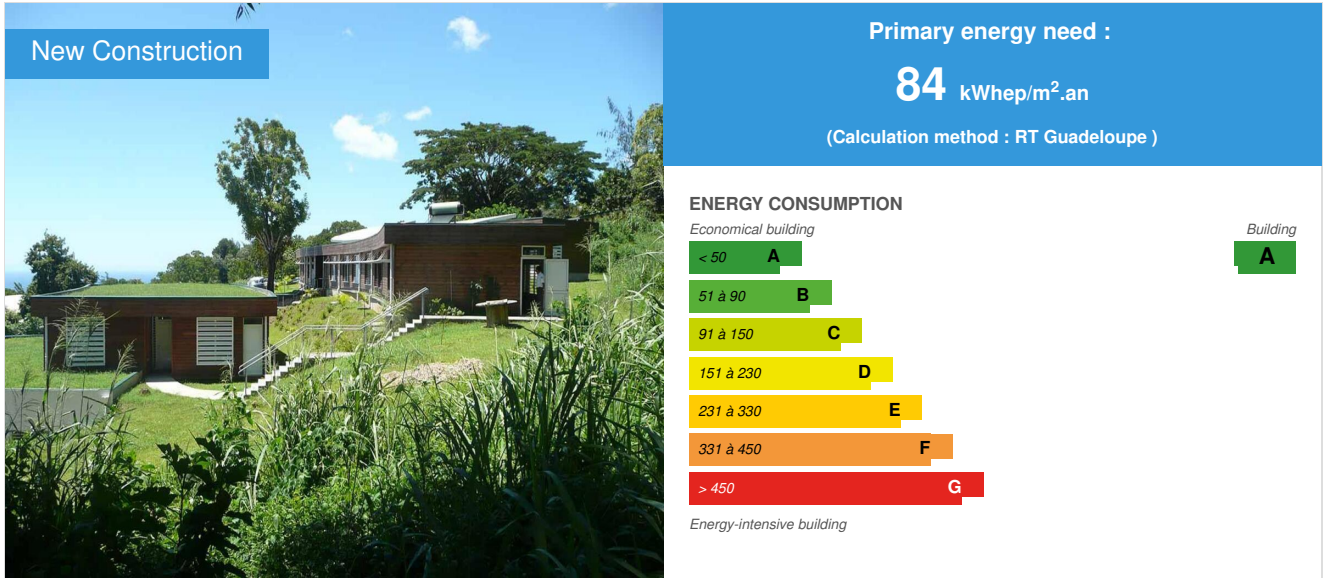


# Guadeloupe National Park Headquarters

by Périne HUGUET / 2022-04-26 00:00:00 / France / 17691 / FR



**Building Type** : Office building < 28m  
**Construction Year** : 2012  
**Delivery year** : 2013  
**Address 1 - street** : BEAUSOLEIL 97120 BASSE-TERRE, GUADELOUPE, France  
**Climate zone** : [Aw] Tropical Wet & Dry with dry winter.

**Net Floor Area** : 1 600 m<sup>2</sup>  
**Construction/refurbishment cost** : 3 023 000 €  
**Cost/m<sup>2</sup>** : 1889.38 €/m<sup>2</sup>

## General information

The headquarters of the National Park of Guadeloupe were designed following a Caribbean environmental quality approach aiming for an architectural project with:

- minimal impact on the local, regional and global environment;
- optimal impact on health and comfort of the users.

The National Park can rely on this iconic building to highlight its missions, its principles and concerns to the public. It fully plays its role as a reknown destination, claimed by the population and the stakeholders.

It is a healthy equipment, a "passer" of knowledge, of respect, of exchanges between people, between the concerns of everyone around nature ,between the indoor spaces and gardens.

## Sustainable development approach of the project owner

A urban development process and construction which is part of a sustainable development approach can meet this double urgency of controlling the environmental impact of buildings at the local, regional and global on the one hand and performing spaces life more comfortable and healthier on the other hand. And this is especially the location and orientation of buildings on the site which define the quality of this response, since they provide no extra cost, satisfactory solutions to this problem:

- A minimizing earthworks, and subsequently a limitation of nuisance, pollution, disruption of the natural environment and the costs incurred ;

- The Building is posed lightly on the land following its topography ;
- No site evacuation was required, all the cuttings were reused ;
- Bypassing all the trees and preserving their root system through foundations limiting excavation;
- Minimum waterproofing of the field by the establishment of more than 500 m² of green roofs planted with plants taken from the site, creating a car park consisting of a dirt / stone complex (or grass / gravel) and car traffic lanes defined by only 2 treads concrete separated by a stabilized vegetated area ;
- A Minimizing direct solar gain on facades, optimizing the potential of natural ventilation and maximum use of natural light deposit, three issues that have a direct impact on user comfort and energy consumption ;
- The Creation of atmospheres and quality of views, a harmonious dialogue with the natural environment, limiting harmful interference to the neighborhood and the site. The headquarters of the National Park of Guadeloupe is thus to "land" with respect for the site on the ground level curves between existing trees preserved. The few necessary earthworks are treated balanced cut and fill.

## Architectural description

- The sweet integration of the building and on the host site ;
- The preservation of the diversity of environments and remarkable trees of the site ;
- The Opening and transparency of the building as an attraction to the knowledge of nature ;
- The Quality of the interior spaces fostering relationships, exchanges and conviviality in a place to work, comfortable and generous ;
- The architectural transition between this place on the edge of the city and the natural area of the park and Soufrière ;
- A Fluid and readable for all operating upon entry Headquarters ;
- An exemplary in controlling energy consumption and conserving natural resources.

## See more details about this project

<http://www.guadeloupe-parcnational.fr/>

<http://www.construction21.org/france/articles/fr/le-siege-du-parc-national-de-la-guadeloupe-en-video-et-en-poesie.html>

## Stakeholders

### Stakeholders

**Function :** Contractor

Parc National de Guadeloupe

marie-edith.adolphe@guadeloupeparcnational.fr

<http://www.guadeloupe-parcnational.fr/>

**Function :** Designer

ATELIER 13

Périne Huguet, Eric Ramlall, Laurent Lavall

architectural design; followed the worksite; reception

**Function :** Designer

ACAPA

Frédéric Pujol

<http://www.acapa-architecture.com/agence.html>

architectural design

**Function :** Other consultancy agency

A2E

Jean-Louis Hernandez

fluids

**Function :**

BIEB

David Malaval

[http://www.bieb.fr/fr\\_index.html](http://www.bieb.fr/fr_index.html)

Structure et VRD

**Function :** Other consultancy agency

Robert Célaire Consultant

Robert Célaire

HQE

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Function : Other consultancy agency

EQUINOXE

Laurent Séauve

BET energy and photovoltaic generator

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Function : Environmental consultancy

Agence Ter

<http://agenceter.com/>  
landscaper

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Function : Other consultancy agency

AGENCE TER

Michel Hoessler

[http://agenceter.com](http://agenceter.com/)  
landscaping, protection of existing remarkable trees

## Contracting method

Separate batches

## Type of market

Global performance contract

## Energy

### Energy consumption

Primary energy need : 84,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Primary energy need for standard building : 344,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

Calculation method : RT Guadeloupe

CEEB : 0.0001

Breakdown for energy consumption : - Interior light: 25% - Air Conditioning local server: 30% - Controls: 11% - Computers 23%

### Real final energy consumption

Final Energy : 21,70 kWh<sub>ef</sub>/m<sup>2</sup>.an

Real final energy consumption/m<sup>2</sup> : 21,70 kWh<sub>ef</sub>/m<sup>2</sup>.an

Year of the real energy consumption : 2 015

### Envelope performance

Envelope U-Value : 0,60 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

not representative for the building because bioclimatic operation in the tropics in open atmosphere. The solar factor characterizing the quality of the envelope under tropical conditions is less than 0.03 roof.

### More information

The energy optimization approach uses the Negawatt principles:

- simplicity of needs, thanks to the successful bioclimatic design
- equipment performance: including ceiling fans, orders by presence detectors
- the use of renewable energy, the solar generator operating in consumption that has been sized to cover 100% of the electrical needs.

## Renewables & systems

## Systems

### Heating system :

- No heating system

### Hot water system :

- Solar Thermal

### Cooling system :

- No cooling system

### Ventilation system :

- Natural ventilation

### Renewable systems :

- Solar photovoltaic
- Solar Thermal

Renewable energy production : 105,00 %

### Other information on HVAC :

Optimization of natural ventilation after sunscreen limiting external heat gains, thermal comfort throughout the building, is created by the breakdown of local enabling:

- firstly, to evacuate the internal loads which have previously been minimized;
- Secondly, to create an air speed of the occupant can reduce up to 4 ° C the temperature felt by the latter with an air speed inside the building and on the occupier of the order of 1 m / s.

Excellent capacity for natural ventilation of buildings is permitted by the design of the master plan :

- which outlines the best building to capture the prevailing winds;
- Which includes tall circulation spaces with optimal natural ventilation positions of input-output, and scalability of the doors (frames ventilation) leading to the ability to control the directional flow and air speeds.

In terms of design: the porosity (drilling rate) of the facade downwind air flow, less efficient (thermal day breeze) is increased minimally to values consistent with those specifications ECODOM loads and allow for circulation homogeneous air and a venturi effect. For periods without wind or when the wind speed will be insufficient to ensure thermal comfort, it may be obtained by means of air ceiling brewers. These ceiling fans create an air speed of about 0.5 m / s in the rooms where they are installed and may induce improvement felt comfortable around 2 ° C.

In the first year of operation, the performance ratio of the solar generator is higher than average (11%) of the monitored facilities in Guadeloupe

### Solutions enhancing nature free gains :

La conception d'une protection solaire efficace est indispensable pour créer du confort dans un bâtiment qui n'est pas climatisé, cette protection solaire minimisant par ailleurs les charges de climatisation des bâtiments qui le sont. Les principes généra

## Environment

## Risks

### Hazards to which the building is exposed :

- Flooding/Runoff
- Earthquake
- Wind / Cyclone

### Risks measures put in place :

#### Seismic hazard:

The wood construction has been calculated to resist seismic zone 5 (strong). The choice of the wood structure, more flexible than concrete, facilitates this resistance (in addition to the environmental qualities of the material).

All bracing and expansion joints were created and calculated for this seismic resistance.

#### Cyclone hazard:

The wood construction has been calculated to resist cyclonic winds zone 5 (250 km/h). However, in agreement with the project owner, it was agreed that only the office blocks would be hermetically sealed (like closed boxes). The reception areas, the patio and the circulation areas will be left open to the passage of wind and rain, thus avoiding overpressure and minimizing the effects of the roof being torn off. The grids and wood closure of these spaces to "break" the wind and stop the projectiles (sheets, branches, ....) which are the cause of the greatest damage.

All the fastenings and fixings, the "ballast" (foundations and concrete slabs), the bracing have been created and calculated for this resistance to cyclonic winds.

#### In terms of flooding due to the stream:

Particular care was taken in the treatment of runoff water because the building is positioned across a significant slope that receives a large amount of stream water. One of our site visits during the competition allowed us to "touch with our finger" this problem of flooding due to the stream.

To alleviate the problem we first created very large grassed ditches upstream of the building to redirect the water to natural outlets (such as the gully to the north)

Then a passage for the waters of brook in the center of the building was arranged, in normal time this passage accomodates the "river" but the water way can be used for the "overflow" of the waters of swisslement.

And finally the will of not impermeabilized the site to the maximum allowed to minimize the impact of these waters of brook.

## Urban environment

Land plot area : 13 000,00 m<sup>2</sup>

Built-up area : 12,00 %

Green space : 11 000,00

The buildings emerge from the vegetation that has been densified to accentuate this visual effect, especially in the part of parking, high slope, respecting existing species. The pedestrian and automobile traffic fit into dense vegetation. The cafeteria (local staff) is in the middle of a clearing, surrounded by fruit trees. The footpaths plunge through dense planting beds, where the buildings are emerging, playing both the role of service and discovery of the vegetation of the site. The patio, a beautiful garden, the main content of this vegetation to extend this wealth to the heart of the building. The print request is the superposition of these layers on a site of great wealth, all so just stick to the existing, only the minimum is kidnapped and finds substituted by an outstanding building.

## Products

### Product

photovoltaic solar generator

SOLAR ELECTRIC

[http://www.solarelectric-intl.com/?page\\_id=5072](http://www.solarelectric-intl.com/?page_id=5072)

<http://www.solarelectric-intl.com/>

Product category : Finishing work / Electrical systems - Low and high current

The sizing was done to cover all electrical needs annual review. Considering the appropriateness of the site needs with solar output, the generator has no energy storage. Stakeholders have decided to work on the site of a photovoltaic generator PNG operating in consumption, with injection of surplus energy on the network. Finally, the choice was made to use micro-inverters, promising technology offering multiple benefits in a listed office building ERP security, guaranteed for 25 years inverters optimized producible. Moreover, the hot water is provided by a solar water heater installed on the roof.



Wooden trellises from a local track

Delta pose

<http://www.deltapose-antilles.fr/contact>

<http://www.deltapose-antilles.fr/>

Product category : Structural work / Structure - Masonry - Facade

Local wood was used for all claustras gates that close the building. This is a performance because the wood industry does not exist in Guadeloupe. Indeed, in order to succeed, we had to use the only wood that still comes from the forest and used to make timber propping in construction. To do so, an agreement with NFB (National Forestry Board) was passed so they designate the parcel can be harvested. The trunks of young trees are used as raw. The principle is to replace them if they are degraded. Presently, one of the species (white gum tree the more tender) hosts many "Vonvon" (*Xylocopa mardax*, fat bumblebee) to the delight of manager who sees and biodiversity invade even his building. Another advantage is the light that is created inside of the building is screened, soft, like a wood.



The client was very pleased of this product because its environmental approach had suffered from the failure to use local wood Ni Ni even the Guyana timber (cost problem). The client was therefore particularly interested and satisfied with this solution that places again as remarkable building by that use.

## Costs

### Construction and exploitation costs

Renewable energy systems cost : 88 429,00 €

## Health and comfort

## Water management

The eco-management process on drinking water was identical, in methodological terms, to the overall conceptual approach adopted by the team for the project design and especially for the management of other fluids including energy:

- Sobriety in the use of water ie overall design of facilities and green spaces (patio, green roof ...) minimizing the drinking water needs and encouraging users to rational and reasonable use of this water;
- Efficiency in the use of water ie designing distribution systems and terminals minimizing, for a given service, cold water consumption and hot water;
- Rational design of inland water networks with pressure relief valves (max 3 bar), a minimization of dead legs and lengths of terminal antennas, global optimization pathways enabling: to save water by reducing rates (controlled pressure); water savings by presence detection for each withdrawal point (except the common kitchen);
- Design of water terminals efficient potable use: Toilets double speed, robust and easy to use, with integrated signage speed max 3/6 liters; Terminals shower and sinks with modular flow aerators with Max 8 l / min; Minimizing Legionella risk through the use of electronic faucets with automatic opening 45 s after 24 hours of non-use thus preventing the development of bacteria.
- Selection of local plant species of trees and shrubs with very low water needs. The species selected are all non-allergenic

## Comfort

**Health & comfort :** The main pillars of comfort for the users of the premises are:

- Optimal natural ventilation but anytime manageable and assisted by low power consumption devices (ceiling fans ceiling)
- An optimized natural lighting
- Spaces open onto the preserved or reconstructed nature
- distant views omnipresent sea, the Caribbean mountains but also the mature gardens.

To do this:

- All buildings of bodies 6 meters deep at most to allow penetration of natural light uniformly
- All offices have a wide open frontage on the direct sunlight (north or south facade) and a second day of the patio or the lighted corridors,
- All offices are in direct through-ventilation,
- prevailing winds are drained into the "bottleneck" of patio creating a pull factor conducive to ventilation that advertises the freshness created by plantations in all offices.
- The friendly meeting places are present throughout the circulations. These spaces are working on the outside and the treatment of their front raw wood trellis provides permanent ventilation while letting in a gentler filtered light.

## Carbon

### GHG emissions

**Building lifetime :** 40,00 année(s)

### Life Cycle Analysis

**Eco-design material :** - Use of certified wood for all uses;

- Building without the use of CFCs or HCFCs (eg insulators, refrigerants since no air conditioning, ...)
- absolute minimization of the use of PVC

## Contest

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

#### Green Building Solutions Awards 2016

Ce bâtiment de référence en Guadeloupe est emblématique d'une recherche du confort et de minimisation des impacts environnementaux à moindre coût global. Il a été conçu dans une démarche de Qualité Environnementale du Bâtiment (QEB) en milieu tropical, qui s'appuie fortement sur une conception bioclimatique du projet architectural.

En exploitant les ressources naturelles du site (climat, topographie) et respectant scrupuleusement son environnement naturel (arbres remarquables préexistants, minimisation des déblais-remblais, inscription paysagère, orientation optimisée...) au service d'un fonctionnement en mode bioclimatique (c'est à dire sans recours à la climatisation), le bâtiment est aujourd'hui reconnu comme une référence en matière de QEB, dans le contexte tropical.

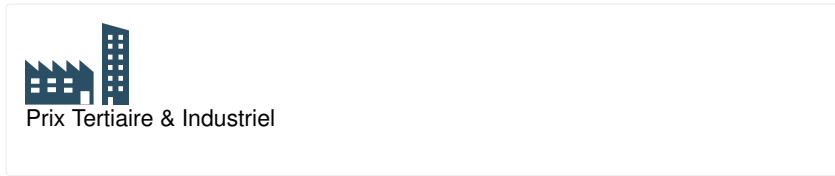
#### Trophées Bâtiments Résilients 2022

Ce bâtiment est un exemple simple et concret de résilience vis à vis de phénomènes naturels. Résilience directement issue des principes constructif (règles

antilles para-sismique et paracyclonique obligatoire) bioclimatiques et environnementaux : laisser passer le vent cyclonique tout en se protégeant des projectiles (la ventilation des espaces de circulation et de rencontre), rester souple lors de tremblement de terre (la construction bois), se poser légèrement sur le site d'accueil en suivant les courbes du terrain et végétaliser l'ensemble du site (la maîtrise des eaux de ruissellement)

Un parfait exemple d'une symbiose, confort / sécurité / permanence réussie.

## Building candidate in the category



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