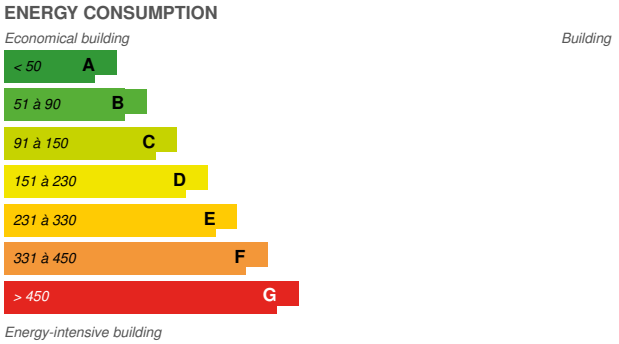
Headquarters of the Guyana Land Development Public Establishment

by aurélie brunelot / 2017-02-21 14:14:02 / France / 10381 / FR

Primary energy need :

114 kWhep/m^2.an

(Calculation method :)



Building Type : Office building < 28m
Construction Year : 2017
Delivery year : 2017
Address 1 - street : 97357 MATOURY, GUYANNE FRANCAISE, France
Climate zone : [Af] Tropical Wet. No dry season.

Net Floor Area : 1 800 m^2
Construction/refurbishment cost : 4 200 000 €
Number of Work station : 80 Work station
Cost/m2 : 2333.33 €/m^2

General information

The construction, intended for offices, is composed of two parallel buildings. The buildings are located in the direction of the slope of the ground, with access to the upper part of the land, giving directly onto an esplanade that allows access to the offices from the parking lots. A convivial space protected by a stretched canvas connects the two buildings to each other and allows the users to meet in the shelter of the sun and the rain, having a view on the magnificent landscape located below.

The building produces the energy needed to refresh it, its lighting and its operation by a field of photovoltaic panels which will also eventually charge electric vehicles.

The buildings are composed of 3 levels, including an R-1 level partially embedded in the natural ground.

Sustainable development approach of the project owner

The EPFAG is a strong actor in the creation of Guyanese territory. From the very outset of his own headquarters, he decided to create the first bioclimatic energy-positive building in Guyana. In addition, the building is located at the Amazonian Factory, Guyana's first business plateau. It must therefore, by its strategic positioning, be exemplary in terms of building a tertiary building.

Architectural description

- Implementation of the building in the direction of the prevailing winds - fretted roof and large edges - solar protections on the facade, coupled with large windows allowing significant natural light inputs - insulation of walls and floors - use of local wood - installation of photovoltaic in superimposition in roof and wind - treatment of hygienic air for comfort of users in a humid climate - high-performance centralized air conditioning of the DRV type allowing in-air comfort, quiet operation and low consumption. - geographical location in the vicinity of commercial activities and residential areas, making it possible to limit the transport by car

Building users opinion

Pride in working in a building that produces more energy than it consumes

If you had to do it again?

We would pay even more attention to the design phase in which many site hazards can be avoided. This phase must be longer to shorten the realization.

Stakeholders

Stakeholders

Function : Contractor

EPFAG

Aurélie Brunelot et Boris Rotsen.

http://www.epfag.fr

Willingness to build a headquarters in accordance with the sustainable development approach undertaken in the development projects carried out by EPFAG in urban planning and land-use planning.

Function : Thermal consultancy agency

INGEKO Energies

Pierre PERROT - Michel EHRESMANN : contact@ingeko-energies.fr

http://www.ingeko-energies.fr

Assistance to project management for the design of high energy performance and the feasibility of an integrated renewable energy production, in the spirit of a transposition of the BEPOS approach in the Guyanese context. Photographer

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Function : Designer

amarante architecture

amarante.archi@orange.fr Laurent Chamoux architecte

http://www.amarante-architecture.fr

Overall design of the project with the workshop Yves Le Tirant de Kourou. Amarante was a proxy architect and took care of bioclimatic design, heliodon and site monitoring, as well as the choice of the BET MDE Ingeko.

Contracting method

Separate batches

Type of market

Table 'c21_maroc.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 114,00 kWhep/m^2.an

Primary energy need for standard building : 400,00 kWhep/m^2.an

Calculation method :

CEEB : 0.0001

Breakdown for energy consumption : Electricity is the only energy used in the building. The distribution of consumption is: - Heating: 0% - Air conditioning: 45% - Lighting: 8% - Ventilation: 7% - ECS: 0% - specific uses (offices): 40%. Conventional energy consumption (5 uses) amounts to 114 kWhEP / m² / year, total consumption at 194 kWhEP / m² / year In the absence of official value, the Electricity -> Primary Energy conversion factor is set at 2 for the Guyanese coastal

electricity network (65%).

Real final energy consumption

Final Energy : 97,00 kWhef/m^2.an

Envelope performance

Envelope U-Value : 1,70 $W.m^{-2}.K^{-1}$

More information :

The Guyanese building standards do not yet incorporate the insulation of the vertical walls or the double glazing. The heat loss coefficients are therefore generally high.
However, in a tropical climatic context, the Ubat criterion is not the only representative of the energy performance of the envelope, as the internal / external temperature differences are generally low. On the other hand, it is essential to reduce as much as possible the solar contributions, the main source of thermal discomfort and energy consumption.

In the present case, considerable efforts have been made to insulate the vertical walls of the air-conditioned areas, protection devices against direct sunlight (roof overhang, horizontal solar shading, peripheral netting, etc.) supplemented by a Solar control glazing.
Overall, the solar factor of the building envelope is of the order of 5%, at a very high level.

Building Compactness Coefficient : 0,60

More information

The actual consumption is measured by the GTB system, distinguishing the different zones and uses (air conditioning, lighting, other uses, production). The data will be used for feedback after a full year of use of the building. The use of the RT2012 calculation standard for this project in the Guyanese context required the following adaptations: climatic zone H3, office use, summer comfort CE2, climatic data standard hours. The reference values are: CEP max: 132 kWhEP / m² / year CEP BEPOS: 79 kWhEP / m² / an Bbio max: 168

Renewables & systems

Systems

Heating system :

- No heating system

Hot water system :

- No domestic hot water system

Cooling system :

- Fan coil
- Tape
- VRV Syst. (Variable refrigerant Volume)

Ventilation system :

- compensated Air Handling Unit
- humidity sensitive Air Handling Unit (hygro A

Renewable systems :

- Solar photovoltaic
- Micro wind

Renewable energy production : 65,00 %

The photovoltaic field has been sized to cover all electricity needs annually: 60% of the production is directly used for self-consumption and does not leave the building, the remaining 40% is made available to the electricity network for other uses of electricity. The ZAC.

The micro-aerogenerator has the role of an urban demonstrator: the wind turbine with vertical axis and rated power of 1kW is mounted on a mast of 7m.

Solutions enhancing nature free gains :

Simulation 3D des apports solaires avec héliodon complet lors de la conception pour détecter les zones critiques. Mise en oeuvre de dispositifs adaptés (brise-soleil horizontaux et verticaux, débords de toitures, verres spéciaux) pour protéger les vitrage

Smart Building

Users' opinion on the Smart Building functions : A little early to define it, the building being occupied for only two months. An analysis is planned with users during the sixth month of use.

Environment

Urban environment

Land plot area : 2 530,00 m^2

Built-up area : 55,00 %

- set up on a business platform, dedicated to business real estate - is located close to commercial activities and residential areas, allowing to reduce car journeys

Products

Product

Photovoltaic panels AXITEC 260P

axitecsolar

http://www.axitecsolar.com

http://www.axitecsolar.com

Product category : Gros œuvre / Système passif

Pride of site users

Costs

Construction and exploitation costs

Renewable energy systems cost : 270 000,00 €

Cost of studies : 406 900 €

Total cost of the building : 4 424 900 €

Health and comfort

Comfort

Calculated thermal comfort : L'ambiance intérieure est régulée à 25°C / 70% hR en période d'occupation.

Carbon

GHG emissions

GHG emissions related to the energy needs of the building are estimated at 53 kgCO2eq / m² / year on the basis of a carbon factor of 545gCO2 / kWh_el of electricity in the Guyanese coastal network. These emissions are offset by photovoltaic production

Life Cycle Analysis

Eco-design material : There was no LCA for this project. However, the constructive principle adopted (metallic structure, collaborative floors and wood-frame walls) has significantly reduced the use of concrete and incorporated volumes of wood

Contest

Building candidate in the category

Energie & Climats Chauds

Coup de Cœur des Internautes

Date Export : 20230719181930