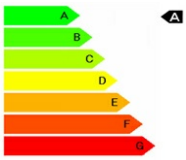
14 Public Housing rental in Sant Ferran, Formentera

PUBLISH BY OLIVER BARCELÓ | 22 JUNE 16

- Project type : New Construction
- Building Type : Collective housing < 50m
- Construction Year : 2015
- Climate zone : [BSk] Mid-latitude Dry Semiarid (Steppe)
- Net Floor Area : 1 005 m^2
- Construction/refurbishment cost : 1 373 361 €
- Number of Dwelling : 14 Dwelling
- Cost/m2 : 1 367 €/m^2
- Cost/Dwelling : 98 097 €/Dwelling



, 07871 Sant Ferran, Formentera, España

// Description

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So we propose a change of paradigm:

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The rest of the material used in this project comes from a market study based on their cost, the embodied energy, and the adaptation to comfort levels required to achieve a passive house.

See more details about this project :
http://reusingposidonia.com/

Data reliability : Assessor

// Stakeholders

Contractor

Name : Ferrovial Agroman SA

Contracting method : Maximum Guaranteed Price

Owner approach of sustainability : Buildings pollute*.When you build them, the contamination is produced by manufacturing materials and production of rubble.And when you use them, the contamination is produced by the energy to live in them.Our proposal is to reduce pollution by 50% in manufacturing, 50% of waste production, and 75% energy for heating or cooling.Therefore, we’ll recover techniques and materials from traditional architecture, and low-tech systems without sophisticated devices that use to get broken.Not only for environmental issue, but also because we would live much better and costs nearly the same.And if this is repeated widely, cities will be more friendly and nice.For this reason, the project is a prototype to reduce the vulnerability of human environments to climate change. It establishes measures to reduce the production of CO□ by 50 %, and therefore, if all new buildings would be made in this way, the building sector and energy consumed by this cease to be an important factor in increasing the global temperature (the construction industry produces 17% of CO□ emissions in Spain).The experience of this project has an added value for the EU since it is directly applicable to the Mediterranean region.It is also a model of efficient construction to achieve the objectives of the EU 20/20/20 strategy, which requires all public buildings to achieve nearly zero consumption from December 31, 2018. At this moment, the nearest qualification in EU is Energy Class A rating. This building would be the first example of collective housing building with Energy Class A rating at the Balearic Islands.*In the Balearic Islands, the energy consumption for buildings pollutes more than all transports (airplanes, cars, trucks, ships, etc.).

Architectural description : The project is understood as a territory map of resources, and is the result of a comprehensive study of program and site conditions, as summer prevailing winds, solar orientation, rainfall, geotechnical, morphology and urban context, local regulations, reusable waste and local materials, available industries, building tradition and crafts, available clean energy, full-cycle water management, ecological footprint reduction, and dwelling typologies adapted to the needs of potential residents.Traditional architecture has been a constant reference, not as shape, but as a way of working from economy of means and what you have available. These are the glasses to watch closely. With them, we look for what can we use on the island: Junipers, which were used to build frameworks, right now are protected. The sandstone quarries are exhausted and there is little straw used for livestock. So, we have just what comes from sea meadows, boats, and building pallets that remain on the island because of the cost of boarding back.So we propose a change of paradigm:“Instead of investing in a chemical plant located 1.500km away, we invest the same budget to local unskilled labor, which should extend the Neptun grass to dry under the sun and compact it in pallets, achieving 15cm of insulation in roof. Moreover, it turns out that sea salt acts as natural biocide product and is completely environmentally friendly.”The rest of the material used in this project comes from a market study based on their cost, the embodied energy, and the adaptation to comfort levels required to achieve a passive house.

// Energy

Energy consumption

Primary energy need : 26,00 kWh PE/m^2/year
Primary energy need for standard building : 107,00 kWh PE/m^2/year
Calculation method : Other
CEEB : 0,00 kWh PE / €
Final Energy : 20,00 kWh FE/m^2/year

Breakdown for energy consumption : -Heating: 9,2 kWh/m2-Cooling: 4,8 kWh/m2

Envelope performance

Envelope U-Value : 0,22 $W.m^{-2}.K^{-1}$

// Renewables & systems

Systems

Heating system :
- Water radiator
- Others
- Wood boiler

Hot water system :
- Other hot water system

Cooling system :
- No cooling system

Ventilation system :
- Natural ventilation

Renewable systems :
- Biomass boiler

Renewable energy production : 100,00 %
Radiators, low-H2O type, function with water at low temperature (35 ° C).
Solutions enhancing nature free gains : The installation design of ACS has been made so that the maximum distance between the exchanger and ThermoBox-M taps is less than 1m. In addition, all taps are opening cold. Regarding cooling, passive systems imp

// Environment

GHG emissions

GHG in use : 2,00 $KgCO_2/m^2$/year
GHG before use : 325,00 $KgCO_2/m^2$
Building lifetime : 100,00 year(s)
, ie xx in use years : 162,50 year(s)
GHG Cradle to Grave : 2 084 980,00 $KgCO_2/m^2$
It includes the construction and deconstruction of the building and planned consumption for a lifespan of 100 years. Being a building designed with load-bearing walls and with a total weight of 10% compared to a conventional building.

Life Cycle Analysis

Material impact on GHG emissions : 325 000,00
TCQ of the ITEC has been used.
Eco-design material : All materials used in this project have been selected for their improved environmental qualities compared to conventional market solutions. In addition to organic products with eco-label or seal of environmental quality, it is essential to take into account the specific ecological materials of traditional architecture, from small extractions or craft factories at risk of disappearing, which because of its limited production does not have environmental certification (like the "tejares de hornos morunos" of biomass furnaces, disappeared in the Iberian peninsula): -Cimentación: concrete strip footing lime NHL-5 mass unassembled. 50% reduction in CO2 emissions compared Portland cement slab * -Structure (walls): cellular concrete block YTONG with environmental product declaration (EPD according to ISO 14025 - Type III ecolabel). -structure (Forged): laminated timber from Austria, E1 PEFC seal type. OSB-III PEFC seal. -structure (Vaults) stone slab of sandstone from Mallorca. 60% CO2 reduction compared concrete slab * Outdoor -Carpentry: Larch wood from Spain, PEFC seal. -Carpentry Inside: Reused wood from landfill (Fundacio Deixalles Mallorca). Outside -Revoco: air lime CL manufactured in Mallorca. -Revoco Inside: it does not apply. Flagstones to avoid use of material. the use of gypsum, which prevents the recycling of demolition waste as an aggregate is prohibited. Outside -Solados: ceramic tile morunos baked in ovens fed biomass. -Solados Interior: lime slab NHL-5 polished in situ, with aggregate from the excavation. exterior vertical -Particiones: H-16 ceramic block morunos cooked in ovens fueled with biomass. -Impermeabilización: EPDM. It has banned the use of asphalt and derivatives of PVC sheets. -Insulation Cover: Posidonia Oceanica dried at work, confined work pallets reused. -Insulation acoustic interior partitions: recycled cotton Plate type RMT-NITA. -Insulation acoustic flooring: natural cork board with FSC label. -Áridos: From the work itself, during the phases of excavation or residues of aerated concrete block. -Paintings: Silicate paint for walls and partitions. -protection For wood: a vegetable-based raw materials free of lead, barium, heavy metals or polyurethane. -Installations: Not used PVC in all the work. All electrical wiring is halogen free. The installation of running water, hot water and gray water is made using polyethylene and polypropylene. * Own studies in collaboration with the Directorate General of Natural Environment, Environmental Education and Climate Change Govern de les Illes Balears, from BEDEC the ITEC and previous studies Societat Orgànica SLP, as part of the LIFE Project Reusing Posidonia The EU.

Water, health & comfort

Consumption from water network : 899,00 m^3
Consumption of grey water : 408,00 m^3
Consumption of harvested rainwater : 126,00 m^3
Water Self Sufficiency Index : 0,37 %
Water Consumption/m2 : 0,89 m^3/m^2
Water Consumption/Dwelling : 64,21 m^3/Dwelling
Calculated thermal comfort : Winter 21ºC / Summer 26°C
Indoor Air quality : All products have been selected type E1 concentration of formaldehyde (wood, boards, etc.). PVC hasn't been used, nor products that cause CFC'S or HCFC'S emissions, or paints
Health & comfort : 1. volume built in two separate blocks taking advantage of the two street facades enjoy dominant winds from the sea is divided. All homes have double orientation and cross ventilation. No cooling system is needed in summer. 2. All windows are protected from the sun by porches, arbors with vines and reeds, shutters or blinds type larch wood rot. To ward off the cold winter interior wooden shutters or low emissivity glass U are arranged 1.6 as guidance to facilitate passive heating. 3. The first floor houses have a skylight covered with double orientation. In winter, opening the shutters facing south and closing the shutters to north, a solar collector is obtained. In summer, closing blinds and opening the shutters and windows, natural ventilation is obtained by suction. The dimensions have been calculated to ensure the impact of direct radiation the worst of the winter solstice day. 4. They have prepared white fishnets by the facade, to facilitate the growth of climbing plants that protect the blind panels of the walls, reducing solar radiation by more than 90%.

// Products

POSIDONIA OCEANICA INSULATION

Producer : IBAVI + UIB + FERROVIAL
Contact : cgoliver@ibavi.caib.es
Website: http://reusingposidonia.com/
Product category: Finishing work / Partitions, insulation

Description :

Thermal and acoustic insulation composed of dead leaves of Posidonia Oceanica. The use of Posidonia in building work must be done with extreme caution, and their use should be limited to areas where the accumulated volume exceeds the amount necessary to maintain the balance of coastal dune ecosystem. The extraction is always carried by the state or regional bodies that manage this heritage, meeting protocols and legislation, and never by individuals or private companies On the beach, a loading shovel controlled by technicians Environment Consell de Formentera provide the necessary material to the trucks that transport the bulk posidonia to the site of the works. This project complies with all protocols to avoid the environmental impact of the collection of Posidonia on the beaches, as indicated in the authorization by the Service of Protected Species of the General Directorate of Natural Medi, Environmental Educació, i Canvi tprint, and the Ministry of the Environment, Industry and Energy of Formentera. Tests have been conducted thermal insulation in collaboration with the department of applied physics from the University of the Balearic Islands (UIB), obtaining results above forecast.

Comments :

100% acceptance of this product.

http://www.construction21.org/data/sources/users/1

// Costs

Construction/refurbishment cost : 1 373 361 €

Construction and exploitation costs

Reference global cost : 1 304 690,00 €
Renewable energy systems cost : 99 521,00 €
Reference global cost/Dwelling : 1 304 690,00 €/Dwelling
Total cost of the building : 1 373 361,00 €
Subsidies : 754 012,00 €

// Urban Environment

Urban environment : In a town of about 800 inhabitants approx. at the island of Formentera. The site is part of BIC-Església of Sant Ferran, and is protected by the subsidiary rules (level 1), establishing mandatory aesthetic criteria (width max. Windows, finishes, etc.).

Land plot area : 880 m^2

Built-up area : 60 %

Parking spaces : It has been decided not to build an underground parking for the following reasons: 1. Statistically, parkings involve 30% of CO2 emissions associated with the construction of a building, due to excavation works and embankments. 2. They hinder the execution of load-bearing walls and structural system housing. Generally they lead to arcaded structures that increase the stresses on the ground and eliminate the possibility of working with lime concrete foundation, whose resistance is of the order of 5 kN. 3. They take the floor free plots, preventing its use as a garden or crop itself. 4. In the case of social housing, public ownership, building parking lots involves allocating public funds to shelter cars instead of accommodating people.

Therefore, the construction of underground parking is discouraged when urban conditions permit it.

// Building Environnemental Quality

Building Environmental Quality :

- Building flexibility
- indoor air quality and health
- comfort (visual, olfactive, thermal)
- water management
- energy efficiency
- renewable energies
- maintenance
- building end of life management
- integration in the land
- building process
- products and materials

// Contest