The Towers of Bolueta, the highest Passivhaus in the world

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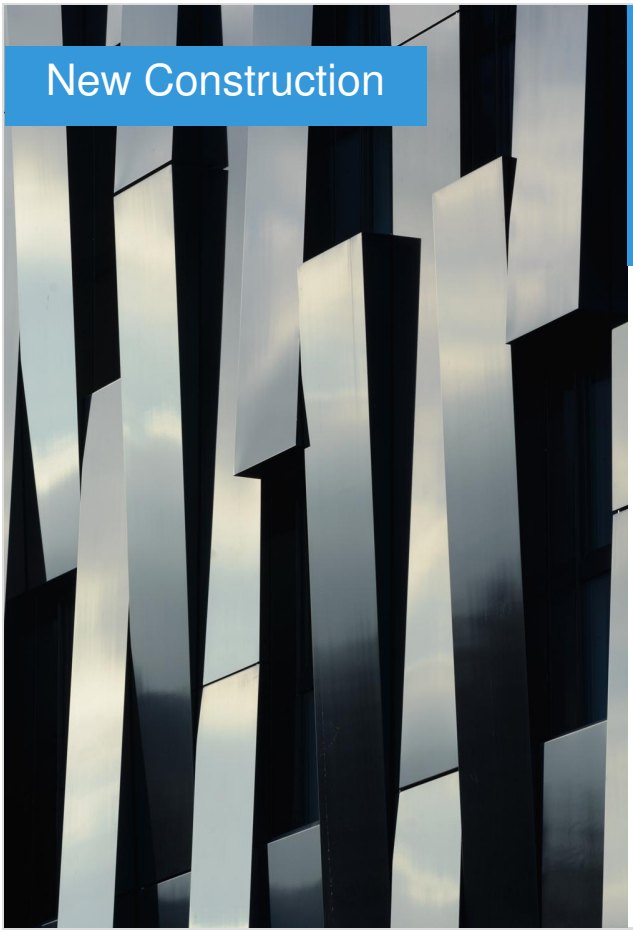

Primary energy need :

6 kWhpe/m².year

(Calculation method : Other)

ENERGY CONSUMPTION

Economical building *Building*

< 50 **A**	**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 Type : Collective housing > 50m
Construction Year : 2018
Delivery year : 2018
Address 1 - street : Calle del Pontón 10, Bolueta 48004 BILBAO, España
Climate zone : [CsC] Interior Mediterranean - Mild & dry summer.

Net Floor Area : 45 843 m^2 Useful area (es)
Construction/refurbishment cost : 26 000 000 €
Number of Dwelling : 361 Dwelling
Cost/m2 : 567.15 €/m^2

Certifications :

General information

Being the highest certified Passivhaus building in the world, it implies a huge improvement in energy efficiency. On a building that complies with current regulations, and with an Energy Rating A, the reduction in heating demand will be of 80%!

There are several issues to highlight in this project, which make it an example of global sustainability:

-Construction traditional: It is a really remarkable aspect, the building has been built with construction techniques and conventional materials such as concrete for the structure, brick, plaster, etc. It was a premise to be able to use the same materials that are commonly used by the administration.

-Passivhaus XXL: Its scale has meant that many constructive issues have had to be reconsidered, in order to make it viable in a building of this size. There have been times when there were more than 125 people working simultaneously in the work, it has been vital to have a great organization by the construction company, Sukia, and the Facultative Directorate, #VArquitectos.

-Social housing: There is no typology in which it makes more sense to improve construction in order to achieve the category of passive building or almost zero consumption. In this way, energy poverty situations will be avoided, maintaining maximum interior comfort, and minimizing after sales maintenance.

-Low cost: The budget is within the parameters established by the Basque Government for VPO construction cost. It has been necessary a deep study of all the solutions and materials to obtain the maximum benefits, maintaining the best durability without an extra cost.

Conclusion: if it has been possible in this case and with these premises, we have the certainty that any project developed correctly can meet the necessary requirements to be considered passive or almost zero consumption.

It is therefore a perfectly exportable example, since it does not have a high budget, nor its construction is complex. These are the great advantages so that in any part of the world, adapting to the conditions of each country, a Passivhaus building can be proposed regardless of the type.

See more details about this project

http://www.diariodenavarra.es/noticias/negocios/dn-management/2018/03/10/un-estudio-pamplones-crea-edificio-residencial-passivhaus-mas-alto-del-mundo-580861-2541.html

Data reliability

3rd part certified

Stakeholders

Contractor

Name : Visesa
Contact : Cristina Alonso
http://www.visesa.eus/

Construction Manager

Name : Construcciones Sukia
Contact : Alfredo Pozueta, Román Santos
https://www.sukia.com/es

Stakeholders

Function : Designer

VArquitectos

Germán Velázquez

http://varquitectos.com/

Project and construction management

Contracting method

Lump-sum turnkey

Owner approach of sustainability

The objective of this project, besides regenerating a highly degraded urban environment, was to be able to develop a product with the maximum benefits from the point of view of energy efficiency.

This was intended to achieve two things, the first to offer future buyers some homes with maximum comfort and minimum energy expenditure possible. On the other hand, being a project of the administration should serve as an example for private developers, and thus replicate the strategy and get to build in a better and more effectively way.

Architectural description

The project presents a very resounding volumetry, with its 28 and 9 height levels. This implies that there is a tower as well as a block, and applying the same compositional criteria was really complicated, since they are very different typologies.

Finally, an exterior composite aluminum cladding was chosen, in vertical bands of large format, with flat pieces, with positive and negative inclination. This is achieved by providing the building with verticality, and giving unity to both the tower and the block. The finish of these pieces is in high brightness, black in the first tower. It sought to achieve maximum reflection, and thus be able to give a feeling of lightness to the block given its enormous volume.
The first block will be black, like the coal used by heavy industry that has operated in the field for more than 250 years. In the second it will be gray, like the steel produced in the foundries in the area.

Energy

Energy consumption

Primary energy need : 6,00 kWhpe/m^2.year

Primary energy need for standard building : 56,00 kWhpe/m^2.year

Calculation method : Other

Final Energy : 98,00 kWhfe/m^2.year

Breakdown for energy consumption :
Heating Demand: 5,7kWh / m2a
Heating load: 7W / m2
Non-renewable energy EP: 98kWh / m2a

Envelope performance

Envelope U-Value : 0,21 $W.m^{-2}.K^{-1}$

Indicator : EN 13829 - n50 » (en 1/h-1)

Air Tightness Value : 0,37

Renewables & systems

Systems

Heating system :

- Condensing gas boiler

Hot water system :

- Condensing gas boiler

Cooling system :

- No cooling system

Ventilation system :

- Nocturnal Over ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Other, specify

Renewable energy production : 60,00 %

Cogeneracion

Other information on HVAC :
Being a passive building, no additional air conditioning systems will be necessary, beyond the radiators themselves.

Solutions enhancing nature free gains :
Free natural gains are maximized thanks to a good thermal envelope, absence of thermal bridges, high performance carpentry, air tightness and heat recovery.

Environment

GHG emissions

GHG in use : 1,50 $KgCO_2/m^2$/year

Methodology used :
Energy Rating

Building lifetime : 75,00 year(s)

Indoor Air quality

The quality of the indoor air will always be guaranteed thanks to the double flow ventilation system with heat recovery installed. Even without opening the windows to ventilate, the interior air will always enjoy the highest quality.

Comfort

Health & comfort :

The absence of thermal gradients, of noises thanks to a high hermeticity and a constant and adequate temperature will make the comfort maximum. Issues directly related to the certification of the building itself as Passivhaus.

Calculated indoor CO2 concentration :
500ppm

Acoustic comfort :

The acoustic requirement generated by the noise map, has made it necessary to adopt specific measures to mitigate it. This is why, among other reasons, blinds are not available, and thanks to the high air tightness, acoustic comfort improves dramatically.

Products

Product

Heat recovery

Zehnder

Javier.Perez@zehndergroup.com

https://www.zehnder.es/

Product category :

Dual flow ventilation system with heat recovery

Product certified by the Passivhaus Institute, with good technical and after-sales service

Costs

Urban environment

The project is located in the area of Bolueta, awarded in the X edition of the United Nations Good Practice Awards, for its adaptation to the environment and urban regeneration.

Land plot area

Land plot area : 3 442,00 m^2

Built-up area

Built-up area : 32,00 %

Green space

Green space : 1 200,00

Parking spaces

There are 500 parking spaces in four underground cellars.

Building Environnemental Quality

Building Environmental Quality

- indoor air quality and health
- acoustics
- comfort (visual, olfactive, thermal)
- energy efficiency
- integration in the land

Contest

Reasons for participating in the competition(s)

El que sea el edificio Passivhaus certificado más alto del mundo, implica una enorme mejora en la eficiencia energética. Sobre un edificio que cumpla la normativa actual, y con una Calificación energética A, la reducción en la demanda de calefacción será de un 80%!!!

Hay varias cuestiones a destacar de este proyecto, que lo convierten en un ejemplo de sostenibilidad a nivel mundial:

-Construcción tradicional: Es un aspecto realmente destacable, el edificio se ha construido con técnicas constructivas y materiales convencionales como el hormigón para la estructura, ladrillo, yeso, etc. Era una premisa el poder utilizar los mismos materiales que se utilizan habitualmente por parte de la administración.

-Passivhaus XXL: Su escala ha hecho que se hayan tenido que replantear muchas cuestiones constructivas, para poder hacerlo viable en un edificio de este tamaño. Ha habido momentos en los que había más de 125 personas trabando simultáneamente en la obra, ha sido vital poder una gran organización por parte de la empresa constructora, Sukia, y la Dirección Facultativa, #VArquitectos.

-Vivienda Social: No hay tipología en la que tenga más sentido mejorar la construcción para poder alcanzar la categoría de edificio pasivo o de consumo casi nulo. De este modo se evitarán situaciones de pobreza energética, manteniendo el máximo confort interior, y minimizando el mantenimiento post venta.

-Low cost: El presupuesto está dentro de los parámetros establecidos por Gobierno Vasco para costo de construcción VPO. Ha sido preciso un profundo estudio de todas las soluciones y materiales para obtener las máximas prestaciones, manteniendo la mejor durabilidad sin un sobrecosto.

Conclusión: si se ha podido en este caso y con estas premisas, se tiene la certeza de que cualquier proyecto desarrollándolo correctamente podrá alcanzar las exigencias necesarias

para ser considerado pasivo o de consumo casi nulo.

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