Rehabilitation of a 19th century paper mill into a media library

by Cerema Communication / 2021-03-29 00:00:00 / France / 4946 / FR

Primary energy need :

57 kWhep/m².an

(Calculation method : RT existant)

ENERGY CONSUMPTION

Economical building — *Building*

< 50	A	
51 à 90	B	B
91 à 150	C	
151 à 230	D	
231 à 330	E	
331 à 450	F	
> 450	G	

Energy-intensive building

Building Type : Library, documentation center
Construction Year : 1857
Delivery year : 2016
Address 1 - street : 21 rue de l'Usine 82700 MONTECH, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 1 000 m²
Construction/refurbishment cost : 1 645 000 €
Cost/m2 : 1645 €/m²

Certifications :

Proposed by :

General information

This project aimed to rehabilitate a former paper mill in the Tarn-et-Garonne whose buildings had been unused since 1968. An extension had been added to the 1873 building, so the project includes the complete renovation of two buildings and the extension.

A large-scale renovation

The condition of the building was rather degraded: the framework, the purlin, the rafters, the mechanical tile roofing and the wooden joinery were in poor condition. The building was made of clay bricks and had no thermal insulation or heating system. In addition, its layout was typical of 19th century industrial buildings, with large volumes and wide openings.

An architectural and energy programme

As a candidate for the Midi-Pyrénées region and ADEME Occitanie call for projects "Economical buildings of environmental quality in the Midi-Pyrénées", the project owner focused on reducing the building's energy consumption and on using bio-sourced materials for its renovation. The objective was also to preserve the architecture of the building, in particular the brick walls, the volumes and the openings.

This work enabled the initial consumption of 381 kWhep/m2.year to be reduced to 57 kWhep/m2.year.

Result: a low-carbon cultural centre

The building currently houses a media library, a games library, a cyberbase and an exhibition room. The different spaces are defined by sliding systems, but which still allow a certain flexibility. This heritage renovation meets the BBC Rénovation objectives, i.e. 40% less energy consumption than the RT reference.

Sustainable development approach of the project owner

The client has particularly focused on energy performance as well as on biobased materials to conceptualize this building.

A lot of work has been done on the wood joinery: the existing ones have all been renovated and others have also been added. Aluminum joinery was installed: triple glazing (Uw = 1.1 W / m2.K) for the north wall and double glazing (Uw = 1.5 W / m2.K) on the other walls. Against heat loss, airlocks have been designed at the glazed entrances to the building.

The insulation of the west and east facing walls is made of bio-based materials (30% hemp fibers, 60% wood fiber and 10% textile fibers). To fit out the interior of the building, an internal structure in poured concrete accentuates the inertia of the building and creates a nice contrast with the bricks. The furniture and the stairs are made of wood.

Architectural description

The architectural ambition was first of all to preserve the heritage spirit of the building. For this, the long lengths of the old paper mill have been preserved and at the level of the outer walls, the original bricks have not been changed, only brushed and repointed.

Regarding the high floor, the mechanical tile roofing as well as the frame, purlins and rafters have been changed. The farms have been preserved. The ceiling is insulated with rock wool (2 x 100 mm and 30 mm black rock wool).

The low floor is a carried floor, with a 20cm concrete slab and an 8.5cm cork underside insulation. This makes up all the walls in contact with the exterior, but it can be seen at the level of the brick pillars. However, the aluminum joinery brings a certain modernity to the architecture of the building.

See more details about this project

http://www.rehabilitation-bati-ancien.fr/fr/retours-d-experiences/reconversion-dune-ancienne-papeterie-en-une-mediatheque-respectueuse-du

Photo credit

CREBA

Stakeholders

Contractor

Name : Communauté de communes de Garonne et Canal
http://www.grandsud82.fr/la-communaute/territoire-et-communes/

Construction Manager

Name : CASCARIGNY ARCHITECTES
Contact : M. RAYMOND CASCARIGNY : 0563636331 / 17 PLACE NATIONALE 82000 MONTAUBAN

Energy

Energy consumption

Primary energy need : 57,00 kWhep/m^2.an

Calculation method : RT existant

Breakdown for energy consumption : Ep consumption concerns the media library

Initial consumption : 381,00 kWhep/m^2.an

Renewables & systems

Systems

Heating system :

- Individual gas boiler
- Heat pump
- Water radiator
- Low temperature floor heating
- Solar thermal

Hot water system :

- Other hot water system

Cooling system :

- No cooling system

Ventilation system :

- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Solar Thermal
- Heat pump

Other information on HVAC :

The heating of the building is provided by the underfloor heating present throughout the building and water radiators for regulation by use. The water which circulates in the floor and the radiators is heated thanks to three devices: a water / water heat pump + a solar concentrator positioned on the roof of the extension + a back-up gas boiler which makes it possible to supplement the two other devices do not achieve the desired temperature in the building.
As the DHW needs are low, electric cumulus clouds have been installed near the sanitary facilities.
The ventilation is coupled with a BMS which manages the opening of the windows for night ventilation.

The water / water heat pump uses water from the canal. It sends water at 45 ° C to the underfloor heating and water at 70 ° C to the radiators (which can be regulated). The solar concentrator heats a heat transfer fluid, which itself will heat the water in the heating circuit thanks to an exchanger.

Environment

Urban environment

The building is located near the lateral canal to the Garonne, the construction of which was completed in 1856.

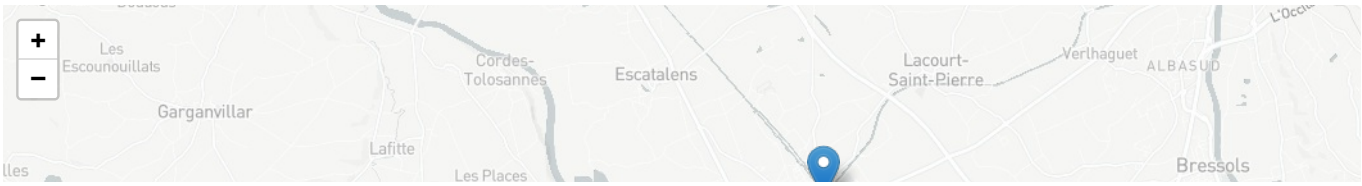
The surroundings of this media library were also worked on during the work. A pool was created behind the building which communicates with the canal, thus allowing the use of water as a cold source for the heat pump (PAC). Visitors can enjoy the outdoor spaces because a terrace is reserved for them.

Costs

Contest

Reasons for participating in the competition(s)

- Ce projet concernant la remise en service d'un bâti existant aux normes énergétiques actuelles, il est donc de fait durable.
- On a choisi des matériaux biosourcés pour l'isolation, le mobilier et les escaliers sont en bois.
- Une pompe à chaleur ainsi qu'un concentrateur solaire ont été mis en place pour assurer le chauffage du bâtiment;
- Ce projet répond aux objectifs BBC Rénovation : diminution de 40% de la consommation énergétique par rapport à la référence RT.



Date Export : 20230520183934