Tivoli - Greencity

by Sandra Carrette / 2019-06-06 11:18:41 / Belgique / 9711 / FR

Primary energy need :

40.57 kWhep/m².an

(Calculation method : PEB - Bxl)

ENERGY CONSUMPTION

Economical building

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

Energy-intensive building

Building **A**

Building Type : Collective housing > 50m
Construction Year : 2016
Delivery year : 2019
Address 1 - street : rue Claessens 1080 BRUXELLES, Belgique
Climate zone : [Dwb] Humid Continental Mild Summer, Dry Winter

Net Floor Area : 53 107 m² SHON
Construction/refurbishment cost : 100 000 000 €
Cost/m2 : 1882.99 €/m²

Certifications :

breeam

General information

In order to ensure a harmonious connection between a dense residential area of Laeken and the industrial area of the Port of Brussels, a brownfield site was requalified. This made it possible to develop a brand new neighborhood integrating housing, modern equipment, activities for children and businesses, integrated in a green framework that meets the status of sustainable neighborhood of the most modern and the most attentive to the environment.

This was directly rewarded by the interest of potential occupants of all types and sectors, concretizing the modernization of a neighborhood that immediately found his own.

See more details about this project

http://www.tivoligreencity.be

Data reliability

3rd part certified

Stakeholders

Contractor

Name : PARBAM (Pargesy – Kairos, part of Royal BAM Group) + citydev.brussels
Contact : Roan Van Boeckel
http://www.kairos.be

Construction Manager

Name : Architecte: ADRIANA - AM (Cerau, Atlante, Atelier 55, YY Architecture, paysage Eole)
Contact : Olivier Vermeersch

Stakeholders

Function : Designer

ADRIANA - AM (Cerau, Atlante, Atelier 55, YY Architecture, paysage Eole)

Olivier Vermeersch

http://www.cerau.com

Function : Company

BAM Contractors – Jacques Delens – BPC

Olivier Mahieu

Function : Structures calculist

Venac

Function : Other consultancy agency

Boydens (techniques spéciales), Establis (stabilité),

Function : Others

W4R (coordinateur sécurité), SECO (bureau de contrôle)

Contracting method

Public Private Partnership

Owner approach of sustainability

The project aims to reduce city water consumption through rainwater harvesting and greywater recycling. The water management systems are integrated into the landscaping of the site, which brings at the same time an omnipresent biodiversity: green and storing roofs, green facades, storm basins, bio-purification and infiltration beds, permeable materials ...

The district is served by a district heating network, from a centralized high-performance boiler room. The production of energy is completed by the installation of photovoltaic panels on the roofs.

These power generation facilities are managed by a third-party investor who guarantees a lower cost of consumption than the official statistical cost.

A system for sorting and collecting household waste by underground containers is installed in the public space.

In order to raise awareness and empower new residents, all have signed a sustainable neighborhood charter outlining the ideal conduct to ensure the smooth functioning of sustainability aspects.

The project followed an assessment path for a BREEAM communities certification. According to preliminary results, to be confirmed by BREEAM, the score would exceed 93%, which would make Tivoli GreenCity the most sustainable district in the world!

Architectural description

The architectural design has been entrusted to several architectural offices and the buildings each have a distinct personality that allows their inhabitants to identify themselves.

In order to integrate the existing heritage, the old building Belgacom is renovated and plays the role of anchoring the new district in the old.

Transit traffic and access to underground car parks are reported on the suburban streets, while the new inner streets are designed for soft mobility and priority for

pedestrians and green amenities. Streets follow a long S-shaped path, which reduces speed while providing a greener overall view through the non-linear alignment of trees on the sidewalk.

663 bicycle parking spaces, including 583 sheltered indoor parking spaces and 80 on-street parking spaces, are located in the immediate vicinity of building access.

The accommodations are compact and through. The rooms of day, stay, kitchen, terrace, are in direct functional relation and the orientation of the housings ensures the best sunshine of the living spaces. Building circulation cores make the most of natural light, which reduces the demand for electricity for common areas.

Energy

Energy consumption

Primary energy need : 40,57 kWhep/m^2.an

Primary energy need for standard building : 54,68 kWhep/m^2.an

Calculation method : PEB - Bxl

Breakdown for energy consumption :

The district is served by a district heating network, from a centralized efficient boiler located in the basement of lot 2. The production of heat is mixed, serving both for heating and water production. sanitary hot. The boiler consists of 3 gas-fired boilers with a capacity of 400 kW each, 2 gas-fired units of 100 kW th and 70 kW el. and a 250 kW pellet boiler. The legislation could, in the future, allow the availability of biogas on the urban network, which would completely green the fuel used in the Tivoli GreenCity boiler plant, without modifying the facilities. The needs of future lots 5 and 6 and extensions of the network to these lots are foreseen in the current Project.

More information :

The first occupants of housing are in the process of moving in, so we do not yet have the level of consumption for a full year

Envelope performance

Envelope U-Value : 0,33 $W.m^{-2}.K^{-1}$

Building Compactness Coefficient : 1,92

Indicator : n50

Air Tightness Value : 0,52

Renewables & systems

Systems

Heating system :

- Condensing gas boiler
- Urban network
- Combined Heat and Power
- Wood boiler

Hot water system :

- Gas boiler
- Condensing gas boiler
- Urban network
- Wood boiler

Cooling system :

- No cooling system

Ventilation system :

- Natural ventilation
- Double flow heat exchanger

https://www.construction21.org/belgique/data/sources/users/2220/systemes-cvac.docx

Renewable systems :

- No renewable energy systems

https://www.construction21.org/belgique/data/sources/users/2220/energie-tivoli-greencity.docx

Environment

Urban environment

PARBAM, in collaboration with citydev.brussels, is carrying out the second phase of the Tivoli GreenCity project (the Greenbizz building was the first phase), an exemplary sustainable urban development project within a perimeter defined by the streets of Molenbeek, Wautier, Tivoli and Claessens in Laeken.

The project includes the construction of 397 housing units, including 271 subsidized housing units (citydev.brussels) and 126 rented social housing units (Société du Logement de la Région de Bruxelles-Capitale/Foyer Laekenois). In each of the five lots (separate condominiums) of the project, approximately 70% of the units will be priced at conventional prices and approximately 30% of the units will be rented social housing.

The project also provides for the construction of 2 nurseries with 62 children each and 770 m² of commercial space. In terms of infrastructure, approximately 10,000 m² of public spaces, including 3 new roads, a 2,000 m² wooded square and a 1,000 m² mall will be built.

Tivoli GreenCity aims to create a harmonious connection between an existing dense residential area of Laeken and the industrial zone of the Port of Brussels by redeveloping an urban wasteland located at the interface of these two entities. At this pivotal point, a new mixed neighbourhood will be developed as a functional and social dialogue between housing and economic activities.

The project has ambitious objectives in terms of environmental protection: reduction of energy consumption, biodiversity, green energy production, rational water management, awareness and citizen participation. These objectives will be included in the Tivoli GreenCity sustainable district charter that future buyers will be asked to sign. These are sometimes binding targets, but they are the guarantee of a better environment and sources of savings for users.

The architectural design is entrusted to several architectural firms and Tivoli GreenCity's buildings each have a distinct personality that allows their inhabitants to identify with them. All buildings meet the "Passive 2015 PEB" criteria and the equivalent of 35% of housing will be "zero energy". In order to integrate the existing heritage, the Belgacom building will be renovated and will play the role of anchoring the new district in the old one. This decision is based on the concern to preserve this architectural heritage, to contribute to the integration of the new sustainable district Tivoli GreenCity into its urban environment and to reduce the project's environmental footprint.

The dwellings are compact and through (efficient natural ventilation). The day rooms, living room, kitchen, terrace, are in direct functional relationship and the orientation of the apartments ensures the best sunshine in the living spaces. The building's traffic cores make the most of natural light, which reduces the electricity demand for the outbuildings.

URBAN ECOLOGY AND BIODIVERSITY

Biodiversity, and in particular the "green structure", is the fundamental element of the district. Various situations are used to install on the site (public and private spaces), more than twenty particular biotopes, both at ground level and on the façades and roofs of buildings. The five islet interiors are designed as evolutionary biodiversity laboratories managed by the inhabitants. It is on this "green" framework that all parts of the project are based and it is it that allows both the coherence of the whole and an optimal biodiversity.

Selective sorting and composting, linked to an objective of reducing waste volumes, are among the civic actions that residents and merchants of the new district will be invited to take. Close collaboration with Brussels-Cleanliness has made it possible to have a system for sorting and collecting household waste by underground containers in public spaces.

MOBILITY

Transit traffic and access to underground car parks (total capacity of 291 spaces) are shifted to the surrounding streets of the district, while the new interior streets are designed for smooth mobility and priority for pedestrians and green developments. STIB plans to implement projects to improve public transport services (tram and bus) in the new district.

On the internal streets, pedestrians and cyclists are largely privileged and protected, while the mall and park are exclusively reserved for pedestrians with a particular regard for Persons with Reduced Mobility (PRM).

663 bicycle spaces, including 583 sheltered spaces inside blocks and 80 on the street, are located in the immediate vicinity of the building accesses.

GREEN ROOFS EVERYWHERE

A green roof, contributing to biodiversity, thermal insulation and rainwater retention, is installed on all buildings, even under photovoltaic panels. Irrigation details and planting choices are specifically designed to ensure sustainability. In each of the lots there are two roof gardens.

POWER GENERATION

The district is served by a district heating network, from a high-performance centralized gas-fired boiler room located in the basement of lot 2. The central boiler room provides the hot water needed for heating and domestic hot water needs for all the dwellings in the new district. For a better comfort of the inhabitants, the regulation of this collective system is carried out individually, per housing unit.

Energy production is supplemented by the installation of photovoltaic panels on the roofs of all building lots. The electricity produced by these panels is used in the common areas of the buildings.

These energy production facilities will be provided and managed, for a period of 10 years, by a third party investor who will guarantee a consumption cost below the official statistical cost. At the end of this period, the installations will become the property of all the inhabitants of the district.

WATER MANAGEMENT

GREY AND RAINY

In terms of hydraulic control, the project aims to reduce city water consumption through domestic use of rainwater and greywater recycling. Water consumption reducing devices (taps, shower heads, flush toilets) are also provided. The project also aims to reduce the amount of water discharged to the sewer through landscaping and the choice of materials that promote water deceleration, absorption, evaporation and infiltration.

Stormwater and greywater management systems are integrated into the site's landscaping: green roofs and storage areas, green facades, stormwater basins, bio-purification and infiltration valleys, water-intensive plants, cisterns, permeable materials, etc.

COLLECTVE AREAS

An experimental greenhouse is installed on the top floor of the highest building at the corner of the park. The management of the greenhouse is currently under study; it could become the didactic centre of biodiversity for the inhabitants and schoolchildren of the extended district.

An educational space, information and initiative centre, strategically located on the mall, will aim, during the initial period of the project, to raise awareness and participation of residents (old and new) in the sustainable character of the district and will focus on project coordination.

In each of the lots are provided, for the use of the inhabitants of the lot:

- two roof-top vegetable gardens, one of which is accessible by lift to People with Reduced Mobility (PRM);

- a garden inside an islet;

- a collective laundry room powered by green electricity from photovoltaic panels and rainwater tanks

Land plot area : 17 135,00 m^2

Built-up area : 56,00 %

Green space : 15 900,00

Products

Product

Treatment and recovery of greywater to feed the toilet

SBP Water works

SBP, Populierstraat 3 8800 ROESELARE

https://www.sbp.be

Product category :

The water in the shower, sink, bath, washing machine and kitchen is called gray water.
It is essentially all domestic wastewater, with the exception of toilet water (= black water).
These gray waters are therefore less polluted and can be perfectly cleaned and then used as a flush or reuse in the garden.
The greywater unit is based on the principle of biological purification. The fat separator is the first step in purifying the system. Because of the internal partitions, the water is forced to pass through the compartment in a winding movement, so that the fats are trapped. The water is then aerated in the second purification stage. Microorganisms break down organic components in wastewater. Bioballs provide additional adhesion surface and promote optimal purification. The water is then cleared of its smells and colors. The third compartment contains activated carbon. Activated carbon is a form of carbon that has been treated to have as large a reaction area as possible per unit volume. In the fourth and final purification step, the water is disinfected using UV light.
After purification, the water must be collected in one day. This daily stock must be plastic and its volume depends on the project. It is important that the purified water is not stored longer than necessary.
The gray water treatment unit comprises a large tank, compartmentalized inside during the purification steps described above.

Treatment and recovery of greywater to feed the toilets.

Costs

Construction and exploitation costs

Cost of studies : 6 434 136 €

Total cost of the building : 97 990 385 €

Subsidies : 21 154 568 €

Additional information on costs :

Costs, revenues, results, land affected, cost excluding land, cash subsidy, subsidy per salable m^2, average selling price per entity, average land per entity, cost per gross square meter above ground

Health and comfort

Indoor Air quality

All apartments are through, allowing easy natural ventilation. All apartments are provided with individual double flow ventilation with heat recovery.

Comfort

Health & comfort :

The accommodations are compact and through. The rooms of day, stay, kitchen, terrace, are in direct functional relation and the orientation of the housings ensures the best sunshine of the living spaces.

Building circulation cores make the most of natural light, which reduces the demand for electricity for common areas.

Each lot has two vegetable gardens on the roof, a garden in the inner island and a collective laundry room.

Acoustic comfort :

The housing meets the standard NBN-S01-400-1, normal acoustic comfort.

The screeds of the apartments are floating screed type, separated from the load-bearing slab by a layer of sound insulation.

If necessary, the acoustic protection is provided by plasterboard bulkheads with interposition of sound insulation.

Carbon

GHG emissions

Building lifetime : 50,00 an(s)

Contest

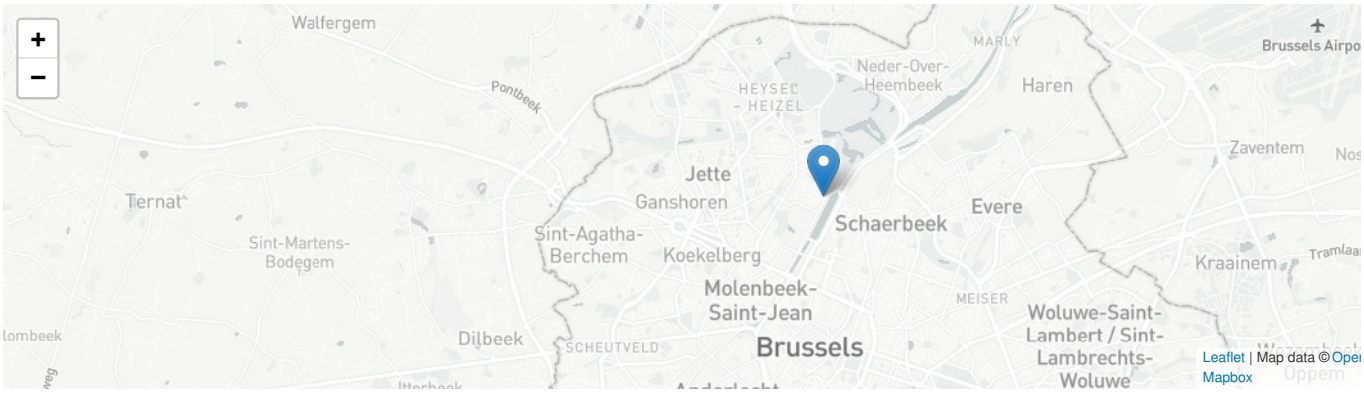
Building candidate in the category

Energie & Climats Tempérés

Santé & Confort

Smart Building

Prix du public



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