Belliard 65

by Jérôme Verdussen / 2018-06-05 15:38:08 / Belgique / 11635 / FR

Primary energy need :

83 kWhep/m².an

(Calculation method :)

ENERGY CONSUMPTION

Economical building — *Building*

< 50	A	
51 à 90	B	B
91 à 150	C	
151 à 230	D	
231 à 330	E	
331 à 450	F	
> 450	G	

Energy-intensive building

Building Type : Office building < 28m
Construction Year : 2014
Delivery year : 2017
Address 1 - street : Rue Belliard, 65 1000 BRUXELLES, Belgique
Climate zone : [Dfb] Humid Continental Mild Summer, Wet All Year

Net Floor Area : 5 134 m²
Construction/refurbishment cost : 7 249 000 €
Number of Work station : 490 Work station
Cost/m2 : 1411.96 €/m²

Certifications :

breeam

Proposed by :

archi 2000 MATRI ciel

General information

Heavy renovation of an office building with a ground floor + 7 floors by completely undressing the building with maintenance of the existing structure.
From the point of view of energy performance, the building achieves the "Nearly Zero Energy Building" (NZEB) standard through renewable production and will obtain BREEAM Excellent certification.
The reallocated building has an area of 6.527 m² above ground and 106 parking spaces.

Building users opinion

The building has been completed and rented recently. Full occupation expected by the end of 2018. We do not have user feedback yet. No news, good news, as

we say here :-)

See more details about this project

http://www.matriciel.be/projets/belliard-65/
http://archi2000.be/belliard_65.html

Data reliability

3rd part certified

Stakeholders

Contractor

Name : AXA REIM Belgium
Contact : Alain Verheulpen
http://www.axa-im.com

Construction Manager

Name : Archi 2000
Contact : Jérôme Verdussen
http://www.archi2000.be

Stakeholders

Function : Company

Herpain Entreprise

Francis Miseur

http://www.herpain.be
Main company and pilot company of companies responsible for HVAC (SPIE), sanitary (SPIE), electricity (ITB), elevators (KONE), photovoltaic panels (NIZET) and high voltage cab (NIZET)

Function : Thermal consultancy agency

Matriciel sa

Sébastien Breels

http://www.matriciel.be/
Energy design mission / Natural lighting modeling studies; dynamic thermal modeling; LCC; renewable energy feasibility studies / Special techniques study mission (HVAC / renewable energies / high voltage / sanitary

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Function :

Pirnay Engineering

Dror Zeiger

http://www.bepirnay.be/
Complete stability mission

Function : Certification company

B4F

Jean-Louis Hubermont

http://www.b4f.eu/fr
BREEAM auditor

Function : Assistance to the Contracting Authority

Advisers

François De Bloudts

http://advisers.be/
Project manager for the client

Function : Structures calculist

Venac

Tom Vandervorst

https://www.venac.be/
Office of acoustic study

Function : Company

SPIE

Jean-Marc Bosquee

http://www.spie.be/
Company in charge of HVAC and sanitary batches

Function : Company

ITB

Guy Beysens

http://www.itb.be/
Company in charge of the electricity lot

Function : Company

Kone

Pieter De Neve

https://www.kone.be/fr/
Company in charge of the elevator lot

Function : Company

Nizet

Jacky Landuyt

http://www.vma.be/fr/sites/vma-nizet
Company in charge of photovoltaic panels and high voltage booths

Contracting method

Separate batches

Entreprise principale pour les lots architecture et stabilite et lots separe pour les lots techniques

Owner approach of sustainability

Located at the corner of rue Belliard and rue d'Arlon, close to European institutions, this building, built in the early 90's, had a very good location and visibility, but the architectural quality is behind the times.

In order to meet current and future standards in terms of comfort and energy, and to reinforce its image, the building has undergone a thorough renovation where only the supporting structure has been maintained.

After renovation, no less than 6,527 m² of new and efficient office space, as well as the corresponding services, are deployed on the 8 levels of the building (ground floor + 7). It also has 106 parking spaces.

The relevance of this project mainly concerns, in addition to its integration in a very high-visibility environment, attention to techniques, energy performance and environmental requirements.

From the technical point of view, all the most modern techniques are integrated in the building, and do not be afraid to say it, even with the architecture of the building, we want as proof the rear facade with only photovoltaic panels coating (a first at the time in Brussels) and a roof / awning also perfectly integrated photovoltaic panels.

From the point of view of energy performance, the building achieves the "Nearly Zero Energy Building" standard (NZEB) via renewable production.

From an environmental point of view, he obtains BREEAM Excellent certification.

The interior layout has also been completely redesigned to offer flexible office and flexible floor, including an active suspended ceiling technology.

Each office floor can be divided in two to be occupied for example by two independent tenants.

Simulations in natural lighting and dynamic thermal modeling were carried out in order to optimize the architectural and technical design in order to guarantee the comfort of the occupants.

Attention to future users has also been privileged so that we are not only at work but also in their journey to and from work where all the modes of transport, cars, bicycles and of course people with reduced mobility, cohabit harmoniously.

Finally, and to a lesser extent, this reference makes it possible to illustrate a layout of an interior courtyard studied in close collaboration with an ecologist and a

landscaper for the choice of endemic plants.

Architectural description

In terms of architecture, metamorphosis is radical and part of the energy-efficient approach which prevails to the entire renovation of the building. In a search fair proportions and spaces, the focus has been on surface gain and efficiency optimal trays. As for the facade, the architect worked on the contrast colors and rhythms of full and empty according to the orientations.

The entrance, judiciously repositioned at the intersection of the two streets bordering the building is made via a glazed entrance hall on two levels, majestic and very bright, communicating with a loggia along its length on the 1st floor. Access control is provided for both this main entrance only for visitors accessing the building through the parking (3 basement levels). On the ground floor, a beautiful landscaped and planted garden offers a breathing bubble and very precious tranquility in this bubbling business district. Some benches and some judiciously planted trees suggest a nice parenthesis for lunch or just take a break.

On the first floor, a large terrace directly connected to the garden also allows to enjoy the sunny island interior. Workspaces are not left out. Generous and bright, they offer comfort unmatched. The chassis, almost any height, bring a maximum of natural light on the trays. The flexibility that these trays has been pushed to its maximum to meet the needs specific occupants. The division of a floor can be done in different places which offers a wide range of surfaces available for rent.

Finally, a prestigious terrace revealing a unique view of the European Parliament has been installed on the roof. The entire building has been designed to be accessible to people with mobility scaled down.

From an environmental point of view, the building has a BREEAM Europe commercial certification Excellent level. It is also Passive certified (according to the PhPP software - needs heating and cooling <15 kWh / m².year) and tends towards the standard "Nearly Zero Energy Building "(NZEB).

The overall insulation level is K20 and the energy efficiency level is E50. The building benefits from a double flow mechanical ventilation with recovery of heat. Lighting is provided by high efficiency LED type luminaires in the offices with absence detector. Renewable energies are present mainly in the form of photovoltaic solar panel fields that are arranged on the roof but also integrated in the facing of the south facade of the 5th on the 7th floor.

Elevators are equipped with energy recovery and display / lighting efficient.

In terms of mobility, the building is located close to major public transport, has 106 parking spaces (4 with electric charging stations) and 34 covered bike pitches (4 equipped with charging stations)

Energy

Energy consumption

Primary energy need : 83,00 kWhep/m^2.an

Primary energy need for standard building : 191,00 kWhep/m^2.an

Calculation method :

Final Energy : 48,62 kWhef/m^2.an

Breakdown for energy consumption :
cons. Heating: 616 070 MJ Primary Energy
cons. Cooling: 694 115 MJ Primary Energy
cons. Lighting: 596,864 MJ Primary Energy
econo. Photovoltaic: - 386 353 MJ Primary Energy
cons. Auxiliary: 473,612 MJ Primary Energy

More information :
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Envelope performance

Envelope U-Value : 0,42 $W.m^{-2}.K^{-1}$

More information :
The building consists of an existing heavy structure of reinforced concrete type slab columns. Ceilings type SAPP (technical ceilings perforated) allow accessibility to the thermal mass to exploit the inertia of the building and the principle of phase shift. Glazing is solar glazing with a 'g' ranging from 50 to 60% depending on the orientation of the facades - a high level of light transmission is maintained (min 70%), the glazing remains a 'clear' glazing. This strategy of the contributions makes it possible to do without external solar protection (in spite of a southern facade). The level of thermal performance of the casing is high (coupled with a high performance airtightness of 0.52 h -1 under n 50):
> Walls: 0.2 to 0.28 (reference PEB 0.4 W / m²K)
> Slabs on ext: 0.15 to 0.22 (reference PEB = 0.6 W / m²K)
> Roofing: 0.1 to 0.11 (reference PEB = 0.3 W / m²K)
> Frame-glazing: Ug: 0.6 W / m²K; Uw variable from 0.8 to 1.36 W / m²K (reference PEB = 1.6 W / m²K)

Building Compactness Coefficient : 0,24

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

Air Tightness Value : 0,52

Users' control system opinion :

Renewables & systems

Systems

Heating system :

- Condensing gas boiler
- Radiant ceiling

Hot water system :

- Heat pump

Cooling system :

- Water chiller
- Radiant ceiling

Ventilation system :

- Nocturnal Over ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic

Renewable energy production : 16,00 %

Renewable production is provided via a photovoltaic installation on the roof (on an independent structure) and on the facade (vertical south position).
> Roof PV:
- 305 m²
- 53580 Wc
> Facade:
- 240 m²
- 29995 Wc
> Total production: 42,928 kWh (PEB)
> Primary energy saving: 386 353.5 MJ
> reduction of CO2 emissions: 27.6 TCO2 / year (ie +/- the equivalent of emissions related to heating = 31 TCO2 / year or equivalent to 65% of CO2 emissions related to artificial lighting = 42.7 TCO2 /year

Solutions enhancing nature free gains :
Reduced heat requirements: airtightness / insulation casing / triple glazing / double flow ventilation with heat recovery - Reduction of cooling needs: by-pass on ventilation / access thermal mass / reduction of intakes

Smart Building

BMS :
> The project is entirely managed by the CTM. The regulation and final consumption are relayed to the CTM and offers a visual of the consumer stations. A specific count separate from the large consumers is made.
> the installations allow the occupants to interact with their environment, in an ad hoc, local manner without disrupting the operation of the other areas of occupancy (hourly management, revival, derogation, etc.). The action of the occupants is possible by half-rental tray and can evolve over time thanks to waiting facilities depending on the type of occupation (landscaped or partitioned offices)

Smartgrid :
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Users' opinion on the Smart Building functions :

Environment

Urban environment

Located at the corner of rue Belliard and rue d'Arlon, near the European institutions, this building whose first construction dates from the 90s, has a very beautiful location and excellent visibility.

The project is thus implanted in an urban fabric where its integration into an existing environment is an important factor.

In terms of mobility, the building is located close to major public transport.

It is located 450m, 5 minutes walk from the train station "Luxembourg", 550m, 7 minutes walk from the metro station Trone.

It is located between Brussels Park, a 12-minute walk, and Leopold Park, a 9-minute walk away.

Various businesses and services surround the site.

The building has a beautiful courtyard planted for the benefit of all occupants.

Land plot area : 1 493,00 m^2

Built-up area : 63,00 %

Green space : 610,00

Products

Product

Photovoltaic panels on the facade

Nizet entreprise en charge du lot ; Panneaux de la marque FranceWatts; Structure en façade de la marque Tweha

Jacky Landuyt

http://www.vma.be/fr/sites/vma-nizet

Product category :

Photovoltaic installation in independent roof structure and installation on the rear facade (integrated into the architecture).
The photovoltaic panels of the FranceWatts brand are glued with a brand Tweha glue on an aluminum structure itself attached to the shell of the building by thermal break tabs, see FT attached.
Photovoltaic panels are substituted as facade cladding materials.
The cost for +/- 250m² is 193.800 €. Omnium maintenance of 3500 € / year.

The development of the system has required a great deal of attention by both the project authors (architect and design office) and the control office and the company.
Close collaboration was created between each stakeholder from the submission stage to provisional acceptance.
In addition to these technical features, photovoltaic panels also had to fulfill the function of façade cladding.
As such, the system has been studied, developed and examined in order to fulfill the characteristics of overall stability and structural resistance required to a façade cladding (choice of lenses, fastening system, ...), fire safety , air-water-snow-dust-tightness (geometry of the panels, storage space, width of the joints between panels, rainscreen, ...), safety of use, hygrothermal comfort, atmospheric environment, acoustic comfort, visual comfort, durability .
A constraint that also had to be taken into account in the system and its resistance to the mechanical stresses due to the support of the wheels of the nacelle cleaning.

Finally, a procedure for the replacement of a defective photovoltaic panel was carefully developed by the company in coordination with the project authors and the control office.

Nizet

Jacky Landuyt

http://www.vma.be/fr/sites/vma-nizet

Product category :

Costs

Construction and exploitation costs

Global cost : 14 500 000,00 €

Reference global cost : 1 350,00 €

Renewable energy systems cost : 312 068,00 €

Global cost/Work station : 29591.84

Reference global cost/Work station : 1350

Cost of studies : 1 180 000 €

Total cost of the building : 7 248 730 €

Health and comfort

Water management

Consumption from water network : 1 955,00 m^3

Water Consumption/m2 : 0.38

Water Consumption/Work station : 3.99

All sanitary facilities are of 'low consumption' type (showers / toilets / sinks / urinals). The sanitary blocks supply facilities are equipped with a solenoid valve which cuts the water supply of the sanitary blocks on the basis of a presence detection, thus avoiding loss of water due to untimely flow (eg flushing). In addition, the main water supply network is equipped with a flow detector including a leak alarm. This detector relayed to the CTM to identify any problem of loss on the network and ensures a detailed accounting of water consumption of the building. The project is not equipped with rainwater recovery (no basement renovation). Calculated consumption per person / year: 3.99 m^3

Comfort

Health & comfort :

Thermal comfort

The building and its equipment have been studied and designed to meet comfort categories I or II of the EN15251 standard (calculation of the predicted mean vote (PMV) index according to ENISO 7730).

To do this, a dual strategy is put in place: in the heating and cooling season, treatment of the thermal parceillings environment and in mid-season, by intensive night ventilation. Maintenance of a strong thermal inertia inside (accessible concrete slabs) contributes to smooth the thermal loads in order to reach the objectives.

The ambient humidity is ensured through the use of a moisture recuperator on the ventilation air (hygroscopic wheel).

Respiratory comfort

The supply of fresh air to the occupants is ensured by a mechanical ventilation system sized in compliance with EN13779-category INT2. Over-sizing of the system allows intensive ventilation ensuring an internal CO2 level of maximum 800 ppm in accordance with the Belgian Code for Well-being at Work. In buildings with high occupancy and variable occupancy, a measurement of CO2 acting on modulating valves ensures automatic management of the fresh air rate.

Visual comfort

The windows of the building and its volumetry have been studied in order to favor the contribution in natural lighting so as to respect the performances required by criterion HEA01 of the BREEAM label:

· FLJ average> 2%

· FLJminimum> 0.8% or FLJ uniformity > 40%

Calculated indoor CO2 concentration :

Sur base d'une concentration en CO2 extérieure de 400 ppm, d'une émission de CO2 de 17,8 litres de CO2/h/pers, le débit d'air neuf possible de 54 m^3/h/pers permet de la maintien d'un concentration intérieure de CO2 de 800 ppm.

Measured indoor CO2 concentration :

Bâtiment non encore occupé entièrement

Calculated thermal comfort : Le confort a été évalué par simulation thermique dynamique (TRNsys 17) sur base de l'occupation la plus probable pour des conditions atmosphériques moyennes et extrêmes. Le résultat obtenu est le suivant (pour les différentes zones traitées du bâtiment),

Measured thermal comfort : Bâtiment non encore occupé entièrement

Acoustic comfort :

The acoustic comfort of the Belliard 65 building meets the contemporary expectations of users by ensuring compliance with Breeam's requests for acoustic comfort inside the building as well as respect for the immediate environment of the building by limiting noise levels. outdoor equipment. The acoustic comfort inside the building has been optimized to accommodate office areas, while leaving the possibility of partitioning for individual offices and / or landscaped offices without interventions or deep transformations.

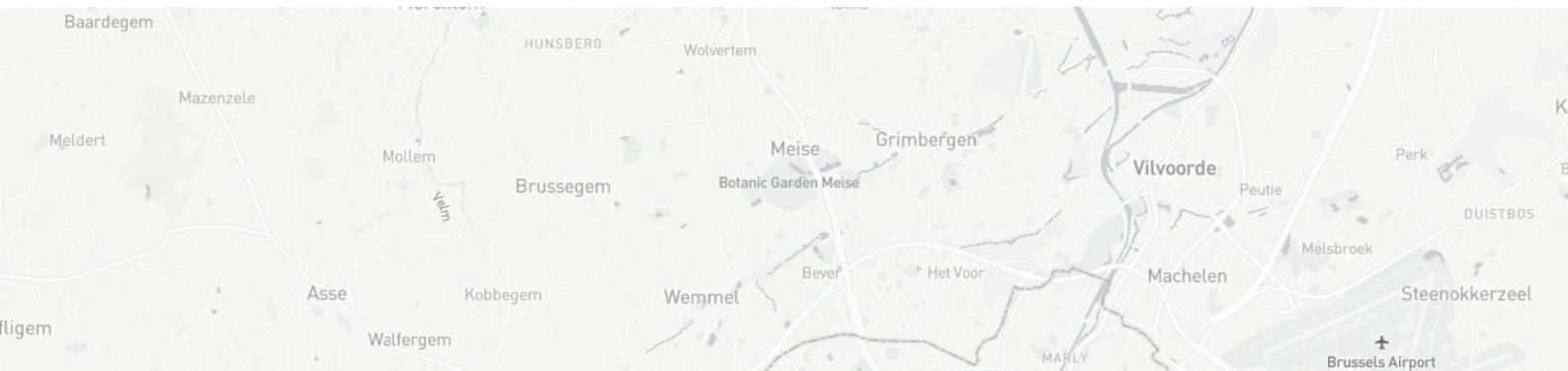
Carbon

GHG emissions

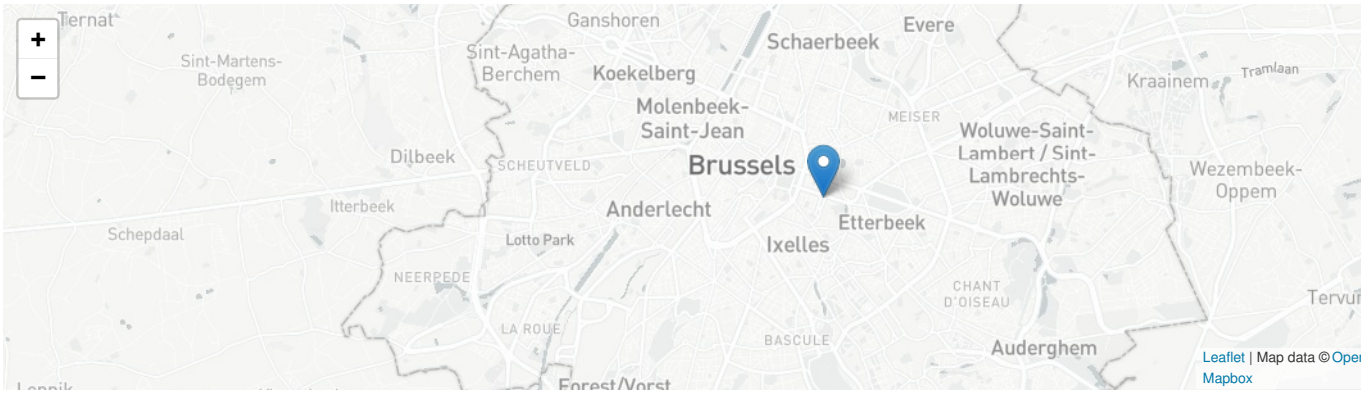
GHG in use : 19,00 $KgCO_2/m^2$/an

Methodology used :

Calculation via PEB tool considering hot / cold / lighting / auxiliaries / renewable production



Contest



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