First passive house Premium of France

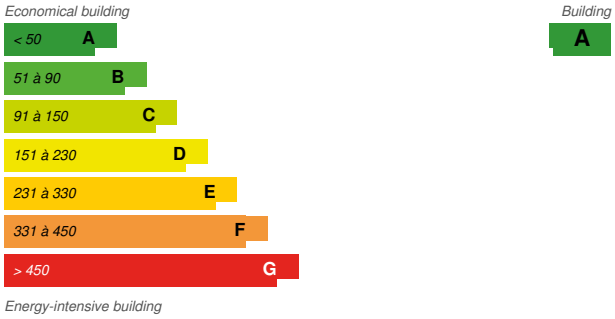
by Valérie GUG-FOUCHER / 2018-05-16 10:06:31 / France / 17689 / FR

Primary energy need :

17.82 kWhep/m².an

(Calculation method :)

ENERGY CONSUMPTION



Building Type : Isolated or semi-detached house
Construction Year : 2016
Delivery year : 2017
Address 1 - street : 83210 SOLLIES-PONT, France
Climate zone : [Csa] Interior Mediterranean - Mild with dry, hot summer.

Net Floor Area : 155 m²
Construction/refurbishment cost : 260 000 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 1677.42 €/m²

General information

The first certified Premium Passive House in France was created in the Var. No need for any heating or cooling system for this building that produces 4 times more energy than it consumes.

This house shows that it is possible to reconcile architectural quality, very low loads, comfort for the user, compliance with regulations, reduction of energy consumption to reduce the deficit of the balance of trade and reduction of gas emissions. greenhouse effect to preserve the planet. All communities should therefore include the liability in the specifications of their development operations and lead by example by building passive public buildings (schools, colleges, town hall, technical centers, fire stations, sports equipment, etc.). .

To Jean-Louis, who carried this project with all his intelligence and determination

Sustainable development approach of the project owner

The owner, Jean-Louis Bidart, training engineer, wanted a passive house, that is to say, comfortable for his family, with the least possible loads, respectful of the environment and sufficiently productive of solar electricity to recharge its hybrid electric vehicle.

He trained in the PHPP software for calculating the energy performance of passive houses and when in 2015 La Maison Passive proposed the new Passivhaus labels: Plus and Premium labels that integrate renewable energies, his project naturally evolved in this direction: the climatic conditions of the Var, with a high rate of sunshine particularly suitable.

The installation of photovoltaic panels has made it possible to obtain the label "Passif Prémium", the most demanding category of certification.

Architectural description

The house had to fit in perfectly with its surroundings and therefore did not differ from neighboring Provencal houses. It has a living area of 122m². This architectural conformism meets both the wishes of the couple and the urban planning rules of their commune of Sollies-Pont, near Toulon. The criteria of Passivhaus labeling impose a frequency of overheating of only 10% of the time is on a day 2h30 The project made use of the advantages that the land could bring to it, and then optimized the ensemble by implementing building elements derived from the rules of bioclimatism. Passivhaus, such as compactness, orientation, blinds, use of concrete in strategic locations, reflective roofing film, absence of thermal bridge, airtightness of construction, triple glazed joinery, insulation from the outside and an insulation under the slab carrier of the DRC etc .... In addition, the region being the sunniest in France has optimized this data geog by installing photovoltaic panels.Bilan: the house produced, thanks to the installation of 42 m² of photovoltaic panels on its roof and 4 m² of solar thermal panels on the roof of the garage, more energy than its consumption all uses, including the charge of the hybrid car. Over the first period of occupation measured from June to August 2017, very favorable to solar energy balance between production and consumption already shows a surplus of 2744 kWh for 122 m², or 20 kWh / m²hab.

Building users opinion

In addition to the undeniable thermal comfort with the absence of cold wall, humidity, drafts, a pleasant and constant temperature in all rooms of the house, good indoor air quality, energy sobriety induces a a virtuous circle that encourages us to further reduce our electricity consumption, for example with energy-saving plugs, low-power appliances ... and soon a solar oven ...
Beyond the reduction of our energy bill this year the sale of surplus electricity generated by photovoltaic panels should allow us to pay the property tax.
Not to mention the very rewarding feeling of participating in the preservation of the environment!

If you had to do it again?

Alike !

See more details about this project

https://www.construction21.org/france/articles/fr/la-premiere-maison-passive-premium-de-france.html
http://www.lamaisonpassive.fr/la-premiere-maison-passive-premium-de-france/

Stakeholders

Contractor

Name : MR et MMe BIDART
Contact : sophieetjl@gmail.com

Construction Manager

Name : IDEATECTUM Architectes
Contact : mail@ideatectum.eu
http://www.ideatectum.eu

Stakeholders

Function : Thermal consultancy agency

Heliasol

contact@heliasol.fr

Thermicien

Contracting method

Separate batches

Type of market

Table 'c21_maroc.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 17,82 kWhep/m^2.an

Primary energy need for standard building : 37,40 kWhep/m^2.an

Calculation method :

CEEB : 0.0001

Breakdown for energy consumption : Heating: 110 kWh ECS: 866 kWh Air conditioning: 0 Auxiliary: 256 kWh Lighting: 86 kWh Domestic electricity: 1628 kWh (washing machine, fridge, computers ...)

Real final energy consumption

Final Energy : 19,30 kWhef/m^2.an

Real final energy consumption/m2 : 19,30 kWhef/m^2.an

Year of the real energy consumption : 2 017

Envelope performance

Envelope U-Value : 0,19 W.m^{-2}.K^{-1}

More information :

Envelope worked to have no thermal bridge (insulation even under pavement)
Value of the thermal bridge slab RDC: - 0.3 W / m.K (negative: calculated according to the Passivhaus method)
Insulation from the outside

Building Compactness Coefficient : 0,83

Indicator :

Air Tightness Value : 0,21

Users' control system opinion :

The owner has developed his own system: see section RE & systems / Smart building

More information

No need for heating or air conditioning

Renewables & systems

Systems

Heating system :

- No heating system

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Double flow

Renewable systems :

- Solar photovoltaic
- Solar Thermal

Renewable energy production : 384,00 %

Other information on HVAC :

EnR production per year 10 605 kWh Ef (PV 9005 and solar thermal 1605)

Self-draining solar thermal system to prevent overheating in summer
PV: 6336 Wc (21m²)

Solutions enhancing nature free gains :

75% des fenêtres au sud, VMC avec récuperateur de chaleur, forte inertie des matériaux, triple vitrage

Smart Building

BMS :

Concerned with energy efficiency, the owner has developed a program to monitor in real time the consumption of different devices and the electricity production. This is based on the use of a Vera controller that centralizes the data from the sensors associated with the various sources of consumption and production, as well as the Opensource emoncms software that retrieves Vera's data and allows the display of the table. real time. The latter is accessible from any PC or tablet in the house ("Cloud" mode).
An example of a screenshot is attached.

Users' opinion on the Smart Building functions :

The consumption monitoring made it possible to compare, for example, the different programs of the machines (laundry / dishes) and thus to optimize the choices. In addition, monitoring its consumption in real time allows awareness and more reasoned use.

Environment

Urban environment

Land plot area : 2 133,00 m^2

Built-up area : 143,00 %

The land is located near agricultural land and on the edge of a wooded area, it has a stone terraces. Shops and local services are about 4 km.

The couple who wished this house also created a dry garden thanks to the advice of nurseries specialized in the Mediterranean species.

Drought offers extraordinary gardening opportunities: rather than fighting the climate and the soil or using large amounts of water, the search for plants adapted to the environment as well as mulching and soil preparation, allow to limit inputs such as water and fertilizers.

In addition to the low water consumption, the dry garden does not require fertilization and does not require phytosanitary treatment. In addition, plants attract many insects through flowering species. The result is all the more gratifying. We were able to observe newcomers in our garden: butterflies, bees ...

Products

Product

VMC double flux NOVUS 300 DC (Paul)

PAUL Wärmerückgewinnung GmbH

ZENDHER GROUP France, 3 rue du Bois Briard BP 60136 F-91021 Evry Cedex

https://www.zehnder.fr

Product category : Génie climatique, électricité / Ventilation, rafraîchissement

The waterproofing of the passive house requires a powerful ventilation system to ensure the renewal of air. A VMC with heat recuperator is essential in winter as well as in hot weather and also allows to recover 93 percent of the calories of the air released in winter and avoid overheating in summer.
The Novus 300/450 comfort ventilation system has been developed specifically for use in demanding residential buildings ranging from T3 to T5 with a maximum surface area of 350 m². It has a volume flow range of 45 to 300 m³ / h (Novus 300) or 50 to 450 m³ / h (Novus 450). With an IHP certified heat efficiency of 93% and energy efficiency of 0.24Wh / m³, it is currently the ideal model for the passive housing sector.

The night cooling for pleasant ambient air is ensured by an automatic summer bypass regulation with 100% motorized flap. A built-in 1.3 kW modulated power defrost damper ensures frost protection, an enthalpy heat exchanger allows additional moisture recovery (both optional). The ventilation units are equipped with constant flow fans with balancing, the regulation allows the automatic mode according to the time or the need.
The cost is about 6400 euros.

The occupants were able to appreciate the air quality provided by the dual flow ventilation. The device is also very quiet, and also meets Passiv'Haus certification criteria.

SmartWin Joinery

Menuiserie ANDRE

Menuiserie ANDRE, 163 route de Chantemerle les Blés F-26260 Chavannes. Tel : 04 75 71 14 01

http://www.andre-menuiserie.fr

Product category : Second œuvre / Menuiseries extérieures

A high-quality window is an indispensable building element for passive constructions, the requirements of thermal comfort implying a high quality of insulation.
The SmartWin is a passive Class A window, certified by the Passivhaus Institute, a mixed wood / aluminum window.
Performance: complete insulation of the frame eliminating the installation thermal bridge.

Basic, triple glazed low-emitting argon filling 48mm (4/18/4/18/4) with a Ug = 0.53 W / mK and a solar factor of 53.
Uw = 0,65W / m2K
The triple glazing also allows in very sunny areas to ensure a better summer comfort.
Cost: about 12600 euros

MISAPOR

MISAPOR AG

info@misapor.fr

http://www.misapor.com

Product category : Second œuvre / Revêtements de sol

Cellular granulate insulating cell fill, it is used as a replacement for embankment under the raft: on this site layer of 30 cm. It is a very interesting product in passive construction because it eliminates the thermal bridges, stabilizes the construction surface, moreover does not fear termites or rodents, it also allows to reduce the time of construction and respects the environment (material ecological).
Coefficient of thermal conductivity lambda of 0.120W / m.K
Cost: 5800 euros

In general, to change building habits, participating in this project has been rewarding and rewarding for all the craftsmen who have gained experience, discovered new materials and more efficient construction techniques.

Swing shutter with extrusions

EHRET GmbH Bahnhofstrasse 14-18 D-77972 Mahlberg tel +49(0)78224390

info@ehret.com

http://www.ehret.com

Product category : Second œuvre / Menuiseries extérieures

In hot weather shutters with adjustable blades contribute to thermal comfort: during the day, solar radiation is stopped by closed shutters, but the brightness is maintained by the adjustable blades of the shutters. At night, the windows are wide open to naturally ventilate the house with the cool night air, through shuttered blinds for security. This fresh air allows structures with high inertia to destock the heat stored during the day and radiate the day the freshness acquired during the night.
Cost: about 6700 euros

In order to avoid the wind resistance of sunshade (BSO), the choice fell on adjustable shutters. This also allowed a better compliance with the type of architecture and offered a guarantee of security when windows are opened wide to optimize the night ventilation essential to summer comfort.

ROTEX SANICUBE SCS 328/14/0 DB

DAIKIN

service-clients@daikin.fr

http://www.daikin.fr

Product category : Génie climatique, électricité / Chauffage, eau chaude

Opting for a solar water heater completed the eco-friendly approach. The risk of overheating during sunny periods has been solved with the choice of a self-balancing system.
Solar hot water system type drainback.
Capacity of the balloon: 300L
2 sensors V21P surface sensor 4m²
Optical efficiency of the sensor B = 0.8
Coefficient of thermal losses 4,86W / (m².K)
Allows a hot water coverage of the home about 80%
Cost: about 6200 euros

System performance.

Costs

Construction and exploitation costs

Renewable energy systems cost : 15 000,00 €

Cost of studies : 4 000 €

Total cost of the building : 320 000 €

Health and comfort

Indoor Air quality

The dual flow VMC ensures an air of irreproachable quality.

Comfort

Health & comfort :

With a dry and ventilated air, the air-conditioning, very energy consuming besides, offer numerous health inconveniences (infections, thermal shocks ...). The cool summer of the passive house brings, without consumption and therefore expenditure of electricity, a comfort much more pleasant, healthier, with temperature differences between indoor air and outside air less disproportionate and without harming the environment .

In addition, the glass clear maximized for more solar input provides significant brightness. In summer, the shutters with adjustable blades filter the contribution of light thus avoiding dazzling or twilight, ensuring a real visual comfort.

Measured indoor CO2 concentration :
428 ppm

Measured thermal comfort : Le logement est resté tout au long de l'année entre 21°C et 24°c : cf courbe insérée dans la rubrique ENERGIE / "Preuves ou témoignages des performances énergétiques ou de l'étanchéité à l'air"

Acoustic comfort :

Triple glazing offers unparalleled acoustic comfort.

Carbon

Life Cycle Analysis

Eco-design material :

Eco-friendly insulation: cellulose waddingTree-safe Zolpan ondipur eco-friendly paints that improve indoor air quality and partially eliminate toxic gases Eco-friendly thermal insulation material manufactured by recycled glass blowing: Misapor

Contest

Reasons for participating in the competition(s)

- The first undeniable advantage of this house is the reduction of expenses. A reduction of nearly 90% in the amount of heating costs can represent significant sums for households. To build in liabilities is also to guarantee oneself of all energy poverty.
- Certainly build in liabilities requires more in-depth design work and rigorous site monitoring. If winter comfort in passive house is no longer in doubt, summer comfort remains a subject to be deepened. The Passivhaus labeling criteria impose an overheating frequency of only 10% of the time above 25 ° C. But the examples of passive certified buildings in the world and especially in hot countries like Dubai or Morocco (embassy of Belgium in Rabat for example) are more and more numerous and show that it is possible (See tertiary passive buildings and New ecological architectures published by Editions du Moniteur).
- To meet the constraints of passive construction, the designer of this house has used the benefits that the land could bring him, then he optimized the set by implementing building elements derived from the rules of bioclimatism and Passivhaus, such as compactness, orientation, shutters-louvers positioned outside, the use of concrete in strategic locations, the installation of a reflective film on the roof, the waterproofing air reaching in n50: 0.21 v / h, a design without thermal bridge, an insulation by the outside, a VMC double flux with 93% of recovery of heat etc ... All this made it possible to reach exceptional performances.
- At first glance, this house looks like neighboring Provencal houses. Yet in this ordinary appearance hides a jewel in terms of comfort and performance, with a need for reduced heating to 1 kWh / (m².an) and a primary energy requirement of 54 kWh / m².an for heating, l hot water, lighting, ventilation and auxiliaries (according to the PHPP software essential to Passivhaus certification and recognized as reliable by all experts, unlike the calculation engine of the French thermal regulation, the TH- ECB).
- In addition, thanks to 42 m² of photovoltaic panels and 4 m² of solar thermal panels, this house produces 4 times more energy than it consumes all uses (including the load of the hybrid car). This is a particularly interesting advantage in a region with a large deficit in electricity supply.
- In addition, French thermal regulations will impose the Bepos (positive energy building) on all buildings in 2020. When energy needs are low, some photovoltaic panels are enough to become Bepos (positive energy building). The saving made on photovoltaic panels makes sense and compensates for the additional cost of passive construction.

Building candidate in the category

Energie & Climats Tempérés

Coup de Cœur des Internautes

Prix des Etudiants

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