


The "Old Mill" Villa, Martinique

by [Xavier Lagurgue](#) / 2019-06-12 15:08:50 / France / 4542 / FR

New Construction



Primary energy need :

21.6 kWhep/m².an

(Calculation method :)

ENERGY CONSUMPTION

Consumption Range (kWhep/m ² .an)	Grade
< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Building **A**

Energy-intensive building

Building Type : Isolated or semi-detached house
Construction Year : 2014
Delivery year : 2016
Address 1 - street : 1 rue du Plateau 97200 FORT-DE-FRANCE, France
Climate zone : [Aw] Tropical Wet & Dry with dry winter.

Net Floor Area : 156 m²
Construction/refurbishment cost : 702 000 €
Number of Dwelling : 1 Dwelling
Cost/m² : 4500 €/m²

Certifications :



General information

Located on the crest of the ravine Touza near the old mill on the heights of Fort de France, the house opens on two levels with trade winds. In the Caribbean climate, which has the particularity of being hot and humid, where only ventilation can naturally refresh, the elevated situation is an asset.

Designed for the Agence Française de Développement (AFD) agents on a delegation in Martinique, the Villa Vieux Moulin has sought to **reduce its ecological footprint as much as possible while aiming for energy autonomy**. Located on a steep ground, the house has been positioned to benefit as much as possible from the garden offering a panorama mastered. The **surrounding plantations help refresh the atmosphere and hygrothermal comfort**.

The space is divided into two distinct parts: A day on the ground floor and a night party on the floor, so that a **protocol life can take place regardless of family life**. The living room on the ground floor is open to the kitchen. The ground floor is also the place of the technical spaces of the house. A door to the kitchen leads

to the cellar, laundry and garage. Upstairs, four bedrooms, one with en-suite bathroom, open onto an interior north-facing walkway. To the south, the rooms overlook a shared terrace overlooking the garden. The layout provides on the ground floor the possibility of making a room and an additional bathroom to accommodate, if necessary, a disabled agent.

The bioclimatic operation reinterprets the traditional principles of Creole architecture that channel the flow of wind into the roof and the living spaces to ensure its refreshment. The large façades equipped with glazed *nacos* make it possible to control the through ventilation and air brewers come into operation in case of 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. The sun breezes put the windows north and south away from direct radiation, the sun oscillating on both sides of the vertical in this latitude. 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 were installed in the rooms but coupled to a **wall shelf installed in the living room which allows to measure in real time the consumption generated by the occupant**. It is empowered and 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 that also includes the "logbook" of the villa allows to optimize maintenance and consider successive improvements in all the knowledge of both the comfort of use and the ecological footprint.

In 2018, the villa Vieux Moulin 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, that it has recently undertaken to renovate given its great age.

Architectural description

The Old Mill Villa

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Building users opinion

Very well

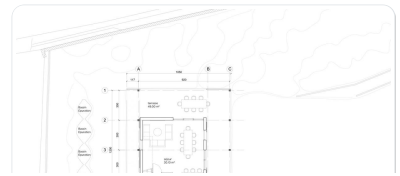
If you had to do it again?

On this site in particular, a major difficulty of earthworks that we chose to face to release the sight and the space of the garden. An extra cost that was worth it.

See more details about this project

Photo credit

XLGD architectures



Stakeholders

Contractor

Name : Agence Française de Développement
Contact : M. Marc Garnier
<https://www.afd.fr/fr>

Construction Manager

Name : XLGD architectures
Contact : architectures@xlgd.fr
<https://www.xlgd.fr/>

Stakeholders

Function : Thermal consultancy agency
TRIBU
Me. Edith Akiki
<http://www.tribu-concevoirdurable.fr/>
Environmental diagnosis and STD

Energy

Energy consumption

Primary energy need : 21,60 kWh_{ep}/m².an
Primary energy need for standard building : 167,00 kWh_{ep}/m².an
Calculation method :
CEEB : 0.0002
Breakdown for energy consumption : Objective: energy 0 with 36 m² of photovoltaic sensors to cover all needs but the electrical cabinet still needs to be optimized to achieve this goal which is currently only 30%. in electricity. DHW requirements are 100% covered by solar capture.

Real final energy consumption

Final Energy : 49,60 kWh_{ef}/m².an
Real final energy consumption/m² : 49,60 kWh_{ef}/m².an
Real final energy consumption/functional unit : 19,23 kWh_{ef}/m².an
Year of the real energy consumption : 2 018

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_{th} = 0.94 + ventilated roof
solar absorption = 0.4

Users' control system opinion :
Excellent

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 : 114,00 %

Other information on HVAC :

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.

Smart Building

BMS :

Domotic management of the logbook of consumptions

Environment

Urban environment

Land plot area : 2 020,00 m²

Built-up area : 8,00 %

The villa is located on the crest line of the ravine Touza near the old mill on the heights of Fort de France.

Products

Product

Cobon aluminum in shower and bathtub walls to fight against seismic damage

Alucobon

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

Product category : Second œuvre / Peinture, revêtements muraux

Well accepted

Plasterboard in Fermacell

Product category : Second œuvre / Cloisons, isolation

Well accepted

Mahogany Wood

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

Well accepted

Bois de Courbaril

Product category : Second œuvre / Menuiseries extérieures

Well accepted

Corrugated steel lacquered steel

Product category : Gros œuvre / Structure, maçonnerie, façade

Well accepted

Costs

Construction and exploitation costs

Renewable energy systems cost : 72 000,00 €

Cost of studies : 58 000 €

Total cost of the building : 820 000 €

Health and comfort

Water management

Unmeasured data.

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

Contest

Reasons for participating in the competition(s)

Contemporary rewrite of Creole architecture

Bioclimatic design with STD (Dynamic Thermo Simulation):

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

Equipment :

- Solar and photovoltaic capture
- Domotic management of the logbook of consumptions
- Participation of the vegetation of the garden in the control of the atmosphere

Building candidate in the category



Energie & Climats Chauds





Prix des Etudiants



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