

MountEE - Energy efficient and sustainable building
in European municipalities in mountain regions
IEE/11/007/SI2.615937

BEST PRACTICES AS FOR SUSTAINABLE CONSTRUCTION AND RETROFITTING OF BUILDINGS IN THE RHÔNE-ALPES REGION

RENOVATION OF THE TOWN HALL OF TOURNON (73)



Introduction

The town of Tournon is very sensitive to the environment and energy savings as well as renewable energy: monitoring energy consumption of the town in 2006, the implementation of a wood boiler in the school from 2005, actions on public lighting ...

It encourages its citizens to optimize their energy consumption under construction, renovation or simply housing improvement. Wishing to be exemplary, the municipality launched in 2007 an ambitious operation in terms of the environment and energy efficiency: the retrofitting of the town hall and the creation of rental housing for people accumulating economic and social difficulties.

Context and objectives

The building had many problems to solve, including:

- A roof in poor condition
- Many old joinery
- A lack of insulation of walls and facades
- A lack of insulation in low slab (wood floors on underfloor)
- Many problems as regards air tightness generating great discomfort
- A mainly electric heating (very expensive)
- Obsolete housing

The willingness of the municipal team on this project was to significantly improve the comfort inside the building making it airtight, wrapping the building with efficient insulation. The team also wanted to use renewable energies. This project had also take into account the accessibility of the building for people with reduced mobility and meet the standards of safety.

Description

Building use.

Town hall and housing

Surface du bâtiment.

Total SHON: 365 m²

Heating

Connection to the pellet boiler wood created in 2006 (located close to the town hall in the school)

Two independent circuits with sub-metering (one for housing and one for the town hall)

Domestic hot water

For housing, production of domestic hot water is provided by 4 m² of collectors in the roof connected to a hydroaccumulation tank of 300 liters with electrical backup.

Heat Distribution

The distribution of the heat is provided by a network of radiators.

Ventilation

Controlled mechanical ventilation is a Air Handling Central whose efficiency is higher than 80% (blowing and exhaust air) installed to meet the regulatory needs of ventilation.

Lighting and electrical equipment

The lighting of the town hall is provided by 600mm * 600mm lamps including compact fluorescent lamps.

On the town hall, a centralized extinction allows the final user to easily turn off all offices.

Insulation and joinery

30cm mineral wool for the ceiling of the floor

20cm polystyrene TH32 + 45mm outdoors indoors
 (total wall R = 6.53 W / m². K)
 14cm styrofoam under the lower floors
 10cm in feet of frontage
 Windows (4.16.4 Low Emissivity ARGON) and oak French windows (U_w = 1.4 W / m². K)
 Gateway SAS (U_w = 2.6W / m². K)

Air tightness of the building

- Plugging Back of all the "holes" in the basement slab
- Demolition of the floors on wood crawlspace
- Tuck cracks plaster, placing an efficient vapor barrier unperforated through the establishment of a second ceiling
- Tuck cracks of walls
- Positioning rabbet joinery with double seals
- Conviction door seals on performance, access to attic or basement

Test air tightness: I4 value (m³/h.m²)
 Accommodation:
 New housing target BBC m³/h.m² = 0.6
 Objective BBC housing renovation² = 0.8 m³/h.m²
 Result in situ m³/h.m² = 0.25 (70% gain)

Town Hall:
 Tertiary objective BBC renovation² = 1.7 m³/h.m²
 Result in situ m³/h.m² = 1.1

Renewable energies

Connection to district heating supplied by a pellets wood boiler.
 Implementation of a solar thermal production system of domestic hot water for housing (4m² collectors)
 Establishment of a production system of photovoltaic power on the building :
 Power: 9 kWp / Cost: 45 000 € HT / Return time off grants: 12.1 years
 Photovoltaic production between January 2011 and February 2012: 12,598 kWh - Revenue € 7,533.60

Final energy consumption *(heating, domestic hot water, running auxiliaries, ventilation and lighting).*

PEC project : 36,8 kWh/m²/year
 (PEC reference RT2005 – applicable thermal regulation : 154.10 kWh/m²/year).

Consumption of the buildings before works	93 400 kWh/year
Reference consumption RT2005 (applicable thermal regulation) :	46 000 kWh/year
Consumption expected	31 300 kWh/year (Heating consumption recorded between January 2011 and February 2012: 16,474 kWh (Hall) 1886 + kWh (residential) ie heating consumption very close to the expected consumption.

Budgets, costs and financing

Total cost of the operation : 495 688.65 € exclusive of tax

- Additional costs linked to additional energy efficiency: 30% for new buildings most value BBC is estimated between 8 and 12%. This was significantly more value exceeded for this rehabilitation. This is explained by the structure of the building (eg thermal insulation inner plate at the war memorial in front).
- 42 750 € HT photovoltaic

ie a cost (excluding photovoltaic) of 1241 €/ m²

Total cost of works : 495 688 €HT

Subsidies : 101 257 € HT (20%)

Self-financing : 394 431 € HT (80%)

Main results

	Energy Performance
PEC* before renovation	154.1 kWhep/m ² SHON /year
Cep* after renovation	36.8 kWhep/m ² SHON/year
Expected results	76,1% (criteria : 60% of the reference consumption achieved)

* - for uses : heating, domestic hot water, lighting, ventilation, cooling and electrical auxiliaries

Standard BBC renovation achieved

Analysis of lessons and success factors

Mentioning objectives in the tender documents, describing solutions to implement, inform the companies what is achieved is the result of a united labor, inviting companies for a day of training and to the tests in situ has led to the success of the project. The guarantee of results stimulates business and make them careful to the work of all.

Main difficulties:

- Characteristics related to BBC not sufficiently taken into account by the craftsmen who responded on the basis of a classical rehabilitation.
- During work: the need for high availability of contractors and continuous monitoring by the responsible for works of the municipality.

Dates and duration

Deliberation : 2007

End :September 2011

Contact

Town hall of Tournon

Mairie : Chef- Lieu 73 460 TOURNON Tel 33 04 79 38 51 90 Email Tmairie.tournon@wanadoo.fr

info@mountee.eu - www.mountee.eu