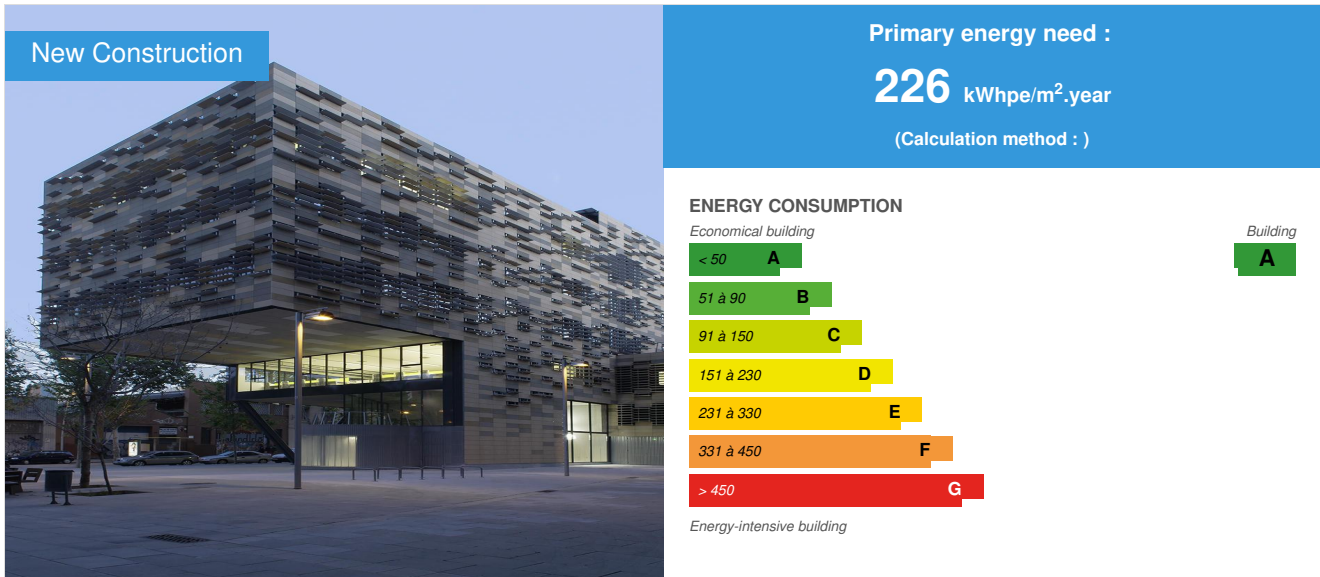


## Leitat Foundation Technology Center

by Picharchitects Pich-Aguilera / 2017-06-07 00:00:00 / Espagne / 8621 / ES



**Building Type** : Other building  
**Construction Year** : 2015  
**Delivery year** : 2015  
**Address 1 - street** : 08005 BARCELONA, España  
**Climate zone** : [Csb] Coastal Mediterranean - Mild with cool, dry summer.

**Net Floor Area** : 3 005 m<sup>2</sup> SHON  
**Construction/refurbishment cost** : 5 239 883 €  
**Number of none** : 5 none  
**Cost/m2** : 1743.72 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



### General information

The building, intended for applied research in the fields of Biotech, Nanotech and new technologies, is located in the Sant Martí neighborhood of the Barcelonés area, in the area renamed a few years ago as a 22@ innovation district, next to the Poble Nou.

The building allocates most of its surface to laboratory and administrative uses. In the two large underground floors there is a parking lot, with several squares prepared for electric cars, and various facilities spaces, among which are the heat exchange stations with the Districlima network, which provides heat and cold to the whole neighborhood. On the ground floor there is access, in the first meeting rooms, and on floors 2a, 3a, 4a and 5a the bulk of the program is located with administrative and laboratory spaces. The deck floor houses the facilities and a green space of coexistence.

The building was designed with the interest, both by the developer and the architect, to show its use from the innovation of architecture itself. The project, its materials, systems were studied to minimize its environmental impact, both in its construction processes, in its use and possible deconstruction. The execution project was developed from the involvement and possibilities of the industry and the construction company that had to execute it.

The building has been awarded 4 leaves (maximum 5) of the GREEN evaluation program.

[See more details about this project](#)

<http://www.picharchitects.com/portfolio-item/centro-tecnologico-leitat/>

## Data reliability

3rd part certified

## Stakeholders

### Stakeholders

Function : Developer

Fundación LEITAT

C/ de la Innovació, 2 - 08225 Terrassa (Barcelona)

<http://fundacionleitat.org>

Function : Designer

Pich-Aguilera Arquitectes/Picharchitects

Àvila 138. 4<sup>º</sup> 1<sup>ª</sup>. 08018 Barcelona, Tel.: 93 301 64 57 Fax: 93 412 52 23, e-mail: [info@picharchitects.com](mailto:info@picharchitects.com)

<http://www.picharchitects.com/>

Function : Structures calculist

Bomainpasa, S.A

Avila 138 3<sup>ª</sup>planta 08018 Barcelona, Tel. +34 934 144 762, Fax +34 932 020 412, e-mail: [bcn@bomainpasa.com](mailto:bcn@bomainpasa.com)

<http://www.bomainpasa.com/>

Function : Construction company

PGI Grup

C/ Llull, 329 - 2<sup>ª</sup> Planta 08019 - Barcelona, Tel: +34 933 633 009, FAX: +34 902 006 731, email: [pgibcn@pgigrup.com](mailto:pgibcn@pgigrup.com)

<http://www.pgengineering.com/>

## Contracting method

Lump-sum turnkey

## Owner approach of sustainability

R & D focused on energy efficiency and environmental sustainability Main fields of research: Photovoltaic energy and associated products. Thermoelectricity and electroluminescence. Storage and recovery of CO<sub>2</sub>. Batteries and supercapacitors. Treatment and recovery of water. Life cycle analysis. Membrane technologies. Treatment, minimization and recovery of waste. Some project areas in progress: New concepts in large-scale energy storage by optimizing Li-ion batteries. New supercapacitors based on electrochemical effects of double layer and pseudocapacity. Reducing levels of greenhouse gases through the capture, sequestration and recovery of CO<sub>2</sub> with ionic liquids. Sustainable biorefinery. Efficient third generation photovoltaic cells and solid state bulbs for consumers. Improving energy efficiency in cities through integrated demand management in transport and transfer of good practices. New advanced electrochemical treatments of wastewater applicable in the biodiesel industry, in the food industry with recovery of phosphates, in the automotive industry and of coatings with recovery of nickel. Design, build and demonstrate an innovative and sustainable technology based on a new approach to solid urban waste (usw), while dealing with urban wastewater.

## Architectural description

The building, intended for applied research in the fields of Biotech, Nanotech and new technologies, is located in the Sant Martí neighborhood of the Barcelonés area, in the area renamed a few years ago as a 22@ innovation district, next to the Poble Nou. The building allocates most of its surface to laboratory and administrative uses. In the two large underground floors there is a parking lot, with several squares prepared for electric cars, and various facilities spaces, among which are the heat exchange stations with the Districlima network, which provides heat and cold to the whole neighborhood. On the ground floor there is access, in the first meeting rooms, and on floors 2a, 3a, 4a and 5a the bulk of the program is located with administrative and laboratory spaces. The deck floor houses the facilities and a green space of coexistence. The building was designed with the interest, both by the developer and the architect, to show its use from the innovation of architecture itself. The project, its materials, systems were studied to minimize its environmental impact, both in its construction processes, in its use and possible deconstruction. The execution project was developed from the involvement and possibilities of the industry and the construction company that had to execute it. The building has been awarded 4 leaves (maximum 5) of the GREEN evaluation program.

[Ver en los siguientes apartados](#)

## Energy

## Energy consumption

Primary energy need : 226,00 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 700,00 kWhpe/m<sup>2</sup>.year

Calculation method :

CEEB : 0.0001

Final Energy : 107,00 kWhfe/m<sup>2</sup>.year

Breakdown for energy consumption :

Thermal final heating energy: 78,43 kWh / m<sup>2</sup> year

Electrical final energy for cooling: 0,62 kWh / m<sup>2</sup> year

Thermal final cooling energy: 20,22 kWh / m<sup>2</sup> year

Electrical final energy for illumination: 7,74 kWh / m<sup>2</sup> year

More information :

Total primary energy: 226,09 kWh / m<sup>2</sup> year

Total CO<sub>2</sub> emissions: 50,37 kg CO<sub>2</sub> / m<sup>2</sup>

Reducing the impact on climate change: 82,33%

Reduction of impact on non-renewable energy: 99,51%

## Envelope performance

Envelope U-Value : 0,28 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The vertical envelope is composed of a succession of layers with bioclimatic functions:

-A first outer layer of lamas with two positions and two materials that have the properties to respond to their orientation and the solar and thermal requirements of the interior. Its composition and position is projected from the light needs, protecting and diffracting the sunlight towards the interior, and analyzing the sufficient natural light in the workplace.

-The second layer of the envelope is a ventilated air chamber that evacuates and tempers the outside temperature.

-The third layer integrates insulation, carpentry and interior finishes of definitive protection.

The cover envelope is an ecological cistern cover, community living space, rainwater storage and base of a vegetation that regenerates the air of its surroundings. The system allows to regenerate the external environment, as well as to protect and to avoid the overheating of the floor of the last floor.

Building Compactness Coefficient : 0,29

Indicator : HE1 BD

Air Tightness Value : 2,00

<https://www.construction21.org/espana/data/sources/users/1958/indicador-de-permeabilidad.docx>

## Real final energy consumption

Real final energy consumption/m<sup>2</sup> : 126,30 kWhfe/m<sup>2</sup>.year

Real final energy consumption/functional unit : 126,30 kWhfe/m<sup>2</sup>.year

Year of the real energy consumption : 2 016

## Renewables & systems

### Systems

Heating system :

- Urban network
- VAV System

Hot water system :

- Urban network

Cooling system :

- Urban network
- VAV Syst. (Variable Air Volume system)

Ventilation system :

- Natural ventilation
- humidity sensitive Air Handling Unit (hygro A)

<https://www.construction21.org/espana/data/sources/users/1958/sistemas-de-climatizacion.docx>

Renewable systems :

- Solar photovoltaic

Renewable energy production : 99,51 %

<https://www.construction21.org/espana/data/sources/users/1958/energias-renovables.docx>

Other information on HVAC :

The heat and cold production system is formed by a Unit of Central Air Treatment (UTA, in Spanish) located in the cover of the building, and counts on the corresponding modules of fan, filters, battery of heat and recovery of heat, as well as with the external air intakes and extractions.

The air conditioning conducts descend from the production system through the facade and are connected, from the outside to the inside, on each floor.

All facilities are viewable and recordable.

DISTRICT CLIMATE: The building does not have its own cold or heat production equipment, but is connected to a central urban distribution network, which produces heat and cold, from the steam generated by an existing incineration plant. Heat and cold enters the building through interchangers located on the floor - 2.

AIR RENOVATION: The central installation for the required air renovation in the building is supported by an integrated system in the building's own floor. The hot and contaminated air from the plants is extracted through existing grilles in the alveolar plates of the slabs and is conveyed to the plant ducts in order to be 100% renewed and again driven. The alveoli of the plates allow an improvement of the interior air, a reduction of the energy consumption of the machinery, as well as the possibility of thermal irradiation of the slabs themselves towards the spaces.

According to the specific solar thermal justification project, the building does not require a solar thermal system with a connection to the "District Heating & Cooling" network (Districlima). The photovoltaic installation produces 100% of the lighting needs of the building.

Solutions enhancing nature free gains :

The architecture has been designed to act as an interface or balancer between outdoor and indoor climate conditions, as an environment that filters and exchanges with the surrounding conditions, to achieve the highest natural interior comfort.

## Smart Building

BMS :

At the electrical level, and in order to be able to perform a good energy management, network analyzers have been installed to the 3 main frames (one for each type of power supply)

Smartgrid :

Energy production is local and renewable.

## Environment

### GHG emissions

GHG in use : 50,37 KgCO<sub>2</sub>/m<sup>2</sup>/year

Methodology used :

Power Software

Building lifetime : 75,00 year(s)

### Life Cycle Analysis

<https://www.construction21.org/espana/data/sources/users/1958/acv.docx>

Eco-design material : All the materials of the interior are exposed, without coatings, nor finished. The health problems due to irradiation of the placed materials are reduced by 99.10%.

<https://www.construction21.org/espana/data/sources/users/1958/disenio-materiales.docx>

### Water management

Consumption from water network : 105 561,00 m<sup>3</sup>

Consumption of harvested rainwater : 17 318,00 m<sup>3</sup>

Water Self Sufficiency Index : 0.14

Water Consumption/m<sup>2</sup> : 35.13

Water Consumption/none : 21112.2

### Indoor Air quality

In terms of air quality, the need to cover both air conditioning and air renewal forces us to heat and cool by air. We try to support these needs with the inertia of the building materials, allowing them to accumulate the freshness and heat of the environment to be able to radiate it in the interior and to allow a greater comfort, as well as a reduction of the consumptions of energy.

## Comfort

**Health & comfort :** According to the green assessment, an increase of 23.82% in health, welfare and productivity of users is calculated.

**Calculated indoor CO2 concentration :**

Concentración de CO2 en el aire interior en partes por millón en volumen por encima de la concentración exterior: 450,75

**Calculated thermal comfort :** Valor de molestia por velocidad del aire DR: 20,07%

**Acoustic comfort :** Noise Ratio per day: 65 dBA

## Products

### Product

Brecco photocatalytic product

BREINCO

938 46 09 51

<http://www.breinfo.com/es>

**Product category :**

Dry envelope system based on cement pieces pressed with fibers and without metal reinforcement. Nano-particles are included in the mass to refract the light, incorporating a luminescent effect and acquiring photocatalytic properties (NO2 absorption).

The product was designed for pavements, but in the LEITAT building it develops an innovation together with the industry to apply it in façades. After its good acceptance, Breinco has now put the new application on the market.



## Costs

### Construction and exploitation costs

**Total cost of the building :** 5 250 000 €

**Subsidies :** 2 625 000 €

## Urban environment

In addition to hosting its interior program, the headquarters of LEITAT also generate a new urban space, a partly covered plaza, sheltered under the large overhang that forms the building itself. The project activates the center of the block, linking it to the open space of the street and creating a step, through the building, to convert the existing public space into a place of meeting and living. Under the slope the building occupies the whole space lot to its limits. In ground floor and first only access is built, becoming the non-built volume in the new plaza-porch, under the upper floors that expand in cantilever. The building proposes a link to the existing built front and gives continuity of the traditional city in the texture of its skin.

### Land plot area

**Land plot area :** 646,58 m<sup>2</sup>

### Built-up area

**Built-up area :** 81,50 %

### Green space

**Green space :** 202,86

### Parking spaces

Floor-2: 445.8 m<sup>2</sup>; Floor-3: 400.74

It will have 26 car spaces with dimensions of 2.2x4.5, one of 2x4.5, two of 2.85x4.5 and one of 4.15x 4.5. Therefore the total number of seats will be 30 vehicles.

The required number of motorcycle sleep 3, the project provides 7 seats of motorcycles and sleep all of 1x2m.

The required number of bicycles seats sleep 24. A number of 2 bBicycles of 0.8x2m for every two squares.

The ramps will have a width of 3 meters and a maximum slope of 20%. There will be access to the car park with a width of 3 meters. Slope will be of 4%, 4.5

meters. With the application of Article 6 of the Decree (loading and unloading of goods), 1 place was reserved for the urban distribution of goods (1 square per 2,000 m2 of roof dedicated to the administrative equipment, similar to offices). This square will have to be marked on the public road, before the building itself.

## Building Environmental Quality

### Building Environmental Quality

- indoor air quality and health
- biodiversity
- acoustics
- comfort (visual, olfactive, thermal)
- waste management (related to activity)
- energy efficiency
- renewable energies
- maintenance
- building process
- products and materials

## Contest

### Building candidate in the category



Bajo Carbono



Premio de los Usuarios

