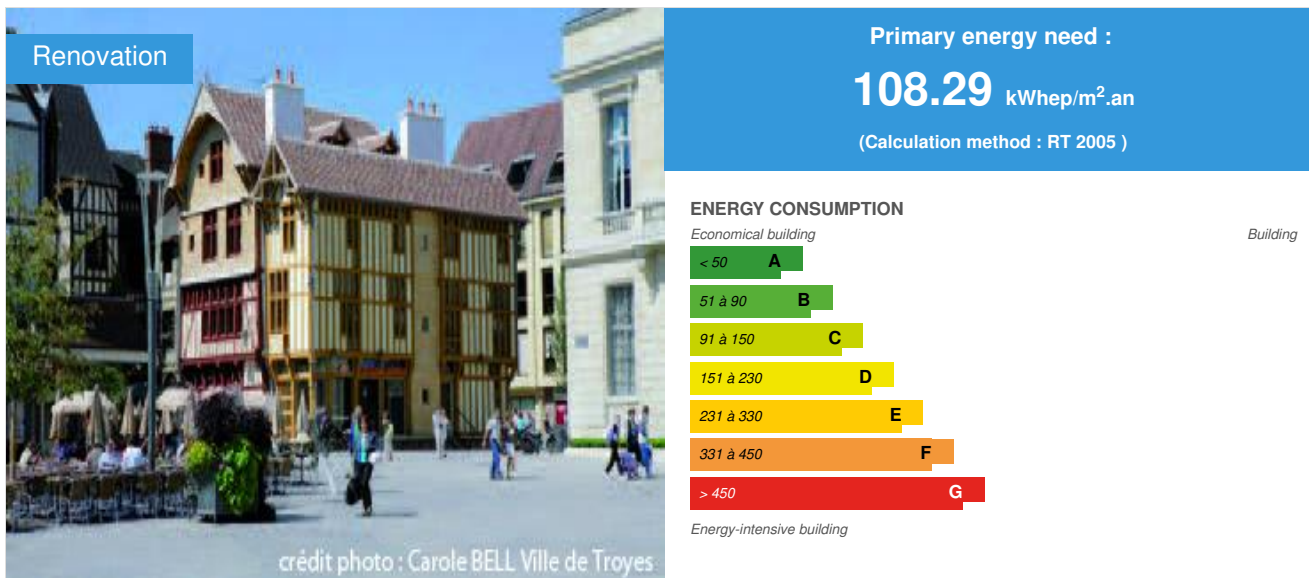


## Tourist office of Troyes

by Aude CATOIRE / 2014-09-05 14:50:21 / France / 6793 / FR



**Building Type** : Other building  
**Construction Year** : 1550  
**Delivery year** : 2013  
**Address 1 - street** : Rue Aristide-Briand 10000 TROYES, France  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 712 m<sup>2</sup>  
**Construction/refurbishment cost** : 2 638 000 €  
**Number of none** : 100 none  
**Cost/m2** : 3705.06 €/m<sup>2</sup>

**Certifications :**



### General information

This operation adopts an environmental quality approach and aims for the BBC Renovation label thermal performances. The building won the PREBAT 2011 call for proposals of Champagne-Ardennes "Efficient réhabilitation with environmental quality" supported by the regional delegation of ADEME and the Région Champagne-Ardennes.

**Goals:**

- Consolidate the premises of the Tourist office of Troyes and municipal services in charge of the city promotion in a place symbolizing the architectural heritage of the city.
- Restore and renovate the ancient building in accordance with the conservation and development plan (PSMV) and in line with the transferability and the parcel plan from the 13th Century.
- Valorize and preserve the representative marks of the building evolution, especially concerning the façade.
- Adapt a 16th Century building made with wood panels to a public access building (ERP) while ensuring users comfort and respect of accessibility, acoustic

and thermal regulations.

## Sustainable development approach of the project owner

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The environmental profile of this operation mainly aims for: energy management, hygrometric and acoustic comfort, air quality, the choice of construction processes and products and management of a low environmental impact building site.

This project combines heritage development and adaptation to use thought building accessibility, care for energy performance and comfort users. Use of materials, such as hemp, that have properties of hygrothermal regulation, contributes to achieve satisfactory comfort and air quality inside the building. An acoustic study was conducted in order to reduce exterior noise perception and interior noise propagation. Further analyses (a dendrochronology study in order to dating wood and analyzing pigments) have confirmed restoration choices of the project.

To minimize the environmental impact of demolitions and observe the existing provisions, the materials in place have been carefully sorting aiming to maintain maximum of it: reuse of joists, wood beams and adapted structural supplements, restoration of stones and bricks chimney. Also, local materials have been privileged: stone, hemp, oak, poplar, terracotta tiles or Burgundy ocher for coats and paints.

### Bioclimatism

- Hemp concrete contributing to the thermal inertia of the building
- Double windows assembled on adjustable pivots (for part of the extension)

### Hemp uses and characterization:

This project gives a large place to the hemp concrete use. It is used to fill the timber frame, the insulation of roof and existing basement screed. It combines respect of constructive traditions, contemporary application, energy performance and environmental impacts limitation. Its implementation is followed by an energy monitoring program and a characterization of construction hemp. The city of Troyes wishes to promote this local resource. Its goal is to prove the viability and efficiency of this natural material to improve the energy performance of traditional houses of Troyes and its sustainability.

The building has been equipped with sensors inside and outside of the walls in order to analyze the phase difference process, the hygrometry regulation and performance of breathable materials. These reports will be analyzed by a scientific committee of local and national partners (City of Troyes, FRD - research and development fibers-, FFB -Building French Federation-, EDF -Electricity of France-, ADEME Champagne-Ardenne -Environment and energy efficiency agency-, LCDA – the hemp fabric of Aube-, CAPEB -Federation of crafts and small businesses of the building-, ENTPE -national school of State civil engineering-)

### Acoustic management of the building

The structure of the building demanding constraints of limited weight, the floors had to combine sound insulation and lightness. As concretes, even lightweight, were not adapted, the implemented solution consists of gypsum and cellulose plasterboards on a bed of 3cm rivers gravels in a honeycomb structure.

A particular solution has also been designed to manage the problematic of operating noise of the heat pump. The regulation on protected sector and the acoustic regulation made impossible its installation on the outside. So, it has been installed in a technical premise designed as a sound trap.

It has been equipped with an air intake and outlet generously dimensioned to ensure the air intake required for the pump while limiting the runoff and caused noise (dynamic regeneration).

### Lighting:

- Fluorescent lamps and LED with energy-saving
- Motion sensors and magnetic loops
- Building management system (BMS)
- High-performance lighting system controlled for the large group reception room

## Architectural description

The building, whose constructive system and base architectural composition are from the 16th Century, shows constructive evolutions of timber-framed houses typical of Troyes. Acquired by the city and restored for the first time in 1976, it was a nursery and apartments until 2009. The tourist office consists of a timber-framed building from the 16th Century and an expansion.

It is organized on five floors:

- A reception and information space, a shop and an office area on the ground floor
- A training room, equipment and storage premises in the basement
- A group reception room (66 people), toilets and an office on the 1st floor
- Offices, a relaxation room, a kitchenette and toilets on the 2nd floor and in the attic
- Independent public toilets accessible from the public space.

### Construction method

- Timber frame filled with hemp concrete
- Low walls made with mixed stones of Burgundy and bricks
- Foundation walls in white concrete (for the expansion)

### Finishes

- Visible exterior wood-frames, treated with a colored distempers
- Lime coats on the outside and lime and lime/hemp coats on the inside
- Terracotta tiles of the Aube in the basement

- Sanded and waxed Burgundy stones and white concrete finishes on the ground floor
- Linoleum floors on the upper floors
- Breathable paints made of ocher based on linseed oil and Burgundy soil.
- Gypsum and cellulose walls dissociated from the ground

Heritage and resources preservation

The study of the composition of original paints confirmed that wood frames was painted in ochre, browns and green tones from the initial building in the 16th Century. This study has justified the choice of an ochre paint made of linseed oil and Burgundy soil.

She has supported the choice of a painting ocher-based linseed oil and land of Burgundy. A dendrochronology study (wood dating) allows identifying the construction date of the various parts of the building. The restoration choices have been made for the sake of a preservation approach of historical characteristics of different periods (16th-17th Century)

## See more details about this project

[http://www.arcad-ca.fr/documents/Fiche\\_ARCAD\\_Maison\\_Tourisme\\_Troyes\\_Web.pdf](http://www.arcad-ca.fr/documents/Fiche_ARCAD_Maison_Tourisme_Troyes_Web.pdf)

## Stakeholders

### Stakeholders

Function : Contractor

Ville de Troyes

Function : Designer

Claire Perron, architecte du patrimoine, ville de Troyes

Function : Thermal consultancy agency

MCI THERMIQUE

Function :

I.D.S

Function : Structures calculist

Leslie

<http://www.leslie-acoustique.fr/>

Function : Other consultancy agency

Qualiconsult

<http://www.groupe-qualiconsult.fr/>

Function : Company

LEON NOEL SAS sous-traitant : M&M DÉSAMANTAGE

Function : Company

CAPRISTO soustraitant : EXATEC

Function : Company

ACC - Artisans couvreurs de Champagne

<http://www.artisans-couvreurs-champagne.com/>

Function : Company

AM'CO

<http://www.amco-troyes.fr/>

### Contracting method

Separate batches

### Type of market

## Energy

### Energy consumption

Primary energy need : 108,29 kWh<sub>ep</sub>/m<sup>2</sup>.an

Primary energy need for standard building : 185,82 kWh<sub>ep</sub>/m<sup>2</sup>.an

Calculation method : RT 2005

Breakdown for energy consumption : - Heating: 48,686

- Cooling: 5,477

- Hot water: 0

- Auxiliary: 8.732

- Ventilation: 30.692

- Lighting: 14,704

Initial consumption : 205,00 kWh<sub>ep</sub>/m<sup>2</sup>.an

### Real final energy consumption

Final Energy : 41,97 kWh<sub>ep</sub>/m<sup>2</sup>.an

### Envelope performance

Envelope U-Value : 0,92 W.m<sup>-2</sup>.K<sup>-1</sup>

Indicator : I4

Air Tightness Value : 1,70

### More information

Primary energy need calculated on the basis of Th-CE-ex (ex global thermal regulation)

Only conventional uses: Level of Renovation BBC Label for tertiary buildings in 2009

## Renewables & systems

### Systems

Heating system :

- Heat pump
- VAV System

Hot water system :

- No domestic hot water system

Cooling system :

- No cooling system

Ventilation system :

- Single flow
- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

Other information on HVAC :

Heating:

- Aerothermal and reversible electric heat pump with variable refrigerant output (DRV) controlled by temperature sensor and clock
- Supplemental heating by electric battery

### Smart Building

BMS :

BMS for heating, ventilation and lighting

## Environment

### Urban environment

Situated in a protected area, the Tourist office is in the heart of "Bouchon de Champagne", historical center of the town and gives onto the city hall square. The building, whose constructive system and base architectural composition are from the 16th Century, shows constructive evolutions of timber-framed houses typical of Troyes.

## Costs

## Health and comfort

### Water management

Water: valves equipped with an electronic control

### Indoor Air quality

Breathable paints made of ocher based on linseed oil and Burgundy soil.

Ventilation:

- Double flow ventilation controlled by scheduled programming and motion sensors in meeting and group rooms.
- Simple flow extraction to adjoining premises controlled by scheduled programming
- Aerothermal and reversible heat pump regulated by temperature sensor and clock

## Carbon

### Life Cycle Analysis

Eco-design material : Hemp concrete; stone; wood (oak, poplar); lime; terracotta.

