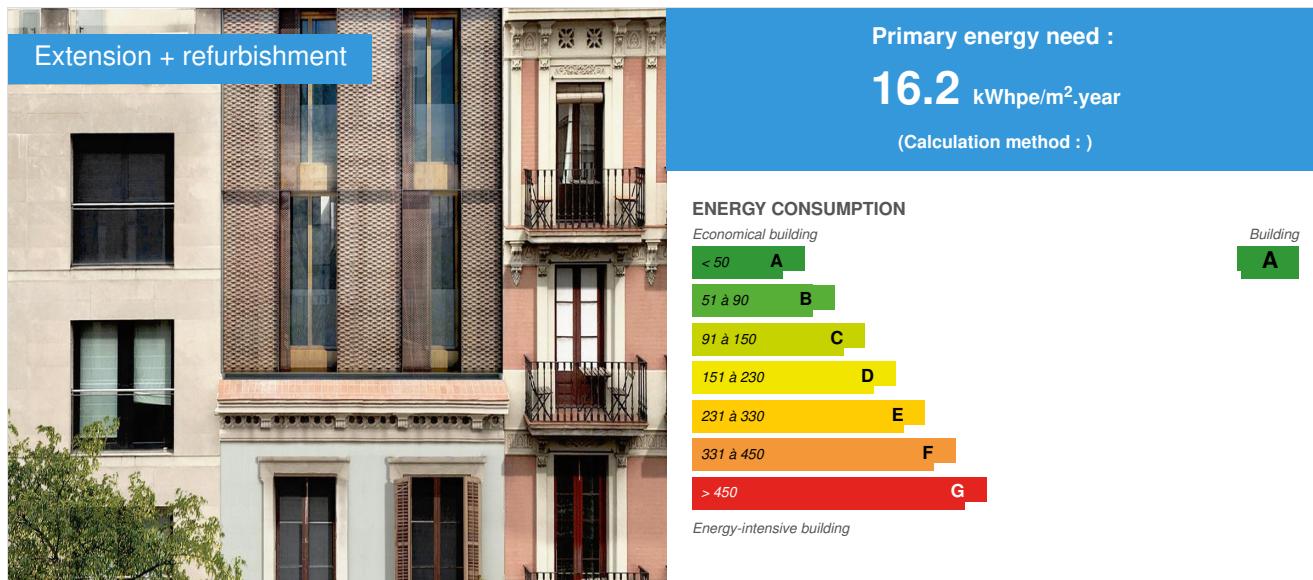


## SYSTEM IMPROVEMENT FOR BUILDING EXPANSION: THE CASE OF ENRIC GRANADOS 69, BARCELONA

by carlos delgado garcia / 2016-06-21 10:24:14 / Espagne / 15806 / ES



**Building Type** : Collective housing < 50m  
**Construction Year** : 2015  
**Delivery year** : 2016  
**Address 1 - street** : 08008 BARCELONA, España  
**Climate zone** : [Csb] Coastal Mediterranean - Mild with cool, dry summer.

**Net Floor Area** : 161 m<sup>2</sup>  
**Construction/refurbishment cost** : 279 205 €  
**Number of Dwelling** : 2 Dwelling  
**Cost/m<sup>2</sup>** : 1734.19 €/m<sup>2</sup>

Proposed by :



### General information

A new architectural system, management and financing, has been developed by La Casa por el Tejado, for the improvement of existing buildings and their completion. It is based on the use of vacant buildability that some buildings have. Enric Granados 69, one of several projects, involves the rehabilitation of a centuries-old estate (ground floor and three upper) and a freeboard with industrialized construction (floors 4 and attic). Enlargement, made with materials that store CO<sub>2</sub> and qualified A in energy certification, provides economic resources to improve the existing building.

See more details about this project

<http://www.lacasaporeltejado.eu/es/blog/enric-granados-69-categoria-a/>

[http://www.lacasaporeltejado.eu/wp-content/uploads/2016/06/Inarquia---ticos-Eco-Eficientes-en-los-tejados-de-Barcelona-\\_150616.pdf](http://www.lacasaporeltejado.eu/wp-content/uploads/2016/06/Inarquia---ticos-Eco-Eficientes-en-los-tejados-de-Barcelona-_150616.pdf)

- <http://www.lacasaporeltejado.eu/wp-content/uploads/2016/03/ProMateriales-96-032016.pdf>
- <http://www.lacasaporeltejado.eu/wp-content/uploads/2016/02/InterEmpresa-22012016-baja.pdf>
- <https://youtu.be/qJ70fPSy5ss>

## Data reliability

3rd part certified

## Stakeholders

### Stakeholders

Function : Developer

La Casa por el Tejado

info@lacasaporeltejado.eu

<http://www.lacasaporeltejado.eu>

Development and sale of the project

Function : Designer

MIBA Architects

miba@mibaarq.com

<http://www.mibaarq.com/about/>

Designers

Function : Facility manager

AT-3 Oller Peña

AT3@AT3SCP.com

<http://www.at3.cat>

Recruitment, coordination and construction management

Function : Environmental consultancy

Societat Orgànica

so@societatorganica.com

<http://www.societatorganica.com>

Environmental and counseling facilities

Function : Construction company

Atres80

info@atres80.com

<http://www.atres80.cat>

Design and calculation of facilities

Function : Manufacturer

Novadomus hàbitat

info@novadomushabitat.com

<http://novadomushabitat.com>

Manufacture and assembly of structures and wooden fences

Function : Construction Manager

Vegas del Valles

Builder

### Contracting method

Separate batches

### Owner approach of sustainability

La Casa Por el Tejado has created its own quality tool called Senda. Senda is a help system and evaluation of environmental quality of the projects of La Casa Por el Tejado, ie for attics that the company is developing in Barcelona, Madrid, Pamplona, Bilbao and other medium and large cities in Spain. Created by Societat Orgànica, Senda follows the philosophy of a life-cycle assessment simplified vision which allows to consider buildings under the same system of analysis and decision-making, from the extraction of raw materials and its manufacture, to the limit of its durability, deconstruction, reuse or recycling of resources invested. Besides taking into account the entire life cycle, the system assists and performs an assessment of various environmental impacts like: changes in biodiversity, consumption of non-renewable energy, deterioration of drinking water, impacts caused by materials and generation of pollutants.

## Architectural description

The multifamily building where the freeboard is performed finds itself between party walls and is aligned to the boundary of a plot of approximately 164 m<sup>2</sup>. It has a ground floor where there is a shop, and three floors, with one dwelling per floor. The two new housings, 161 m<sup>2</sup> of usable area, are in the same plane of the existing facade on the street Enric Granados, in order to respect the composition. In the rear, however, the 4th floor is adapted to the current built depth, but on the 5th floor 1.70 m is removed creating a terrace overlooking the interior of the block. To facilitate the entry of natural light in the rooms and promote cross ventilation, the inner courtyard of the estate extends to the new cover, extending its diameter in the freeboarded plants. An additional partially walkable courtyard is created. These interior spaces are closed by some woodworks. The envelope of the new homes on the Enric Granados facade consists of a ventilated facade expanded metal panels of transparent red. A solution that seeks dialogue with the existing facade from the point of view of contemporary design. On the side facing the interior of the block, it has opted for the construction of a louvered type enclosure gallery of cedarwood. As a differentiator, on the 5th floor which has created a new terrace, the connection to the interior of the house is done through a sliding window aluminum profile with minimum thermal break. In the new flat roof, exclusively for maintenance, telecommunication facilities and chimneys as well as solar collectors for hot water production are placed. The rest of timber are pine reddish.

## If you had to do it again?

Building on an existing building requires a lot of coordination and agreement among all actors involved in the process from the inhabitants of the building to work technicians, not to mention public administration. This process requires a great experience and management capacity by the project developer team.

## Building users opinion

Of the two new floors, the attic is inhabited, but not the lower floor. The owner of the penthouse said "pleased to have found a home of this type, of which there are no more in the city, similar to a house because it has a terrace, sun, views, but with the wealth of being part of a historic building in a central urban area, with all amenities within walking distance."

## Energy

### Energy consumption

Primary energy need : 16,20 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 82,90 kWhpe/m<sup>2</sup>.year

Calculation method :

CEEB : 0.0002

Final Energy : 6,20 kWhfe/m<sup>2</sup>.year

Breakdown for energy consumption :

Heating = 2.9 kWh / m<sup>2</sup> year Cooling = 1.6 kWh / m<sup>2</sup> year ACS = 1,7kWh / m<sup>2</sup> year

More information :

Not required solar thermal installation of vacuum tubes. This is beyond regulations, and commitment to non-renewable energy consumption

Initial consumption : 6,20 kWhpe/m<sup>2</sup>.year

### Envelope performance

Envelope U-Value : 0,20 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

FACADE (inside to outside):

gypsum plasterboard PYL 750 Oriented strand board OSB d<650 e=15mmMW

Mineral wool e=160mm

Oriented strand board OSB d<650 e=15mm

Slightly ventilated air chamber

Finishing aluminum facade e=2mm

Indicator :

### Real final energy consumption

Real final energy consumption/m<sup>2</sup> : 6,10 kWhfe/m<sup>2</sup>.year

Real final energy consumption/functional unit : 6,00 kWhfe/m<sup>2</sup>.year

Year of the real energy consumption : 2 015

### Systems

#### Heating system :

- Heat pump

#### Hot water system :

- Heat pump
- Solar Thermal

#### Cooling system :

- Reversible heat pump

#### Ventilation system :

- Natural ventilation
- Single flow

#### Renewable systems :

- Solar Thermal
- Heat pump

Renewable energy production : 74,00 %

Solar collector system for vacuum tubes

#### Solutions enhancing nature free gains :

Detailed study of natural lighting, solar protection, insulation and ventilation

### Smart Building

#### Smartgrid :

Does not exist in the district

Users' opinion on the Smart Building functions : right

## Environment

### GHG emissions

GHG in use : 4,00 KgCO<sub>2</sub>/m<sup>2</sup>/year

#### Methodology used :

Calculation Method of Real Decree Spanish: 47/2007

Building lifetime : 100,00 year(s)

A specific study has been performed, but similar approach to building systems (wood-based in almost all components) is at the lowest level of industrialized building systems.

### Water management

Consumption from water network : 116,00 m<sup>3</sup>

Water Consumption/m<sup>2</sup> : 0.72

Water Consumption/Dwelling : 58

## Products

### Product

Fermacell Aestuver

Fermacell

Robert.walendy@xella.com

[http://www.fermacell-aestuver.com/aestuver-fire-resistant-boards\\_2034.php](http://www.fermacell-aestuver.com/aestuver-fire-resistant-boards_2034.php)

Product category :

Plasterboard with noncombustible fire behavior A1, dimensions 1250x2600x18

OK. It has solved the fire insulation issue with a dry solution and absolute control of the necessary thickness.



Wooden structure

Novadomus Hábitat

info@novadomushabitat.com

<http://novadomushabitat.com>

Product category :

Steel-wood composite beam with epoxy binding resins. Protects steel wood fire heat and steel provides greater flexural strength. NovadomusHábitat

OK. It has been possible to work with a minimum thickness of forged increasing flexural strength. This is particularly interesting when the limit height between floors is very restrictive.



aluminum sliding window Technal Lumeal.

technal

technal.es@technal.com

<http://www.technal.com>

Product category :

"Lumeal XXL is the new slide Technal for glazed spaces of dimensions out of the ordinary. The bearing system allows sheets of up to 600 kg weight that slide smoothly and maximum precision. Its central reinforced profile ensures wind resistance glazing allowing the realization of remarkable heights.

At the vision level, the top profile and side can hide in work, while the central core and the lower profile sheet small size, offer a very slim and minimalist image. Lumeal XXL is an industrial product easy to manufacture by professionals enclosure, with services tailored to compliance with the CTE."

OK. It has allowed to perform a carpentry with minimum framework thicknesses while maintaining low thermal conductivity and low leakage. This is sought to give great visual breadth to the environments in a narrow estate.



Los rodamientos continuos soportan hasta 600 kg por hoja

## Costs

### Construction and exploitation costs

Reference global cost : 1 375,00 €

Renewable energy systems cost : 18,00 €

Reference global cost/Dwelling : 1375

Cost of studies : 4 200 €

Total cost of the building : 402 027 €

### Urban environment

The building is located in the Eixample district in Barcelona, perfectly connected by public transport, surrounded by trade and on the pedestrian street Enric Granados.

### Land plot area

Land plot area : 165,00 m<sup>2</sup>

### Built-up area

Built-up area : 80,00 %

## Parking spaces

NO

## Building Environmental Quality

### Building Environmental Quality

- comfort (visual, olfactive, thermal)
- energy efficiency
- renewable energies
- building end of life management
- integration in the land
- building process
- products and materials

## Contest

### Building candidate in the category



Energía y Climas Templados



Premio de los usuarios

