



Passive House Retrofit Best practice example No 2 from Spain



BADALONA (Spain)

Improvement of all building facilities (gas, plumbing)

Improvement of winter and summer comfort

Solar collectors

Project data

Location, address:	Barrio de Pomar-Badalona (Barcelona)
Region:	Cataluña
Surroundings:	Northeast of Spain
Climate:	Mediterranean climate
Heating degree days:	1200
Year of construction and renovation:	1965-67 (constructed) 1985-2003 (renovated)
Typology:	Multifamily house
No. of dwellings:	2000 dwellings (251 Multifamily houses)
Treated floor area:	114688 m ² (average of 57.34 m ² each dwelling)
Owner:	Shared property (housing association and tenant)
Architect and Builder:	Luis Escolà Gil, Julio Chinchilla Ballesta, Joseph Oliva Casas y Antonio Pineda Gualba& Obra Sindical del Hogar y Arquitectura
Costs of (energy) saving measures:	€ 25.000.000
Renovation financed by:	ADIGSA



Figure:
Multifamily
house,
before
renovation
(courtesy of
ADIGSA
housing
association)



Figure:
Multifamily
house,
after
renovation
(courtesy of
ADIGSA
housing
association)

Objectives and Results

Since 1985, ADIGSA social housing association has been working on the maintenance of the 251 multifamily houses located in Barrio de Pomar in the city of Badalona. The main activities in the renovation project have been the improvement of the installations quality and the structural quality. On the other hand, the intention has also been to save energy, increasing the level of insulation of the dwellings with materials with low environmental impact. Photovoltaic systems have been installed in 12 dwellings as a pilot test. The renovation is financed by ADIGSA, without any cost for the tenants.

The energy saving in energy need for heating and cooling per dwelling estimated is: 1.992 kWh/year¹ (east orientation) and 2.082 kWh/year¹ (west orientation). (Assuming 19 °C indoor temperature, using the tool: "Programa de cálculo de consumos energéticos, ICAEN", 1999)".

Renovation concept

Key renovation features

- Structural rehabilitation
- Renovation of gas and plumbing installations
- External insulation of façades
- Insulation of roofs
- Solar collectors
- Photovoltaic system (under consideration)

Technical details

Before renovation

Constructions

- Non-insulated roof⁴, $U = 1,256 \text{ W/m}^2\text{°C}$
- Non-insulated façades⁴, $U = 1,343 \text{ W/m}^2\text{°C}$

Installations

- Individual boilers (conventional)

After renovation

Constructions

- External insulation of roof⁴, $U = 1,536 \text{ W/m}^2\text{°C}$
- External insulation of façades⁴, $U = 0,544 \text{ W/m}^2\text{°C}$

Installations

- Solar collectors for domestic hot water
- Photovoltaic system (under consideration)

Energy saving

The energy saving in energy need for heating and cooling per dwelling estimated is around: 1.992 Kwh/year (east orientation) and 2.082 Kwh/year (west orientation). (Assuming 19 °C indoor temperature, using the tool: "Programa de cálculo de consumos energéticos, ICAEN", 1999).

Treated floor area 114688 m²: (average of 57,34 m² each dwelling).



Figure: Photovoltaic system
(cortesy of ADIGSA)

Additional information

- Since 1985, complete restoration and improvement of the building installations: improvement of the gas installation, improvement of the plumbing installation, improvements of the quality of live of the tenants.
- Improvement of the thermal comfort: external insulation on façades and roof.
- Lower energy costs for the tenants.
- Improvement of the acoustic comfort, air quality and health of the tenants.
- Urbanistic revaluation.

Lessons learned and conclusions

- To make the renovation of the building efficient and economically feasible, it is very important not to displace the tenants during the civil works, if it is possible. For instance: external insulation instead of internal insulation.
- Expirience in Photovoltaic systems installed in 12 dwellings as a pilot test.

References

- [1] Mestre, A. Estalvi energètica i viabilitat ambiental dels sistemes d'aïllament per a l'exterior de façanes, 2000.
- [2] Mas, C. Els Barris d'Adigsa - El Pomar - Badalona. Departament de Benestar Social Generalitat de Catalunya. Barcelona, 1995.
- [3] Pomar 25 años 1967-1992. Recopilación de acontecimientos del barrio. Benestar Social. Generalitat de Catalunya. Barcelona, 1992.
- [4] Datos facilitados por ADIGSA