


Scientific University of Bordeaux

by FRANCK BOUTTE CONSULTANTS / 2015-06-23 16:57:17 / Francia / 18289 / FR

Extension + refurbishment



Primary energy need :

39 kWhep/m².an

(Calculation method :)

ENERGY CONSUMPTION

Economical building *Building*

< 50	A	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 : School, college, university
Construction Year : 1961
Delivery year : 2015
Address 1 - street : Cours de la libération 33400 BORDEAUX, France
Climate zone : [Cfc] Marine Cool Winter & summer- Mild with no dry season.

Net Floor Area : 87 000 m²
Construction/refurbishment cost : 95 000 000 €
Number of Pupil : 13 000 Pupil
Cost/m2 : 1091.95 €/m²

Certifications :



Proposed by :



General information

As part of the renovation project undertaken on the Bordeaux University campus, design, construction and operational group develops a bioclimatic double skin for the facades of six buildings. This operation, conducted by SRIA (Real state and Development Company) aims the rehabilitation and renovation of existing buildings. This results in a contract between SRIA and a group of an energy performance commitment for heating consumption. Moreover, buildings are designed to obtain: Low consumption building certification (BBC label -Effinergie renovation) and Non-Residential Building HQE certification.

The agency "Franck Boutté consultants" leads specific studies on energy and comfort related to these bioclimatic facades. It was accompanied, by the leader of DV Construction group, Quille construction and a delegate of the general contractor, the agency "AAUPaul Chemetov".

The Campus of the University of Bordeaux presents a homogeneous heritage. Its local colors as well as its supporting structure. The first intention was to maintain view to strengthening the urban, architectural and identity link between buildings spread over almost 2km. This identity and coherent approach is essential to initiate a dynamic and provide a new coherence to life Campus.

Our architectural proposal is respectful of preliminary choices of the architect René Coulon. So we wanted profit of existing buildings qualities; it doesn't means to erase an insulating cladding behind the mouldings, rhythms and tessitura but rather to use the intrinsic qualities of these buildings.

The operation relies on the identity and symbolic continuity of the campus to adapt architectural aspects of fifty years ago with the will of renewed consideration and esteem. Rather than a more prescriptive response - insulating all the buildings from the outside, or a half-measure that would isolate them from the inside, ignoring in both cases their materiality and their original qualities- we chose of bioclimatic façade. This response was born of architectural specificity of existing blades buildings (large imposing volumes, a relatively small thickness, exposing their main fronts north and south) keeping it identity and image while transfiguring the scene inside. Moreover, this decision echoed the need to intervene occupied sites: tertiary buildings for offices and teaching.

Sustainable development approach of the project owner

The contracting authority has the strongly ambition to make of this project "a testing ground for energy efficiency and sustainable development". Indeed, the University of Bordeaux wants to make its campus a "site for experimentation" from the laboratory skills such as:

- Materials
- Civil Engineering
- Thermal and energy
- Carbon footprint
- Photovoltaic electricity
- Economy sustainable development

In addition, the rehabilitation works concern the three inseparable levers of energy efficiency:

- the renovation of buildings
- the use of renewable energy
- optimization of energy equipment.

The contracting authority wants to take in account the HQE-renovation (Certivéa) referential without applying for a certification. However, all buildings are applying to obtain the low consumption building certification (BBC label- Peqa Certivéa referential).

Architectural description

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Moreover, this decision echoed the need to intervene occupied sites: tertiary buildings for offices and teaching.

The hard choice is not to take the easy way, substituting a simple poorly insulated glazing but rather to propose a renewed architecture. A new university, which does not need to erase the past to be sustainable, stand future and face unpredictable developments.

The bioclimatic façade is an evolving principle during the year: it is adaptive, it evolves with climate. We like to say that for this performance (reducing heating requirements by a factor of 5 to 10, primary energy consumption \leq Cep ref -40 % within the meaning of thermal regulations) we do not change the building but the climate that surrounds it, and the seasons. Instead of changing the building according to the terms of environmental regulatory, bioclimatic skin turns cold climate near the surrounding when it's hot and warm when it's cold. And the buffer space created between the glass skin and the existing façade allows energy performance and occupant comfort.

In addition to maintaining the large openings of the buildings without reducing their surfaces, we make generous natural light in all classrooms while renewing the interior comfort without changing the medium.

In winter, the new glass facade absorbs solar radiation and can heat passively the interior of the building. Thus, it constitutes a buffering space around the building. In summer, this front facade opens up and down and creates an air-draft. The air set in motion around the building naturally cools and ventilates interior spaces.

This bioclimatic process is possible thanks to a greater use of modelling tools and climate engineering in all phases of the project. These help to qualify the architectural features while ensuring the quality of atmospheres offered to occupants. These tools take a full part in integrated design processes and performance requirements become a resource for design.

In addition, the innovative character of the project has led to commit a validation process with national authorities (METL / MEDDE) concerning the current thermal regulation (Titre V - METL / MEDDE). The Committee of Experts has approved our request in January 2015 and has certified the compliance with the regulations and a Low consumption building performance (BBC label).

See more details about this project

<http://www.paulchetov.com/>

<http://ronaldirio.fr/indexhibit/>

Stakeholders

Function : Other consultancy agency

Franck Boutté Consultants

agence@franck-boutte.com

<http://franck-boutte.com/>

Bioclimatic design of the facade, thermal studies (Dynamic Thermal Simulation)

Function : Construction Manager

AUA Paul Chemetov

<http://www.paulchemetov.com/>

Agent Architect

Function : Construction company

DV Construction - Quille Construction

<http://www.dv-construction.fr/>

Deputy of the design-build contract

Function : Designer

Debarre - Duplantiers

<http://www.debarreduplantiers.com/>

Associate architect

Function : Designer

Ronald Sirio Architectes

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

Associés Architectes

Function : Other consultancy agency

ECCTA

Structure design office and fluids

Function : Other consultancy agency

Terrell

Façade Design office

Contracting method

Other methods

Energy

Energy consumption

Primary energy need : 39,00 kWhep/m².an

Primary energy need for standard building : 66,00 kWhep/m².an

Calculation method :

Breakdown for energy consumption : Heating: 10.8 kWhep / m².year Fans: 10.5 Lighting: 17.6 Auxiliary: 0.1

Initial consumption : 159,00 kWhep/m².an

Real final energy consumption

Final Energy : 21,80 kWhef/m².an

Envelope performance

Envelope U-Value : 0,74 W.m⁻².K⁻¹

More information :

The existing buildings have a bioclimatic glass facade. This creates a buffer space in winter to minimize heat loss and reduce heating consumption.

Indicator : I4

Air Tightness Value : 1,70

More information

The final energy consumption does not include the specific energy (computers ...)

Renewables & systems

Systems

Heating system :

- Urban network
- Heat pump
- Water radiator

Hot water system :

- Individual electric boiler

Cooling system :

- No cooling system

Ventilation system :

- Nocturnal ventilation
- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

Renewable energy production : 10,00 %

Environment

Urban environment

The project fits into the existing campus of the University Bordeaux 1. The existing buildings are rehabilitated. The new buildings are constructed on the site of demolished buildings. Plots are created and access to public transport are valued to facilitate the movement of users.

Products

Product

Bioclimatic facade

Franck Boutté Consultants

agence@franck-boutte.com

<http://franck-boutte.com/>

Product category : Table 'c21_italy.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '6'

Bioclimatic facade is a glass facade fitted with louvers at the top and bottom to create a bioclimatic space around the existing building. The technical solution developed the University of Bordeaux seeks a "soft" intervention on the building. We like to say that for this performance (reducing heating requirements by a factor of 5 to 10, primary energy consumption \leq Cep Cep ref -40 % within the meaning of thermal regulations) we do not change the building but the climate that surrounds it, and the seasons. Instead of changing the building according to the terms of environmental regulatory, bioclimatic skin turns cold climate near the surrounding when it's hot and warm when it's cold. And the buffer space created between the glass skin and the existing façade allows energy performance and occupant comfort. In addition to maintaining the large openings of the buildings without reducing their surfaces, we make generous natural light in all classrooms while renewing the interior comfort without changing the medium.



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This device has been praised for its innovative and revealing character of the existing architectural heritage.

Costs

Construction and exploitation costs

Cost of studies : 6 000 000 €

Total cost of the building : 95 000 000 €

Contest

Reasons for participating in the competition(s)

Energy renovation

The project proposes an energy renovation solution for buildings based on a double - bioclimatic skin. This concept is currently being developed on the University campus as part of the renovation of 6 teaching and research buildings. It is the crossroads between energy performance and built heritage upgrading.

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Building candidate in the category



Rénovation énergétique

