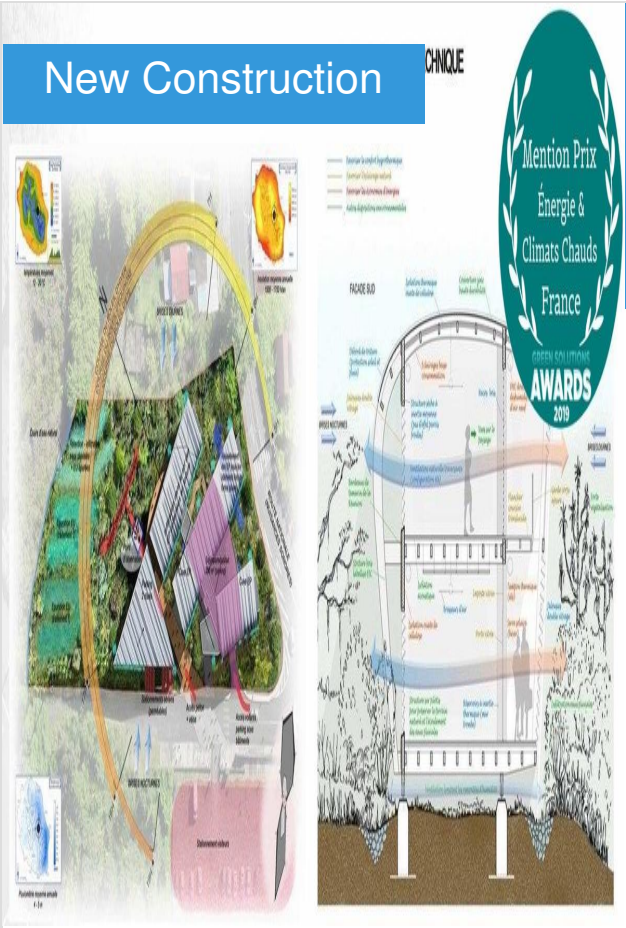
National Park Headquarter in la Reunion

by antoine perrau / 2019-06-11 14:17:22 / France / 6446 / FR



Primary energy need :

154 kWhep/m².an

(Calculation method : Built before those regulations)

ENERGY CONSUMPTION

Economical building *Building*

- *< 50* **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 : Other building
Construction Year : 2014
Delivery year : 2014
Address 1 - street : Rue de La République 97431 LA PLAINE DES PALMISTES , France
Climate zone : [Af] Tropical Wet. No dry season.

Net Floor Area : 1 744 m^2
Construction/refurbishment cost : 4 250 000 €
Number of none : 50 none
Cost/m2 : 2436.93 €/m^2

General information

Construction of the Reunion National Park headquarters (offices and meeting room) and a permanent exhibition room open to the public. SHON 1744sqm.

Specificity of the project : situation in altitude humid tropical zone (1000m), a wet and cold season and a hot and humid season.
Environmental device:

Economy systems :
VMC double flow. Wheat panels for cafeteria and changing rooms LED office lighting with presence detectionWood stove for cafeteria

Double climate strategy :
Climatic zoning of premises according to uses

Summer comfort :
Dry structure with low inertia limiting the accumulation of heat and the radiation of the walls, efficient insulation of the envelope (roof and insulated walls), natural ventilation through individually adjustable openings to the right of each workstation, fine constructive frame optimizing the potential of natural ventilation, thermal buffer of the northern corridor shaded by the overhang of roof, vegetation of the surroundings favoring the bubble of freshness.

Winter comfort :
Dry structure limiting the effect of cold walls, insulation of walls and joinery (double glazing), passive green space in the North, fast-moving

water column wall in the afternoon (generally sunny in the morning and cloudy in the afternoon) noon) between greenhouse and offices, VMC double flow with dehydration and preheating of fresh air.

Natural lighting : Optimization of the natural lighting of all the offices thanks to the narrow constructive grid, transparent floor of the corridors optimizing the natural lighting of the ground floor.

Biobased materials : Bonded laminated wood structure, KLH floors, pine façade frames, Red Cedar shingles (all woods are PEFC or FSC certified).

Healthy materials : VOC-free materials, mineral lime paints, PVC floors with VOC (volatile organic component) encapsulation.

Local materials : Lava stone doubling walls, volcanic slag for parking floors.

Rainwater management : Dissemination without concentration of rainwater in time delay systems, infiltration landscaped (removal of pipes), construction on stilts preserving the hydraulic transparency.

Water- **saving systems** : Floating water 3/6 l, tap delay

Ecological restoration of the site :
ecological restoration of the forest ecosystems of the upper part of the island (pandanées forest), first Réunion. completion 2015.

Low carbon construction : Use of wood in frame, structure, floors and cladding.

Energy management : Projected consumption 24KWh / m² / year floor area **Total capacity** : 62 kW

Sustainable development approach of the project owner

Excerpt from the contest program:

Offer of the high level of comfort conditions

(ch. HQE)

The designer must propose a project that respects all the constraints and requirements relating to the comfort of the staff during work and relaxation, as well as for all visitors

The architecture should provide solutions for a high level of comfort and therefore the satisfaction of users in terms of acoustics, lighting, taking into account climate data and space functionality.

The qualities of space, clarity, fluidity and acoustics should apply to all workplaces but also to the relaxation areas of staff and public reception.

By its choice of location and design, the designer will have to provide satisfactory solutions, particularly in the following areas:

- promote the acoustic protection of all premises,

- to favor the natural light of all the premises despite the constraints related to the low sunshine of the Plaine des Palmistes,

- to favor the natural ventilation of all the premises while guaranteeing quality conditions of

the air in order to avoid the inconvenience associated with the high humidity of the climate of the Plaine des Palmistes.

- to allow the management of the temperature of the offices summer as hive r,

Architectural description

Extract of the notice of the contest:

The duparc house must be an illustration of the park's missions , a ***tool*** As said the program, which can express the originality of these missions ... **the house of the park can not be conceived as a confinement** , a new theater of administrative power, a "reiteration" to use the language of the ecologists of a formeassise and historical like that which is the house of the turrets.

In a high village, marked by the modesty of its inheritance built in a vegetal matrix, certainly todayadded and subject to the insatiable appetite of invasive species (to which species we could easily add concrete, asphalt and fences ....), **the house of the park interferes in a free movement allowing to pass, to live and to develop the original reconstituted vegetal matrix** ....

Here, **sacred soil** , magical epidermis and essential to the original biodiversity, manager of the hydrological impacts, already wounded by the human artifice, it is then the most preserved possible, in order to satisfy its essential missions: its global role of terrestrial epidermis, interface interlithosphere and atmosphere. This posed, the site is then constructible.

Pointing its orientation towards the climatic clock of the rains indicated by the waterfall Biberon , the House of the Park seconcentre in its site, the *one that the ecologists attribute to him* , and unfolds itself in arms or troncspaysagers, by opening the panorama towards the ramparts, and privileging the moreproche to exalt the force.

Along this line of sight towards the waterfall column of Cascade Biberon is a simple dividing line with **eastward the spaces of the personnel and towards the West the open and panoramic space of the reception** . This one, touching the vegetal ridge reinforced and revitalized by the project, unfolds towards the big landscape while protecting itself from the views of the "street". Lamise in theatrical scene of the valued landscape is thus magnified.

The workplaces of the teams stretch out in three branches, seeking each saposition to the light, in the manner of sciaphile species orienting their leaves to seize the thin

luminosities offered by the environment. These workplaces, decreation, sharing and consultation, enjoy a large centralrécréatif quiet space, open to the landscape of the eastern wall of the Plain. On the national side, their gears emerge as enigmatic signals drowned in the reconstituted vegetable sands.

Between these two opening movements, there is a ramp leading to the observatory of landscapes suspended above the territory. The dynamics of the composition is an invitation to travel ...

In this immersion in the environment, the environmental value of the project is played out.

If, punctually, the natural stone comes to clad outdoors to be inhabited by primitive lichens and mosses or other ferns, **wood and dry structures is the guest of the environmental project,** the concrete being restricted to the strict minimum of the foundations reduced to the finest . Salty and traumatic dechantier point for the site, since the VRD (Roads and various networks) becomes landscape and the building mechanized game dry storing C02 ... .The materials of the architectural project are melted in nature: raw wood of shingles of tamarind, basalt with lichen, zinc of variable shade , transparent glass ... leaving the interior colors of the workspace to resonate freely.

The bioclimatic project , in addition to a strictly limited system and a climatic buffer in the North, proposes an active system only for recreational winter stoves for reception areas and staff; **the artefacts are generated by the built envelope which constitutes itself the "climate machine with comfort".** But, beyond the "physical" comfort, the park house is conceived as an inviting support for creative and involved work; to be well, to co-exist with its environment, its anthropic part, it is the starting point so that the park can exalterses missions and to invite each one with the respect of the biodiversity of Reunion.

If you had to do it again?

This project and one of the emblematic achievements of our agency. Some improvements could have been made: Use of tamarind shingles (local wood) instead of red cedar (cost problem). Reuse of rainwater for toilet water (initially planned but abandoned by the building owner). Increase of the glass area of some offices on the ground floor to improve the autonomy in natural lighting. Use of sourced organic insulation instead of polystyrene graphite (no technical advice available for ERP at the time) In order to optimize the comfort of offices in winter, the VMC could be improved by reversing the circuit: extracting warmer air on the floor and blowing on the ground floor.

See more details about this project

https://www.construction21.org/france/data/sources/users/7721/c-21.doc

Stakeholders

Contractor

Name : Parc National de La Réunion
Contact : Hyves Baret
http://www.reunion-parcnational.fr

Construction Manager

Name : Antoine Perrau architecutres mandataire- 2APMR
Contact : Antoine Perrau
https://labreunion.fr/

Stakeholders

Function : Other consultancy agency

LEU Réunion

Clara Sautron

http://leureunion.fr
bet QEB, Thermo and landscape

Function : Structures calculist

Bois de bout

Laurent Devaud

wood structure study

Function : Other consultancy agency

INSET

Eric Ottenwelter

bet fluids

Function : Other consultancy agency

CREATEUR

Patrick Goujon

bet VRD

Contracting method

Separate batches

Type of market

Table 'c21_belgium.rex_market_type' doesn't exist

https://www.construction21.org/france/data/sources/users/7721/cr64-mdp.doc

Energy

Energy consumption

Primary energy need : 154,00 kWhep/m^2.an

Primary energy need for standard building : 390,00 kWhep/m^2.an

Calculation method : Built before those regulations

CEEB : 0.0001

Breakdown for energy consumption : EXPECTED ENERGY BALANCE SHEET area in work SDO = 1624 m² USESOF BUILDING ENERGY DEMAND UnitElectricity networkCombustible: wood Wood stoves (relaxation rooms and expo in winter) kWh / year2000 (1 sterre) Air conditioning meeting room (10 days / year) kWh / year400 VMC dual flow deskskWh / an870 Dehumidification air new offices (winter + days of very heavy rain summer) kWh / year8 052- Warm air new offices (early morning winter) kWh / year2 236- Additional heating showroom (punctually in winter) kWh / year 1,690 Solar hot water kWh / year 2,381 LightingkWh / an3 137- auxiliarieskWh / an3 248- officewarekWh / an32 869- ascenseurskWh / an9- TOTAL FINAL ENERGYkWh / an54 892 TOTAL FINAL ENERGYkWh / m²SDO.an341.2

Real final energy consumption

Final Energy : 55,00 kWhef/m^2.an

Envelope performance

More information :
MATERIALS CARACTERISTICS
Structural work - facades
Flying foundationsBuilt concrete
Structure, frameWoodPin, class IV, FSC or PEFC label
CouvertureZinc
PlanchersDuripanel

Bracing panelsDuripanel
Exterior claddingWooden shinglesRed Cedar split
Runway floorPolycarbonate36% light transmission
Walls room exhibitionTrespa + insulation
Second work
Opaque partitionsDuripanelLight colors
Glass partitionsGlassLight clear glass
Ceiling R + 1BoisVoliges pin, FSC or PEFC label
Ground floor ceiling
Insulation floors, walls, ceilingsPolystyrene
Outdoor DecksWoodIPE label FSC
Thermal Storage TubesPMMA Water Filling

Joinery
Interior glass doorsGlassSimple clear glass
offices on exteriorOFDouble glazing
offices on coursiveNacosSimple glazing
Jealousies curtain façadesAluminium framed blindsSingle glazing, reinforced sealing
Fixed glazing facade curtainGlassDouble clear glazing
Solid panels curtain facadeTrespa

Users' control system opinion :

No home automation

More information

PREVISIONAL ENERGY JUSTIFICATIONS HYPOTHESES Opening of the establishment From 8 am to 6 pm for 253 days / year Lighting: installed power8276 W Lighting: installed power5 W / m²SDO Lighting: abundance of installed power0.60 Operating autonomy in natural lighting75% Lighting: annual lighting time632 h / year Office ventilation: fans power 0.5 kW nominal, 1 kW max (for heating) Office ventilation: VMC11 hours / day operation for 130 days / year (winter) + 50 hours / year (very heavy summer rainfall) = 1480 hours / year Office ventilation: CTA power (max.) 8.6 kW Office ventilation: CTA power (nominal) 6.6 kW Office ventilation: operation dehumidification9 hours / day, 130 days / year (winter) + 5 days / year (very heavy rain) = 1220 hours / year Office ventilation: heating operation2 hours / day (early morning) for 130 days / year = 260 h Office ventilation: CTA power for heating8.6 kW ElevatorCumulative operation: 1 hour / year Office automationAverage power density: 8 W / m² Auxiliary (EP recovery, devices taken, ...) Average power density: 2 w / m²

Renewables & systems

Systems

Heating system :

- Wood boiler

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Natural ventilation
- Double flow heat exchanger

Renewable systems :

- Solar Thermal
- Wood boiler

Solutions enhancing nature free gains :

Mur trombe à eau : exposé au soleil, diffusion de chaleur pour les deux niveaux grâce à la convection naturelle de l'eau vers le haut du réservoir. Inertie thermique.

Environment

Urban environment

Land plot area : 4 921,00 m^2

Built-up area : 23,00 %

Green space : 3 447,00

The project is located in the center of the village of La Plaine des Palmistes. The built context consists mainly of individual houses.

Products

Product

SAPISOL

SIMONIN

https://www.simonin.com/

Product category : Gros œuvre / Charpente, couverture, étanchéité

Wood polystyrene wood sandwich

This product serves as a support for zinc roofing and finishing for floor ceilings

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DURIPANEL

ETERNIT

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjM9KuwyOHiAhVeRxUIHQOnDGAQFjAAegQIAhAB&url=https%3A%2F%2Fwww.eternit.fr%2Ffr-fr%2Fconstruction%2Fplaques-de-construction%2Fduripanel&usg=AOvVaw14pGat2R4hG0fEZLtojFeP

Product category : Second œuvre / Cloisons, isolation

Particleboard of wood and cement

Has advantageously replaced the traditional plasterboard partitions that could not be used in view of the humidity and rainfall conditions of the building site

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KLH

KLH

http://www.KLH.at

Product category : Gros œuvre / Structure, maçonnerie, façade

Structural panel consisting of spruce boards glued in crossed layers

Replaces concrete floors and optimizes the CO2 balance of the project

Costs

Construction and exploitation costs

Reference global cost : 2 400,00 €

Reference global cost/none : 2400

Cost of studies : 357 000 €

Total cost of the building : 4 250 000 €

Additional information on costs :

The energy bill cost is based on the actual annual cost with EDF invoices

Energy bill

Forecasted energy bill/year : 18 000,00 €

Real energy cost/m2 : 10.32

Real energy cost/none : 360

Health and comfort

Water management

Estimated load :
Dimensioning of wastewater treatment works
50 l x 50 staff = 2500 liters
10 l x 100 visitors = 1000 liters
This makes a volume of 3500 liters. a pit of 5 m3 (10 EH) will have a good margin in terms of prior treatment

Indoor Air quality

Choice of low VOC products: Mineral Lime Paint (KEIM) PVC flooring (Gerflor Click System) encapsulating VOC laid without glue, laying plaster Building in natural ventilation

Comfort

Health & comfort :

Visual comfort

With regard to the large landscape, the reduction of the visual impact of the park house will be controlled, in addition to the very vegetal environment, by the absence of too light colors, white abuse for example, but rather very "natural". The effects of the outer skin, zinc, shingles, composite panels, transparencies, will have low reverberation effects, and the house will be very discreetly perceived in its echevégétal. Of course in the night situation, the house of the Park has the duty to have gone out to let live to compose with the cycles nycthéméraux ... only very discrete LEDs will be disposed on the central axis of composition, no lighting is placed on the facades, neither foreseen for the gardens, only will be perceived through the built transparencies the inevitable but modest security lighting

The visual comfort of the premises is determined in particular by the orientation of the facades to the North and South. The sun will be adapted for the facades and are limited in number because of the main orientation of the premises. In the North, the overhangs of the

covers make it possible to respond strictly to the summer comfort while avoiding the sunshine of the offices, while in Winter, this one can penetrate and be controlled by the occupant. The southern lighting optimizes the useful depth of the rooms, illuminated from the two preferential orientations of comfort. The West and East lights are carefully avoided for work premises, and if they exist (reception room) they are treated by adapted sun visors.

The views

The major spaces are oriented towards the large landscape of the ramparts for the reception areas and the conviviality area of the offices, and for the premises of the management, which benefit from a private "panoramic" terrace.

The offices have views to foissur the great landscape (especially moving) and to the inner gardens interfering between the bars of premises.

Of course, the reception room is privileged by its panoramic position unfolding its facade along a natural bi-boundary belvedere, that of the restored forestation in the foreground and in the background of the rampart left bank of the Plain, the most preserved being representative the endemism of the environments to be protected

We can not say also the benefit of the integration of parking areas in "open basement" releasing the material of living soil and participating proximity comfort of the living spaces of the Park House, and not with "view of bitumen cars" as too often ... ..

Calculated thermal comfort : Hypothèses de simulation : Logiciel : Design Builder V 2.2.5.004 Conception bâti : suivant dossier d'étude phase APD Occupation bureaux : 0.07 pers/m² Plannings d'occupation : 8h00 – 18h00 du lundi au vendredi Apports internes : 11 W/m² (informatique,

Acoustic comfort :

Protection against interior noise

The provisions for the work premises comply with standard NF X 35 102 (ergonomic design of work spaces), namely in particular for the acoustic environment:

· Continuous sound level below 55 dB (A) - this value is a maximum not possible, the value retained will be 50dB (A)

· For the reverberation time, an average reverberation of 0.6 s between 0.3 and 0.8s will be used - the surfaces of the false ceilings are minimized in the case of flexible floors.

The sound insulation between separated offices is 40 dB (A) (dry partition walls type FERMACEL with insulation or equivalent)

Carbon

Life Cycle Analysis

Eco-design material :

Framing: glued laminated pine Floors: KLH Facades: wooden frame (pine and cladding red cedar) Facade facades ground floor: lava stone meeting Soils parking: volcanic slag meeting

Contest

Reasons for participating in the competition(s)

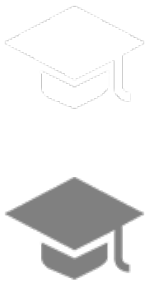
Reduction of energy consumption by inertial storage in the water tubes.
Thermal zoning by function, use of low consumption equipment (optimization of lighting, water, ecological restoration of the site, use of passive solar).

Thermal comfort provided by low radiation wood construction, passive solar + VMC (controlled ventilation) double flow + inertial storage.
100% wood frame building.

Building candidate in the category

Energie & Climats Chauds

Prix du public



Prix des Etudiants

Date Export : 20230520131342