale-de-grezieu-la-varenne/?cat=Enseignement


Stakehol

Contractor

Name : VILLE DE GREZIEU-LA-VARENNE
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Construction Manager

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Stakeholders

Function : Other consultancy agency

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AMO environmental quality

Function : Assistance to the Contracting Authority

SEDL

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Operational AMO

Function : Assistance to the Contracting Authority

INITIAL CONSULTANT

Stéphane Coche

programmiste

Function : Company

SDCC

David BOSCH, dbosch@sdcc.fr

company lot structure wood

Contracting method

Separate batches

Type of market

Table 'c21_maroc.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 73,50 kWhep/m^2.an

Primary energy need for standard building : 98,73 kWhep/m^2.an

Calculation method :

Breakdown for energy consumption : Calculation of actual final energy consumption (kWhEF / m2SDO.an) heating needs 11,76 heating consumption 15,5 DHW requirements 0.24 ECS consumption 0.24 consumption of ventilation DF 7,05 auxiliary consumption 0.20 lighting consumption 4.19 Office consumption 3.16 ECS kitchen / catering needs 18,42 consos ECS kitchen / catering 24,23 electrical consumption 19,12 consumption ventilation kitchen / restaurant 1 needs heating kitchen / catering 5.65 consumption heating kitchen / catering 7.4 lighting consumption 1,2 TOTAL Teaching 30.3 TOTAL Restoration 53 TOTAL school + restaurant 83.3 RT calculation in kWhep / m2.an Heating: 22,60 Cooling: 0 ECS: 21.00 Lighting: 6.30 Auxiliaries: 23.60

Real final energy consumption

Final Energy : 83,00 kWhef/m^2.an

Envelope performance

Envelope U-Value : 0,25 $W.m^{-2}.K^{-1}$

More information :
See Attachment

Building Compactness Coefficient : 0,89

Indicator :

Air Tightness Value : 0,60

More information

For the moment there is no invoice. An AMO QEB two-year analysis is planned to identify potential problems and to take corrective action where necessary.

Renewables & systems

Systems

Heating system :

- Water radiator
- Low temperature floor heating
- Wood boiler

Hot water system :

- Individual electric boiler
- Wood boiler

Cooling system :

- No cooling system

Ventilation system :

- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Wood boiler

Renewable energy production : 56,00 %

Other information on HVAC :

High efficiency double flow ventilation with heat exchanger part teaching
High efficiency double flow ventilation with rotary exchanger part teaching
High efficiency double flow ventilation with kitchen plate heat exchanger
2 boilers wood cascading
Air brewers in the classrooms and motor skills for cooling (feeling of -3 / 4 °)
ECS by wood boiler for the kitchen part

The wood boiler volume all concrete is to facilitate delivery from the path of travelers.

Solutions enhancing nature free gains :

Ouvrants spécifiques de ventilation naturelle protégés de la pluie et l'intrusion/ Récupération de chaleur par l'échangeur de la double flux / 54% de vitrage sud

Smart Building

BMS :

A CWG system has been implemented. It remains simple to use
- Energy meter reading (EF / heating / electric)
- EF system / leak rate management
- CTA / boiler information record
- Heating management
- Fine management by room of the heated floor
- Site offload management

Smartgrid :

mission monitoring building consumption for 2 years

Users' opinion on the Smart Building functions :

Users are not installed

Environment

Urban environment

Land plot area : 10 280,00 m^2

Built-up area : 21,00 %

Green space : 4 025,00

The project will be established in the northeast corner of the plot for:

- to be closer to the structuring axes of the site (path of the Voyageur and green way) and to propose a facade "strong and significant" in term of image,
- open to the south on the courtyard, in an arc, to enjoy the bioclimatic orientation and views of the great landscape,
- preserve a space to enlarge the school to the west,
- to stage the building in a vegetal "box" installed in the regulatory withdrawals to the north and the development of the ecological corridor to the east,
- access mainly to the equipment from the south, from the new east-west street stuck on Voyageurs Road, which irrigates parking and other plots, or by pedestrian paths from the Greenway.

The implantation in an arc provides a simple and bioclimatic response:

- south / south-west orientation of all classes (except for a basic class) for optimal living comfort,
- protection against the north wind of recreation areas,
- inscription in the vein of north-south winds for the natural ventilation through and comfort in hot season.

A south-west / northeast radiating axis supports a large pedestrian mall linking the new street and the parking lots to the lobby crossing the school, which leads to the north at the crossroads of the Greenway and Chemin des Voyageurs.

This crossing hall allows the possibility to access directly from the greenway to the school, for the users coming from the village in soft mode (pedibus, bike ...), and that to encourage and encourage this type of eco-friendly movement. However a path on the western boundary of the plot also allows to return to the shortest to the south, in the case where a single entrance to the school by mail is desired.

The ecological corridor is the place of expression and development of biodiversity. The topsoils resulting from the stripping are deposited there to create micro-reliefs allowing to vary the exposures, the sunshine and thus to develop a complex and diversified vegetable pallet.

The use of different strata (mucins / herbaceous / shrub / woody) allows to frame the views to and from the school group and ensures the animation of the courses along the bike path.

Alternative rainwater management, a structuring element of the project, is also an essential support for plant and animal biodiversity.

Beyond the technical, economic and environmental stakes, it allows the setting up of a complex and plural landscape welcoming the school group. Management is envisaged according to two principles:

- the reduction of runoff water by installing green roofs and limiting impervious surfaces,
- the actual management, by the establishment of vegetated areas ensuring the collection and storage of rainwater: The roof waters are collected at the foot of facades in a system of valleys, then airlifted to a water system. retention ponds that dump into each other following the dip of the land before being rejected to the network in limited flow.

The parking area is fully integrated into the landscaping. In the interests of environmental impact and landscape quality, it is treated with porous materials outside pavements. In order to ensure pedestrian safety, lane crossings are clearly identified.

In its design the car park integrates a broader urban reflection, anticipating the future development of the area:

- the road network can be continued to ensure the service of the future activity zone,
- Parking pockets can also be extended to the south, in connection with future public facilities.

The school grounds' proximity areas (playgrounds, educational gardens, rainwater harvesting areas) are entirely designed in an interior / exterior reflection and constitute the " garden " of the school group.

Products

Product

Hunter Industry 2 air brewers

ALDES

M. Thorez vincent.thorez@aldes.com

https://pro.aldes.fr/

Product category : Génie climatique, électricité / Ventilation, rafraîchissement

3-speed air blower.
The air brewers achieve the desired temperature with a temperature drop of -3 or 4 degrees. With work on the envelope for summer comfort it is a good alternative to air conditioning. The model prescribed and laid down had an acoustic requirement.
Dimeter 132 cm
Speed flow 5134/7524/8902 m3 / h depending on speed
acoustic 26.3 / 32.8 / 39 dB (A) depending on speed
price supplied asked 350 € HT

This product has been proposed by the project management to reach the desired temperature in hot period. The project owner has accepted this solution to stay in a passive system.
The users have not yet taken possession of the premises but we have a very good feedback from users of other buildings where we have prescribed such products.

Costs

Construction and exploitation costs

Global cost : 8 918 180,00 €

Renewable energy systems cost : 41 784,00 €

Global cost/Children : 27024.79

Energy bill

Forecasted energy bill/year : 1 069 110,00 €

Real energy cost/m2 : 590.67

Real energy cost/Children : 3239.73

Health and comfort

Comfort

Health & comfort :

Summer comfort: adjustable sun breeze, natural night ventilation by specific opening, slab inertia, air brewer

Measured thermal comfort : Pas de mesures prise pour l'infant

Acoustic comfort :

The building is located in an environment without noise pollution.

The thicknesses of partitions have been differentiated according to the type of room to respond in particular to the sound insulation.Different acoustic treatments have been planned according to the type of room for the sound absorption of the room (perforated plaster ceilings + perforated perforated wall covering in classrooms and motor rooms, Wall cladding and wooden cladding + insulation in the ceiling). hall and locker rooms, ceiling plaster perforated in circulations, ceiling ecophon DS + wall cladding in the restaurant).Reverberation time Tr sabine:class 0.7motor skills 0.6restaurant 0.5.The acoustic treatment in the restaurant is maximized because we notice that there is very often a source of discomfort with regulatory level.

Carbon

GHG emissions

Emissions were not calculated during the studies but are currently being calculated because the project is one of the selected for the Objective Building Energy Carbon Rhône Alpes experiment to prepare the new E + C- regulation.

Life Cycle Analysis

Eco-design material :

Structure: wood frame - concrete slab

Facade: wood and Fiber cement cement Eternit typeInsulation walls: cellulose wadding and glass woolRoof insulation: polyurethane and rockwoolFloor insulation: polyurethaneFlooring: linoleum and tilingwood volume 192 dm3 / m2wood boiler

Contest

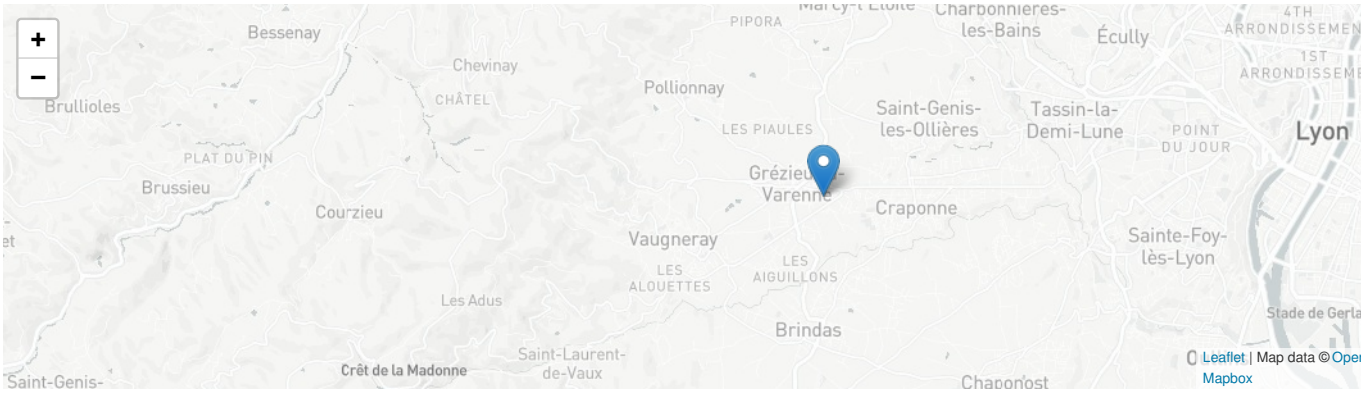
Reasons for participating in the competition(s)

PASSIVE LEVEL heating requirement <15kWh / m2.an

Building candidate in the category

Energie & Climats Tempérés

Coup de Cœur des Internautes



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