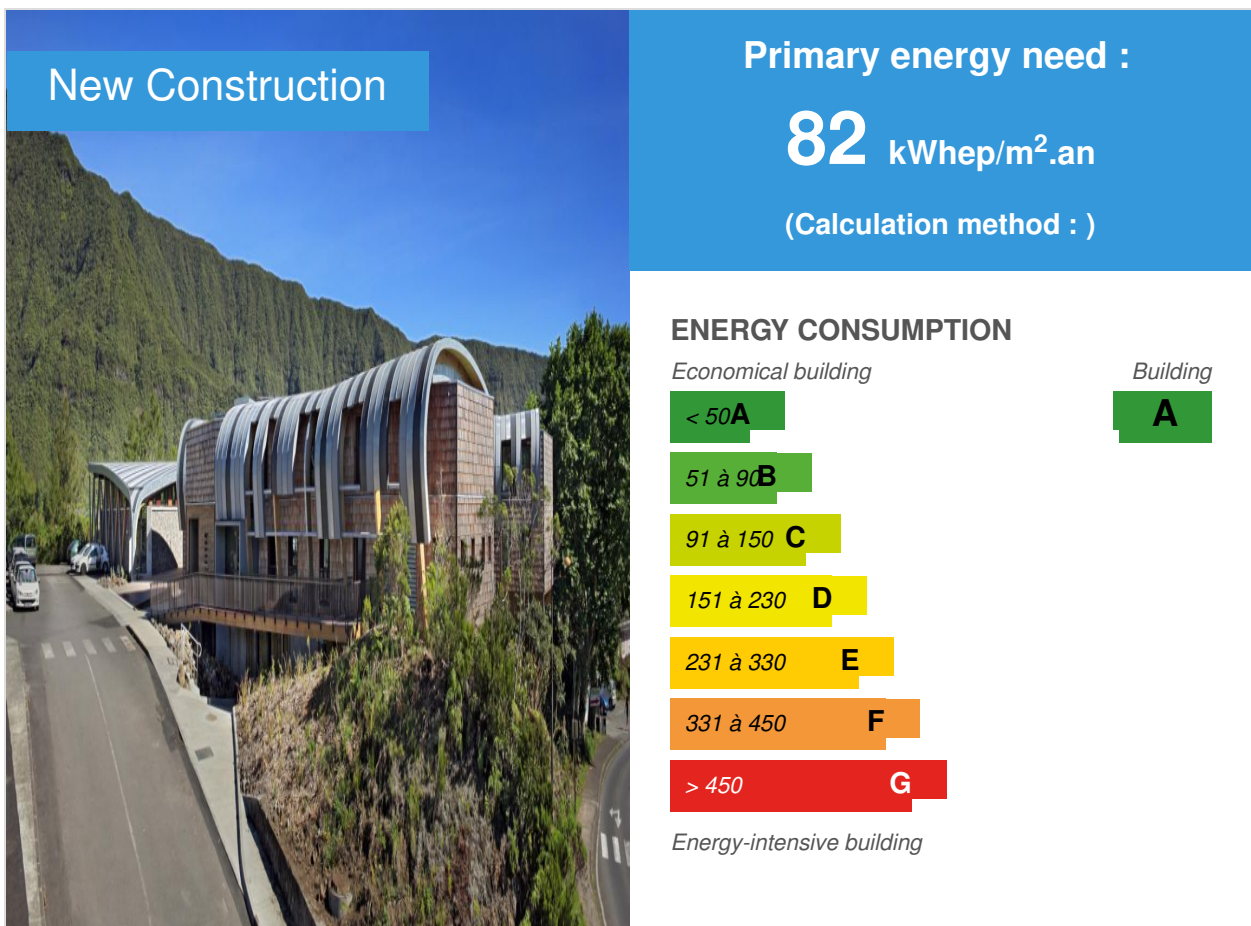


House of "Parc National de La Réunion"

by ANTOINE PERRAU / 2015-07-06 13:08:02 / France / 14432 / EN



Building Type : Office building < 28m

Construction Year : 2012

Delivery year : 2012

Address 1 - street : PLAINE DES PALMISTES 97431 îLE DE LA RÉUNION, France

Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 744 m²

Construction/refurbishment cost : 4 265 126 €

Number of Work station : 47 Work station

Cost/m2 : 2445.6 €/m²

General information

The environmental quality to build the House of "Parc National de La Réunion" project at the "Plaine des Palmistes", is based on the HQE framework for non-residential buildings adapted to the island of La Reunion, as well as the PERENE (local toolkit).

The headquarters of the "Parc National de La Réunion" and a showroom open to the public (included on UNESCO's worlds Heritage list) was constructed to illustrate the originality of the activities this park. In a village on the top of the island, marked by modesty scholar of its heritage; built in a vegetable matrix; today certainly deteriorated and victim of the insatiable appetite of invasive species (we could easily add concrete, asphalt and fences) the house of "Parc National de La Réunion" represents a free movement of letting pass, live and develop the plant tissue. Here the soil is sacred, magical epidermis and essential to the original biodiversity. Already wounded by human artifice, this regulator of hydrological impacts is preserved to the maximum to meet an essential role: being a Terrestrial epidermis , an interface between lithosphere and atmosphere.

Orientated to the climate clock of rain represented by the waterfall of Biberon, the Park house focuses on the site and deploys landscaped trunks, opening the view to the ramparts. Along this line of sight to the water column of "Biberon's", a simple score line eastward with the personal spaces and in the west the open and panoramic space of reception. The latter, touching the vegetable peak strengthened and revitalized by the project is deployed to the great landscape by protecting views of the "street".

The theatrical staging of landscape is valued and magnified. Teamworkplaces lengthen into three branches, each seeking its position in the light, like sciaphilous (shade-tolerant species) it directs their leaves to seize the brightness offered by the environment. These workplaces, of creation, sharing and cooperation, have a broad quiet central space open to the landscape of the eastern rampart of the Plain. On the national street, their pinions emerge as enigmatic signals embedded in there constituted plant expansion ...Natural stone siding outside to be inhabited by primitive lichens and mosses or other ferns, wood and its dry structures is the main guest of this environmental project. The concrete being exclusive to foundations.

A traumatic point for construction site, is the highway. Road networks become landscape and the building mechanical game storage of CO₂. The materials of the architectural project are based in nature: tamarindraw woodshingles, lichen basalt, zinc variable tint, transparent glass ...leaving the interior colors of workplaces resonate freely. The bioclimatic project, besides a strictly limited whirlwind buffer system in the North, only offers an active masss toves system for winter in reception areas, artifices are generated by the envelope itself which is built as a "climate comfort machine ."

But beyond the "physical" comfort, the house of "Parc National de La Réunion" is designed as support inviting creative and involved work; the well-being co-exist with the environment, its anthropogenic part, is the starting point for the park to exalt its missions and invite everyone to respect the biodiversity of La Reunion.

Sustainable development approach of the project owner

As part of the project to build the House of "Parc National de La Réunion" at the "Plaine des Palmistes", the environmental quality of the project is based on the HQE framework for non-residential buildings adapted to the island of Reunion, as well as the PERENE (local toolkit).

Architectural description

The House of "Parc National de La Réunion" is a tool enhancing the work of the park, which is offered with a free and sober architecture inscribed with utmost respect for the original site. Considering the spirit of the building as to determine a way of being, a simple invitation to position itself vis-à-vis the territory, the project offers an unconstrained philosophy of "ready made" images of architecture, in opposite to the trends of mineralization and "bunkerisation" of the island's territory.

Firstly, the house of "Parc National de La Réunion" determines a landscape of wet matrix and magical high plains, upside parks to cows and lawn trimmers, determining the ways of living coexisting with the environment.

Instead of an architecture for "administration", the House of "Parc National de La Réunion" should be a lively place respectful of the biosphere and what it must be preserved in La Reunion. As such, benchmarks and a free intermingling with the original environment respectful of the Plaine site. Here, the landscape project has the same importance as of the human artifice. The House of "Parc National de La Réunion" is an invitation to go to nature that justifies its function ...

The bioclimatic strategy is remarkably simple, to capture some heat in winter to regulate the temperature and to change the program in summer by protecting the building of sun and by breaking down more if necessary... a passive building, with a little more active people, tolerating some variation, in daily journeys by example. No heating or air conditioning, only a dehumidification when necessary; adapted emissivity walls; an important natural light and managed according to the seasons; a controllable cross ventilation; an energy supply by solar greenhouse and trombe walls limited to the strict minimum.

Building users opinion

22 users surveyed (16 men and 6 women). Viewers rating on the overall design of the building is positive 82% of them (18 people) consider that it is satisfactory or very satisfactory. The answers show that 72% (16 people) of users surveyed believe that the building meets their

needs satisfactorily or very satisfactorily. Regarding the image that the building gives to visitors, 77% of respondents consider that it is good or very good.

The positives points of the building according to users are:

- A satisfactory architectural image to many users and external visitors.
- The view offered to occupants of the ramparts and Bebour's forest
- The promotion of interactions and exchanges between the occupants in the building particularly in the central cafeteria.

Negatives that appear most often in comments from users are:

- The lack of one or more covered spaces around the building
- Thermal comfort especially in winter where the temperature is too cold in some areas and where internal conditions vary widely at temporal level (changes during the day according to outside sunlight) or spatially (large gap between the ground floor and floor).
- Noise and poor soundproofing offices and meeting rooms.
- Problems with luminaires equipped with dimming light and presence detection that does not satisfy users who would have preferred manual controls.
- Users are demanding more control over the following parameters: heating (active or passive), light (natural or artificial) and noise.

If you had to do it again?

Dynamic thermal simulations have led to a slight oversizing of controlled mechanical ventilation.

See more details about this project

<http://iletducentre.fr/projet/maison-du-parc/>

<http://www.leureunion.fr/la-maison-du-parc>

Stakeholders

Stakeholders

Function : Designer

AP Architectures

Antoine PERRAU

<http://iletducentre.fr/>

Designing a bioclimatic architecture



Function : Designer

2APMR

Michel Reynaud

<http://iletducentre.fr/>

Designing a bioclimatic architecture

Function : Other consultancy agency

LEU REUNION

Antoine Perrau

<http://www.leureunion.fr/>

Design office in environmental quality of buildings and landscaping

Contracting method

Separate batches

Type of market

Table 'c21_luxembourg.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 82,00 kWh/m².an

Primary energy need for standard building : 330,00 kWh/m².an

Calculation method :

CEEB : 0.0001

Breakdown for energy consumption : Meeting room air handling (10j / year): 0.7% dual flow VMC offices: 1.6% air dehumidification nine offices (winter + days of very heavy rain was): 14.7% Reheat air nine offices (Winter early morning): 4.1% Auxiliary heating showroom (occasionally in winter): 3.1% Solar Hot Water: 4.3% Lighting 5.7% Auxiliary: 5.9% Office: 59.9% Elevators: 0.02%

Real final energy consumption

Final Energy : 34,00 kWh/m².an

Envelope performance

Envelope U-Value : 0,81 W.m⁻².K⁻¹

More information :

The heat treatment has been specially care taking into account the comfort of winter and summer.

- Winter Comfort: insulation of walls and treatment of thermal bridges (limiting losses), reduced ventilation and infiltration, solar gain on the northern façade (closed glass façade), treatment of cold walls (dry structure, wall insulation) , medium inertia of the structure provided in particular by the insulating material (polystyrene graphite, local manufacture). Solar greenhouses and waterspouts walls help providing calories passively. For some large volume rooms (exhibition and personal relaxation), of radiant wood stoves and / or mass will provide additional localized thermal comfort.

- Summer comfort: insulation of walls (limiting solar gain), night cooling (hyper night ventilation and cold storage in the whirlwind wall), natural ventilation and ceiling fans, reduction of inputs of joinery and facades (insulation , solar shading and louvred elements, roof overhangs), reduction of inputs by insulated roof cellulose wadding. Natural ventilation is through-and adaptable by users (jealousy) for all living and working spaces.

Note: the change in summer or winter configuration is easily achieved and manually maneuvered by the joinery, to adapt to changing climate conditions of the site (summer and winter in the same day). The summer or winter operations are not static and reserved to a particular season.

100% of spaces with prolonged occupation works by cross ventilation.

The porosity of facades is higher than 15%.

The joinery (blinds) allows users to easily modulate the porosity according to the desired ventilation rate.

Being in the tropics, the tightness of the building is not a determining factor for the level of energy performance. We have therefore not determined the sealing factor in building air. The generous plantations around the albedo improve and refresh the air by shading and evapotranspiration.

Systems

Heating system :

- Fan coil
- Wood boiler

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Natural ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Solar Thermal
- Wood boiler

Renewable energy production : 8,80 %

A 5m area of solar thermal collectors was installed on the roof of the Park House.

Solutions enhancing nature free gains :

Maximiser l'éclairage naturel ; espaces tampons thermiques ; serres solaires ; Optimisation des protections solaires ; Eclairage basse consommation ; murs trombes (réservoirs à inertie thermique) ; Ventilation naturelle traversante (en été) ; zonage therm

Smart Building

BMS :

In addition to the alarm referrals and control of VMC, the system can monitor and optimize consumption (water, electricity) with monthly monitoring.

Land plot area : 4 921,00 m²

Built-up area : 36,00 %

Green space : 2 194,00

Land in the heart of the village of "Plaine des Palmistes" (essentially composed of individual houses) in the center of the island, occupied by many invasive alien species, but also relics of endemic and native plants.

Products

Product

Wood-cement panel Duripanel

ETERNIT

service.technique@eternit.fr

<http://eternit.fr>

Product category : Second œuvre /
Cloisons, isolation

Duripanel is a monolithic high-density panel made from wood particles bonded to the cement. Its unique manufacturing process gives it excellent physical characteristics.

Duripanel can be used: - flooring - in wall - acoustic lining - ceiling - in development of space ...

Advantages: • Non-flammable (classification B-s1, d0 (M1)) from 12mm • High mechanical strength (shocks, heavy loads) • high acoustic performance • Moisture resistance • A non-polluting manufacturing process • No noxious fumes (formaldehyde) • Respect the quality of indoor air accordance with protocol AFSSET, the emission tests were performed by Eurofins. They demonstrate that Duripanel meets the requirements of the AFSSET. VOC concentration is well below the threshold defined by AFSSET (test report available from the Service Quality and Environment).

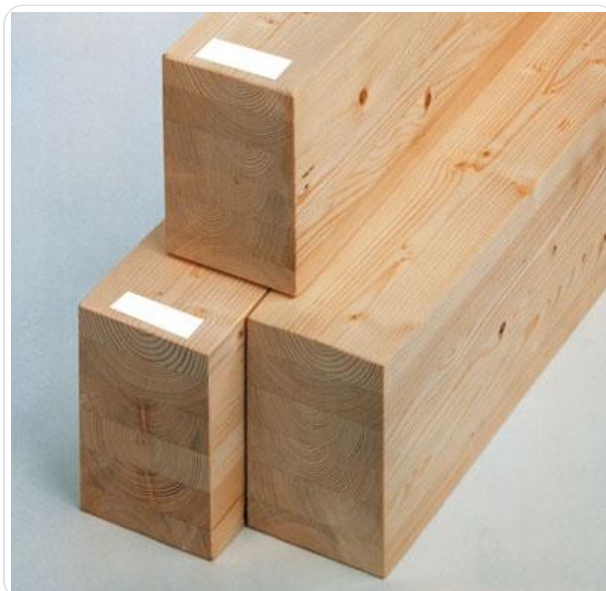
The Duripanel wood-cement panel is easy to implement. It is resistant to moisture, has good mechanical strength, reaction to fire and sound insulation. Used both inside and outside (with top coat), the Duripanel panels are intended for the most diverse applications in the field of construction, with excellent performance-price ratio.



WOODEN BEAM LAMELAS

SNBL

snccblc@magic.fr



<http://www.proxxilog.com/testing/index.php?id=15>

Product category : Gros œuvre / Charpente, couverture, étanchéité

Laminated wood is an excellent carbon storer as proved its Life Cycle Analysis. It is also an energy-efficient material, which demands few energy for manufacturing and transport. The energy consumed throughout the life of a glulam beam is 72% from renewable sources. This important renewable energy consumption and low consumption of fossil fuels are associated with an important reduction of pollution compared to other building materials. When producing a laminated wood beam, we can consider that 80% of the raw material (sawing) is converted into laminated wood; the remaining 20% are waste ... which in this case are valued energy. So we can say that in the manufacturing process of laminated wood, 100% of the raw material is valued, either material or energy.

Combining progress and nature, laminated wood allows an optimal integration of structures. Urban or rural context, the strength of laminated wood is its aesthetics, coupled with a strong dose of creativity to achieve realizations respectful of their environment, both aesthetically by a lighter footprint.

Compact roof VM ZINC PLUS

UMICORE

vmzinc.france@umicore.com

 <http://vmzinc.fr>

Product category : Gros œuvre / Charpente, couverture, étanchéité

A method of "warm roof" made by the superposition of:

- a metal support, of wood or concrete;
- a FOAMGLAS® cellular glass insulation panels (T4, S3 or TAPERED) grouted with bitumen and glued to the support;
- an attachment interface having galvanized steel plates engraved to FOAMGLAS® and a SBS modified bitumen membrane welded to the FOAMGLAS® and covering the pads;
- a cover zinc standing seam (width of single out 430 mm) made using VM ZINC PLUS sheets (polyamide with polyurethane coating 60 J.lm the



underside), with interposition of a geotextile between the waterproofing membrane and zinc; the cover fastening lugs are screwed on in the above galvanized steel plates. This system led to the production of non-ventilated warm roofs ensuring compliance of the support element to the local humidity. The FOAMGLAS Thermal insulation systems are made in a respectful manner vis-à-vis the environment (use of recycled materials such as glass). The optimization of production processes and the use of hydropower and wind power have allowed in recent years, a significant improvement in all relevant ecological indicators, particularly in the field of air emissions, greenhouse gas Greenhouse and the consumption of energy and natural resources. The potential lifetime of the insulation use corresponds to that of the building. The FOAMGLAS® is free of toxic environment and habitation.

Good thermal and acoustic performance and a good esthetic. Relatively simple installation.

Costs

Construction and exploitation costs

Cost of studies : 438 000 €

Total cost of the building : 4 265 126 €

Health and comfort

Indoor Air quality

Using natural ventilation.

Comfort

Health & comfort : Thermal buffer zones were performed in order to limit the discomfort

Natural ventilation

Daylighting autonomy

Calculated thermal comfort : Dans l'ensemble, les bureaux sont confortables durant plus de 95% de l'année en été, et durant plus de 85% de l'année en hiver.

Acoustic comfort : Acoustic comfort primarily relates to the work rooms of the House of "Parc National de La Réunion". The only current nuisance comes from the highway of which impact is however very measured. The built layout avoiding any front reverberating against this element, limits the nuisance for working environments. The reception area, open on the small restored forest is completely faraway from urban noises, including traffic from the entrance of

“La maison des Tourelles”. The inner garden of the station is thus highly protected (learning path) by the positioning of building plan mass. The provisions for working premises comply with the NF X 35 102 (ergonomic work spaces), including the acoustic environment:

- Continuous noise levels below 55 dB (A) - this value is Maximum not possible, the selected value will be 50 dB (A)
- for reverberation time, we will build on an average reverberation 0.6 s between 0.3 and 0.8s - the surfaces of false ceilings are minimized in the case of setting work of flexible floor. The acoustic insulation between separate offices is 40 dB (A).

Carbon

Life Cycle Analysis

Eco-design material : - Wood type IV FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification)

- Mineral Paints, according to European Standards (EN) and the guidelines for health
- Certified Satin lacquers (French certification NF environnement)

Contest

Reasons for participating in the competition(s)

Reduction of Energy consumption by inertial storage in the water tubes. Thermal zoning by function, use of low power equipment (lighting optimization, water, ecological restoration of the site, use of passive solar). Thermal comfort provided by low radiation timber construction, passive solar VMC turbofan + + inertial storage. Building 100% wood frame.

Building candidate in the category



Smart Buildings



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