

### Project information

Project type:	ECO – Refurbishment
Address:	Manuel Robles Pintado 5, Benito Caparroso Paños 3,11
Rehabilitation year:	2011
Building type:	Multi-level block of apartments
Dwellings:	44
Storeys:	5
Gross area BTA:	4506 m <sup>2</sup>
Net area:	3482 m <sup>2</sup>
Heated area:	3806 m <sup>2</sup>
Additional costs* for eco-a	
Applications:	184.992 €
Total building cost*:	682.371 €

\* Not included industrial benefits, overheads and taxes

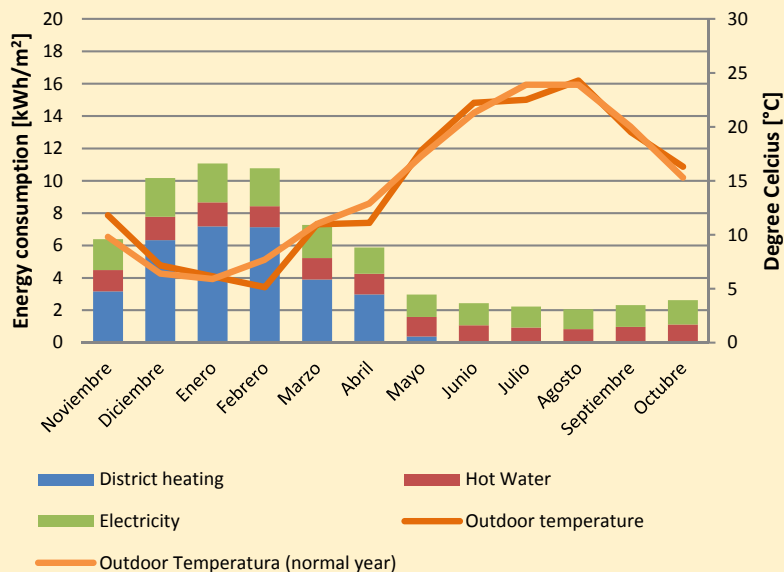
### Special ECO-technologies applied:

- Complete refurbishment, including the installation of elevators
- EIFS (Exterior Insulation and Finishing System) applied to the external façade (Avoidance of thermal bridges and increased insulation)
- Individual electric and thermal meters
- Optimization of window type (duplication of the frames)
- District Heating



## Energy consumption

### Energy consumption 2011-2012



Heat trans.	Unit	National reg.(2006)	Concerto spec.*	Actual
Outerwall	W/m <sup>2</sup> K	0.66	0.66	0.48-0.52
Roof	W/m <sup>2</sup> K	0.49	0.38	0.38
Floor	W/m <sup>2</sup> K	0.49	0.5	0.2-0.22
Windows (north)	W/m <sup>2</sup> K	3	-	-
Windows (south)	W/m <sup>2</sup> K	3.5	-	-
Glazing	W/m <sup>2</sup> K	-	1.7	1.6
Vent. rate	h <sup>-1</sup>	1	0.5	0.5

Energy consumption	Unit	60's National Regulation	Concerto spec.	Actual 2011-2012
Heat	kWh/m <sup>2</sup>	110	58	31.1
Hot water	kWh/m <sup>2</sup>	20	-	14.3
Electricity	kWh/m <sup>2</sup>	25	-	20.8
<b>Total</b>	<b>kWh/m<sup>2</sup></b>	<b>155</b>	<b>58</b>	<b>66.2</b>

## ECO-City project partners

## Lessons learned:

- Apart from the savings due to the refurbishment, profit is made due to the district heating's replacement.
- Several difficulties have been found since an agreement between the 100% of the users was necessary. In Spain every flat has a private owner so it is necessary to achieve a high percentage of agreement to modify structural components of a building.
- To grant the success of Eco-rehab in areas where inhabitants have low incomes, it is crucial to gain the access to soft loans. The application of these loans must be done in the basis of the Community and not as a personal loan, due to the risks analysis that financial entities develop.
- The EIFS system is optimal for refurbishing since it fixes thermal bridges and does not require the users being vacated.
- Thermal comfort improvement confirmed by the users.
- Call effect (once that other users have seen the results, they want to refurbish their own buildings)
- Consumptions lower than expected, probably due to the economical context.



## Key figures

Heat trans.	Unit	Normal practice	Concerto spec.	Actual
Outerwall	W/m <sup>2</sup> K	0.66	0.66	0.48-0.52
Roof	W/m <sup>2</sup> K	0.49	0.38	0.38
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Glazing	W/m <sup>2</sup> K	-	1.7	1.6
Vent. rate	h-1	1	0.5	0.5

Energy consumption	Unit	Normal practice	Concerto spec.	Actual 2011-2012
Heat	kWh/m <sup>2</sup>	110	58	31.1
Pipe losses	kWh/m <sup>2</sup>	Inc	Inc	Inc
Ventilation	kWh/m <sup>2</sup>	Inc	Inc	Inc
Hot water	kWh/m <sup>2</sup>	20	Inc	14.3
<b>Total heat</b>	<b>kWh/m<sup>2</sup></b>	<b>130</b>	<b>58</b>	<b>45.4</b>
Lighting	kWh/m <sup>2</sup>	Inc	-	Inc
Other	kWh/m <sup>2</sup>	25	-	20.8
<b>Total elec.</b>	<b>kWh/m<sup>2</sup></b>	<b>25</b>	<b>-</b>	<b>20.8</b>
<b>Total</b>	<b>kWh/m<sup>2</sup></b>	<b>155</b>	<b>58</b>	<b>66.2</b>

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