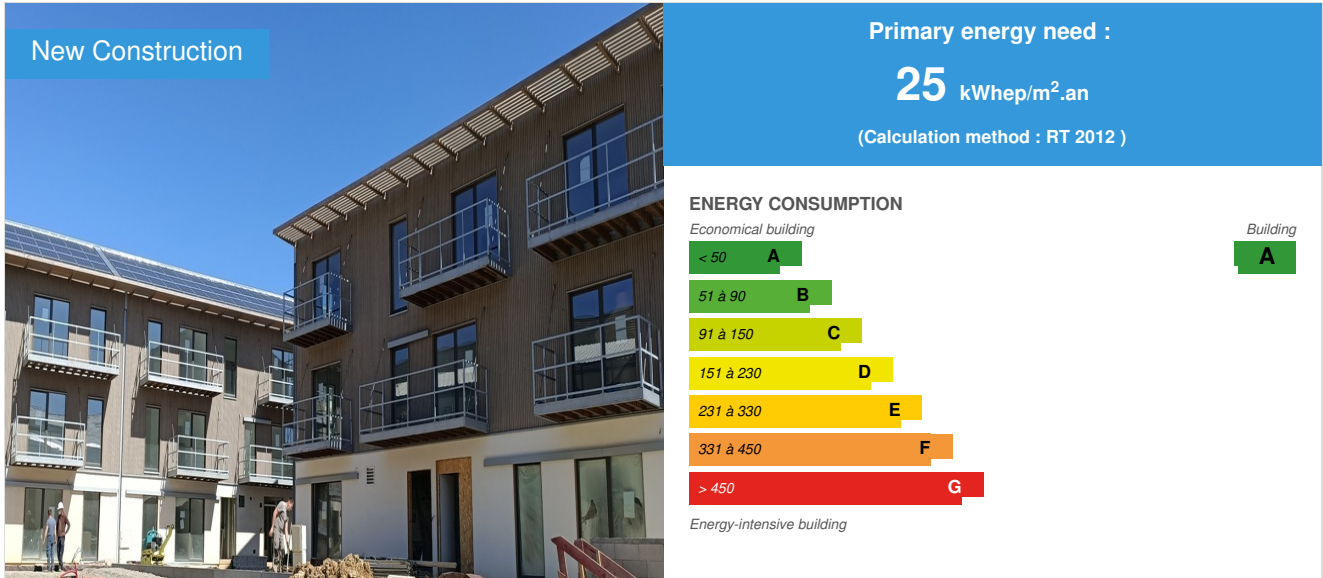


Zero Carbon operation on semi-collective housing

by Stéphane Cochet / 2021-03-19 17:16:51 / France / 9316 / FR



Building Type : Collective housing < 50m
Construction Year : 2019
Delivery year : 2021
Address 1 - street : 99 rue de la ferme du pavillon 77600 CHANTELOUP EN BRIE, France
Climate zone : [Cwb] Mild, dry winter, cool and wet summer.

Net Floor Area : 4 030 m²
Construction/refurbishment cost : 7 790 550 €
Cost/m2 : 1933.14 €/m²

Certifications :



General information

Construction of 58 all-wood housing in social housing, labeled E3C2 and made up of 10 individual housing on R + 1 and 48 collective housing on R + 2 spread over 4 buildings and 6 stairwells. 110 parking spaces including 60 semi-underground spaces. Buildings labeled biosourced building level 3 (use of wood fiber and recycled cotton for insulation) and certified NF Habitat HQE entry level. Pilot project in the experimentation program of the E+C- benchmark led by the ACV IdF community with ADEME, IFPEB, CSTB.

Sustainable development approach of the project owner

Expansiel Promotion is the social home ownership branch of the Valophis group, one of the largest landlords in Ile-de-France with more than 40,000 housing units, and one of the first hlm cooperative to experiment with the BRS.

The group has been involved for more than 5 years in sustainable development and energy management (SMé) initiatives through ISO 50001, ISO 9001 and ISO 14001 certifications.

The Valophis group has integrated a Sustainable Development and Innovation pole within its Department.

The delivery of its new headquarters in Créteil in 2018 is presented as a model of ecological and energy-efficient construction.

Since 2017, Karibati has supported the Valophis group in the systematic integration of bio-based materials in its projects.

The registration of the "Zero Carbon" project as a Pilot Project within the framework of the testing of the E + C- standard within the framework of the ACV IDF Community with ADEME, IFPEB, CSTB, is part of the environmental performance approach and energy of the group.

Architectural description

Project carried out in design-construction with MEHA Charpentes as agent company of the group and TCE wood company.

Competition held in 2015. The project is part of the ZAC of Chêne Saint Fiacre at the entrance to the city of the town of Chanteloup en Brie, not far from the Val d'Europe.

The architectural part of the project takes up the architectural style in R + 2 developed on the neighboring lot - Terralia / Simeio architectes project - in order to ensure the architectural continuity of the urban ensemble: facades coated on the public space, roofs with 2 sides with cutaway, corner loggia, wooden shutters, balconies and wooden cladding on the inside of the island, built layouts with the effects of broken lines. The facades alternate a composition that plays between facades coated in white and pre-chipped openwork wood cladding, white tile roofs cut out by the galvanized edges of the Nantes gutters, photovoltaic roofs, and cut sides of ventilated wood cladding which echoes the writing of the Briards dryers. The EP descents that punctuate the facades are treated in an open U revealing the flowing water like the Harari project located not far from the operation.

The project reinterprets the Briarde courtyard and organizes the buildings around an interior courtyard closed on 3 sides, dedicated to common circulation and serving each stairwell, framing the common garden of the residence. The creation of a semi-underground car park allows the buildings to be placed on a raised base of 1.00m which draws around the garden an equally raised terrace posing the garden as an open-air theater.

The drop created by this raised terrace is treated with planted moats that bring natural light to the parking lot and create a residential boundary without fencing.

The mainly south orientation of the land allows to install balconies and terraces and living rooms on the south facing facades, nightlife rooms as well as circulation on the north side. The collectives are made up of 4 buildings and 6 stairwells with lift. The 12.00m wide buildings have 8 housing units per cage. 75% of the accommodation is through and 100% of the accommodation has a private outdoor space with a balcony or terrace.

The exterior fittings are based on a "local plant" approach, including landscaped valleys at the edge of the lot to ensure the infiltration of runoff water. 40% of the land is treated in the ground for 16.5% dedicated to roads. Heat island control strategy.

Shared garden in the heart of the island + composting

Typologies:

- Plot of 7845m²
- 10 individuals with G + 1 contiguous in T3 and T4 - 750m² SHAB
- 48 collective spread over 4 buildings on R + 2 and 6 stairwells and elevator in T2 / T3 / T4 - 2943m² SHAB

Average SHAB of the project 64m²

- 110 parking spaces including 60 in semi-underground parking.

Participation in the LCA experimentation community, carbon optimization of the constructive solutions implemented and products:

- timber frame construction and prefabrication, stairs and elevator shaft in CLT, dry sector,
- limitation of excavation with creation of semi-underground parking,
- stabilization of land with lime in road sub-layer (VRD),
- management of EP on the plot,
- anhydrous screeds,
- passive design of the building with centralized double-flow AHU and elimination of radiators in housing,
- work on IAQ and summer comfort with COOL ROOF roofs and revegetation, limitation of ICUs,
- biobased materials (lumber, wood fiber, metis)



If you had to do it again?

in biogas!

See more details about this project

[🔗 label bâtiment biosourcé niveau 3](#)

Photo credit

A003architectes + M'CUB architects

Stakeholders

Contractor

Name : EXPANSIEL PROMOTION - Groupe VALOPHIS

Contact : Karine Augustin karine.augustin[a]groupevalophis.fr

<https://www.expansiel-promotion.fr/>

Construction Manager

Name : M'Cub architectes + A003architectes

Contact : c.hackel[a]mcub.eu: c.hackel[a]mcub.eu et stephane cochet: s.cochet[a]a003architectes.com

<https://www.mcub.eu/> et <http://www.a003architectes.com/>

Stakeholders

Function : Company

MEHA Charpentes entreprise bois TCE

sebastien[a]meha.fr: sebastien[a]meha.fr

<http://meha.fr/>

Function : Thermal consultancy agency

MAYA concept

Pierre Bersand: pierre[a]maya-concept.com

<http://maya-concept.com/>

Fluid, Thermal, Environmental and LCA studies

Contracting method

General Contractor

Type of market

Realization

Energy

Energy consumption

Primary energy need : 25,00 kWhep/m².an

Primary energy need for standard building : 70,00 kWhep/m².an

Calculation method : RT 2012

Breakdown for energy consumption : Heating 5.8 kWh / m².a DHW 26.50 kWh / m².a CMV 20.90 kWh / m².a AUX 2.20 kWh / m².a ECL 3.50 kWh / m².a Prod Elec 33.20 kWh / m².a Level E3 with 103 kWhep / m².a all uses

Real final energy consumption

Final Energy : 102,00 kWh_{ep}/m².an

Envelope performance

Envelope U-Value : 0,25 W.m⁻².K⁻¹

More information :

13.7 bbio (-81%)

Indicator : EN 13829 - n50 » (en 1/h-1)

Air Tightness Value : 0,60

More information

Compact 3 in 1 from Nilan for MI, 20kW condensing gas boiler / staircase for 8 units, a centralized double flow AHU with RC / staircase for 8 units. No radiator in the accommodation - air heating with individualized EC coil per accommodation.

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 :

- Nocturnal Over ventilation
- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic
- Heat pump

Renewable energy production : 28,00 %

Other information on HVAC :

Implementation of Compact 3in1 from Nilan in single-family homes

363m² of PV for a power of 72Wp with 12.9kWh / m². Produced or 28.17% of consumption over 5 uses.

Solutions enhancing nature free gains :

Triple vitrage, CTA à récupération de chaleur, Uparoi <0,15W/méK, Toitures Cool Roof

Environment

Urban environment

Land plot area : 7 845,00 m²

Built-up area : 33,00 %

Green space : 3 138,00

Zac du Chêne Saint Fiacre, EPA Marne / EPA France Developer.

Project located at the entrance to the town of Chanteloup en Brie. Peri-urban territory between town center, commercial zone, agricultural territory, forest. Plateau de la Brie.

Products

Product

Installation of PMR shower on wooden support - zero projection showers

WEDI

Patrick.Vayssie[a]wedi.fr

<http://www.wedi.fr>

Product category : Finishing work / Plumbing - Sanitary equipment

Realization of wooden box integrating the subsequent installation of a ready-to-tile shower tray system for the adaptability of bathrooms for people with reduced mobility

Adaptation of the existing technical advice to the wood support + integration of the acoustic performance



Cool roof in white tiles

Terreal

<https://terreal.com/>

Product category : Structural work / Carpentry, cover, tightness

Implementation of white tiles as a Cool Roof solution with IRS of 86



Compact 3 in 1

NILAN

<https://nilan.fr/compact-s/>

Product category : HVAC, électricité / heating, hot water

Double flow ventilation, DHW production and air vector heating support

Costs

Construction and exploitation costs

Renewable energy systems cost : 62 000,00 €

Cost of studies : 627 385 €

Total cost of the building : 7 792 385 €

Subsidies : 372 960 €

Additional information on costs :

Building instrumentation + monitoring over 3 years = € 42,000

Health and comfort

Water management

Leak rate at the plot <math><0.11 / \text{sec.h}</math> under ten-year rain

Indoor Air quality

Double flux ventilation

75% of through-housing

Comfort

Health & comfort :

double flux ventilation

75% of through housing

fight against Urban Heat Islands (ICU), cool roofs,

summer comfort

Calculated thermal comfort : 20°C

Acoustic comfort :

Qualitel / ACOUBOIS

Carbon

GHG emissions

GHG in use : 586,00 KgCO₂/m²/an

Methodology used :

E + C-

GHG before use : 437,00 KgCO₂ /m²

Building lifetime : 50,00 année(s)

Use in use years : 0.75

GHG Cradle to Grave : 1 023,00 KgCO₂ /m²

C2 with 1.023.7kgeq CO₂ / m²sdp on 50-year DVR for 1.073.72 max with Egés PCE = 436.87kgeqCO₂ / m²sdp for 769.4 max (-57%)

Life Cycle Analysis

Eco-design material :

Wood construction, wood fiber insulation and recycled cotton (Métis), stabilization of land with lime in VRD,

Contest

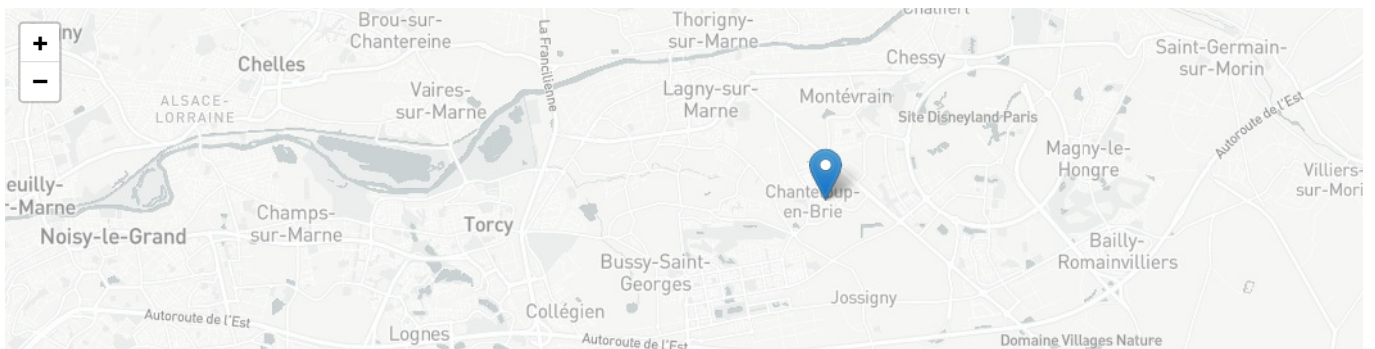
Reasons for participating in the competition(s)

- label E3C2 avec énergie GAZ + ELEC, avec 72kWc de PV
 - conception passive des bâtiments avec Bbio -80%, menuiseries triple vitrage, ventilation double flux centralisée, étanchéité à l'air à 0,6N-1
 - construction tout bois en technique ossature bois et planchers à solivage, cage d'ascenseur et escaliers en CLT, fermettes industrielles,
 - toitures cool roof avec mise en oeuvre de tuiles blanches,
 - stabilisation des terres existantes à la chaux en sous couche de voirie (VRD),
 - limitation des déblais avec traitement des parkings en semi-enterré et ventilés naturellement,
 - label bâtiment biosourcé niveau 3 avec utilisation de Fibre de bois et de coton recyclé (Métis),
 - gestion des EP à la parcelle (noues d'infiltration), rétention en toiture terrasse.
- > Préfiguration de la RE2020 avec 3,25 kgeqCO₂/m².a sur chauffage + ECS (source élec. avec PAC 3 en 1 de chez Nilan) pour les individuels et 7,8kgeqCO₂/m².a pour les collectifs (source gaz chaudière à condensation), PCE <450 kgeqCO₂/m² en ACV statique compris VRD

Building candidate in the category



Bas Carbone



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