

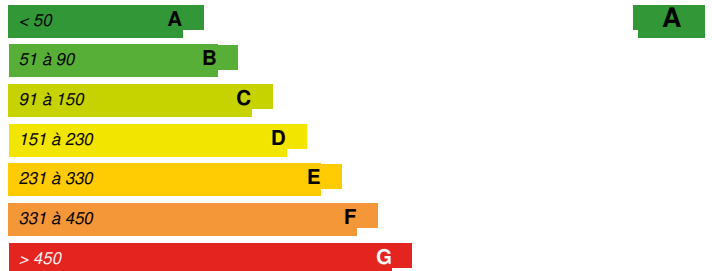
# BSolutions: Certified passive and BREEAM

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New Construction

2



**Building Type** : Office building < 28m  
**Construction Year** : 2011  
**Delivery year** : 2013  
**Address 1 - street** : 5032 ISNES - GEMBOUX, Belgique  
**Climate zone** : [Cbc] Mild, dry winter, warm and wet summer.

**Net Floor Area** : 1 113 m<sup>2</sup>  
**Construction/refurbishment cost** : 1 922 000 €  
**Number of Work station** : 80 Work station  
**Cost/m2** : 1726.86 €/m<sup>2</sup>

## General information

The BSolutions building is a certified "Passive Building" building on 3 levels in the heart of the Créalys science park in Isnes (Gembloux). It is the fruit of the complementarity of the offices of Architects and Studies BSolutions which occupy the building that they designed. It is currently being certified BREEAM, which is the methodology for assessing the environmental performance of the most widespread buildings in the world.

It is a technological showcase NZEB (Nearly Zero Energy Building) of the know-how of BSolutions.

**Watch the video of BSolutions, international winner of the Sustainable Construction Grand Prize of the Green Solutions Awards 2017:**



Building users opinion

For 3 years of occupation of the premises, it is a feeling of comfort and well being of the occupants.

If you had to do it again?

Certain technical aspects of construction can always be better anticipated such as for example the air tightness.

See more details about this project

<https://www.construction21.org/belgique/articles/be/laureat-grand-prix-construction-durable-des-green-solutions-awards-2017-bsolutions-belgique.html>

Data reliability

3rd part certified

## Stakeholders

### Stakeholders

Function : Construction company

Cobelba

Leverit Sébastien, Gestionnaire de chantier, 081 40 14 21

<http://www.cobelba.be/Home.aspx>

Construction of the building

### Contracting method

General Contractor

### Owner approach of sustainability

Certified passive building. No use of fossil energy. Nearly Zero Energy Building: very high energy performance whose energy required to be covered from renewable sources on site.

### Architectural description

The first architectural gesture is a building that snuggles in and interacts with the sun. The building is first of all an intention of compactness. Therefore, the activities are divided into three levels. It is then to partially bury itself, which constitutes a first natural thermal insulation and especially the exploitation of a natural thermal inertia. Adaptation to the place and the context These principles are translated by the articulation of 2 volumes: the first, mineral, oriented full North so as to have, throughout the year, a light as constant as possible avoiding the overheating of local. and the other, organic, oriented along the constructible boundary (South-South-West) with a roof inclined at 35 °. This architectural and technical gesture gives its identity to the building. This roof slope is the cover of integrated photovoltaic panels (optimal orientation to 35 °). This roof is a strong architectural identifier of the building. It is visible from the E42 motorway and the national highway. The building appears in the extension of the ground in which it anchors. In order to reduce unwanted solar energy in the South-oriented rooms, the side facades and the extended roof serve as sunscreens. Structural elements in glued laminated timber are extended to create a natural shade, reinforcing the first architectural gesture. A walkway penetrates the entrance and leads the visitors, users and RMP to the building. Inside the building, the traffic is simple, legible and easy thanks to a buffer zone serving all three levels. This "sas" zone is also a buffer in the passive role of the building. As for the interior layout of the office areas: The non-parallel façades (N and SSO) have generated a central area that represents the circulation path and a sharing space composed of glass offices known as "bubbles": zones of interactions, meetings and work. This transparency within the landscape trays along each facade offers acoustically insulated areas while maintaining a luminous permeability. It was the design of the workspaces (sizing of the offices and storage) which induced the modulation and the implantation of the sails bearing and pierglass in facades. It is the architectural design that defines the structural constructive principles.

[Voir ci dessus](#)

## Energy

### Energy consumption

Primary energy need : 6,40 kWhep/m<sup>2</sup>.an

Primary energy need for standard building : 60,00 kWhep/m<sup>2</sup>.an

Calculation method :

Final Energy : 34,50 kWhep/m<sup>2</sup>.an

Breakdown for energy consumption :

HVAC: 65% Lighting, sockets, IT: 35%

More information :

After delivery of the building, a ventilation audit was carried out and comfort temperatures were adjusted. Acoustic comfort also followed the study of ventilation: silencers installed in certain zones. Optimization of the lighting management according to the natural light supply was achieved.

### Real final energy consumption

Real final energy consumption/m2 : 42,00 kWh/m<sup>2</sup>.an  
Real final energy consumption/functional unit : 42,00 kWh/m<sup>2</sup>.an  
Year of the real energy consumption : 2015

## Envelope performance

Envelope U-Value : 0,30 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The operation of the building is based on the thermal inertia of the envelope.

Indicator : n50

Air Tightness Value : 0,60

## Renewables & systems

### Systems

Heating system :

- Heat pump

Hot water system :

- Other hot water system

Cooling system :

- Reversible heat pump

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic

Renewable energy production : 60,00 %

Photovoltaic roof panels

Solutions enhancing nature free gains :

Glued laminates on the south façade which cause a first shade. Blackout blinds connected to a heliometer and GTC in order to dim light.

### Smart Building

BMS :

DBM6000 DINEC International

Smartgrid :

No digital connection to the control rooms.

Users' opinion on the Smart Building functions : A Building User Guide has been produced in accordance with the Breeam certification application. This document explains the operation of the techniques, mainly lighting. Several specific requests (meeting room, for example) led to derogations.

## Environment

### Urban environment

The BSolutions building is located in the Créalys Science Park. [Http://invest-in-namur.be/fr/parc-scientifique/](http://invest-in-namur.be/fr/parc-scientifique/) The Créalys Science Park offers the advantages of facilitated mobility close to major roads. The Créalys park is served by bus lines. It has a business center offering services such as changing rooms and showers, a gym, ironing services for clothes. The Créalys Science Park offers businesses incubators and business centers.

Land plot area : 5 100,00 m<sup>2</sup>

Built-up area : 10,00 %

## Products

### Product

Heliometer

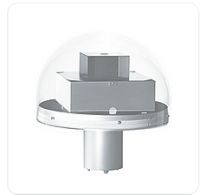
ZUMTOBEL

ZG Lighting Benelux Rijksweg 47 Industriezone Puurs Nr. 442 2870 Puurs Tel: +32 3 860 93 93

<http://www.zumtobel.com/be-fr/contact.html#BE>

Product category : Table 'c21\_italy.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '17'

The heliometer is positioned above the roof of the building and manages the luminaires according to the contribution of natural light. The heliometer is a device equipped with a multitude of photosensitive cells allowing to announce according to different algorithms the entry of light throughout the building. This device is connected to a computer that manages all the lighting according to the given programming. Depending on the stroke of the sun, programming automatically lowers the blinds of the windows on the south side. This prevents glare from computer screens and prevents overheating of the building. This means that artificial lighting (lighting) is in addition to the contribution of natural light, on the basis of a chosen luminous intensity. Example, an office should have 500lux (light intensity), natural light gives us 400lux, the fixture will be dimmed to bring the difference, here 100lux. This allows us to save at least 50%.



The heliometer automatically lowers the blinds but the system can be forced if the timer is not fast enough by the occupants. Since the system is automatic and manually forced, the system is easily accepted.

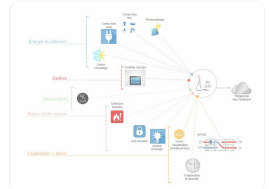
GTC - Centralized Technical Management

DINEC International

30 rue de la gare 1420 Braine-l'Alleud Téléphone : +32 2 389 16 40contact@dinec.be

<http://www.dinec.be>

Product category : Table 'c21\_italy.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '3'



The GTC allows to merge the different techniques (fire, intrusion, access control, lighting) in order to visualize the whole on a supervision screen, and to communicate interactions between these techniques. The GTC allows to monitor the building and generates energy savings thanks to multiple programming described below. Here, for example, what can be found there as interactions: the control of the gray sockets, the value of the electrical meters of each panel, the value of the green meters of the photovoltaic panels of each installation, the state of the anti-intrusion, control of lighting in the event of intrusion, control of the color outlets (see below), ... Thanks to the information of the various meters, we have a view on our consumption, production, .... We combine them in order to produce a global consumption information. To this management is connected a touch screen allowing to find all this information, and commands, ... (placed at the main entrance of the building). This console also serves as a link to access control of the entrance door (biometric reader (fingerprint because building without keys), badge and code). We also have management on some electrical outlets, which is why you find red, orange, green and, in some places, gray outlets. For offices, red plugs, are provided only for PCs (laptops), 24 hours a day. The orange jacks are for screens and laptop, office hours (alarm off). Green plugs are sockets used, for example, for a GSM charger, a wall lamp on the desk, ... devices that can be switched off after office hours. These orange and green plugs are turned off after the alarm is activated, this avoids waste of energy. Access control: To enter our building, we have a door with electric strike, and it is through a biometric reader (also badge and code keypad) that we will release this waste.

The GTC generates an ease of use of the building. This intelligent management generates energy savings but changes the behavior of the users: more key to the building, more codes to start the alarm, real-time monitoring, ...

## Costs

### Construction and exploitation costs

Reference global cost : 1 800,00 €  
Renewable energy systems cost : 100 000,00 €  
Reference global cost/Work station : 1800  
Cost of studies : 245 000 €  
Total cost of the building : 2 376 000 €  
Subsidies : 133 000 €

### Energy bill

Forecasted energy bill/year : 1 000,00 €  
Real energy cost/m<sup>2</sup> : 0.9  
Real energy cost/Work station : 12.5

## Health and comfort

### Water management

Consumption from water network : 50,00 m<sup>3</sup>  
Consumption of harvested rainwater : 70,00 m<sup>3</sup>  
Water Self Sufficiency Index : 0.58  
Water Consumption/m<sup>2</sup> : 0.04  
Water Consumption/Work station : 0.63

Several rainwater tanks are installed and are connected to the GTC. The consumption of water from the network and rainwater is monitored.

## Indoor Air quality

Indoor air quality was developed as part of the building's BREEAM certification, in particular in obtaining the VOC (volatile organic compounds) criterion in the "Comfort and Health" section of the certification.

## Comfort

Health & comfort : The "COMFORT and HEALTH" strategy developed is closely linked to the BREEAM environmental certification in its "HEALTH & WELLBEING" criterion. 36 points were obtained in the following criteria: luminous comfort thanks to high frequency ballast, low impact of VOCs (volatile organic compounds), thermal comfort of the offices, absence of risk related to legionnaire's disease,

Calculated thermal comfort : Le confort thermique a été développé dans le cadre de la certification BREEAM du bâtiment.

Acoustic comfort : The acoustic strategy was very advanced from the design stage: suitable floor covering, acoustic elements in the offices and at the reception. Creation of glass working cells with acoustic glazing. The result is increased comfort at the point of acoustics

## Carbon

### GHG emissions

GHG in use : 4,15 KgCO<sub>2</sub>/m<sup>2</sup>/an

Methodology used :

@ Air Climate

Building lifetime : 100,00 an(s)

## Contest