


Botanica building in La Chapelle sur Erdre

by Ludovic GUTIERREZ / 2020-12-23 15:09:36 / France / 6976 / FR

New Construction



Primary energy need :

27 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION

<i>Economical building</i>	<i>Building</i>
< 50 A	A
51 à 90 B	
91 à 150 C	
151 à 230 D	
231 à 330 E	
331 à 450 F	
> 450 G	
<i>Energy-intensive building</i>	

Building Type : Collective housing < 50m
Construction Year : 2017
Delivery year : 2020
Address 1 - street : 2 et 8 rue Jean-Louis Foulquier 44240 LA CHAPELLE SUR ERDRE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 3 465 m² SHON RT
Construction/refurbishment cost : 4 868 000 €
Cost/m2 : 1404.91 €/m²

Proposed by :



General information

Botanica is a program of 56 housing units located within the ZAC des Perrières de la Chapelle sur Erdre in the Loire Atlantique department (44). It is one of the two programs located on a plot of which the development was carried out in joint project management:

- "L'Échappée Nature" produced by COGEDIM includes 39 free-access housing units spread over two buildings from T2 to T4.
- "Botanica" produced by the social landlord AIGUILLON will total 45 subsidized rental housing units spread over two buildings (B1 & B2 and B3) ranging from T2 to T5 and 11 home ownership housing (PSLA) ranging from T2 to T4.

An innovative choice for ENR

The Effinergie + label, as well as an energy consumption of at least 40% ensured by renewable energies were required by the developer Loire Atlantique Développement. Aiguillon construction and GRDF have thus decided to experiment with an original solution highlighting the complementarity of renewable energies and natural gas.

One of the objectives was to offer a solution that would reduce charges for tenants by preheating hot water.

Domestic hot water is produced and stored in a 2000 liter tank (see the solutions tab for more information) using an exchanger allowing the transfer of the waste heat from the three Qarnot QB-1 digital boilers. of 2kW each. The DHW temperature at the tank outlet is between 37 ° C and 50 ° C, covering 30% of the needs. Two gas condensing boilers provide back-up during consumption peaks.

The renewable energy mix is supplemented by 60m2 of solar panels intended for self-consumption. Their main function is to supply the commons (elevator, lighting, etc.) to reduce building loads. In the absence of a storage solution, the excess energy is sold.

In order to confirm the simulations of energy consumption, Qarnot, GRDF and the social landlord Aiguillon Construction signed a tripartite agreement. The results of the experiment are pooled through consumption monitoring for 2 years. This monitoring will make it possible to assess the performance of the installation as well as the energy savings obtained in the production of domestic hot water.

A constructive choice anticipating the future

In order to avoid significant disparities in terms of comfort, lighting and energy performance, it was decided not to create housing exclusively facing north or south. The common areas rely heavily on solar gain. This bias contributes to obtaining a Bbio -20% compared to RT2012.

For the structure of the building, the first levels are made of concrete, while the attics use wood.

An E + C- approach

The Carbon Energy initiative was carried out with the aim of showing an innovative solution associating a collective gas boiler with a digital boiler (a first in a new collective building in Pays de la Loire) to preheat domestic hot water and meet E objectives. + C- and the challenges of RE2020. The global approach to energy and environmental performance implemented on this project made it possible to reach the E2C1 level.

For more information on Botanica:

- [Botanica and l'Échappée Nature: two ambitious projects that give new collective housing a sustainable dimension](#)
- [Computer servers heat the water](#)

Sustainable development approach of the project owner

In partnership with GRDF, Aiguillon Construction has decided to bet on the complementarity of energy solutions to reduce the building's carbon footprint during the operating phase. Among the 8 solutions analyzed by Pouget Consultants, two made it possible to meet all the criteria: a dual-use heat pump or a digital boiler with photovoltaic input. It is the latter solution that was chosen because of its low upkeep and maintenance costs, but also the security provided by maintaining a collective make-up gas boiler.

The recovery of fatal heat from computer computers is indeed a major issue today. This choice also makes it possible to optimize the sizing of the boilers without back-up to meet peaks of use.

Aiguillon Construction's approach thus makes it possible to significantly reduce the cost of supplying energy to residents of housing with social access.

Architectural description

Particular care has been taken with the lighting in the apartments and common areas. Thus the buildings of the two projects present on the plot are arranged so as to let light penetrate widely into the halls. The ground floor as well as each landing thus benefit from natural light from bay windows.

All of the accommodation has a view of the green spaces. The perfectly legible halls surround a private patio located in the center of the plot. The white facades of the building are punctuated by wood, materials used for storage on the balconies. The architectural style of the penthouses is extended to the ground by the wooden slats covering part of the North and South facades.

See more details about this project

Photo credit

Aiguillon Construction
GRDF

Stakeholders

Contractor

Name : Aiguillon Construction
Contact : Damien Carpentier
<https://www.aiguillon-construction.fr/>

Construction Manager

Name : Golhen Associés
<http://www.golhen-associés.archi/>

Stakeholders

Function : Thermal consultancy agency

Pouget Consultants

<http://www.pouget-consultants.eu/>

QB-1 Digital Boiler Feasibility Study

Function : Environmental consultancy

Loire Atlantique développement

<https://www.lad-sela.fr/>

Developer of the ZAC des Perrières

Function : Company

GRDF

Hervé Guinard

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

Technical support on the implementation of digital boilers

Energy

Energy consumption

Primary energy need : 27,00 kWhep/m².an

Primary energy need for standard building : 57,80 kWhep/m².an

Calculation method : RT 2012

Breakdown for energy consumption : Primary energy consumption excluding renewable energy (digital boilers + PV) is 45.1 kWhep.m² / year. The renewable energy share in the vine therefore reaches 40.1%. 8.2 kWhep.m² / year are produced by photovoltaic panels and 9.9 kWhep.m² / year by digital boilers, for a total of 18.1 kWhep.m² / year. The consumption breakdown is as follows: - Heating: 17.7 kWhep.m² / year - DHW: 10.9 kWhep.m² / year - Lighting: 3.8 kWhep.m² / year - Ventilation: 2.2 kWhep.m² / year

Envelope performance

Indicator : I4

Air Tightness Value : 0,70

More information

The perimeter of the Botanica project includes buildings B1, B2 and B3 of the plot. The consumption data taken into account here relate to lots B1 and B2.

Renewables & systems

Systems

Heating system :

- Condensing gas boiler

Hot water system :

- Condensing gas boiler
- Other hot water system

Ventilation system :

- Humidity sensitive Air Handling Unit (Hygro B

Renewable systems :

- Solar photovoltaic
- Other, specify

Renewable energy production : 40,10 %

Botanica has an innovative renewable energy production system coupling a digital boiler to photovoltaic panels. This complementarity of energies makes it possible to produce 18.1 kWhep / m². This renewable energy consumption breaks down as follows:

- 8.2 kWhep / m² by photovoltaic panels
 - 9.9 kWhep / m² for the digital boiler.
- The 36 photovoltaic panels of 1.67 m² cover a total area of 60 m².

Environment

Urban environment

The development of the ZAC des Perrières gives pride of place to respecting the hedgerow and the biodiversity initially present on the site. Existing afforestation has thus been preserved. In 2009, the Perrières district received an award in the EcoQuartier competition launched by the Ministry of Ecology, Energy, Sustainable Development and Regional Planning, under "Biodiversity and Nature in city".

The Botanica and L'Échappée Nature projects, which share the plot, are organized around a shared garden that echoes this green environment. The Erdre river, the hiking trails and the various parks are structuring elements in the same way as a pine forest, a body of water and a humid wood.

Products

Product

QB-1 digital boiler

Qarnot

contact[a]qarnot.com

<https://qarnot.com/>

Product category : Génie climatique, électricité / Chauffage, eau chaude

Thanks to the heat released by its 24 processors, the QB-1 digital boiler preheats domestic hot water. Each unit is equipped with a high performance "cold plate" system that conducts heat to convert it into:

- 90% calorie exchange towards preheating water to over 60 ° C
- 10% hot air over 45 ° C

The installation of a QB-1 boiler requires: optical fiber, an electrical connection and a connection to the drinking water network. Each QB-1 digital boiler can provide up to 3 kW of power. The installation of several modules can be done in series or in parallel.



Costs

Construction and exploitation costs

Renewable energy systems cost : 45 000,00 €

Cost of studies : 437 000 €

Total cost of the building : 4 868 000 €

Additional information on costs :

Regarding the cost of renewable energy systems, only the digital boiler was taken into account, made up of 3 modules worth € 15,000 each.

Contest

Reasons for participating in the competition(s)

The building seeks carbon energy excellence by cleverly combining renewable, fatal and traditional energy and the result is there since the project obtains the E2C1 level and the Effinergie + label:

- Domestic hot water preheated by heat recovered from digital servers up to 30% of the need.
- Installation of 36 photovoltaic panels covering a total area of 60 m².
- A well thought out orientation with a reinforced frame.

Conclusion: 40% of the energy consumed is produced on site and of renewable origin.

The comfort of the occupants has been treated with care:

- The energy systems selected make it possible to reduce costs.

- The accommodations are bright and all have a view of the shared green spaces.
- Priority is given to soft mobility and to limiting the impact of cars on the landscape: the bicycle park offers 166 spaces and the majority of cars are parked in the basement.

Building candidate in the category



Energie & Climats Tempérés



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