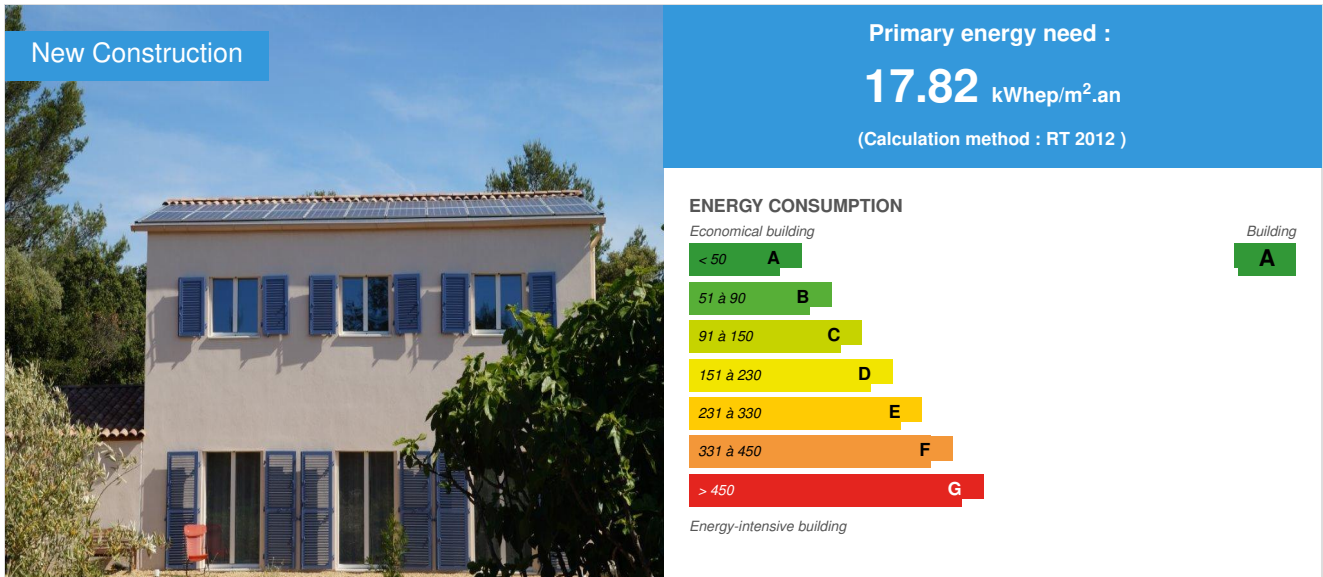


## First passive house Premium of France

by Valérie GUG-FOUCHER / 2018-05-16 10:06:31 / France / 17130 / FR



**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 m<sup>2</sup>  
**Construction/refurbishment cost** : 260 000 €  
**Cost/m<sup>2</sup>** : 1677.42 €/m<sup>2</sup>

### 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 122m<sup>2</sup>. This architectural conformism meets both the wishes of the couple and the urban planning rules of their commune of Solliès-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 m<sup>2</sup> of photovoltaic panels on its roof and 4 m<sup>2</sup> 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 m<sup>2</sup>, or 20 kWh / m<sup>2</sup>hab.



## 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 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

Global performance contract

## Energy

## Energy consumption

Primary energy need : 17,82 kWh/m<sup>2</sup>.an

Primary energy need for standard building : 37,40 kWh/m<sup>2</sup>.an

Calculation method : RT 2012

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 kWh/m<sup>2</sup>.an

Real final energy consumption/m<sup>2</sup> : 19,30 kWh/m<sup>2</sup>.an

Year of the real energy consumption : 2 017

## Envelope performance

Envelope U-Value : 0,19 W.m<sup>-2</sup>.K<sup>-1</sup>

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 : n50

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 (21m<sup>2</sup>)

Solutions enhancing nature free gains :

75% des fenêtres au sud, VMC avec récupérateur 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<sup>2</sup>

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 : HVAC, électricité / ventilation, cooling

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 m<sup>2</sup>. It has a volume flow range of 45 to 300 m<sup>3</sup> / h (Novus 300) or 50 to 450 m<sup>3</sup> / h (Novus 450). With an IHP certified heat efficiency of 93% and energy efficiency of 0.24Wh / m<sup>3</sup>, 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 PassivHaus 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 : Finishing work / Exterior joinery - Doors and Windows

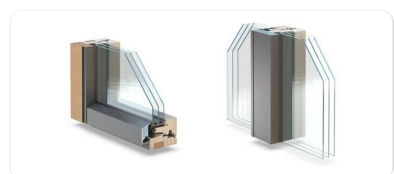
A high-quality window is an indispensable building element for passive constructions, the requirements of thermal comfort implying a high quality of insulation.

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 : Finishing work / flooring

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

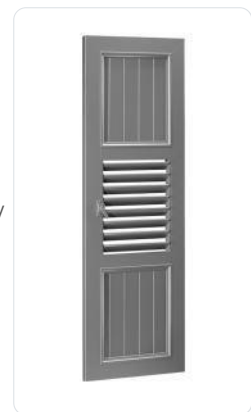
<http://www.ehret.com>

Product category : Finishing work / Exterior joinery - Doors and Windows

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 : HVAC, électricité / heating, hot water

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 4m<sup>2</sup>

Optical efficiency of the sensor B = 0.8

Coefficient of thermal losses 4,86W / (m<sup>2</sup>.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 wadding Tree-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)

- Le premier avantage incontestable de cette maison est la réduction des charges. Une réduction de près de 90 % du montant des charges de chauffage peut représenter des sommes importantes pour les ménages. Construire en passif c'est aussi se garantir de toute précarité énergétique.
- Certes construire en passif demande un travail de conception plus approfondi et un suivi de chantier plus rigoureux. Si le confort d'hiver en maison passive ne fait plus de doute, le confort d'été reste un sujet à approfondir. Les critères de labellisation Passivhaus imposent une fréquence de surchauffe de seulement 10 % du temps supérieure à 25°C. Mais les exemples de bâtiments certifiés passifs dans le monde et notamment dans les pays chauds comme à Dubaï ou au Maroc (ambassade de Belgique à Rabat par exemple) sont de plus en plus nombreux et montrent que c'est possible (Voir Bâtiments passifs tertiaires et Nouvelles architectures écologiques parus aux Editions du Moniteur).
- Pour arriver à respecter les contraintes de la construction passive, le concepteur de cette maison individuelle s'est servi des avantages que pouvait lui apporter le terrain, puis il a optimisé l'ensemble en mettant en œuvre des éléments de construction tirés des règles du bioclimatisme et du Passivhaus, telles que la compacité, l'orientation, les volets-persiennes positionnés à l'extérieur, l'utilisation du béton aux endroits stratégiques, la mise en place d'un film réfléchissant en toiture, l'étanchéité à l'air atteignant en n50: 0.21 v/h, une conception sans pont thermique, une isolation par l'extérieur, une VMC double flux avec 93 % de récupération de chaleur etc... Tout ceci a permis d'arriver à des performances exceptionnelles.
- Au premier regard, cette maison ressemble aux maisons provençales voisines. Pourtant sous cette apparence ordinaire se cache un bijou en terme de confort et de performances, avec un besoin de chauffage réduit à 1 kWh/(m².an) et un besoin en énergie primaire de 54 kWh/m².an pour le chauffage, l'eau chaude sanitaire, l'éclairage, la ventilation et les auxiliaires (d'après le logiciel PHPP indispensable à la certification Passivhaus et reconnu fiable par tous les experts, à la différence du moteur de calcul de la réglementation thermique française, le TH-BCE).
- De plus, grâce aux 42 m² de panneaux photovoltaïques et aux 4 m² de panneaux solaires thermiques, cette maison produit 4 fois plus d'énergie qu'elle n'en consomme tous usages confondus (y compris la charge de la voiture hybride). Ceci est un avantage particulièrement intéressant dans une région largement déficitaire en approvisionnement électrique.
- De plus la réglementation thermique française imposera le Bepos (bâtiment à énergie positive) à tous les bâtiments en 2020. Lorsque les besoins en énergie sont faibles, quelques panneaux photovoltaïques suffisent pour devenir Bepos (Bâtiment à énergie positive). L'économie réalisée sur les panneaux photovoltaïques prend alors tout son sens et elle compense l'éventuel surcoût de la construction passive.

## Building candidate in the category





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