

A case study: pilot site building in Zaragoza

E3SoHo Final Workshop
Paloma Bozman (ZARAGOZA VIVIENDA S.L.U.)
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Zaragoza City

Population: 680,000 hab



- Eurocities, since June 2002
- ICLEI Local Governments for sustainability (since August 2005).
- Spanish Net of Smart Cities (RECI): Zaragoza Digital city and Digital citizens (June 2012)
- Signatory of the Green Digital Charter

- Covenant of Majors: signed the 27 of April of 2011

Sustainable Energy Action Plan: Goals and Estimated Budget

Sectors of intervention	Private investment (M€)	Public investment (M€)	Total investment (M€)
Transport	273.5	89.45	362.95
Residential Sector	551.7	53.95	605.65
Tertiary sector	40.5	2.47	42.97
Public buildings and lighting	164.8	10.97	175.77
Renewable energy	7	-	7
Total	1,037.5	156.84	1,194.34

WHO ARE WE?

The council of Zaragoza, through Zaragoza Vivienda, promotes the renovation of the city and the social improvement of its inhabitants through various measures in the housing sector.

The purpose is to achieve better energy related with urban renovation promoting social rent and social homes.

In cooperation with other administrations.



Social Rent: different housing programs exist, priority is given to special sectors (the elderly, youth).

New Homes: we have recently sold 1,800 dwellings in the city.

Refurbishment through Municipal Ordenance: we promote the private refurbishment.

Two types of helps are offered:

- To the building (including general aspects: insulation of façades, roof and installation of lifts).
- To the owner who refurbishes of the interior of his dwelling

Actions involving energy saving or suppression of barriers have priority

More than 2,500 dwellings for social rent: the biggest offer of social rentals in the city

1,800 social homes sold and 485 in upcoming promotions

Between 1989 and 2012 municipal assistance valued at 61,152,544€ has benefitted 3,612 buildings and 6,105 private actions reaching a total of 41,678 beneficiaries



Interreg III A France/ Spain:



CONCERTO Initiative
VI Frame Work



LIFE + 10

European Projects



Regional Cooperation Initiative
France- Spain-Andorra

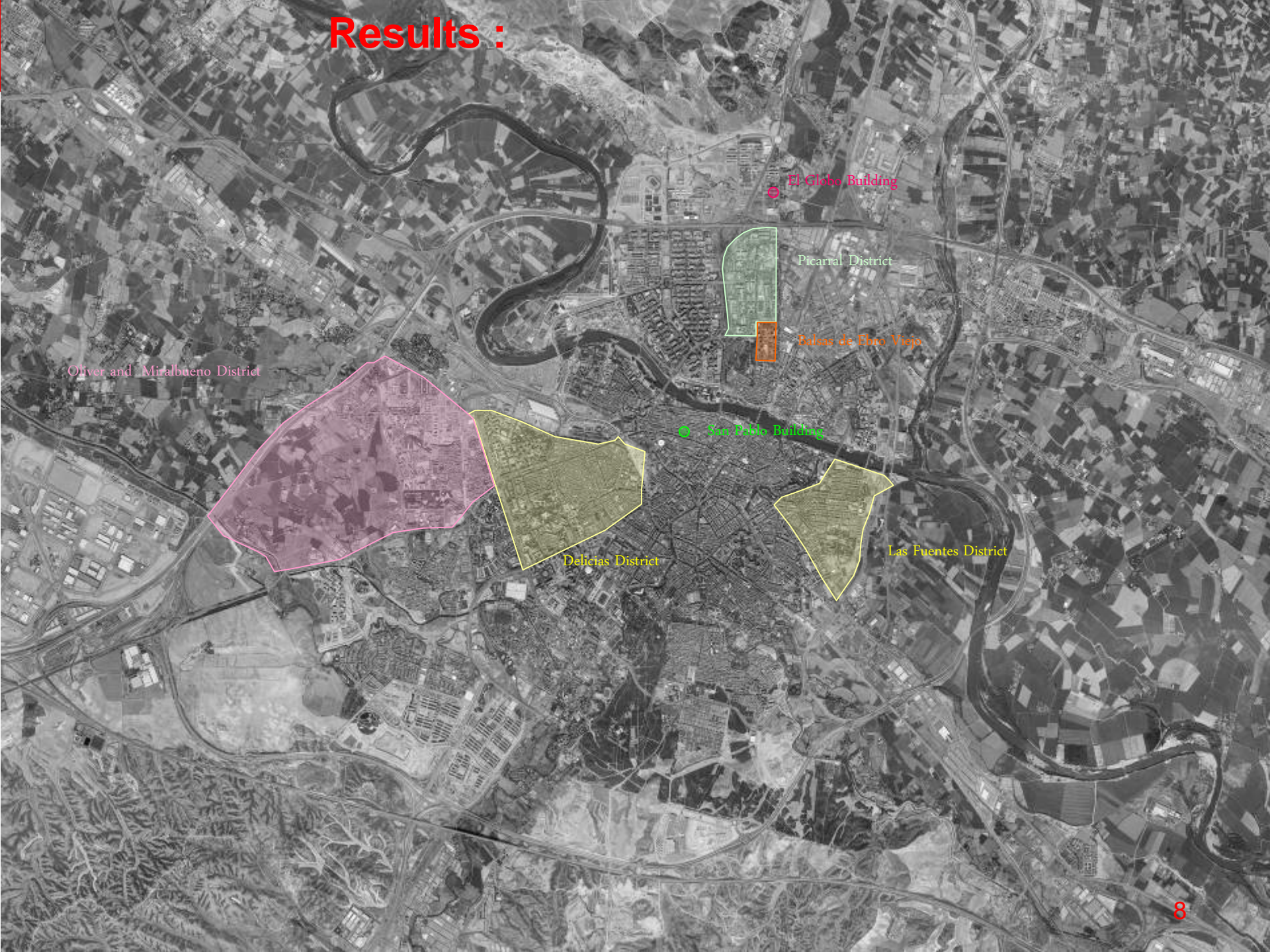


ICT PSP



IEE PROGRAM

Results :



Oliver and Miralbueno District

El Globo Building

Picaral District

Balas de Oro Viejo

San Diego Building

Delicias District

Las Fuentes District

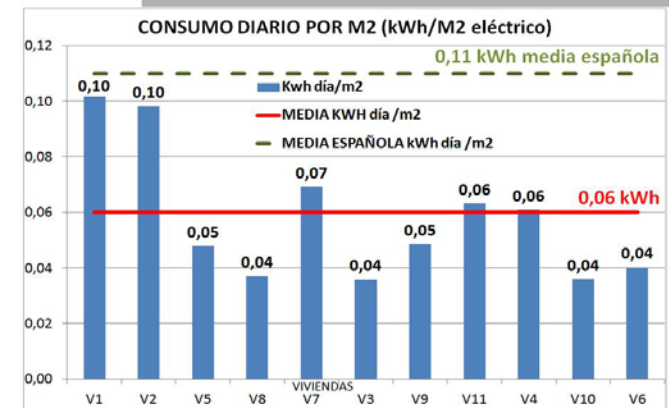
More than 10 years in European projects related to social and energetic renovation in existing buildings....

Compiled Results :

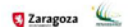
- **Social and Urban analysis of 5 districts:**
Las Fuentes y Delicias- Picarral- Oliver y Miralbueno
- **Analysis and Refurbishment Proposals of 21 Urban Groups of Buildings affecting 8,500 dwellings in in Zaragoza City**
- **Passive measures of insulation in the refurbishment of 40 dwellings in Las Fuentes district**
- **Construction of 616 Bioclimatic dwellings in Valdespartera: 70% saving in energy matters compared with the “typical house”, solar panels (654m²)...with a production of 392MWh/year**
- **37 KW of photovoltaic panels in 2 buildings of ZV for a self consumption.**



ELECTRICITY CONSUMPTION IN HOMES



INFORMATION AND MONITORING SYSTEM



More than 10 years in European project related to social and energy renovation in existing buildings....

Results :

-Creation of new jobs for the unemployed of the districts involved in the project (Oliver y Miralbueno) and Social Harmony Plan.

-Total Rehabilitation of 70 dwelling in Picarral achieving 50% of saving in energy demands and an *energetic re-qualification (starting as a D we achieve a C)* plus the collocation of solar panels (75m²) in the roof.

CO2 saving of 231 Ton.CO2/m2

Production of 45.3 MWh/year

- Training of inhabitants and monitoring of dwellings.

- Technical and Social Office to boost and supervise interventions in the districts:
management of 106 buildings and 542 dwellings.

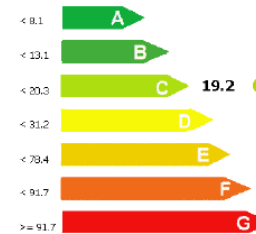
-Awards:

.....Qualification BEST to Rehab Program 2010 Dubai ONU Program

.....1er Endesa Award, Pilot in Delicias District

.....1er Award AVS (Public promoters of buildings) in Las Fuentes District (2011)

Calificación energética de edificios
Indicador kgCO2/m2



Edificio objeto

Demanda de calefacción (kWh/m2/año)	46.0	C
Demanda de refrigeración (kWh/m2/año)	1.4	A
Emissiones de calefacción (kg CO2/m2/año)	16.9	D
Emissiones de refrigeración (kg CO2/m2/año)	0.5	B
Emissiones de ACS (kg CO2/m2/año)	1.8	B

Figura 10. General Yagüe 2,4 and 8- Energy certification after retrofitting
Source: Cener.



Where exactly are we?....Future

1- Publicise activities done and possible benefits:

-The social investment impact through several tools (SROI: Social Return of Investment).

2- Promote process of private refurbishment of buildings at certain scales in the city (200 dwellings..):

-With the expertise: we have a network of professionals, knowledge and possible financial help from the State.

- Exploring **private financing formulas** that bring to light and resolve difficulties in financing this type of process without too much dependence on public help.

-Including in this process **instruments that visualize the refurbishment actions as being smart**: certification of reduction of CO2 emissions, inclusion in voluntary carbon markets, green labels.

- Continuing targeting European Initiatives: Smart Cities, Horizon 2020

- Promoting the **deployment of ICT tools for energy awareness and management** as part of the refurbishment process.

3- An intelligent management of our building stock at a building level involves the following:

- **Optimizing the installations of common use in our buildings:** DHW, lifts, **installation of renewable energy installation, the aim being eventual self consumption** (1 to-way metering).
- **Refurbishment of our oldest building stock** from an energetic point of view: we have electrical heating systems in almost 200 dwellings.
- Creation of a System (Information Sheet) common to all our buildings and will focus on their energy saving qualities.
- A single contract with the supplier company if possible (with out fixed costs, avoiding individual contracts of turning on and of from the electrical service between our tenants).



El Globo 40

- Reduce energy expenses for the tenants (2,500 dwellings)

Through:

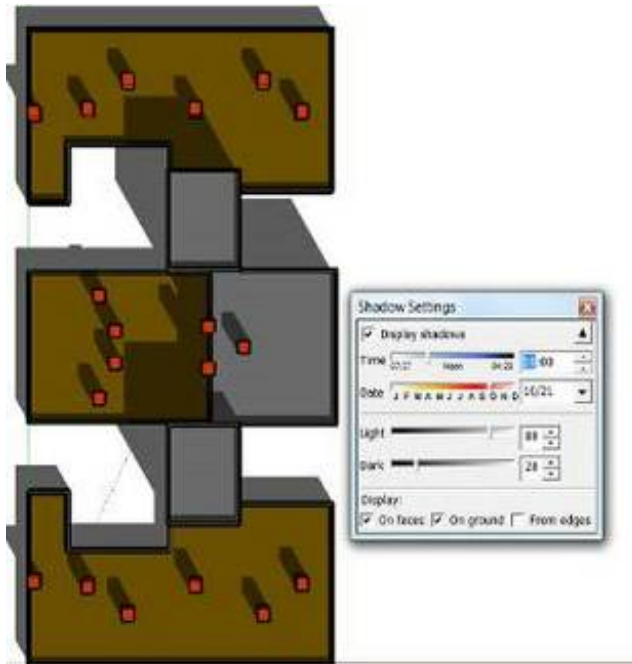
- Training and awareness raising to help users in energy saving.
- Start the use of new technology (ICT) in our offer of social rented homes as another benefit for the tenants.
- Learn through European projects about behaviour and technology:

PATRES, NEW4OLD and E3SOHO

PATRES

Goals:

- Training of municipal technicians in measures to promote energy saving.
- Assessment of the renewable energy installations in two buildings of rented housing by ZV (photovoltaic panels, 37kW)



NEW4OLD

Goals:

- **Monitoring** of dwellings and **behaviour analysis** of buildings before and after intervention.
- **Analysis of ZV stock with similar** characteristics.
- **Development of an *On line*** tool that calculates best solution in relation to saving and costs.
- **Refurbishment action** in building testing the online tool.



E3SoHo Partners:



In 3 cities:

Genova

Varsovia

Zaragoza

E3SoHo Zaragoza Pilot site

- Building El Globo nº 40 (2004)
- Eco district Parque Goya
- Good insulation (gas central heating, individual thermostat, solar panels, double glaze, 25 cm of exterior wall with a K of 0.5...).
- Good orientation (cross ventilation, solar gain)
- Social rented flats
- 16 volunteers



Main activities of Zaragoza Vivienda:

- **Search and selection** of tenants participating in the project
- **Collaboration** with the installation of the ICT solution
- **Training and awareness** raising fo the tenants
- **Elaboration of Information for the neighbours** about their consumptions through tablets and newsletters
- **Monitoring of ICT solution performance and acceptance**, at tenants and building level
- **Assessment of results.** Exploitation and replications strategies.



Temperature/humidity sensor installed in a dwelling



Interface of the tablet user interface for the tenants

Interaction with the tenants

- Information about the ICT solution installation process
- Training sessions:
 - General Meeting
 - Home visits advising about good habits to obtain energy saving and using the tablet (4 visits per family)
 - Delivery of an educational energy efficiency kit
 - Delivery of an energy saving summary bulletin
- Elaboration of a survey before and after the experience in using the tablet interface.



Ejemplo de boletín final



Evolution of energy consumptions

	Annual consumption (baseline period)		Annual consumption (monitoring period)	Savings		
	Real	Corrected		Without HDD correction	With HDD correction	
Heating (kWh)	40.075	41.940	37.591	6,20%	10,37%	
DHW (m3)	593	645	613	-3,37%	4,96%	
DHW (kWh)	17.078	18.576	17.654	-3,37%	4,96%	
Electricity (kWh)	34.969		32.224	7,85%		
Total (kWh)	Without corrections	Corrected Heating	Corrected Heating + DHW	Without corrections	With corrected Heating	With Corrected Heating + DHW
	92.122	93.987				

HDD: Heating Degree Days

The E3SoHo experience Project

- The agreement among tenants to participate in this Project has been good from the start, keeping in mind that ZV is their landlord.
- The savings is the main factor that motivates them
- Training has been valued positively, plus the energy efficiency educational kit (energy saving bulbs, water diffusers, ecological games).
- Most of the tenants don't have internet, for which reason they have to be provided with alternative means to access information. They appreciate having written information that summarizes their consumption.
- The tablet has proved to be difficult for the elderly and adults immigrants.
- The youngest find it easy to use the tablet but they don't care about energy consumption or saving.



The E3SoHo experience Project

-When the application poses a problem or they find access difficult, they don't phone to ask how to fix it, they wait weeks until they are next visited. We reckon that we haven't developed a proactive attitude among them (this may be the result of the relationship established with ZV, accustomed as they are to being visited frequently by a social worker).

-It has been difficult to arrange for everyone to have access to the Internet

- The economic crisis in this country and the precarious financial situation of many of the tenants who have very small pensions or are unemployed makes them reduce drastically all their expenses (they don't put on the heating system; they wash clothes while having a shower). This situation makes it difficult for us to quantify the savings that have been achieved from their participation in the project as distinct from saving made on account of the national crisis.

Lessons learnt:

- ✓ The economic reasons are decisive in the matter of changing consumer habits.
- ✓ The use of this new technology continues to be complicated for some sectors of the population: elderly people, foreign men.
- ✓ It's very important to provide information in an easy and comprehensible way: the tablet involves various previous steps (password), page turning, kWh concepts that are not familiar to many of the participants.
- ✓ The support offered through visits, news letters summarizing results has been much appreciated by them.
- ✓ To implement a project of these characteristics requires a long period in order to define adequately initial consumption, install and validate the solution, monitor the situation and evaluate the results.

Replication Plan

Line of Action	Status	Current achievements	Forecast in 1 year	Forecast in 5 years
Energy diagnosis of our stock	Under way	8 buildings done	50 buildings	153 buildings
Refurbishment and use of ICT to check consumption before and after intervention	Under way	Pilot project for demonstration purposes in 1 social housing building	2 buildings	4 buildings of the less energy efficient stock
Installation of renewable energies for on-site consumption in common areas (lifts, lighting, garage, etc.)	Under way	2 building	Feasibility study in 1 building	Present legislation concerning on-site generation makes it difficult to obtain profits from investments in this area
Integral management of buildings by ZV in collaboration with the respective suppliers. Analyze feasibility of providing integral energy management (similar role to a ESCO)	Under way	Case study of general and individual consumptions in 3 dwellings	-	-

Thanks for your attention

www.zaragozavivienda.es