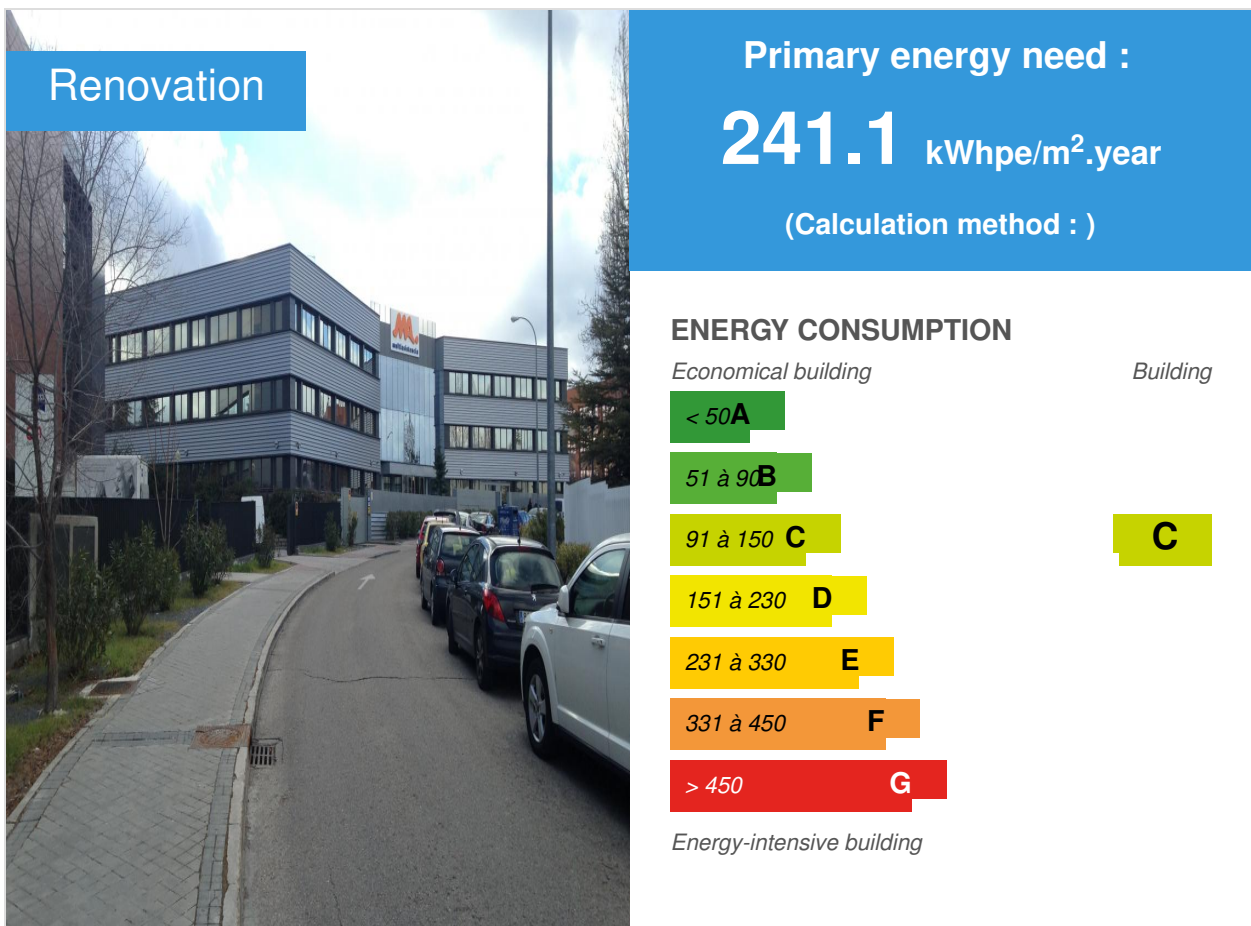


## Improvement Energy efficiency of the building Multiasistencia

by Francisco Berruete / ⌚ 2015-06-19 11:25:27 / Espagne / 👁 11038 / 🇪🇸 ES



**Building Type** : Office building < 28m

**Construction Year** : 1979

**Delivery year** : 2014

**Address 1 - street** : Ronda de Poniente 7 28760 MADRID, España

**Climate zone** :

**Net Floor Area** : 4 614 m<sup>2</sup>

**Construction/refurbishment cost** : 536 083 €

**Number of Work station** : 660 Work station

**Cost/m2** : 116.19 €/m<sup>2</sup>

**Proposed by :**

 grupo  
create.



## General information

The Multiasistencia headquarters is located at Tres Cantos town, it was built in 1979. It is located between the Ronda de Poniente, the railway and two other office buildings on both sides. The plot has 4541m<sup>2</sup> of surface, with a floor area of 1446m<sup>2</sup>, the total constructed area is 5903 m<sup>2</sup>.

The building type is isolated block, with a symmetrical floor, consisting of two articulated areas by a central core, where general services are located. It has three floors using like offices, and a basement floor for parking. There is a main pedestrian entrance in the central zone, a lateral entrance of vehicle access to parking and other access for vehicles at the other side.

The rehabilitation works, for the purpose of improve energy efficiency and thermal conditions, have consisted in putting of a rigid insulation on outer face, as part of the construction of a ventilated facade; which has permitted a significant improvement of the corporate image of the building. On the other hand, the air conditioning system has improved, replacing the current machines, with more efficient ones; enhancements have also been made in the ventilation system.

The totality of these construction works have been carried out between the months of June and September 2014, over 14 weeks.

The objectives were achieved, obtaining an energy certification type C, a significant improvement in efficiency and user comfort, as well as a modern update of building envelope and recreation green areas.

The results have been achieved, saving 45,000 euros in electric cost per year, with the improvement of two degrees in the energy rating and reducing 40% energy consumption.

This project has convinced the jury of the Ministry of Environment and Innovation of the Community of Madrid to give the first "Award for Best Energy Rehabilitation in the Tertiary Sector 2015"

# Data reliability

3rd part certified

## Stakeholders

### Stakeholders

Function : Designer

FRANCISCO BERRUETE b+b ARQUITECTURA

FRANCISCO BERRUETE francisco@bmasb.com

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

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Function : Designer

EMILIO RUIZ

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Function : Facility manager

CREARTE

ÁLVARO BERRUETE

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Function : Developer

KYRENE. Fernando Rodrigo

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Function : Others

MULTIASISTENCIA. Inquilino

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Function : Others

CRISTINA LAPUENTE

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Function : Construction company

INOVA. CARLOS MARTÍNEZ JOVER MANUEL LÓPEZ LLOPÍS

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Function : Construction Manager

ARQUITECTURA DE OBRAS CASTELNOU, AMBITEC Y JOSE ANTONIO PEÑAS

## Contracting method

Other methods

## Owner approach of sustainability

The philosophy of the builder is to maintain and retain the tenant by reducing electrical costs, improving comfort of the workers and in turn renew the corporate image of the building.

## Architectural description

Sheet steel: model 'Athena' 'on blind parts.

Curtain wall: in the central part of the building on the front facade.

Expanded steel panel: type "Deploye " in the central part of the building in the rear facade.

## If you had to do it again?

Maybe I thought the curtain wall solution centerpiece on the front facade for its mismatch price and implementation deadlines with respect to the set of solutions adopted.

In the rear facade of the central core of communications would have chosen a sheet expanded with dimensions smaller holes, to give a more opaque picture.

BUILDING USERS OPINION :

In addition to the requirements set by our client, building owner, in terms of budget and execution time, we have worked closely with Multiasistencia user of the building during the restoration work.

Contributions and tenant demands proposed in weekly meetings with the Finance Department of the multinational, the architecture team that advised them, the works council of workers and those responsible for health and safety at work.

The exchange of views with our technical team and especially with the Project Management reported us a feel-back very enriching impressions of building users as to the expectations that rehabilitation could bring them and the revised and improved comfort obtained.

## Energy

### Energy consumption

Primary energy need : 241,10 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 275,40 kWhpe/m<sup>2</sup>.year

Calculation method :

CEEB : 0.0001

Final Energy : 92,60 kWhfe/m<sup>2</sup>.year

Initial consumption : 151,60 kWhpe/m<sup>2</sup>.year

## Envelope performance

Envelope U-Value : 0,31 W.m<sup>-2</sup>.K<sup>-1</sup>

### More information :

The rehabilitation works, for the purpose of improve energy efficiency and thermal conditions, have consisted in putting of a rigid insulation on outer face, as part of the construction of a ventilated facade; which has permitted a significant improvement of the corporate image of the building. For this we have chosen A ventilated facade: improves the insulation has been placed aluminum profiles, which enables the creation of an air chamber. It has also installed a sheet steel: model 'Athena' 'on blind parts, a curtain wall: in the central part of the building on the front facade, and a expanded steel panel: type "Deploye " in the central part of the building in the rear facade.

## Renewables & systems

### Systems

#### Heating system :

- Fan coil
- Others

#### Hot water system :

- Other hot water system

#### Cooling system :

- VRV Syst. (Variable refrigerant Volume)

#### Ventilation system :

- Natural ventilation

#### Renewable systems :

- No renewable energy systems

#### Other information on HVAC :

They highlight the passive measures introduced to the building, thanks to the design of the construction elements. In the south and east facade they are arranged in the gaps flights, resolved folded sheet, adding 25cm to that item, which significantly reduces heat stroke in summer glasses.

The solution adopted varies for the west façade, eliminating flights to prolong the plates over holes. Perforated plate was used on top of the windows, reducing by 30% the incidence of the sun setting over the holes.

The curtain wall becomes a protective element of the sun from east in the summer season, avoiding direct sunlight double space that exists in access to the building.

They have installed new vents and air exchange exterior-interior, its aesthetically integrated under the sheets "deploye" the core of the rear facade, help to improve environmental conditions inside the offices; while the replacement of all control systems the installations, get a reduction and greater user comfort.

#### Solutions enhancing nature free gains :

Ventilated facade flights on the windows to prevent insolation in summer glasses in the East facade and prolongation of sheets steal on the windows to reduce solar incidence in the west.

## Environment

### Water management

The system is based on units variable refrigerant volume (VRV).

The air conditioning system has been divided into eight sub-systems.

Each floor are heated independently of the rest of the building, operating autonomously.

It has a ventilation / air renewal independently.

Each subsystem consists of an external unit and generating a number of indoor units.

Areas under management and meeting rooms are provided with system called "heat recovery" based on three tubes and capable of providing heat and cold simultaneously.

Regarding the ventilation system ductwork has been extended to provide new air from the spaces of facade and creating a network of extraction from the general to the recovery plenum.

### Indoor Air quality

It has been considered fundamental change of heat-generating equipment cold to a VRV model, with the aim of improve system efficiency and adapt to current legislation gases such machinery used. For the purpose of improve energy efficiency and thermal conditions it has been chosen by an outer insulation of facades fixed to the wall. It has improved system performance ventilation and air conditioning system replacing existing machines by other more.

### Comfort

## Calculated indoor CO2 concentration :

Con el fin mejorar la demanda energética y las condiciones térmicas, la solución adoptada ha sido el sistema de fachada ventilada, que permite mejorar el aislamiento, al tiempo que renovar la imagen del edificio.

## Products

### Product

#### THERMAL INSULATION

DANOSA

info@danosa.com

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

Product category :

Model "DANOPREN 40"

4 cm thick

Panel of extruded polystyrene foam high density 30Kg / m<sup>3</sup>

It is placed with mechanical fixings over the existing enclosure

Union tongued



The ventilated facade gets a great savings in energy consumption, both summer and winter.

#### ARCHITECTURAL METAL PROFILE

EUROPERFIL

lluis.paguera@europerfil.es

<http://europerfil.com/web/>

Product category :

ATENEA architectural metal profile, designed as facade exterior cladding.

Nerve height 44 mm

Useful width 1010 mm

Thickness 0.75 mm

Profiled galvanized steel fixing

Pre-lacquered silver



Although needed mechanical placement, coordinated work of different teams collaborated in

the quick installation, working after hours to prevent workers acoustic discomfort.

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## PANEL EXPANDED STEEL

IMAR

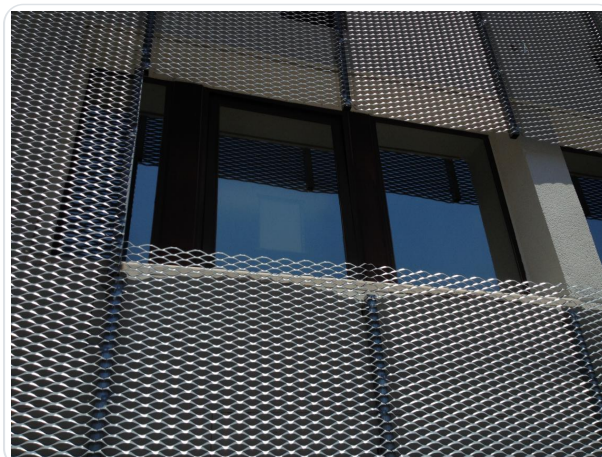
madrid@imarsa.com

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

### Product category :

The rear facade has been met with a panel of expanded steel, type "deploye".

Expanded metal mesh type RO90 (90x30x9), starting for manufacturing materials galvanized steel GA 275 DX 51D + Z NAC 1.5 mm thick.



Perforated plate was used on top of the windows, reducing by 30% the incidence of the sun setting over the holes.

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## AIR ACONDITINING

DAIKIN

marketing@daikin.es

<http://www.daikin.es/>

### Product category :

The Daikin VRV system is a multi-split type air conditioner that uses variable refrigerant flow control developed by Daikin to provide customers with the ability to maintain individual zone control in each room and floor of a building.

VRV Outdoor Units: model RXYQ8T

Indoor unit: model FXSQ20P

This system managed to reach comfort temperatures faster.



## Costs

### Construction and exploitation costs



Total cost of the building : 536 083 €

## Energy bill

Forecasted energy bill/year : 71 328,00 €

Real energy cost/m<sup>2</sup> : 15.46

Real energy cost/Work station : 108.07

## Urban environment

The rehabilitation of the building has brought an action in the corporate image MULTIASISTENCIA offers its customers, as well as improving integration as architectural piece in the urban environment where it is located. More than 600 people have improved their work conditions, in aspects such as: climate comfort, environmental air quality, accessibility and enjoyment of building with a new recreation area in the garden. The solution of a ventilated facade made possible the placement of outer plates, which besides creating flights that protect glazed areas, increasing their isolation and create an attractive envelope. The substitution of machinery for producing heat and cold in the deck area, it generates no visual impact and has equipped its location conditions that increase their performance and durability. They have installed new vents and air exchange exterior-interior, its a esthetically integrated under the sheets "deploye" the core of the rear facade, help to improve environmental conditions inside the offices; while the replacement of all control systems the installations, get a reduction and greater user comfort. Rehabilitation works were executed in 90 days, coinciding with the summer holidays of employees, with the building area where the construction has been made. The stay of people in a building often avoids possible restructuring of human resources, as well as outsourcing or offshoring of services in big companies.

## Land plot area

Land plot area : 4 541,00 m<sup>2</sup>

## Parking spaces

The building has pedestrian main access and two secondary access of passing vehicles and has outdoor parking area and garage.

## Building Environmental Quality

- Building flexibility
- indoor air quality and health
- works (including waste management)
- comfort (visual, olfactive, thermal)
- waste management (related to activity)
- energy efficiency
- integration in the land
- building process
- products and materials

### Contest

### Building candidate in the category



Rehabilitaciones energéticas

