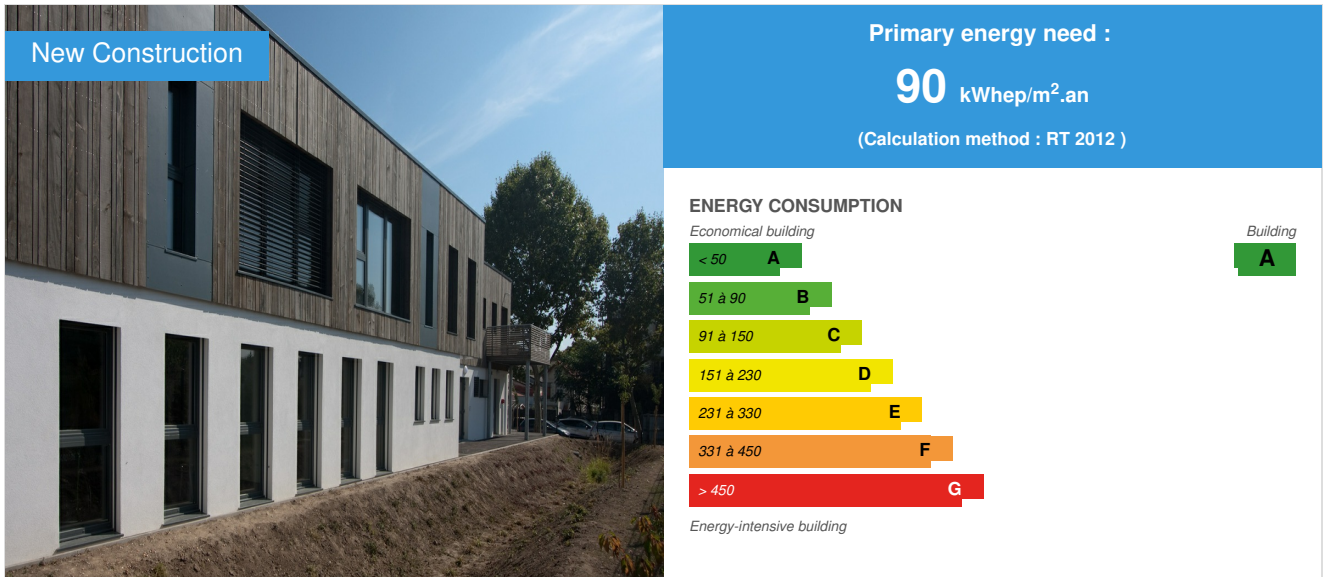


The Astrolabe

by pierre baux / 2017-10-09 16:08:22 / France / 9921 / FR



Building Type : Public or private hospital
Construction Year : 2016
Delivery year : 2016
Address 1 - street : 178 Rue des Renouillers 92700 COLOMBES, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 280 m²
Construction/refurbishment cost : 1 800 000 €
Number of Bed : 12 Bed
Cost/m² : 1406.25 €/m²

General information

Program: Construction of a passive hospitalization unit for adolescents

Area of the operation: 1000 m², heated volume: 3005 m³

Keywords: Hospital building, solid wood wall

Sustainable development approach of the project owner

The AP-HP (Assistance Publique Hôpitaux de Paris) is deeply committed to a sustainable development approach with the following lines of application of this strategy: reducing the greenhouse gas footprint, lowering energy consumption, improvement of purchasing and waste management. The HUPNVS group (which includes the Louis-Mourier hospital) pursues, among other things, the objective of reducing its energy consumption and primarily those of fossil origin. The project to build a building to house a new hospitalization activity for child psychiatry, intended to receive and treat adolescents with social and psychiatric difficulties, has created the opportunity to consider a passive standard construction goal. The building had to contribute to reduce the environmental footprint of the AP-HP and improve the quality of life at work of the staff as well as the care of the patients. Three other targets were also included in the program: economic construction, speed of execution and low operating costs.

Architectural description

From the outset, the MOE team sought to conserve natural resources, control environmental and health impacts, and create comfortable and healthy indoor environments. The general form is relatively simple, in "T". The simplicity of the volumes, the thermal quality of the walls and the unhooked of very limited facades make this building a building both economic and passive. The technical choices of design and construction have been oriented towards a sober energy and a simplicity of exploitation, while preserving a comfortable and healthy interior environment (quality of indoor air in particular).

If you had to do it again?

Always a wooden building! Prefabrication makes it possible to complete the structure of the building in a few weeks and to work in a dry sector, sheltered. The APHP teams visited the site several times and found that the wood gave a particularly pleasant atmosphere even if it was only the infrastructure and the joinery was not yet installed. Indeed, there was not the cold and wet sensation of concrete yards. Given the shape and the varied activities of the building zones, we would use one or two more CTAs to simplify the network and the regulation of the CTA. The ECS represents a significant part of consumption, it would be interesting to provide heat recovery on the showers. Since the end of the project, solutions have appeared on the market to integrate the recovery of the showers in the slabs or to be able to integrate them in the shower screeds with reduced reservations. The flexible connections of the ventilation outlets had been banned to ensure an excellent airtightness of the ventilation network. This choice may occasionally cause acoustic problems. Even if the airtightness of the ventilation network is slightly degraded, the use of flexible connections would make it possible to solve certain problems of noise on the mouths.

Stakeholders

Stakeholders

Function : Contractor

Hôpitaux Universitaires Paris Nord Val de Seine - Assistance Publique Hôpitaux de Paris

Grégoire RIGAL Ingénieur Travaux – Hôpital Beaujon 01.40.87.56.45

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

Function : Construction Manager

Menguy Architectes

Bernard Menguy

<http://www.menguy-architectes.fr/>

Function : Thermal consultancy agency

Sunsquare

Pierre Baux

<http://www.sunsquare.fr>

Contracting method

Separate batches

Type of market

Global performance contract

Energy

Energy consumption

Primary energy need : 90,00 kWh_{ep}/m².an

Primary energy need for standard building : 120,00 kWh_{ep}/m².an

Calculation method : RT 2012

Breakdown for energy consumption : Heating: 18,5 kWh_{ep} / m² / year Cooling: 0 ECS: 12.9 Lighting: 15.2 Auxiliaries: 7.6

Real final energy consumption

Final Energy : 115,00 kWh_{ef}/m².an

Envelope performance

Envelope U-Value : 0,19 W.m⁻².K⁻¹

More information :

CLT solid wood panels, exterior insulation in wood fiber.
Coated finish or wood cladding

Indicator : n50

Air Tightness Value : 0,52

Users' control system opinion :

no home automation

More information

System for automatic recording of consumption during installation

Renewables & systems

Systems

Heating system :

- Geothermal heat pump

Hot water system :

- Condensing gas boiler

Cooling system :

- Others

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Heat Pump on geothermal probes

Other information on HVAC :

The building has been broken down into areas in which the heating and ventilation needs are very different:

- Zone "night" on the ground floor with 12 rooms equipped with sanitary facilities;
- Zone "day" on the ground floor including activity rooms, relaxation, catering, reception and a maintenance office;
- Technical area on the ground floor including the technical premises, the linen room and the household and waste premises;
- Room "staff" area including cloakrooms, offices and meeting rooms.

Heating and cooling of the building are provided only by the building's double-flow ventilation system (CTA with high efficiency rotary exchanger). The ventilation network is divided into three branches at the exit of the double-flow CTA: "night" zone, "day" and "technical" zones and finally "personal" zone.

This separation into three sub-networks is carried out directly in the technical room and each branch departure includes a hot battery and a flow control valve.

This organization allows to group the main organs in the technical room not to intervene in a building housing a sensitive public.

Heating requirements for hot batteries will be provided by a heat pump on 5 vertical geothermal probes of 80 m depth (thermal power 28.8 kW, electrical power 6 kW, exchangers on evaporator and brazed plate condenser, against a current).

In summer, the CAP is bypassed and cooling is provided in geocooling, by recovering the freshness of the soil via geothermal probes.

A buffer tank has been put in place between production and distribution in order to avoid compressor operation in short cycles.

The ECS is produced by a semi-instantaneous gas DHW cylinder and is distributed by an over-insulated DHW loop.

Environment

Urban environment

Adjoining plot at Hôpital Louis Mourier. Suburban fabric, two-lane road in front of the plot, sports field in the back.

Products

Product

Gold RX 8 TOP

Swegon

Responsable Agence IDF / Nord 01 45 15 09 70

<http://www.swegon.com>

Product category : HVAC, électricité / ventilation, cooling

CTA double flow



WWP S 26 ID

Weishaupt

WEISHAUPT - PARIS 9 Avenue de de l'Epi d'or 94807 Villejuif Tel: 01.45.60.45.62

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

Product category : HVAC, électricité / heating, hot water

Reversible PAC on geothermal probe. In summer, geocooling bypassing the CAP. The heat pump is connected to batteries on the start of the ventilation networks

Geothermal energy was chosen by the tablecloth of the Seine is close



Geothermal probes

Weishaupt – Geoforage

Christophe LUTTMANN luttmann@weishaupt.fr www.weishaupt.fr

<http://www.weishaupt.fr/produkte/waermepumpen/waermequelle-erde/waermequellen-erschliessung>

Product category : HVAC, électricité / ventilation, cooling



Costs

Construction and exploitation costs

Renewable energy systems cost : 40 000,00 €

Cost of studies : 141 290 €

Total cost of the building : 1 626 831 €

Subsidies : 60 000 €

Health and comfort

Indoor Air quality

Double flow ventilation with high efficiency heat recovery

Comfort

Health & comfort :

Filtration of fresh air on the CTA

Carbon

GHG emissions

Contest

Reasons for participating in the competition(s)

Le programme de l'opération visait initialement la RT2012 mais la Maîtrise d'ouvrage avait déjà exprimée sa volonté d'utiliser la géothermie, des panneaux de bois massifs (CLT) et des épaisseurs importantes d'isolants en fibre de bois. La résistance thermique de l'enveloppe du bâtiment était donc déjà bien plus performante que ce qui aurait été prévu pour un bâtiment RT2012. Les calculs réglementaires et les simulations réalisés en début de projets montraient que le bâtiment était proche des consommations de chauffage d'un bâtiment passif.

L'équipe de maîtrise d'œuvre a donc proposé à l'APHP d'améliorer le bâtiment pour atteindre les performances d'un bâtiment passif, ce qui représentait plusieurs avantages :

- Pouvoir se passer d'équipements de chauffage dans le bâtiment : Etant donné les comportements à risques de certains patients, les risques de blessures étaient trop importants avec des radiateurs. Le plancher chauffant aurait bien répondu à ce risque mais étant données les faibles consommations, ces équipements auraient de toute façon été peu utilisés.
- Simplicité de conception et d'exploitation en n'utilisant aucun réseau de chauffage et émetteurs de chaleur dans le bâtiment.
- Le coût des améliorations à prévoir était raisonnable : Choisir une CTA double-flux avec un excellent rendement, renforcer
- En visant le niveau passif, le projet a pu recevoir des aides de l'ADEME dans le cadre du programme PREBAT, ce qui a couvert une partie des surcoûts

Ne pas utiliser réseaux de chauffage dans un bâtiment tertiaire présente cependant un point sensible : Le bâtiment est divisé en 3 zones au niveau de la CTA. Le chauffage est assuré uniquement par une batterie chaude sur le départ d'air neuf de chaque zone. La consigne de chauffage est adaptée en fonction de la température mesurée sur l'air de chaque réseau retour.

Building candidate in the category



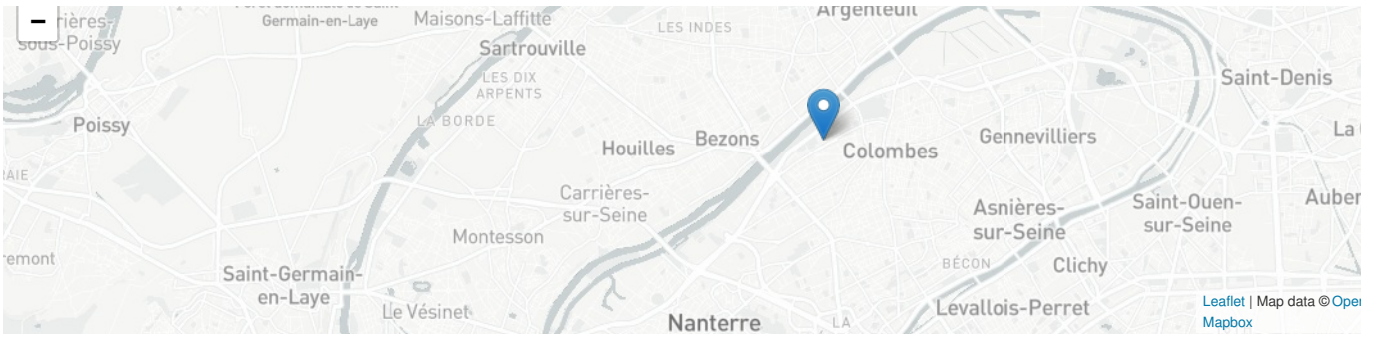
Santé & Confort



Coup de Cœur des Internautes



Prix des Etudiants



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