BIOTOPE project

by Alan Bragado / 2020-07-10 17:25:34 / France / 8985 / FR

New Construction

Primary energy need:
76.1 kWhep/m².an
(Calculation method: RT 2012)

ENERGY CONSUMPTION

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Office building &lt; 28m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Year</td>
<td>2018</td>
</tr>
<tr>
<td>Delivery year</td>
<td>2019</td>
</tr>
<tr>
<td>Address 1 - street</td>
<td>94 boulevard des Cités Unies 59000 LILLE, France</td>
</tr>
<tr>
<td>Climate zone</td>
<td>[Cfb] Marine Mild Winter, warm summer, no dry season.</td>
</tr>
<tr>
<td>Net Floor Area</td>
<td>31 723 m²</td>
</tr>
<tr>
<td>Construction/refurbishment cost</td>
<td>91 000 000 €</td>
</tr>
<tr>
<td>Number of Work station</td>
<td>1 400 Work station</td>
</tr>
<tr>
<td>Cost/m²</td>
<td>2868.58 €/m²</td>
</tr>
</tbody>
</table>

Certifications:

BREEAM Excellent, WELL Gold, BiodiverCity, WiredScore and E+C-.

General information

BIOTOPE is an exemplary project, with a very efficient environmental level. This desire to create a sustainable and resilient building has been supported by the award of 5 of the most demanding sustainable certifications: BREEAM Excellent, WELL Gold, BiodiverCity, WiredScore and E+C-.

2 strong axes of the project:

Energy

The low carbon impact and energy performance of the project have been valued by an avant-garde French label foreshadowing the next French thermal regulation: E+C-. The double skin facade of BIOTOPE participates in the bioclimatic design of the building; its connection to the city’s heating network, its groundwater geothermal energy for heating and cooling by geocooling contributes to energy excellence. Numerous dynamic thermal simulations have been carried out in order to justify this high performance design. They made it possible to obtain grants from ADEME, the French agency for ecological transition.

Biodiversity
Biodiversity is the strong marker of the BIOTOPE project, the building offers an incredible diversity of habitats and an omnipresent biophilia: 7 roof terraces, 2 green walkways, 30 m² of vegetable garden, 3000 m² of green spaces, water points, balconies and a green square. The greening of the outdoor spaces is the result of a reflection that was carried out from the design of the building and still is today thanks to a biodiversity management plan over the first 5 years of operation of the building.

**Sustainable development approach of the project owner**

First imagined as part of the Lille application to host the European Medicines Agency, BIOTOPE was designed with current best practices to accommodate many employees.

The environmental ambition was high. The project team, made up in particular of Bouygues Bâtiment Nord-Est for its client Linkcity, had this ambition upstream of construction, in order to guarantee quality environmental performance.

Valorization of renewable energies (geothermal energy and heating network), implementation of a passive design, air quality control consisting of a flow rate of 36 m³/h/person and taking into account the management of soft transport located nearby: these are the key actions of the project.

Biotope is the culmination of many objectives:

- a connectivity service that stands out for the excellent quality of its wired infrastructure, mitigating the risks of failure of telecom services and improving the resilience of the building,
- energy and carbon performance through its qualities in renewable energies and its heating network. Obtaining the E + C- label has enabled the Biotope to be a true pioneer building, the label foreshadowing the new environmental regulations of 2020.
- quality of use of the building thanks to biomimetic and high ecological quality fittings; and the guarantee of thermal comfort (via an STD), lighting comfort (via an FLJ) and acoustic comfort (via a study of ambient noise and sound insulation).

After 1 year of development and 19 months of work, BIOTOPE is a success being a resilient building, creator of value for its users and the environment.

**Architectural description**

New icon of the Lille skyline, BIOTOPE draws a silhouette that is recognized in the urban landscape of Lille. Several architectural choices have contributed to this by making BIOTOPE a new urban signal.

**Volume optimization:**

The volume is cut, twice, to allow an optimized use of daylight in the building. These devices also make it possible to establish a dichotomy in the writing of the facades, thus breaking with the effect of length and the monotony that a traditional office building could inspire. The indentations draw a few curves in the volume, conducive to creating a microclimate and promoting vegetation on the balconies protected from the westerly winds.

**Active roofs:**

The interplay of terraces, at the level of the various roofs of BIOTOPE, gives offices unobstructed views and access to outdoor planted spaces. The project thus develops an urban facade and creates a green facade effect.

**Green continuity:**

The green spaces start from the forecourt up to the various terraces and balconies, passing through the atrium of BIOTOPE. This green continuity offers visitors and employees a direct and unique link to nature, inside and out, unifying the architectural ensemble within a harmonious public space.

**Envelope:**

The facade of the building is a concept of breathable double-walled panels made up of two consecutive window frames. This high-tech product is among the most modern and efficient facade systems today. These advantages are very fast and high precision assembly, and also high thermal performance (an STD has demonstrated an 11% gain in energy consumption thanks to this double skin facade compared to a conventional double glazing). The envelope protects the building from seasonal climatic variations: Protective in summer (sunshade and natural ventilation in the boxes), as in winter (buffer space, solar gain). It contributes to the thermal regulation of the interior of the building.

**Materials:**

All the materials used have an A or A + label indicating a low emission of volatile pollutants into the indoor air of BIOTOPE.

See more details about this project

[https://www.lillemetropole.fr/votre-metropole/grands-projets/grands-projets-equipements/biotope-le-siege-de-la-metropole](https://www.lillemetropole.fr/votre-metropole/grands-projets/grands-projets-equipements/biotope-le-siege-de-la-metropole)
Stakeholders

Contractor

Name: Linkcity
Contact: William Delmas
https://www.linkcity.com/

Construction Manager

Name: Henning Larsen
Contact: Søren Øllgaard
https://henninglarsen.com/en

Stakeholders

Function: Construction company
Bouygues Bâtiment Nord Est
Philippe Poustoly
http://www.bouygues-batiment-nord-est.fr/

Function: Certification company
ELAN
Alan Bragado
https://www.elan-france.com/

Energy

Energy consumption

Primary energy need: 76.10 kWhep/m².an
Primary energy need for standard building: 122.70 kWhep/m².an
Calculation method: RT 2012
Breakdown for energy consumption:
- Cep heating: 17.10 kWhep/m².an
- Cep cooled: 8.20 kWhep/m².an
- Cep DHW: 7.00 kWhep/m².an
- Cep lighting: 13.60 kWhep/m².an
- Auxiliary vine: 30.20 kWhep/m².an

Envelope performance

Renewables & systems

Systems

Heating system:
- Urban network
- Geothermal heat pump
- Radiant ceiling

Hot water system:
- Urban network

Cooling system:
- Water chiller
- Geothermal heat pump
- Radiant ceiling

Ventilation system:
- Double flow heat exchanger

Renewable systems:
- Heat pump (geothermal)
Smart Building

BMS:
BMS and smart meters via a metering plan by use and zone.
Building ready to accommodate any type of connected system thanks to its network architecture optimized under the WiredScore label.

Environment

Urban environment

Land plot area : 10 404.00 m²
Green space : 3 000.00

BIOTOPE is a new urban signal and enjoys a location giving it a symbolic position with strong markers:
• commercial: in the heart of the 3rd business district in France, Euralille
• history and events: attached to the Grand Palais
• institutional: attached to the Hotel des regions

Perfectly located in the heart of Lille, BIOTOPE promotes soft mobility in the city by being close to TGV stations, the metro and bus lines. Arrangements, such as a xx m² bike room on 2 floors, electric charging stations and the creation of a cycle path also promote less carbon-intensive mobility.

Products

Product

Prefabricated sanitary ware
Ossabois
https://www.ossabois.fr/

Product category : Finishing work / Plumbing - Sanitary equipment

One of the innovations of the project was the creation of prefabricated sanitary blocks. The 76 sanitary blocks were built off site and arrived with all their finishes (earthenware, washbasins, mirror, hand dryer, etc.) and sanitary equipment. Only the connection was necessary. This site innovation has made it possible to reduce waste, optimize the work schedule and lower the carbon impact.

Very well accepted. Time saving on the site planning.

Costs

Health and comfort

Water management

Consumption from water network : 32 855.00 m³
Water Consumption/m² : 1.04
Water Consumption/Work station : 23.47

Hydro-economical system set up, with low flow rates

Indoor Air quality

A set of pollutant measurements was carried out in order to meet the demanding thresholds of the WELL label. All ventilation systems meet current best practices: high heat recovery efficiency, efficient filtration of the outside air and sizing to improve air quality for users with a flow rate of 36 m³/h/nobody. Also note: the drafting of an indoor air quality plan, a clean site charter, the use of non-polluting materials (A+ label), ban on smoking on terraces, ban on pesticides, no combustion on the site,...
Comfort

Health & comfort :
The Biotope improves the quality of use of the building thanks to biomimetic and high ecological quality fittings. Several measures have thus been created to make biodiversity a strong axis of the well-being of users: terraces for recharging your batteries or working, fruit tree species, creation of a vegetable garden with the provision of tools, wetlands for the creation of an island of freshness and an educational course on the theme of biodiversity.

Numerous technical studies have also been carried out in order to guarantee users: thermal comfort (via an STD), lighting comfort (via an FLJ) and acoustic comfort (via a study of ambient noise and sound insulation). The building has been optimized following these studies to meet all of these comfort issues.

Calculated indoor CO2 concentration :
Présence de sondes C02 dans les espaces de réunion afin de moduler le débit de ventilation et de conserver un taux de dioxyde de carbone inférieur à 800 ppm.

Calculated thermal comfort :
Indices PMV/PPD en accord avec la norme EN 15251:2007, catégorie II

Acoustic comfort :
Noise from outside or repetitive noise can be a source of stress, especially in urban areas. Preventing noise from outside and preventing it from entering buildings can help improve occupant well-being and comfort:

- Acoustic studies were carried out from the design phase by an acoustician. Several measurements have been carried out by the IWBI (certification body WELL), in terms of the intrusion of exterior noise. The average sound pressure level caused by the exterior does not exceed 50 dBA.
- HVAC systems and occupants are the main sources of indoor noise. As offices and workspaces are increasingly designed to promote employee interaction, acoustic comfort may decrease, especially when different types of users share space:
  - Acoustic studies were carried out from the design phase by an acoustician. The sound levels of HVAC equipment were measured by the project acoustician and the IWBI in order to verify the different thresholds of the WELL standard.

Daylight factor :
FLJ respecté dans le cadre du BREEAM / Autonomie lumineuse respectée dans le cadre du WELL

Carbon

GHG emissions

Methodology used :
As part of the E+C- label

Life Cycle Analysis

Contest

Reasons for participating in the competition(s)

La conception et la réalisation du projet BIOTOPE ont été menées en suivant une stratégie de résilience face au changement climatique d’atténuation et d’adaptation.

L’atténuation contribuant à la lutte contre le changement climatique en limitant ses émissions carbone :

BIOTOPE est un bâtiment à haute efficacité énergétique limitant ses consommations grâce à une conception bioclimatique (orientation, façade double peau ayant un rôle tampon, brise soleil). Cette conception vertueuse est couplée à des systèmes énergétiques très performants basés sur des énergies renouvelables (géothermie sur nappe, géocooling, raccordement au réseau de chaleur avec un mix énergétique prochainement à 50% d’EnR). L’ensemble de cette démarche a été valorisé par le label E+C- (E2C1), préfigurant la future réglementation environnementale 2020.

Grâce notamment à sa structure poteaux/poutres, BIOTOPE a été pensé comme un bâtiment modulable et adaptable améliorant sa durabilité. Un changement d’usage du bâtiment nécessiterait donc moins de travaux générateurs des déchets et émetteurs de carbone.

Biotope contribue également à limiter l’impact des vagues de chaleur en créant un effet d’îlot de fraîcheur à l’échelle du bâtiment mais également du quartier. L’incroyable densité biophilique du projet participera à la réduction des pics de température grâce notamment aux 3000 m² d’espace vert, à ses points d’eau au niveau des terrasses et ses balcons végétalisés.

Un bâtiment adapté anticipant les futurs effets du changement climatique pour être plus résilient :

BIOTOPE assure le confort thermique de ces occupants. Une simulation thermique dynamique a pu le démontrer dès la phase conception et a été confirmée par des tests réalisés par un organisme tiers à la livraison du bâtiment. Afin de garantir ce confort thermique tout au long du cycle de vie du bâtiment, ces simulations réalisées ont pris en compte un fichier météorologique d’anticipation climatique à horizon 2050. Le confort thermique a ainsi été validé grâce aux indices des certifications environnementales visées.
Les larges zones végétalisées du projet, en plus des bénéfices déjà évoqués et de l’amélioration de l’inertie du bâtiment, permet de faciliter la gestion des eaux pluviales en limiter les débits rejetées (évaporation notamment).

La structure du bâtiment a également été pensée pour répondre au mieux aux aléas climatiques (neige, vent), de séisme et de températures extrêmes.

BIOTOPE assure une résilience numérique grâce à la redondance et à la qualité de ses services connectés, vérifiées par le label WiredScore.