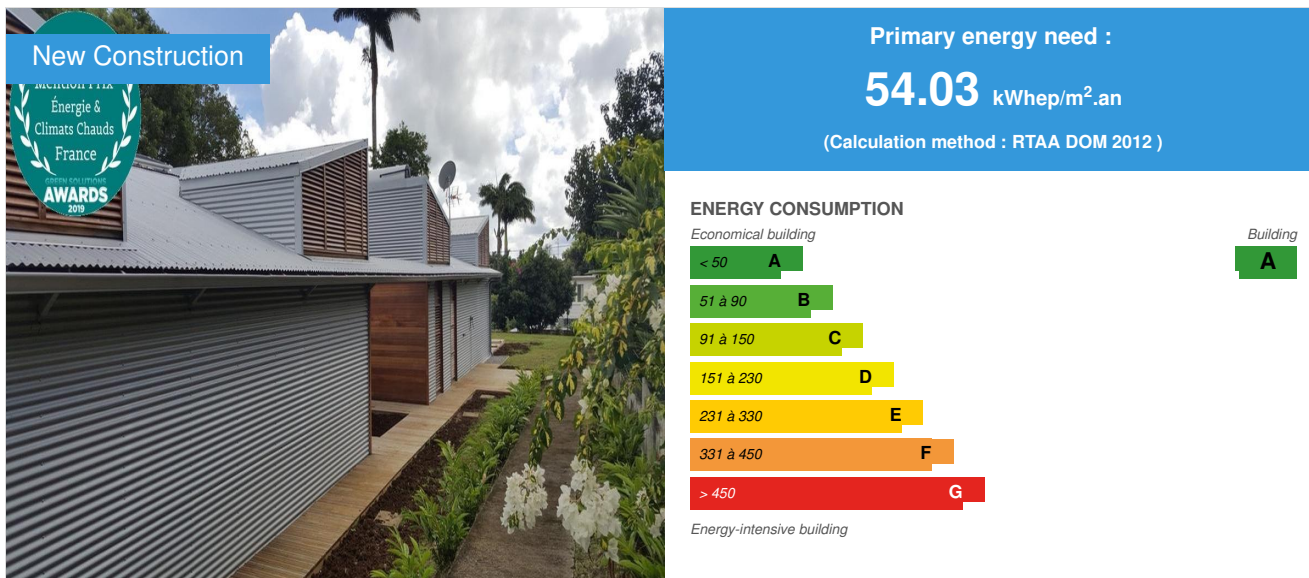


## The Villa Klébert Grand Paradis

by Xavier Lagurgue / 2019-06-12 12:01:28 / France / 6070 / FR



**Building Type** : Isolated or semi-detached house

**Construction Year** : 2014

**Delivery year** : 2016

**Address 1 - street** : 32 avenue Klébert Schoelcher 97233 SCHœLCHER, France

**Climate zone** : [Aw] Tropical Wet & Dry with dry winter.

**Net Floor Area** : 211 m<sup>2</sup> SHON

**Construction/refurbishment cost** : 850 000 €

**Cost/m<sup>2</sup>** : 4028.44 €/m<sup>2</sup>

**Certifications** :



### General information

Villa Klébert "big paradise" is located in a subdivision in the municipality of Schoelcher north-west of Fort de France (La Reunion). It **replaces a construction considered unsafe and obsolete** in terms of thermal comfort. Designed for the attention of the director of the French Development Agency (AFD) in Martinique, Villa Klébert Grand Paradis has sought to **reduce its ecological footprint as much as possible while aiming for energy autonomy**. The perimeter of this autonomy having been evaluated by including commuting trips between home and workplace, **the house is equipped with an electric vehicle which is recharged on a photovoltaic farm installed on the work site**.

The space is divided into two distinct parts: A day in the south and a night in the north, **so that a protocol life can take place regardless of family life**. The two parts are separated by an interior garden which welcomes the visitor in the entrance hall and serves as an in-between. The south living room has three parts, an area hidden by bay windows, a covered area concealable by wooden shutters and an open terrace overlooking a footbath. The latter is intended to cool the trade wind wind up the hill before entering the house. The night area has four bedrooms, one with en-suite bathroom that opens onto the inner garden. All rooms are naturally ventilated by maneuverable wooden shutters located above the doors.

The **bioclimatic operation reinterprets the traditional principles of Creole architecture** that channels the flow of wind into the roof and the living spaces to ensure its refreshment. For this, the roof has a **longitudinal air intake strip** fitted with wooden shutters to curb the strong winds and on the west facade, "ears" which create in the roof a venturi effect of flow acceleration.

Air ventilators enter into operation in the absence of wind. The **metal structure designed to withstand cyclones and seismic jolts** that threaten the site can limit unnecessary inertial masses that would harm the comfort of the occupants, as evidenced by the thermodynamic simulations carried out by the design office TRIBE.

Nacosbois sun breezes, blind shutters are all devices that protect the berries from direct radiation. Two **solar captures, thermal for domestic hot water and photovoltaic for electricity** allow to move towards energy autonomy and level with the frequent power cuts of the island.

The problem posed by AFD's program consisted of the realization of a **villa naturally refreshed but which is air-conditioned in order to be able to receive people of fragile health**. In order to satisfy these two seemingly contradictory requests on the bioclimatic level, air conditioners have been installed in the rooms but coupled to a wall-mounted tablet installed in the living room which makes it possible to measure in real time the consumption generated by the occupant. "finds it responsible and the domestic consumption reduced.

Thus equipped with a software specially developed by Martinique company *Windéo Green future* in collaboration with *XLGD architectures*, the villa is constantly susceptible to calibration of consumption. This software also includes the "logbook" of the villa allows to optimize maintenance and consider successive improvements in all knowledge of the cause both with regard to comfort of use as the ecological footprint.

In 2018, the villa Klébert Grand Paradis has been certified NF HQE housing by Cerqual.

## Sustainable development approach of the project owner

The French Development Agency (AFD) intervenes in the world especially to fight against poverty and support economic growth. These actions led her to build up a real estate portfolio in each of the countries concerned. To date, it includes more than 360 well distributed in more than seventy countries of Africa, South America, Asia or the Caribbean. An important park therefore, which she has recently undertaken to renovate.

## Architectural description

### The Villa Klébert Grand Paradis

Villa Klébert "big paradise" is located in a subdivision in the municipality of Schoelcher north-west of Fort de France (La Reunion). It replaces a construction considered unsafe and obsolete in terms of thermal comfort. Designed for the attention of the director of the French Development Agency (AFD) in Martinique, Villa Klébert Grand Paradis has sought to reduce its ecological footprint as much as possible while aiming for energy autonomy. The perimeter of this autonomy having been evaluated by including commuting trips between home and workplace, the house is equipped with an electric vehicle which is recharged on a photovoltaic farm installed on the work site.

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The bioclimatic work reinterprets the traditional principles of Creole architecture, which channels the flow of wind into the roof and the living spaces to ensure its refreshment. For this the roof has on all the East facade a longitudinal air strip equipped with wooden blinds to curb the violent winds and West facade, "ears" which create in the roof a venturi effect of flow acceleration. Ventilators enter into operation in the absence of wind. The metal structure designed to withstand cyclones and seismic jolts that threaten the site can limit unnecessary inertial masses that would harm the comfort of the occupants, as evidenced by the thermodynamic simulations carried out by the office of study TRIBE.

Wood sun breezes, shutters are all devices that protect the windows from direct radiation. Two solar captures, thermal for domestic hot water and photovoltaic for electricity allow to move towards energy autonomy and to offset the frequent power cuts of the island.

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## Building users opinion

Positive to very positive

## If you had to do it again?

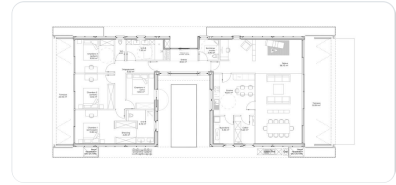
In structure, to be economical, the use of the metal industry in Martinique requires starting from pre-studied models to divert and derive them.

## See more details about this project

<https://www.xlgd.fr/villa-klebert-texte>

## Photo credit

© XLGD architectures



## Stakeholders

### Contractor

Name : Agence Française de Développement

Contact : Monsieur Marc Garnier

<https://www.afd.fr/fr>

### Construction Manager

Name : XLGD architectures

Contact : Xavier Lagurgue, x.lagurgue@xlgd.fr

<https://www.xlgd.fr/>

## Energy

### Energy consumption

Primary energy need : 54,03 kWh<sub>ep</sub>/m<sup>2</sup>.an

Primary energy need for standard building : 167,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Calculation method : RTAA DOM 2012

CEEB : 0.0001

Breakdown for energy consumption : In the course of calibration. Data not available

### Real final energy consumption

Final Energy : 20,94 kWh<sub>ef</sub>/m<sup>2</sup>.an

### Envelope performance

More information :

RT AA DOM / PERENE 2009

walls: ventilated cladding air knife 14cm

solar absorption = 0.4

roof: insulated steel tray 3cm PXE lambda 0.032 R<sub>th</sub> = 0.94 + ventilated roof

solar absorption = 0.4

### More information

all-purpose consumption <= 25 kWh<sub>ef</sub> / m<sup>2</sup> SU.an Cold power <100 W / m<sup>2</sup> air-conditioned Lighting power <5 W / m<sup>2</sup> Average household electric power / HIFI <45 W / m<sup>2</sup> (class A-A +) Hot water 70% solar energy conventional evening and weekend

## Renewables & systems

### Systems

Heating system :

- No heating system

Hot water system :

- Solar Thermal

Cooling system :

- Reversible heat pump

#### Ventilation system :

- Natural ventilation

#### Renewable systems :

- Solar photovoltaic
- Solar Thermal

Renewable energy production : 70,00 %

#### Other information on HVAC :

Air blower in all living rooms

Air conditioner coupled with the bill of consumptions displayed in the hall.

The tropical climate is characterized by an extremely high humidity level. The installation of air brewers and a punctual use of air conditioning is necessary.

#### Solutions enhancing nature free gains :

Solution domotique de contrôle des consommations par l'occupant

## Smart Building

#### BMS :

Domotic management of the logbook of consumptions

## Environment

### Urban environment

Land plot area : 2 050,00 m<sup>2</sup>

Built-up area : 14,00 %

Villa Klébert "Great Paradise" is located in a subdivision in the municipality of Schoelcher northwest of Fort de France

## Products

### Product

Alucobon shower wall and bathtub wall to fight against seismic damage

<https://www.acodi.fr/c/25/alucobond>

Product category : Second œuvre / Peinture, revêtements muraux

Well accepted

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plasterboard in Fermacell

Product category : Second œuvre / Cloisons, isolation

Well accepted

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Mahogany wood

Product category : Second œuvre / Menuiseries intérieures, serrurerie, quincaillerie

Well accepted

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Courbaril wood

Product category : Second œuvre / Menuiseries extérieures

Well accepted

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Corrugated steel sheet of lacquered steel

Product category : Gros œuvre / Structure, maçonnerie, façade

According to availability in the island

Well accepted

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## Costs

### Construction and exploitation costs

Renewable energy systems cost : 70 000,00 €

Cost of studies : 70 000 €

Total cost of the building : 850 000 €

## Health and comfort

### Water management

Unmeasured data.

EP recovery tank and use of EP for flushing and watering.

## Carbon

### GHG emissions

Building lifetime : 50,00 année(s)

No calculation of GHGs but purchase of a hybrid vehicle to minimize carbon footprint on home-work commuting

## Contest

### Reasons for participating in the competition(s)

Contemporary rewrite of Creole architecture

Bioclimatic design with DTS (Dynamic Thermo Simulation):

- Refreshment by natural ventilation
- Choice of materials ensuring the sustainability of the work

Equipment :

- Solar and photovoltaic capture
- Domotic management of the logbook of consumptions
- Coupling with an electric vehicle to control the overall carbon footprint.

### Building candidate in the category



Energie & Climats Chauds





Prix du public



Prix des Etudiants



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