Aria, Mediatheque and Concert Hall in Cornebarrieu

by Philippe Madec / 2020-06-28 16:15:53 / Frankreich / 11913 / FR

Primary energy need :

103 kWhep/m².an

(Calculation method :)

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 : Concert or conference hall, theater
Construction Year : 2017
Delivery year : 2017
Address 1 - street : Rue du 11 Novembre 1918 31700 CORNEBARRIEU, France
Climate zone : [Cwa] Mild, dry winter, hot and wet summer.

Net Floor Area : 3 135 m²
Construction/refurbishment cost : 8 300 000 €
Number of Seat : 389 Seat
Cost/m2 : 2647.53 €/m²

Certifications :

General information

The building, taken off the ground to mark the wet nature, is part of the landscape along an existing dike.
The accessible and sloping roof wraps around the volumes and offers a panoramic reading garden.
The use of traditional materials of agricultural architecture, wood and mud, perfect its integration in the place.
Inside, the two programs are articulated by three halls, which can be combined in a single space of conviviality.
The natural hybrid ventilation provided by chimneys / sheds allows the natural lighting of the media library.
The backdrop of the village hall opens largely onto the landscape, which then becomes the backdrop.

Assisted Natural Controlled Ventilation and Double Flow in the room, Perf. Ener. Passive, Wood Boiler (natural die), Local materials (raw earth, terracotta).
First French use of structural raw earth brick (ATEX 2016)

Sustainable development approach of the project owner

The contest was aimed at a BBC 2005 Effinergie consumption level. We have reached the Passive level for the Media Library.

Architectural description

The building, taken off the ground to mark the wet nature, is part of the landscape along an existing dike. The building then proposes a crossing hall. It is accessible from both sides, according to the two uses that it offers.

The building is a set of articulated volumes. The two programs housed inside the building generate different volumetrics, taking into account the dissimilar practical requirements. So that these differences do not produce two different buildings juxtaposed, we integrated them in a set which envelops and gives a unique character and compound: this device is the accessible roof whose regular adjustable slope comes to surround the differentiated volumes. A ribbon that wraps around the building gives rise to an architectural path and defines a fifteenth facade.

An outdoor landscaped space is proposed on the roof: "Building feet in the water, head to the sun" or how we move from wet gardens to the treatment of landscaped areas on the roof referring to the pioneer dry environment. It is the panoramic reading garden.

In the North, the media library is open to the ground floor to accommodate. On the floor, it is in mezzanine on the hall. It is lit by chimneys / sheds, which animate the volumetric vertically and participate in the definition of different places of consultation.

The double-height crossing hall is articulated by the raw earth volume of the auditorium.

In the South the Salle de Spectacles is flexible. The various mobile stands and the elevating pit allow multiple configurations.

The back of the stage is open on the garden. The landscape can then become scenery.

An outdoor amphitheater is drawn, depicting the building and management of rainwater. It offers seating in the form of gabions. It also allows the presentation of shows for an audience installed outside.

The specific design of the building by its orientation, the implementation of bio-sourced materials and the treatment of the efficient envelope, allows an efficient management of energy needs and to provide spaces that best meet the various uses provided for in program. The different spaces are oriented according to their specific uses. The media library to the North and East, enjoys a soft natural light conducive to concentration. The West façade set back or protected by shutters also helps prevent overheating and glare at the end of the day. The South Hall almost completely blind protects the hall from overheating summer. The open stage is lit but protected by a roof overhang.

A high-performance envelope isolates all volumetrics from the outside, minimizing thermal bridging and reducing the need for technical systems.

The choice to implement bio-sourced and local materials, such as wood brings a maximum of environmental qualities: low gray energy, carbon stock, durability, reduced maintenance, clean site, etc. but also to all sensible qualities: warmth, gentleness, etc.

The raw earth also allows a hygrometric regulation and an inertia which makes it possible to store the calories and the frigories allowing a passive regulation of the temperature of the spaces (ATEX, wall BTC, First in France).

Heating requirements are below 15KWh / m2.year. The building is therefore said to be passive.

The building is heated by a pellet boiler. The use of wood energy helps to reduce CO2 emissions.

The design of the ventilation is adapted to the two different programs and uses, in order to minimize the systems. The ventilation of the room is performed by a central dual flow to minimize lost calories. The media library and the hall are naturally ventilated by a system of chimneys / sheds which allows the night refreshment for the summer comfort but also the natural lighting and to propose a ubiquitous natural light.

Finally, the rainwater of the building and the plot are managed by a system of valleys that regulates the flow and also participates in the landscaped treatment of the surroundings of the building and the site revealing its wet nature.

Building users opinion

Very satisfied with the building.

If you had to do it again?

Natural ventilation devices are not understood by the safety commission preventing optimal operation of the building. Fortunately we were able to count on the involvement of its users.

See more details about this project

https://www.atelierphilippemadec.fr/architecture/equipements/pole-culturel-_-qe-passif-et-vnac-_-bois-et-terre.html

Stakeholders

Contractor

Name : Ville de Cornebarrieu
Contact : JB. PEDINI, 05 62 13 43 03, jb.pedini@cornebarrieu.fr
http://www.cornebarrieu.fr/

Construction Manager

Name : atelierphilippemadec
Contact : Catherine GOBILLOT, 01 48 04 95 03 , cgobillot@madec.net
https://www.atelierphilippemadec.fr/architecture/equipements/pole-culturel-_-qe-passif-et-vnac-_-bois-et-terre.html

Stakeholders

Function : Others

Coloco

F. DAVID, 01 40 02 09 05, colocofab@yahoo.fr

http://www.coloco.org/
Landscape

Function : Structures calculist

C&E

R. JASNIAK, 01 44 75 48 51, jasniak@ceingenierie.fr

http://www.ceingenierie.fr/
STRUCTURE

Function : Thermal consultancy agency

INEX

G. RHIT (PB/CVC), 01 49 88 81 53, guillaume.rhit@inex.fr

http://www.inex.fr/
Fluids & Environment

Function : Other consultancy agency

SCENE

D. BORLOT, 01 42 57 75 75, dominique.borlot@scene.fr

http://www.scenevolution.fr/
scenography

Function : Structures calculist

AAB

F. ROMARY, 01 42 56 63 31, romary@aab-acoustic.com

http://www.aab-acoustic.com/fr
acoustic

Function : Company

CLEMENT&FILS

P. CLEMENT04 67 69 08 07clement.etfils@wanadoo.fr

http://clementetfils.com/
EQTS SCENIQUES

Function : Company

DEMATHIEU&BARD

P. GARDEIL05 34 46 08 80travaux.toulouse@demathieu-bard.fr

https://www.demathieu-bard.fr/
GO

Function : Company

ARBONIS (SATOB)

R. RINFRAY05 61 88 78 51rrinfray@arbonis.com

http://www.arbonis.com/
CHRP/BARD/MEXT

Function : Company

GB AGENCEMENT

N. LOUPIAS 06 84 33 40 81loupias@gbagencement.fr

http://gbagencement.fr/
INTERNAL JOINERY

Function : Company

COFELY AXIMA

S. KOCIS 06 89 29 97 89steeve.kocis@cofelyaxima-gdfsuez.com

https://engie-axima.fr/
HEAT. / VENTIL

Contracting method

Separate batches

Type of market

Table 'c21_germany.rex_market_type' doesn't exist

Energy

Energy consumption

Primary energy need : 103,00 kWhep/m^2.an

Primary energy need for standard building : 214,00 kWhep/m^2.an

Calculation method :

Real final energy consumption

Final Energy : 193,00 kWhef/m^2.an

Year of the real energy consumption : 2 018

Envelope performance

Envelope U-Value : 0,33 $W.m^{-2}.K^{-1}$

More information :
Part media library: wood frame wall (24 cm insulator - Up = 0.21) and roofing KLH panels (13 cm insulator - Up = 0.14).
Party room: ITE concrete wall (20 cm insulating - Up = 0.19) and vegetated concrete roof (16 cm insulating - Up = 0.15)
Joinery wood double glazing Uw <1.5 W / m².K

Building Compactness Coefficient : 0,34

Indicator : I4

Air Tightness Value : 1,70

More information

the RT2012 was not at the time of the project applicable to halls and media libraries

Renewables & systems

Systems

Heating system :

- Low temperature floor heating
- Wood boiler

Hot water system :

- No domestic hot water system

Cooling system :

- Water chiller
- Floor cooling

Ventilation system :

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

https://www.construction21.org/france/data/sources/users/2826/12020---pro---ventilation-et-traitement-climatique-de-la-mediatheque.docx
Renewable systems :

- Wood boiler

Renewable energy production : 30,00 %

Other information on HVAC :
The innovation of this project is based largely on its assisted natural ventilation system (VNAC), which avoids a mechanical ventilation dual flow costly gray energy and energy use.

Solutions enhancing nature free gains :
VNAC (pas de consommation de ventilation) et sur ventilation naturelle en été (pas de climatisation de la médiathèque)

Smart Building

BMS :
The technical installations are controlled by a centralized GTB

Environment

Urban environment

Land plot area : 8 100,00 m^2

Built-up area : 2 000,00 %

Green space : 3 600,00

Products

Product

Hybrid ventilation turret

EDMONDS

sales@edmonds.com.au

https://www.edmonds.com.au/

Product category : Table 'c21_germany.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 = '19'

Hybrid ventilation turrets can take advantage of the thermal draft to create a natural air movement in the building (between air in facades and extraction by the turret). A micro-fan, associated with a damper and an air quality sensor, can be triggered if the air velocities are insufficient. So we talk about assisted ventilation.

After tuning, the comfort brought by the super-ventilation in summer is appreciated by the users.

Costs

Construction and exploitation costs

Global cost : 8 300 000,00 €

Reference global cost : 8 300 000,00 €

Renewable energy systems cost : 140 000,00 €

Global cost/Seat : 21336.76

Reference global cost/Seat : 8300000

Cost of studies : 7 300 000 €

Total cost of the building : 8 300 000 €

Energy bill

Forecasted energy bill/year : 9 700,00 €

Real energy cost/m2 : 3.09

Real energy cost/Seat : 24.94

Health and comfort

Water management

The EPs of the building and the plot are managed by landscaped valleys that regulate flows.

Indoor Air quality

The woods used are labeled FSC or PEFC. If a wood treatment was necessary, the natural treatments were favored (at least CTB-P + certification of the products used).

The floor coverings, adhesives and gaskets used are class A + and have ECI class VOC emissions according to EMICODE.

The paints used are class A + with VOC levels below 15 g / l for the most part.

Comfort

Health & comfort :

The raw earth participates in the hygrometric regulation and the inertia allowing a passive regulation of the temperature of the spaces.

The ventilation of the room is double flow. The media library and the hall are naturally ventilated which allows night refreshment for summer comfort. Natural lighting is omnipresent.

STDs were carried out in design to evaluate the impact of these provisions on thermal comfort.

Calculated indoor CO2 concentration :
non évalué

Measured indoor CO2 concentration :
non mesuré

Calculated thermal comfort : greater than 28 ° C for 100h on average with a maximum of 30 ° C (by 34 ° C outside)
Measured thermal comfort : between 23 ° C and 27 ° C at noon by 31 ° C outside (measured on 18/07/2017)

Carbon

GHG emissions

GHG in use : 3,00 $KgCO_2/m^2/an$

Methodology used :
Calculation RT2005

Life Cycle Analysis

Eco-design material :

To reinforce the general volumetry and to help the insertion in the place, the selected materials do their services. These are natural materials, already present locally, which therefore use local techniques and materials, carriers of identity:

- The general structure is made of wood, with reference to the large frameworks of the farms and for the ecological qualities of this material. **The wood** gives its main appearance to the project: decking on the roof, unifying peripheral structure that one comes to live, vertical agricultural cladding of the village hall, pleated horizontal cladding of the media library;
- **The raw earth** gives its identity to the project. The independent volumes around the village hall and the auditorium are in mud, like the bricks of raw land present in elevation of the local farms; their straw-yellow color gives its softness to the facade, whose material is always protected by modenature and the overhangs of the roof; thus the earth defines with the wood the relation of the building both to the outside and within reach, to the interior; First in France, in a public establishment, the mud brick is structural inside (ATEX 2016).
- In the same spirit, **terracotta** walls (like Toulouse walls), also present on local farms, complete some volumes around the village hall and especially the ticket office;
- Last material, **concrete** has a technical and environmental function: it constitutes the platform of the isolated base, on stilts, to rise from the ground and avoid the water, to protect the earth from the capillary lifts and to support the garden on the roof. The two main cores make it possible to contravene the wood frame. It is also used to provide the essential mass for the acoustic quality of the village hall and thermal quality for summer comfort; finally concrete is implemented for the safety of technical spaces.

The selected materials are natural, local, identity carriers.

The general structure is in wood, with reference to the large frames of the farms. It is also decking on the roof, vertical agricultural siding of the room, horizontal cladding "plisse" of the media library.

The raw earth is the identity of the project. It is the appropriation of a local technique. Straw yellow, it brings its sweetness to the facade. The material is protected by moldings and overhangs of roofing. First in France, in an ERP, it is structural for the indoor auditorium (ATEX 2016).

Concrete is the platform on stilts, to lift off the ground and avoid water. The two main cores make it possible to counter the frame. It is also used to provide the essential mass for the acoustic quality of the village hall and thermal quality for summer comfort.

Contest

Reasons for participating in the competition(s)

The building, taken off the ground to mark the wet nature, is part of the landscape along an existing dike. The building then proposes a crossing hall. It is accessible from both sides, according to the two uses that it offers.
The building is a set of articulated volumes. The two programs hosted inside the building generate different volumetrics, given the dissimilar practical requirements. So that these differences do not produce two different buildings juxtaposed, we integrated them in a set that envelops and gives a unique and composed character: this device is the accessible roof whose accessible regular slope surrounds the differentiated volumes. A ribbon that wraps around the building gives rise to an architectural path and defines a fifth facade.
An outdoor landscaped space is proposed on the roof: "A building with your feet in the water, your head in the sun" or how you go from gardens in a humid environment to the treatment of landscaped areas on the roof referring to the pioneer dry environment. It is the panoramic reading garden.
In the North, the media library is open to the ground floor to accommodate. On the floor, it is in mezzanine on the hall. It is lit by chimneys / sheds, which animate the volumetric vertically and participate in the definition of different places of consultation.
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A powerful envelope isolates all volumetrics from the outside to minimize the bridges and reduce the use of technical systems.
The choice to use bio-sourced and local materials, such as wood brings a maximum of qualities environmental: low gray energy, carbon stock, sustainability, reduced maintenance, clean yard, etc. but also to all sensible qualities: heat, softness, etc.
The raw earth also allows a hygrometric regulation and an inertia which makes it possible to store the calories and the frigories allowing a passive regulation of the temperature of the spaces (ATEX, wall BTC, First in La France).
Heating requirements are below 15KWh / m2.year. The building is therefore said to be passive.
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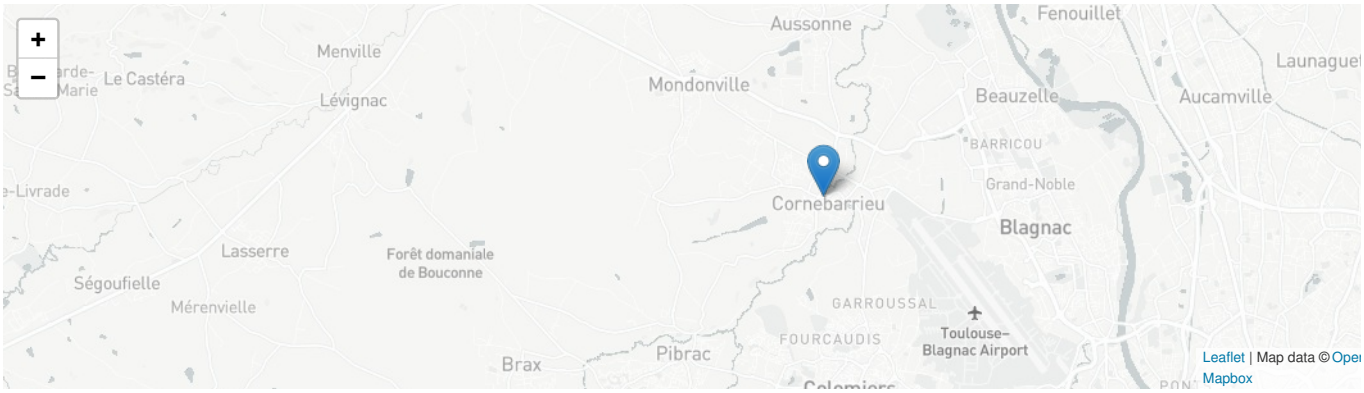
Building candidate in the category

Prix tertiaire & industriel

Trophées
Bâtiments résilients



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