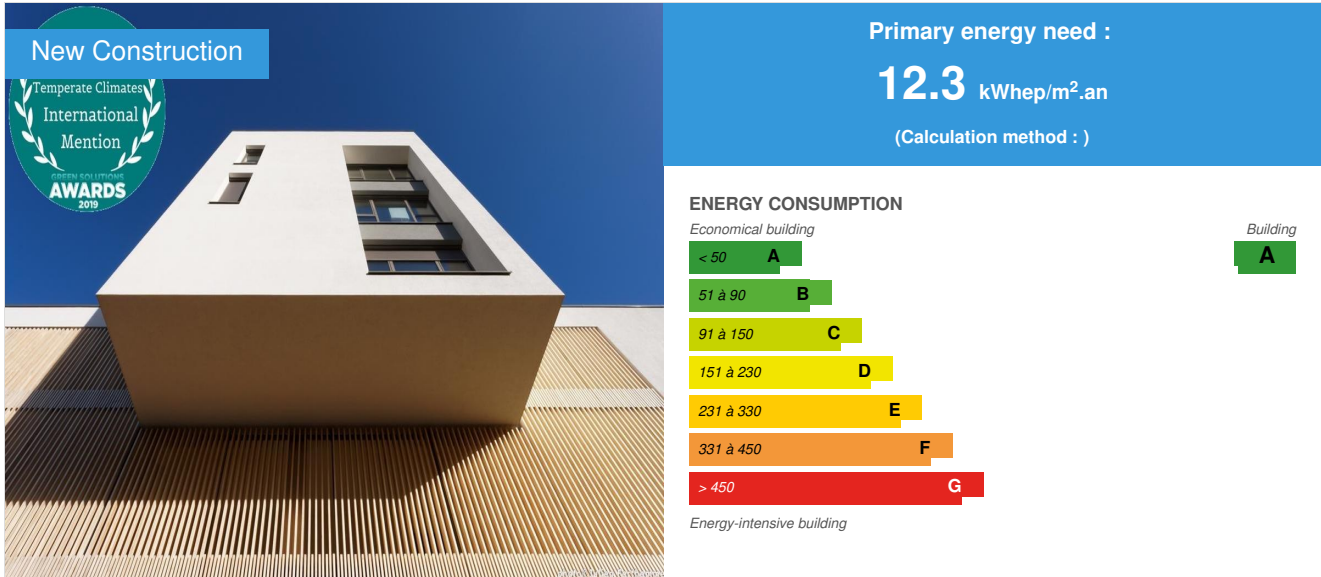


## Construction of the New Police Office - Passive Standard - Police Zone 5340 Brussels West.

by Emmanuel Bouffieux / 2019-05-16 17:14:00 / Belgique / 6835 / FR



**Building Type** : Office building < 28m  
**Construction Year** : 2014  
**Delivery year** : 2015  
**Address 1 - street** : Rue du Géomètre, 45 1080 MOLENBEEK-SAINT-JEAN, Belgique  
**Climate zone** : [Cfc] Marine Cool Winter & summer- Mild with no dry season.

**Net Floor Area** : 3 250 m<sup>2</sup> Other  
**Construction/refurbishment cost** : 4 900 000 €  
**Number of Work station** : 156 Work station  
**Cost/m2** : 1507.69 €/m<sup>2</sup>

Proposed by :



### General information

The New Police Office won the Energy & Temperate Climates Award of the 2019 Green Solutions Awards et the Belgium level + a mention for the international Energy & Temperate Climates Award.

Located on a bare plot, this project is located at the crossroads of many mixed functions, more or less noisy such as residential buildings, a school or an event area including a football stadium and an Olympic pool.

It is a question of taking into account this existing situation in order to propose a new face to a district in full development. The project qualified by the realization of a new building welcoming services specific to authority but also to security, is a symbolic and functional challenge. Thus, it is important to convey this strong image represented by the Police, while ensuring optimal integration in this neighborhood in order ultimately to allow the inhabitants to take ownership of the building.

## Data reliability

3rd part certified

## Photo credit

Julien Forthomme

## Stakeholders

### Contractor

**Name :** Zone de Police 5340 Bruxelles-Ouest

**Contact :** Mr. Buret Pascal - 02 412 69 05

<https://www.police.be/5340/fr/a-propos/la-zone-de-police-bruxelles-ouest>

### Construction Manager

**Name :** BAEB - Bureau d'Architectes Emmanuel Bouffioux

**Contact :** Mr. Emmanuel Bouffioux - 02 376 06 10

<http://www.baeb.eu/>

### Stakeholders

**Function :** Other consultancy agency

TPF - Engineering S.A.

Mr. Stephane Bussing - 02 370 19 70

<https://tpf.eu/companies/tpf-engineering/>

Special technical engineer

**Function :** Structures calculist

ABCIS - Van Wetter S.A.

Mme. Anne Van Wetter - 02 370 19 70

<http://www.sgigroupe.be/abcis-van-wetter>

Stability Engineer

**Function :** Thermal consultancy agency

NEO & IDES sprl

Mr. Jean-Philippe Lemaire - 0498 05 40 11

<http://neo-ides.be/>

Energy engineer - feasibility study and PEB energy calculation

**Function :** Company

BAM Belgium - Galère Sa

Mr. Benjamin Lebacq - 0473 43 23 75

<https://www.galere.be/>

Construction company and civil engineering

**Function :** Certification company

Bruxelles Environnement - Institut Bruxellois pour la Gestion de l'Environnement - IBGE

Mme. Alissia Tassiopoulou - 02 563 42 21

<https://environnement.brussels/>

Technical follow-up and certificate publisher Exemplary building - BatEx

Function : Certification company

Arcadis Belgium

Mme. Katrien Vandenhecke - 09 241 77 75

<https://www.arcadis.com/nl-be/belgie/>

Expert in charge of technical monitoring

## Contracting method

General Contractor

## Owner approach of sustainability

In developing the technical requirements contained in the specifications, the PC noted a number of requirements for sustainable development, these are:

- **Water** : Re-use of rainwater with reservoirs is planned:
  - A rainwater tank from the roofs for sanitary use
  - A rainwater tank from the green roof for building maintenance
- **Energy**: For the administrative building, a zero energy concept will be provided (level K: 33, level E: 0). It will be used according to the principles of trias energetica:
  - Forecast of energy consumption:
    - Compact construction
    - Exaggerated insulation of roofs, walls, floors, chassis, etc.
    - Automated external solar protection
    - Heat recovery on ventilation systems (heat exchanger)
    - Automatic regulation of daylight
  - The use of renewable energies:
    - Use of solar thermal panels for domestic hot water
    - Use of photovoltaic cells that cover the heating / cooling / lighting needs of the administrative building
  - Rational use of fossil energies:
    - It will be chosen to use an additional heating produced using a condensing boiler, energy efficient appliances (fans, pumps, lights, ...).
- **Sustainable Materials**: It will be chosen to use sustainable materials: FSC wood for finishing, durable insulation materials, ... The subsequent choices of sustainable materials will be made during the project.
- **Integration into the environment and plantation forecasting**: Planting of the land will be completely planned for plantations in the region. A green roof will be provided on the administrative building.

## Architectural description

The project is primarily involved in a **logic of sustainability**, particularly through its passive nature, and especially by its vocation "almost zero energy", which is translated into the facts by a **rational and sober operation in energy**. This virtuous approach is not accompanied by a decrease in the thermal comfort of the occupant but passes through an **awareness of the staff on the operating principle of the building**. Located near many residential buildings, a school or an event area including a football stadium and an Olympic swimming pool, the new police office is at the **crossroads of mixed functions**, sometimes quiet, sometimes subject to important events. It is therefore a question of taking into consideration this situation in order to propose a new face to a district in full development. Thus, the project tends to fit into an existing environment, explaining the importance of a **clear reading of the building** and the need to consider it as a central element of reflection. In fact, building a building with services that are specific to authority and security is a **symbolic and functional challenge**. It is about conveying the strong image represented by the Police, while ensuring optimal integration in a neighborhood so that the inhabitants can appropriate it. Through its volume and its proportions, it is a question of proposing a strong symbol in a determined environment, reflection of the services proposed by the new office of Police. From an architectural element present in the street du Géomètre, it was question of taking advantage of it to ensure its integration and mark a symbol of strength through a buffer wall between the public space and the private area. This approach allows us to clearly distinguish the new police office while maintaining a balance with the other occupants of the neighborhood. However, we are trying to achieve this goal while also working on a volume that respects the existing environment. It is a question of valuing the new construction, like the surrounding buildings. At the functional level, it is a question of proposing **fluid and luminous spaces** despite the magnitude of the demand on a site limited in terms of surface area. From free trays, our approach aims to offer **flexibility** over time to the police office. To enhance this adaptability, **natural light** for all occupants of the building is a strong objective of our approach. Thus by means of a **patio**, we create a luminous quality, adaptability and a visual relation between the different workers and visitors of the building.

## Energy

### Energy consumption

Primary energy need : 12,30 kWh/m<sup>2</sup>.an

Primary energy need for standard building : 58,90 kWh/m<sup>2</sup>.an

Calculation method :

Breakdown for energy consumption :

- Net heating requirement: 12.3 kWh / m<sup>2</sup>

Actual non-renewable energy consumption for heating: 13,2 kWh / m<sup>2</sup>.an

- Net need for domestic hot water: 10,5 kWh / m<sup>2</sup>.an

Actual consumption of non-renewable energy for DHW: 9.3 kWh / m<sup>2</sup>.year

- Net energy requirement for cooling: 1 kWh / m<sup>2</sup>.an

- Net electricity consumption for ventilation: 5.2 kWh / m2.an
- Net electricity consumption for lighting: 7.4 kWh / m2.an

Total: 58.9 kWh / m2.an

#### More information :

Ultimately, the combination of all these efforts made on the envelope and its performance, combined with various technical equipment that is efficient and adapted to the needs and completed by a mix between photovoltaic and thermal panels implemented on the roof to reach zero envisaged energy.

## Envelope performance

Envelope U-Value : 0,23 W.m<sup>-2</sup>.K<sup>-1</sup>

#### More information :

Several passive design strategies make it possible to reduce the building's energy needs by prioritizing the natural inputs and without compromising the high level of comfort of the place:

- An optimization of the shape (compactness) and the implantation of the building
- Reinforced insulation to reach an envelope with a K level of less than or equal to K16 (K18 with flat-rate recognition of thermal bridges), and net heating energy requirements of less than 15kWh / m2.year, meeting the passive standard.
- A tightness with the pushed air
- Minimization of thermal bridges
- The development of a solar architecture (solar thermal)
- The valuation of the thermal inertia of the building
- The valorization of natural lighting

Efforts made on the envelope make it possible to limit the use of technical systems, in order to instead have recourse to local production of renewable energy as well as to efficient technical systems adapted (mainly focusing on ventilation) to energy needs. limited substituents after valorization of natural energy inputs.

Building Compactness Coefficient : 0,22

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

Air Tightness Value : 0,60

## Renewables & systems

### Systems

#### Heating system :

- o Condensing gas boiler
- o Water radiator
- o Low temperature floor heating
- o Fan coil

#### Hot water system :

- o Condensing gas boiler
- o Solar Thermal

#### Cooling system :

- o Water chiller
- o Fan coil

#### Ventilation system :

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

#### Renewable systems :

- o Solar photovoltaic
- o Solar Thermal

Renewable energy production : 33,00 %

#### Other information on HVAC :

More precisely, regarding cooling, comfort is achieved by passive adiabatic cooling and the valuation of night exchanges by free-cooling. The use of such a cooler is based on the spraying of water droplets in the return air flow generating additional power consumption, which at the project level remains marginal. The use of an adiabatic cooling is a solution certainly less effective than a true air conditioning but its complementarity with several groups of ventilation to ensure several techniques of free-cooling night guarantees its efficiency. Thus, the use of an adiabatic cooler is not innovative but this combination with different means of ventilation and other elements such as geometry, the inertia of the building, the choice of glazing and the use of solar protection external ones allow a real innovation, that of being able to do without active cooling, thus allowing a saving of 65% of energy for cooling compared to a conventional cooling unit.

Efforts made on the envelope make it possible to limit the use of technical systems, in order to instead have recourse to local production of renewable energy as well as to efficient technical systems adapted (mainly focusing on ventilation) to energy needs. substituents, limited after valorization of natural energy inputs.

These systems are:

- Ventilation with heat recovery with a yield greater than 85%

- Heat production for domestic hot water provided by a solar thermal system (33%)
- Coverage of substitute heating needs with a condensing gas boiler
- Passive cooling strategies (free cooling and adiabatic cooling)
- Low energy lighting
- Renewable production of photovoltaic electricity, allowing to exceed the level of passive performance to reach the level of performance close to zero energy.

Solutions enhancing nature free gains :

Details above

## Environment

### Urban environment

Several areas currently consist of fallow land composed of vegetable gardens or other undeveloped land. These areas have a high urbanization potential. The context in the vicinity of the construction project of the Police Office is essentially dedicated to housing, so the presence of equipment such as the police office can not conflict with these future assignments. Thus, through its volumetry and its proportions, it is a question of proposing a strong symbol in a specific environment, reflecting the services proposed by the new police station. This symbolism is translated through a buffer wall between public space and private space, giving unity to the project while respecting the surrounding built heights and social promiscuity possible between users. This space is at the same time a place of meeting, waiting, passage generating interaction between users. At the functional level, it is a question of proposing fluid and luminous spaces in spite of the scale of the demand on a site limited in terms of surface. From free trays, our approach aims to offer flexibility over time to the police station. To reinforce this adaptability, natural light for all occupants of the building is a strong objective of our approach. Thus by means of a patio, we create a luminous quality, adaptability and a visual relation between the different workers and visitors of the building. In addition, concerning ecosystems and biodiversity; if we can not preserve all the existing biotopes on the site to be built (currently vegetable gardens), our intention is to maximize a renewal of biotopes in exploitable areas. Having a very dense footprint, we compensate for the absence of biotopes by creating new spaces conducive to the development of biodiversity. This results in the presence of extensive flat green roofs (374 m<sup>2</sup>, having the advantage of a considerable impact on the quality of the air and the water cycle), the maintenance of a maximum of gardens in the ground (ensuring a richness of biodiversity and having a considerable impact on the air quality and on the water cycle) and the preservation of mineral zones in permeable zones (with the advantage of ensuring a certain maintenance of the cycle of the water). This approach maximizes biodiversity and achieves a CBS of 0.55, above the minimum value of 0.3 preconfigured for office buildings.

Land plot area : 1 215,00 m<sup>2</sup>

Built-up area : 65,00 %

## Products

### Product

Birdhouses and lodges for the protection of birds and nature

Schwegler

+49 7181 97745 0

<https://www.schwegler-natur.de/?lang=en>

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 = '29'

SCHWEGLER nest boxes are patented suspension systems inspired by nature. The internal volume and the diameter of the flight hole have been studied to meet the needs and habits of the different species. As shown by scientific tests carried out by several ornithological observatories in Germany and other countries, it is thanks to the wooden SCHWEGLER nesting boxes that the densities of the highest avian populations have been obtained. These nest boxes are of high quality and weather and other deterioration for undisputed durability of 20 to 25 years. Their success and high acceptance rates are scientifically proven and confirmed, among other things, by the numerous recommendations of the major international nature protection leagues, state organizations and public-interest associations as well as by enthusiastic customers.

Their manufacture requires very few natural resources, they will not be foreign bodies in nature and should not be evacuated. In addition, these products are composed only of organic materials that do not pollute the environment during and after their use.

Despite the completeness of the OM specifications in terms of sustainable development approach, a crucial element that, in our opinion, was lacking in the notion of integration into the environment and the forecasting of plantations was conservation. , the extension and the protection of the biotopes currently present on the site. Thus, concerning ecosystems and biodiversity; if we can not keep all the existing biotopes on the building site (currently vegetable gardens), our intention was to maximize a renewal of biotopes in exploitable areas. Having a very dense footprint, we compensate for the absence of biotopes by creating new spaces conducive to the development of biodiversity. This results in the presence of these nesting boxes, flat green roofs extensive (374 m<sup>2</sup>), the maintenance of a maximum of gardens in the ground and the preservation of mineral zones in permeable zones. Ultimately, this approach maximizes biodiversity.

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## Costs

## Construction and exploitation costs

Renewable energy systems cost : 21 250,00 €

Additional information on costs :

€ 21,250 excluding VAT are invested for the installation of 20m<sup>2</sup> of solar thermal panels and photovoltaic and more exactly, € 14,550 all costs and subsidies considered.

Return on investment in 20 years contribution of ± 738 € / year of energy saving.

## Carbon

## GHG emissions

GHG in use : 14,20 KgCO<sub>2</sub>/m<sup>2</sup>/an

## Contest

### Reasons for participating in the competition(s)

- The target **energy performance** for the project is the passive standard at a minimum, with the aim of reaching a zero-energy performance. The energy approach is the **energetica trias** :

1. use fossil fuels effectively
2. use renewable sources
3. reduce the energy demand

- **Sustainable approach** integrated into the project: materials, water management, integration into the environment, comfort, ...

- The intention is to maximize a renewal of biotopes in exploitable areas (currently presence of vegetable gardens on the site):

1. presence of extensive green flat roofs (374m<sup>2</sup>)
2. the maintenance of a maximum of gardens in the ground (426m<sup>2</sup>)
3. the preservation of mineral zones in permeable zones (103m<sup>2</sup>)

- In terms of **reproducibility** , the project is technically applicable to other similar buildings (office buildings or administrative buildings) in the Brussels context given the destination of the building.

- The **cost** is based on a quantification of capital gains and losses related to the technical choices specifically made in the project (passive envelope, adiabatic cooling, low-energy lighting ...) compared to a building designed to simply respect the PEB regulations currently in force.

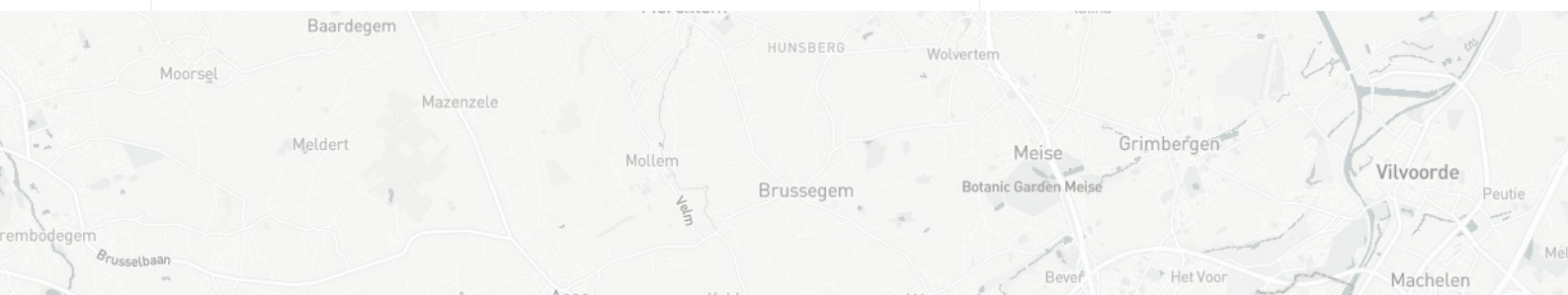
### Building candidate in the category



Energie & Climats Tempérés

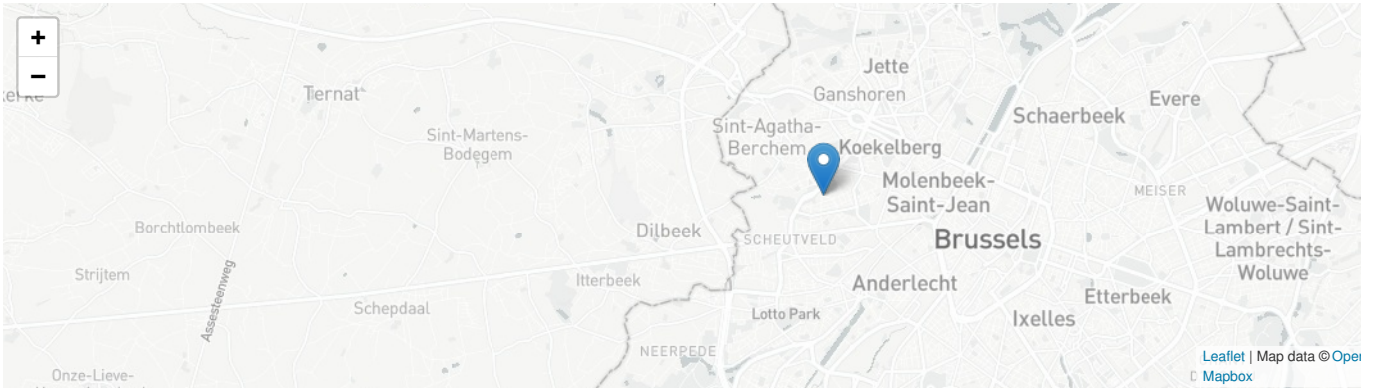


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