


## Anvers Simons

by Claire Lheureux / 2015-07-08 13:52:49 / Belgique / 11959 / FR



Primary energy need :

**82.2** kWhep/m<sup>2</sup>.an

(Calculation method : )

**ENERGY CONSUMPTION**

*Economical building* *Building*

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

*Energy-intensive building*

**Building Type** : School, college, university  
**Construction Year** : 2011  
**Delivery year** : 2015  
**Address 1 - street** : Rue Simons, 12 1000 BRUXELLES, Belgique  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 5 331 m<sup>2</sup>  
**Construction/refurbishment cost** : 4 316 000 €  
**Cost/m2** : 809.6 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



### General information

The School of Heliport

In a booming neighborhood, school and a new passive housing have emerged. The project was conducted in design-build team with ambitious sustainable goals. The school can accommodate 490 children, in new buildings and parts of buildings renovated. 51 units complement the whole. This project was devoted Exemplary Building 2011 by the Brussels region.

History of the draft

The Brussels North neighborhood is known for its multisocial frame. A place where men and business women alongside the students. A social melting pot where different cultures intermingle. In the heart of this diversity is that primary school 'The Heliport'. See a construction project at that location is not a surprise. The area

has a high population density and dire need of new housing. At present, there is not enough land to meet the huge demand. An increase in population also means more children and young children, who naturally require access to education.

#### Urbanity

Previously, the island was not closed and urban structure is found in weakened. On the other side of the street Simons, new homes were built recently. Housing project will create a vis-a-vis to make his character to the street.

Overall, the implementation can close the island and thereby make it more legible urban structure. The project links the various functions required and is treated as a coherent whole. However, access and circulation allow a different use, specific to each program.

The templates of the new buildings are the same as those of neighboring buildings:

Ground + 1 for new school buildings and co-inviting local,  
+ Ground + 4 penthouse setback for housing.

The island is closed and legible while keeping variable heights that create breaths in the urban landscape.

Moreover, existing buildings were in great need of renovation. Dilapidated school buildings were a sharp contrast to the newly built apartment building across the street Simon. Before the renovation, the former primary school building 'L'Heliport' was divided into two blocks. A Nicolay on the street and the other on Avenue Heliport, who was shot to make room for new construction. The Nicolay Street Building was renovated and integrated into the new school building. The new school building is included in the lower part of the complex and occupies only a part of the area of the building block. Architecturally, the volumes and the façades are treated differently and identify each part while maintaining overall coherence.

Next Regional PPAS (specific plan of land use) plans imposed a large concentration of new construction, but they are biased to the quality and usability. A balanced implementation has led to all buildings in value. The school has become a kind of 'walk', where dining halls, gym and classes form a meeting place. An ideal space for residents and locals, to organize events.

Simons-Anvers'reinforce and the social fabric. School life adapts to daily activities and not the reverse.

#### Habitability

The site is located in a very mixed social environment of great cultural richness. The project wanted to respect and emphasize the diversity enliant various programs and responding to different needs of the neighborhood.

The school welcomes students from raw to primary reception classes. The gym, two dining halls and the playground can also be used on evenings and we regularly or for special events. These spaces create new meeting places for the neighborhood.

The 51 units are distributed as follows: 3 studios, four 1-bedroom apartments, 30 2-bedroom apartments, 11 apartments 3 rooms and 3 apartments 4 rooms of which 2 have been adapted for disabled people. In this way, the new building can bring together people of ages, cultures and different profiles. The new apartments develop spatial quality in all his aspects: functionality, architectural quality, natural lighting, acoustic performances and, of course, thermal performance. Almost all apartments are equipped with windows to front and rear and all have an outdoor space in the form of a garden, balcony or terrace. The common areas are emerging as a meeting place for residents and, in a broader sense, to the local residents. The new complex also has a reception function for children. This space is tailored for children.

#### Durability

Priority was given to a sustainable approach to architecture and technical construction.

#### Envelope and technical

To limit the heat demand of the building, the walls will have a thrust insulation. Windows, meanwhile, will include a glazing of a U-value of 0.5 W / m<sup>2</sup>. K. Energy saving is further enhanced by heat distribution system properly developed, powered by 200 square meters of thermal panels and supplemented by more gas condensing boilers small format.

#### Biodiversity

The natures'invite including through 900 m<sup>2</sup> of green roofs, plus 945 sqm garden in the ground for good infiltration of water pluie.La high capacity rain barrels will be almost sufficient to supply toilet .

#### Material

The project includes more than 50% sustainable materials classified under 3 as the Nibe. All finishing materials are environmentally friendly. For the choice of materials, the impact on the environment and health was predominant. He was also selected in the research project PassReg ([www.passreg.eu](http://www.passreg.eu)) as a pilot project for the dissemination of liabilities and sustainable Europe.

#### Water

All rainwater arriving on non-accessible roofs is collected in recovery tank. School health work with rainwater via rainwater tanks in ordinary concrete.

6 concrete tank of 20,000 L / pc (000 liters or 120 in all) are provided for all.

## Comfort and health

The passive standard offers unparalleled comfort: by simple physical principles, a pleasant temperature of air and walls is ensured, and a constant air renewal.

Comfort, but also real psychological occupant is essential. So the project meets the standards of comfort for both acoustics, as heating or ventilation, but attention is also paid to the empowerment of the personal environment.

The health level, the double flow, used properly, can prevent a number of pollutants and maintain a good quality indoor environment

## Acoustic

At the school level, various acoustic panels are planned in noisy spaces (dining halls, gym, ...).

Inside the building:

The project includes the establishment of technical installations low noise, acoustic insulation of ducts and false ceilings.  
All utility lines will be closed by masonry blocks.

## Compared to external disturbances

No special action is taken at the outer envelope level, however thanks to passive criteria, measures are taken logically, as the introduction of triple glazing significantly reducing outside noise.

## Repeatability

The casing is constructed with blocks of sand-lime, insulation and enduit. Seule the thickness of the insulation (30cm) differs from the traditional design. Doors and windows are made of wood profiles (PEFC) aluminum covers. The completion is done with materials such as plaster, sheetrock, linoleum, tile, ... Although the heating and ventilation are provided by a recent type of equipment, installation is based on techniques already known as the heat exchanger, solar water heaters and fans.

In other words, materials and implemented hardly differ from a traditional site. No materials found or techniques that people know not practice. Anyone can do it. The processes and materials are well known to all.

## Budgetary aspect

The project is built for all budgets in of € 1,100 / m<sup>2</sup>, or 10% less than a standard project. For information, the average price during the submission of bids was € 1,500 / m<sup>2</sup>! And only 4 proposal reached the passive standard, but not by more expensive elsewhere.

Special techniques comply with the same desire for simplicity and sustainability as the overall design. The structure is optimized taking as a basis the mass necessary for acoustic, which implies a minimum slab thickness. This then induces an optimal thickness range, used for the entire project.

The Brussels-Capital Region has praised the energy performance and design of the project. These congratulations come back mainly to the collaboration between the different parties involved, which have consistently sought the most relevant solutions.

More? : [Http://a2m.be/anvers\\_simons.html](http://a2m.be/anvers_simons.html)

Note: the description compote excerpts from A2M press kit and an article of the magazine "edu-care" April May 2015

## Building users opinion

The school opened its doors and housing begin to be inhabited.

## If you had to do it again?

The tender in Design and Build has shown that program presqu'équivalents templates (the area is strictly defined by an Individual Assignment Soil Map), it is possible to build quality passive buildings reasonably priced. Of all the projects submitted, only 4 have proposed the passive standard, and it was not the most expensive, far from it. This procedure helped launch an attractive project in this developing area.

## See more details about this project

<http://www.a2m.be/a2m-anvers-simons-dossier-presse.pdf>

## Data reliability

3rd part certified

### Stakeholders

**Function :** Construction Manager

Ville de Bruxelles - Régie Foncière

Marc Libens ; marc.libens@brucity.be

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**Function :** Designer

A2M sc sprl

Sebastian Moreno-Vacca ; moreno@a2m.be

<http://www.a2m.be>

Design, site supervision and acceptance of works; Thermal study PHPP

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**Function :** Construction company

Democo

Frederik Bijmens ; frederik.bijmens@democo.be

<http://www.democo.be>

Construction

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**Function :** Other consultancy agency

CREA-TEC sprl

Marc Coppen ; marc.coppen@skynet.be

Special Technics Bureau

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**Function :** Other consultancy agency

TDEC

Tys Kurt ; kurt.tys@tdec.be

Bureau of Special Technical Studies

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**Function :**

StuBeCo

Tom Molkens ; tom@stubeco.be

Stability consultancy bureau

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**Function :** Structures calculist

D2S

Geert Desanghere ; geert.desanghere@d2sint.com

Acoustic Design Office

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**Function :** Thermal consultancy agency

Enesta

Denis Lefebure ; dlefebure@enesta.be

PEB encoding

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### Contracting method

Other methods

### Owner approach of sustainability

In early 2010, the Housing Management of the City of Brussels launches call for proposals for construction on land they owned a property consisting of a school for 490 pupils, equipment for ONE (Office National de l'Enfance) - Kind & Gezin and 51 units.

### Architectural description

Urbanite Previously, the island was not closed and urban structure is found in weakened. On the other side of the street Simons, new homes were built recently. Housing project will create a vis-a-vis to make his character to the street. Overall, the implementation can close the island and thereby make it more legible urban structure. The project links the various functions required and is treated as a coherent whole. However, access and circulation allow a different use, specific to each program. The templates of the new buildings are the same as those of neighboring buildings: • Ground + 1 for new school buildings and co-inviting local, • Ground + 4 + penthouse setback for housing. The island is closed and legible while keeping variable heights that create breaths in the urban landscape. Moreover, existing buildings were in great need of renovation. Dilapidated school buildings were a sharp contrast to the newly built apartment building across the street Simon. Before the renovation, the former primary school building 'L'Heliport' was divided into two blocks. A Nicolay on the street and the other on Avenue Heliport, who was shot to make room for new construction. The Nicolay Street Building was renovated and integrated into the new school building. The new school building is included in the lower part of the complex and occupies only a part of the area of the building block. Architecturally, the volumes and the façades are treated differently and identify each part while maintaining overall coherence. Next Regional PPAS (specific plan of land use) plans imposed a large concentration of new construction, but they are biased to quality and laconvivialité. A balanced implementation has led to all buildings in value. The school has become a kind of 'walk', where dining halls, gym and classes form a meeting place. An ideal space for residents and locals, to organize events. Simons-Anvers'renforce and the social fabric. School life adapts to daily activities and not the reverse. Habitability The site is located in a very mixed social environment of great cultural richness. The project wanted to respect and emphasize the diversity enliant various programs and responding to different needs of the neighborhood. The school welcomes students from raw to primary reception classes. The gym, two dining halls and the playground can also be used on evenings and we regularly or for special events. These spaces create new meeting places for the neighborhood. The 51 units are distributed as follows: 3 studios, four 1-bedroom apartments, 30 2-bedroom apartments, 11 apartments 3 rooms and 3 apartments 4 rooms of which 2 have been adapted for disabled people. In this way, the new building can bring together people of ages, cultures and different profiles. The new apartments develop spatial quality in all his aspects: functionality, architectural quality, natural lighting, acoustic performances and, of course, thermal performance. Almost all apartments are equipped with windows to front and rear and all have an outdoor space in the form of a garden, balcony or terrace. The common areas are emerging as a meeting place for residents and, in a broader sense, to the local residents. The new complex also has a reception function for children. This space is tailored for children. The quality of the spaces has always been privileged: functionality, spatial quality, light, acoustics, ... The accommodations are diverse to meet the needs of a maximum number of people: from studios to 4 bedroom apartments through suitable for people with reduced mobility. Almost all apartments are through, ...

## Energy

### Energy consumption

Primary energy need : 82,20 kWh/m<sup>2</sup>.an

Primary energy need for standard building : 250,00 kWh/m<sup>2</sup>.an

Calculation method :

Final Energy : 48,62 kWh/m<sup>2</sup>.an

More information :

The delivery of the building is recent, no monitoring has been conducted yet. But the monitoring of consumption is expected in the early years.

Initial consumption : 250,00 kWh/m<sup>2</sup>.an

### Envelope performance

Envelope U-Value : 0,21 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The walls are insulated externally by majority with 40 cm EPS graphite (Lambda = 0.032 W / mK).

The average U-value of the walls is about 0.126 W / m<sup>2</sup>.K

The roof is insulated with PIR (variable thickness, Lambda = 0.023 W / mK). The average U-value of the roof is 0.07 W / m<sup>2</sup>.K

The floor is insulated with 25 cm PUR planned for the new part and 10 cm in the renovated part (lambda = 0.025 W / mK)

The average U-value of the soil is 0.136 W / m<sup>2</sup>.K

The windows are composed of triple glazing (Ug = 0.5 W / m<sup>2</sup>.K, g = 0.49) and efficient frame (Uf 0.7 to 0.8 W / m<sup>2</sup>.K) having an air tightness class adapted to passive constructions. Given the environment in which the building is situated (large shadows caused by buildings around) we have made the choice of glazing with solar with smaller contributions but having a lower coefficient of losses. This minimizes the conductor losses when solar gains are low and therefore optimize insulation thicknesses to be implemented to achieve the passive level.

Thermal bridges have been optimized to reduce losses incurred (back insulation on chassis, thermal breaks to the level of parapets, feet of exterior walls and interior walls of feet with sand-lime blocks to ensure high energy performance the junction between the insulators).

Building Compactness Coefficient : 2,40

Indicator : n50

Air Tightness Value : 0,60

Users' control system opinion : Yet returns on the project coming

## Renewables & systems

### Systems

#### Heating system :

- Condensing gas boiler

#### Hot water system :

- Condensing gas boiler

#### Cooling system :

- Others
- VAV Syst. (Variable Air Volume system)

#### Ventilation system :

- Nocturnal Over ventilation
- Double flow heat exchanger

#### Renewable systems :

- Solar Thermal

Renewable energy production : 12,00 %

#### Other information on HVAC :

To reduce the heating and cooling requirements, the school is equipped with 5 CTA composed of: - A high performance heat exchanger (85% off certificate IHP) - Indirect adiabatic cooling for cooling with low consumption (related to ancillary)

#### Solutions enhancing nature free gains :

Sun protection with automatic light sensors for the busiest parts Dimming the lighting according to natural light, ventilation management with humidity and CO2 sensors, night ventilation COOLING +

## Smart Building

#### BMS :

BMS can control the awnings depending on the lighting, ventilation rates and the adiabatic cooling and bypass with temperature sensors, humidity and CO2

#### Smartgrid :

No smart grid now but a remote control is possible

## Environment

### Urban environment

Project Background The Brussels North neighborhood is known for its multisocial frame. A place where men and business women alongside the students. A social melting pot where different cultures intermingle. In the heart of this diversity is that primary school 'The Helipad'. See a construction project at that location is not a surprise. The area has a high population density and dire need of new housing. At present, there is not enough land to meet the huge demand. An increase in population also means more children and young children, who naturally require access to education. Urbanite Previously, the island was not closed and urban structure is found in weakened. On the other side of the street Simons, new homes were built recently. Housing project will create a vis-a-vis to make his character to the street. Overall, the implementation can close the island and thereby make it more legible urban structure. The project links the various functions required and is treated as a coherent whole. However, access and circulation allow a different use, specific to each program.

Land plot area : 5 472,30 m<sup>2</sup>

Built-up area : 16,20 %

Green space : 643,00

## Products

### Product

Central air processing with dual flow ventilation

Swegon

info@swegon.fr

<http://www.swegon.fr>

Product category : HVAC, électricité / ventilation, cooling

CTA including a comfort ventilation High efficiency with low energy consumption (85% and 0.45 Wh / m<sup>3</sup> certified by PHI) despite significant usage rates (up to 9000 m<sup>3</sup> / h). This type of group is very suitable for passive tertiary buildings.

Validated



Indirect adiabatic cooling

Coolea

(33).04.74.37.15.50

<http://www.evaporative-cooling-solutions.com/>

Product category : HVAC, électricité / ventilation, cooling

The indirect adiabatic cooling allows air cooling by forced air humidification extract. Such a system allows the cooling air consumption by limiting the associated (consumption of ventilation aids and humidifier only)

validated



Blocs silico calcaire à haute efficacité énergétique

Xella

-

<http://www.xella.be>

Product category : Finishing work / Partitions, insulation

This type of block allows for very efficient thermal breaks. Therefore, the consequent reduction of the thermal bridges walls connections (wall / roof and wall / floor slab) achieves the passive standard with simplicity

Validated



External insulation EPS graphite

Kingspan Unidek

info@kingspanunidek.be

<http://www.kingspanunidek.com>

Product category : Finishing work / Partitions, insulation

EPS graphite ( $\lambda = 0.032 \text{ W / mK}$ ). External application

Validated



chassis (frame)

Afinco

info@afinco-nv.be

<http://www.afinco-nv.be>

Product category : Finishing work / Exterior joinery - Doors and Windows

Performant and airtight chassis. Very suitable for designing passive buildings

Validated



## Costs

### Construction and exploitation costs

Cost of studies : 560 000 €

Total cost of the building : 4 316 000 €

## Health and comfort

## Water management

All rainwater arriving on non-accessible roofs is collected in recovery tank. 6 concrete tank of 20,000 L / pc (000 liters or 120 in all) are provided for all. Reclaimed water in the tanks is used for flushing of school toilets.

## Indoor Air quality

Optimization measures Room ventilation is ensured by a system D (with recovery and evaporative cooling). Ventilation is therefore constantly monitored. The ventilation rates correspond to indoor air quality category INT2 (average indoor air quality) according NBN EN13779, ventilation in non-residential buildings. Air filter unit which maintenance should be ensured The double flow units are equipped with EU7 filters.

## Comfort

**Health & comfort :** The passive standard offers unparalleled comfort: by simple physical principles, a pleasant temperature of air and walls is ensured, and a constant air renewal. Comfort, but also real psychological occupant is essential. So the project meets the standards of comfort for both acoustics, as heating or ventilation, but attention is also paid to the empowerment of the personal environment. In terms of health, the dual-stream, used properly, can prevent a number of pollutants and maintain a good quality indoor environment.

**Calculated thermal comfort :** Classes : 60 heures cumulées au dessus des 25°C ; Bureaux : 72 heures cumulées au dessus des 25°C ; Réfectoires : 72 heures cumulées au dessus des 25°C

**Measured thermal comfort :** Le bâtiment étant fini depuis peu, le monitoring est en cours et aucun résultat n'est encore disponible

**Acoustic comfort :** A support for acoustic requirements at the design stage of the project seems essential to achieve the acoustic performance described by the new NBN-S01-400-1 standards according to category called "normal acoustic comfort" to reduce transmission of airborne and impact.

## Carbon

### GHG emissions

**GHG in use :** 21,40 KgCO<sub>2</sub>/m<sup>2</sup>/an

**Methodology used :**

Calculation of CO<sub>2</sub> emissions from heating consumption, ECS, lighting and auxiliary using conversion factors of primary energy / CO<sub>2</sub> (0.198 kg CO<sub>2</sub> / kWh EP for gas and 0.29 kg CO<sub>2</sub> / kWh for EP electricity)

### Life Cycle Analysis

**Eco-design material :** Preference is given to low-impact materials. Particular attention was paid to interior finishing materials (natural paint, flooring, ...) in order to favor the comfort and health of occupants.

## Contest

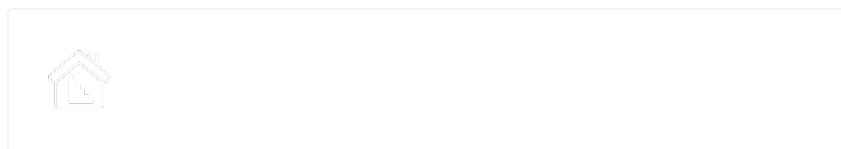
### Reasons for participating in the competition(s)

- **sustainability** : construction et rénovation passive, ce bâtiment est labellisé BATEX, et également référence dans le cadre du projet PASS reg. Des panneaux solaires thermiques assurent la production en eau chaude sanitaire.
- **cost-efficiency** : réalisé dans le cadre d'un appel d'offre concepteur&constructeur (design and build) les études des techniques et matériaux mis en oeuvre ont été intégrés dès la conception en collaboration directe avec l'entreprise. Ceci a permis de baisser le coût à 1.100€/m<sup>2</sup> alors que d'autres projets similaires mais non passifs avaient été remis avec un prix plus élevé!
- **flexibility** : le programme est très varié, à la fois de la construction neuve et de la rénovation, mais aussi une école, des bureaux et des logements. Les fonctions variées ont été intégrées de manière à ce que les programme se complètent l'un l'autre mais puissent évoluer indépendamment
- **responsability** : l'énergie de fonctionnement des bâtiments publics et la rénovation sont les défis actuels que relève ce projet.
- **santé - confort** : tous les matériaux de finition sont écologique. Pour le choix des matériaux, l'impact sur l'environnement et la santé a été prédominant. La lumière naturelle a été étudiée de manière ludique pour un confort optimal des usagers. La priorité était donnée à une approche durable de l'architecture et de la construction technique. Tous les matériaux utilisés sont recyclables et, dans la mesure du possible, doux pour l'environnement et la santé. La pollution atmosphérique et les déchets de construction ont été limités au minimum.

Le concept satisfait aux standards de la construction passive et instaure une gestion optimale de l'énergie, notamment grâce à un système élaboré de distribution de la chaleur, relié aux panneaux solaires thermiques sur le toit.

Au total, le projet est constitué à plus de 50% de matériaux durables et affiche un score inférieur à 3 dans la classification NIBE.

### Building candidate in the category







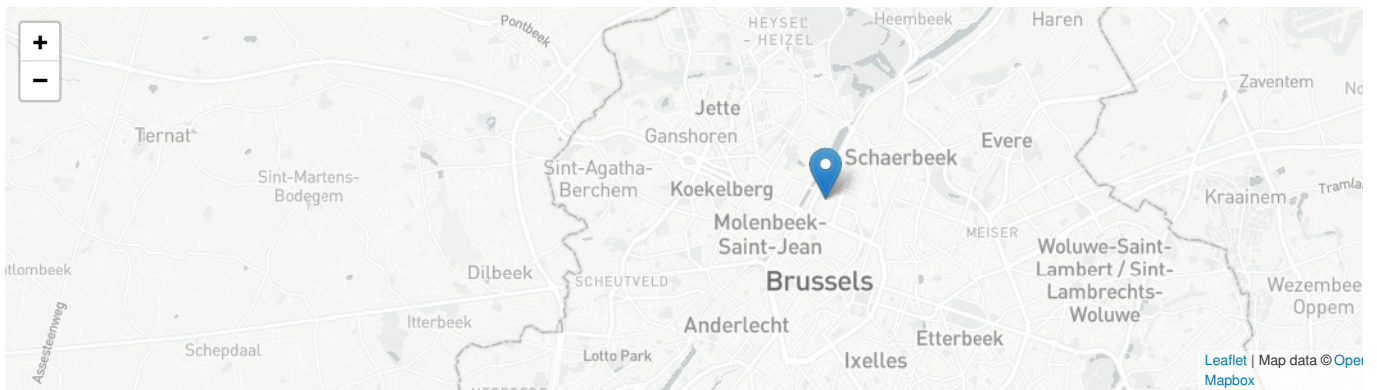
Bâtiment zéro énergie

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Santé et confort



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