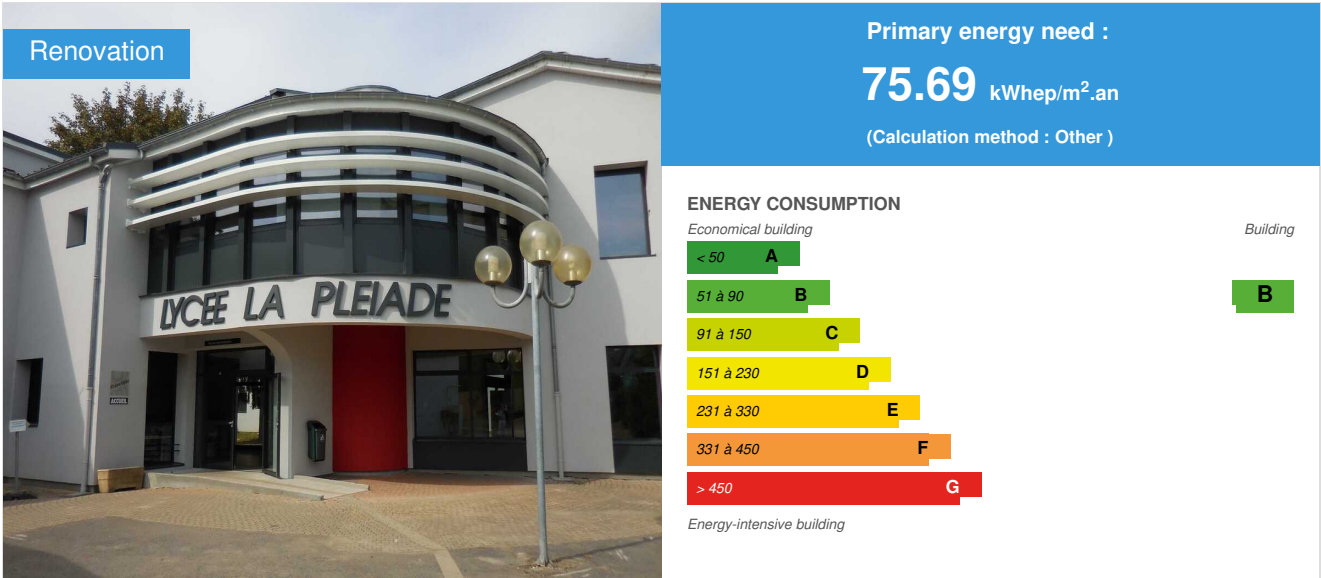


Renovation of the Lycée la Pléiade in Pont de Chéruy

by Ludovic GUTIERREZ / 2021-02-23 10:02:14 / France / 4532 / FR



Building Type : School, college, university
Construction Year : 1987
Delivery year : 2016
Address 1 - street : Rue du Repos 38230 PONT-DE-CHÉRUY, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 13 450 m²
Construction/refurbishment cost : 5 142 891 €
Cost/m² : 382.37 €/m²

Proposed by :



General information

This case study presents the renovation on an occupied site of the La Pléiade teaching high school in Pont-de-Chéruy (38), carried out in 2015 by the SPL OSER.

Renovation on an occupied site

The school provided lessons continuously throughout the work. Operations therefore had to adapt to this constraint. The choice was made to carry out most of the work during the school holidays. For work carried out during the course, such as insulation from the outside, days such as Saturday and Wednesday afternoon have been favored in order to avoid noise pollution. A great deal of consultation with users and planning was carried out to organize the site. Thanks to this, there was no need to relocate the classes during the work.

Do with the existing architecture

The project leaders have chosen to keep the atypical architecture of the school. Indeed, during its construction, the architects decided to create an establishment with a complex shape. The joinery in particular presented cases and shapes quite varied. There were also large windows and curved walls, which had to be accommodated in the renovation. The promoters of the renovation project also had to take into account the very location of the school in space, which is organized like a small village with a central alley open to the city. The former architects who worked on the construction of the school were consulted and gave

their agreement on the renovation project.

A contract that includes energy performance guarantees

The renovation of the school is based on an Energy Performance Contract (CPE) signed for 10 years. Efficient heating systems have thus been installed by the consortium, in order to guarantee satisfactory results. The two existing boilers were replaced by two gas condensing boilers, supplemented by a gas heat pump. The DHW equipment was also replaced and hydrojectors installed.

A great deal of work has also been carried out on the envelope: reduction of the glazed surfaces, provision of inertia in the building by the external insulation (16 cm, $R = 4.2\text{m}^2\cdot\text{K} / \text{W}$), more efficient joinery, equipped windows sun screens, etc. Over the year 2018-2019, 38.1% of savings in primary energy were achieved for a contractual objective of 27%. The school also provides 16% of its energy consumption through a pre-existing photovoltaic installation, which is included in the CPE. Thanks to its elements, summer comfort is optimal in the establishment.

Sustainable development approach of the project owner

The primary objective of the project is fully in line with a sustainable development approach, since it involves improving the energy efficiency of the building, through extensive renovation work and the installation of efficient energy systems. The economic and social aspects are also present in the project: more than 50% of the services were provided by local VSEs and SMEs and the contract signed with the business group provided for 698 hours intended for people in professional integration. Finally, the project owner wanted to develop an educational component around the renovation: bridges were created between high school teaching, for STIDD classes for example, and the project.

Architectural description

The architect sought a "peaceful" architecture, which reconciles energy performance, summer comfort and simplification of solutions, while meeting the challenges of architectural legibility of the site. Indeed, the school was composed of complex shapes, in islands, without a common color code. The team therefore worked on the openings, colors and materials in order to have a more harmonious and uniform whole (off-white on the facades, anthracite on the joinery, etc.).

If you had to do it again?

Use less carbonaceous materials.

Photo credit

SPL Dare

Stakeholders

Contractor

Name : Région Auvergne-Rhône-Alpes

<https://www.auvergnerhonealpes.fr/>

Construction Manager

Name : SPL OSER

Contact : 5 rue Eugène Faure – 38000 Grenoble / Tél. : 04 76 22 55 34 / e-mail : contacts.sp[a]spl-oser.fr

<https://spl-oser.fr/>

Stakeholders

Function : Company

Cuynat Construction

Tél. : 0476560610 / accueil.cuynat[a]cuynat.gcc.fr

General contractor - Agent

Function : Designer

SCP Ludmer & Bouvier Architectes

Tél. 04 76 41 14 76

<http://ludmer-bouvier.fr/>

Function : Thermal consultancy agency

SINTEC

Tél. : +33 4 73 91 50 50

<http://www.sintec.fr/>
Specialized in energy efficiency

Function : Site manager
DALKIA

<https://www.dalkia.fr/fr>
Maintenance and operation

Contracting method

Other methods

Energy

Energy consumption

Primary energy need : 75,69 kWh_{ep}/m².an
Primary energy need for standard building : 121,82 kWh_{ep}/m².an
Calculation method : Other
Initial consumption : 121,78 kWh_{ep}/m².an

Real final energy consumption

Final Energy : 51,92 kWh_{ef}/m².an

Envelope performance

Indicator : EN 13829 - q50 » (en m³/h.m³)
Air Tightness Value : 2,30

More information

The initial final energy consumption was 91.7 kWh_{ep} / m².year

Renewables & systems

Systems

Heating system :

- Condensing gas boiler
- Heat pump

Hot water system :

- Condensing gas boiler
- Heat pump

Cooling system :

- No cooling system

Ventilation system :

- Single flow

Renewable systems :

- Solar photovoltaic

Renewable energy production : 16,00 %

Other information on HVAC :

The heat pumps operate on gas.

Smart Building

Environment

Urban environment

The school is located on a hill, near the center of the village. The area is peri-urban: the surroundings are mainly made up of housing, large commercial areas and a park. Initially conceived as a link between the different areas of the district with its internal "street", the school gradually lost this ambition, in particular following the closure of one of the entrances. The renovation project thus aims to reaffirm the place of the establishment in the district by adapting it to the challenges of our time and to the transformation of the district.

Products

Product

Natural gas A / W absorption heat pumps

ROBUR

phone +39-035-888.111 fax +39-035-884.165

<https://www.robur.com/>

Product category : HVAC, électricité / heating, hot water

Absorption heat pumps operate using a classic thermodynamic cycle. The surrounding thermal energy from different sources (air, water, soil) is brought, using a refrigerant, from a relatively low temperature to a higher temperature level. For these systems, the compression step is carried out using a natural gas burner and the refrigerant / absorber pair used is the NH₃ / H₂O pair: ammonia (refrigerant) with a very low GHG impact, and water (three sources of heat are used:

- the condensation of the refrigerant,
- the absorption reaction between the refrigerant and the absorbent,
- the possible recovery of heat from the combustion products

Absorption heat pumps have a COP on high primary energy (1.5 to 1.7), which depends very little on the outside temperature. They manage to maintain a high COP, close to nominal, in cold or negative outside temperatures, and protect themselves against the phenomenon of icing. These systems have good reliability explained by the few moving parts. Model: 5 non-reversible A / E absorption heat pumps, 35kW thermal unit power.



Costs

Construction and exploitation costs

Cost of studies : 400 000 €

Total cost of the building : 4 800 000 €

Energy bill

Forecasted energy bill/year : 77 000,00 €

Real energy cost/m² : 5.72

Real energy cost/Pupil : 90.59

Health and comfort

Indoor Air quality

The high school classes are equipped with CO₂ probes with indicator lights.

Carbon

GHG emissions

GHG in use : 7,00 KgCO₂/m²/an

Contest

Reasons for participating in the competition(s)

La rénovation énergétique est un grand chantier pour les établissements scolaires, qui ont souvent des déperditions énergétiques importantes mais qui manquent de fonds pour engager des travaux importants.

La rénovation de ce lycée est exemplaire en tout point. Elle montre que c'est possible de réaliser des travaux très performants pour un établissement public et d'installer des équipements de production d'ENR, avec des résultats plus que satisfaisants.

Cette étude de cas présente également un modèle original : la signature d'un Contrat de Performance énergétique pour 10 ans, qui garantit ainsi les résultats de performances énergétiques. Cela pourrait être un modèle pour les établissements scolaires qui souhaitent s'engager dans la rénovation de leurs bâtiments.

Building candidate in the category



Energie & Climats Tempérés



Date Export : 20230409165442