Avenger

by Bense Antoine / 2018-06-04 09:35:55 / Frankreich / 9504 / FR

Primary energy need :

30 kWhep/m^2.an

(Calculation method : Other)

ENERGY CONSUMPTION

Economical building — *Building*

< 50	A	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 : Isolated or semi-detached house
Construction Year : 2017
Delivery year : 2017
Address 1 - street : 23150 AHUN , France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 252 m^2
Construction/refurbishment cost : 373 000 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 1480.16 €/m^2

Certifications :

Certifiée Maison Passive Passivhaus Institut classic | plus | premium

General information

After several years of R & D, Avenidor has embarked on an extraordinary project: to build the 1st Passive Premium certified and 100% autonomous house in the world.

The Avenidor building is located in the KZB Group's sustainable housing center (Ahun in Creuse).

Here are the peculiarities of this house:

- Certified passive premium by the PassivHaus Institute

No heating or cooling system (thanks to the design of the envelope and the orientation of the building in order to make the most of the solar contributions)

- Exceptional living comfort (no cold areas, optimal air quality, etc.)

100% autonomous in electricity (fields of photovoltaic panels bi-facial and park batteries)

100% autonomous in drinking water (rainwater drilling or recovery, filter body purification system and UV bactericide)

- WIFI system without being connected to the traditional wired network (amplification of the 4g and redistribution in WIFI)

In short, this house is so powerful that it surpasses the RT2020 (future thermal regulation of the building), it works by making the most of what nature has to offer.

Our goal is to make this type of housing accessible to all and thus drastically reduce pollution related to buildings. That is why, from September 2018 we offer our solutions to individuals wishing to afford an exceptional house, tailor-made and eco-responsible.

Sustainable development approach of the project owner

Pollution related to the building activity sector accounts for 25% of total CO2 emissions in France.

Alarmed by this observation Avenidor aims to design houses that have no impact on the environment, from their realization to their use. In order to take up this major challenge, the prototype presented here has been developed to consume very few resources and use only renewable energies, while favoring materials with low environmental impact.

Architectural description

Architecturally inspired Alsatian, the house Avenidor is built of cellular concrete (masonry material the least impacting ecologically and offering the best performance) and is insulated with polystyrene (recycled) extruded under raft and expanded in elevation. This house of 252m ², has 3 levels:

- A basement in heated envelope
- Ground floor (living room and open kitchen, WC)
- R + 1 (3 bedroom and 3 bathroom)

Through its aesthetics, Avenidor demonstrates that a high-performance building can have a traditional architecture. One of the challenges of this construction was to make half-timbering reconstituted stone fixed directly on the ITE without diminishing the effectiveness. In addition to benefit from a perfect insulation (R of 10 on average overall envelope) the building is oriented in order to make the most of the bioclimatic contribution (maximum opening to the south and very little to the north) .Here is precisely the constructive mode of the house:

Raders:

From bottom to top :

- All coming 100mm
- Geotextile membrane
- DOW XPS (λ = 0.029 W / mK) 240mm
- Anti-hiking membrane
- Reinforced concrete slab (λ = 2,500 W / mK) 300mm

U Radices = 0.104W / (m²K)

Exterior walls:

From outside to inside walls:

- 25 mm reconstituted stone cladding (aesthetic function)
- Crepe facade covering 15 mm
- TE ZOLPAN EPS (λ = 0.038 W / mK) 200mm
- YTONG cellular concrete block (λ = 0.090 W / mK) 365mm
- SIGA steam
- Unvented air gap 48mm
- 18mm plasterboard
  UMurs ext = 0.098W / (m²K)

Roofing:

From outside to inside:

- Roof tiles
- By rain
- Fir farmhouse
- Projected cellulose wadding (λ = 0.039 W / mK) 600mm
- Oriented Strand Board 22mm
- SIGA steam
- Ceiling in plasterboard 13mm

UToiture = 0.073W / (m² / K)

Window

- HF310 Wood-aluminum frame chassis
- Triple glazing 48mm, 44b.2 (VSG) / 16Ar / 4 / 15Ar / b4

U g-value = 0.88 W / (m²K)

g -value = 60%

Uw = 0.898 W / (m²K)

Building users opinion

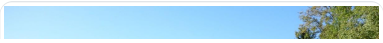
All the people having stayed in our house are unanimous on the comfort of life which it proposes:
Irreproachable quality of the air managed by the VMC double flux.
Outstanding acoustic comfort
Feeling of homogeneous heat throughout the house

If you had to do it again?

As our prototype house has achieved the expected consumption and performance targets, we would like to increase the share of bio-sourced in our homes. This is why we are currently developing a straw house carrier that will have the same performance and will also be 100% autonomous.

See more details about this project

https://www.avenidor.com/



Stakeholders

Contractor

Name : Avenidor
Contact : Bense Antoine
http://www.avenidor.com

Construction Manager

Name : Avenidor
Contact : Bense Antoine
http://www.avenidor.com

Stakeholders

Function : Construction company

SETIM

Kaszuba Boris

http://groupekzb.com/
Partner design and realization

Function : Thermal consultancy agency

SRKLIM

Legros Jean-Paul

http://groupekzb.com/
Thermal Study and Fluid Management Office

Contracting method

Lump-sum turnkey

Energy

Energy consumption

Primary energy need : 30,00 kWhep/m^2.an

Primary energy need for standard building : 50,00 kWhep/m^2.an

Calculation method : Other

CEEB : 0.0001

Breakdown for energy consumption : Hot water requirements: 11.03 kWh / m².an Heating requirements: 7.44 kWh / m².an Cooling requirements: 0.6 kWh / m².an Auxiliary electricity: 2.71 kWh / m².an Specific electricity: 6.14 kWh / m².an VMC double flow (need in electricity): 2.7 kWh / m².an

Real final energy consumption

Final Energy : 31,00 kWhef/m^2.an

Real final energy consumption/m2 : 31,00 kWhef/m^2.an

Real final energy consumption/functional unit : 31,00 kWhef/m^2.an

Year of the real energy consumption : 2 018

Envelope performance

Envelope U-Value : 0,10 W.m^{-2}.K^{-1}

More information :
Here is precisely the constructive mode of the house:
Raders:
From bottom to top :
All coming 100mm
Geotextile membraneDOW XPS (λ = 0.029 W / m.K) 240mm
Anti-hiking membrane Reinforced concrete slab (λ = 2,500 W / m.K) 300mmU
Raders = 0.104W / (m²K)
Exterior walls:
From the outside to the inside of the walls:
25 mm reconstituted stone cladding (aesthetic function)
Crepe facade covering 15 mmTE ZOLPAN EPS (λ = 0.038 W / m.K) 200mm
YTONG cellular concrete block (λ = 0.090 W / m.K) 365mm
Steam SIGAVide unventilated air 48mm
Gypsum board 18mmU Walls ext = 0.098W / (m²K)
Roofing:
From the outside to the inside:
TilesFor rainFarm fir treeUse of projected cellulose (λ = 0.039 W / m.K) 600mm
Oriented Strand Board 22mm
SIGA vapor barrier 13mmU plasterboard ceiling
Roofing = 0.073W / (m² / K)
Internally Window Wood-Aluminum HF310Triple Glazing 48mm, 44b.2 (VSG) / 16Ar / 4 / 15Ar / b4U g-value = 0.88 W / (m²K) g -value = 60% Uw = 0.898 W / (m²K)

Building Compactness Coefficient : 0,60

Indicator : n50

Air Tightness Value : 0,18

Users' control system opinion :

Extremely easy to use.

Perfect.

More information

The house is 100% autonomous thanks to its field of 96 m² bifacial photovoltaic panels (sized for two buildings) and its battery park. Production of photovoltaic panels = 19.2 kW peak battery storage capacity 15 kW

Renewables & systems

Systems

Heating system :
- Heat pump

Hot water system :
- Heat pump

Cooling system :
- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :
- Solar photovoltaic

Renewable energy production : 100,00 %

The site is supplied with electricity by 96m² of photovoltaic panels bifacial (20% additional production) connected to an automated battery park. The bifacial panels are placed on a white slab and along a pond to enjoy a phenomenon of reverberation and donate more.The system generates electricity for 2 buildings (19.2 kW peak and 15kW storage), whose Avenidor house. Treatment and purification system for drilling water by filter body and UV bactericide. Microstation purification, operating without electricity, for the total treatment of gray and black water.

Solutions enhancing nature free gains :
Échangeurs thermiques pour la récupération de chaleur sur eau grises. VMC double flux avec rendement à l'échangeur de 90%

Smart Building

BMS :
Intelligent because of its simplicity. Intelligence is in the design of the building

Smartgrid :
Automatically manage by the energy storage system.

Users' opinion on the Smart Building functions :

RAS

Environment

Urban environment

Land plot area : 24 000,00 m^2

Built-up area : 112,00 %

Green space : 13 000,00

Building realized on the Research and Development Center of the KZB Group.

In the middle of the woods. Bordering 2 lakes.

Products

Product

House Avenidor

SETIM

Arnaud Ramelot, DO, arnaud.ramelot@groupekzb.com

http://www.groupekzb.com

Product category : Table 'c21_germany.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '33'

1st certified Passive Premium home and 100% autonomous. It is the combination of materials, equipment, know-how and studies that made this house a success. Nowadays we have the experience and the technology to build the future, why stay anchored in the past?

Each stakeholder must be told the purpose and the issue of their work. On-site crews are rigorous when they understand the impact of their tasks on building performance. The most complicated is to obtain the insurance of CMiste (procedure started in November 2017 ...)

Costs

Construction and exploitation costs

Global cost : 680 000,00 €

Reference global cost : 3 500,00 €

Renewable energy systems cost : 80 000,00 €

Global cost/Dwelling : 680000

Reference global cost/Dwelling : 3500

Cost of studies : 75 000 €

Total cost of the building : 650 000 €

Health and comfort

Water management

House totally off networks. Drilling water.

Indoor Air quality

Optimal: about 350 ppm on average (house in Creuse, in the countryside)

Comfort

Health & comfort :

Optimal.

Calculated indoor CO2 concentration :
350

Measured indoor CO2 concentration :
de 350 à 1200ppm avec des fumeurs

Calculated thermal comfort : 20 et 25

Measured thermal comfort : de 19 à 24.6

Acoustic comfort :

27dB on one of the ventilation vents (worst measurement)

Carbon

GHG emissions

GHG in use : 0,45 $KgCO_2/m^2/an$

Methodology used :
GES calculation tool developed by Ecobatiment

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

Building lifetime : 100,00 année(s)

, ie xx in use years : 2.22

GHG Cradle to Grave : 297,00 $KgCO_2 /m^2$

RAS

RAS

Life Cycle Analysis

Material impact on GHG emissions :
89

Material impact on energy consumption : 45,00 kWhEP

Eco-design material :

RAS 100% bio-sourced prototype under design. Start of work on July 30, 2018

Contest

Reasons for participating in the competition(s)

The Avenidor house is 100% autonomous and certified Passive House Premium.

In summary, this dwelling:

- Is totally off-grid
- Enjoy all the natural resources of its environment
- Recycles the majority of its thermal energy (exhaust air exchanger & gray water)

A technical data collection system has been implemented in this prototype to study the behavior of the building over the long term.

The constructive system is as follows:

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Double flux ventilation :

- MAICO WS 470
- Heat recovery system HER = 87.6%
- Sheath insulation (λ = 0.039 W / mK) - 100mm
- Heating coil (copper spiral) downstream of the VMC to heat the air to breathe VMC in winter

Domestic hot water :

- Air / water heat pump DAIKIN Altherma BT 260L
- Heat exchangers under the shower trays.

Ecological aspect:

96m² of two-sided photovoltaic panels (20% additional production) connected to an automated battery park. The system generates electricity for 2 buildings, including the Avenidor house.

ZOLPAN depolluting paints have been used to clean indoor air (up to 80% reduction in VOCs).

Drinking water treatment and purification system (filter body and UV bactericide).

Heat exchangers for heat recovery in greywater.

Microstation purification, operating without electricity, for the total treatment of gray and black water.

Data and consumptions:

- Living area of the house: 252m²
- Air permeability N50 = 0.18 / h
- Production of photovoltaic panels 19.2 kW peak
- Need annual heating 6kWh / (m²a)
- Primary energy requirement: 43 kWhEP / m² / a (on the heating system, domestic hot water, domestic electricity and auxiliary electricity).
- Price of the house: 1489 € / m²

Building candidate in the category

Energie & Climats Tempérés

Coup de Cœur des Internautes

Prix des Etudiants

Date Export : 20230526021729