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# PROGRAMME RENAISSANCE

*Renaissance is a programme of the European Union, included in Concerto Programme, aiming at energy saving in Europe.*

*Lyon, France, Lombardy, Italy; and Zaragoza, Spain, participate in this European programme.*

## CITY OF ZARAGOZA

The **goals** of Renaissance Programme in the city of Zaragoza are these:

- Improve energy management through proving the feasibility and benefits of energy saving, as well as the integration of renewable energies in new, restored and public buildings.
- Monitor the households in order to obtain indicators.
- Use Community funding to boost research and testing.
- Carry out training, public awareness and participation activities.
- Validate the scientific results and spread the conclusions.
- Learn about energy efficiency and urban sustainability from a multidisciplinary perspective in order to improve the social, economic, environmental, and energy aspects of the households, as well as social policies related to housing.



Our goals are fulfilled through these **actions**:

- New construction of bioclimatic buildings (Valdespartera, 616 households).
- Restoration of buildings through the incorporation of bioclimatic criteria (El Picarral, 360 households).
- Restoration of a school (Municipal School Cándido Domingo) following bioclimatic criteria, installation of a photovoltaic system and development of a project on environmental education.
- Building in Valdespartera of a Monitoring Center in real time for the analysis of construction solutions.
- Education and participation.

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Graphic: diagram of Valdespartera's main networks



## VALDESPARTERA

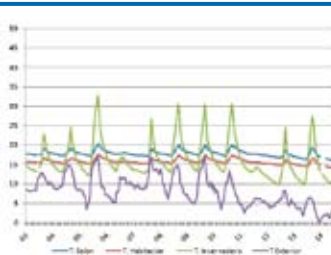
This new district situated at the south of the city, is housing about 10,000 households (more than 95% of them state-subsidized) in an urbanization planned with bioclimatic criteria, both in the development of the district and the use of sustainable materials, solutions and constructive techniques, in order to create healthy residential surroundings with a bigger quality of life and approaching the standards demanded for the citizen.

The most relevant feature of Valdespartera is its development which includes elements such as:

- Building orientation, defined mainly to favor solar collection.
- Screens placed to avoid wind.
- Water saving through ponds and water sheets to collect water rain with an independent circuit for watering gardens.
- Flat covers to favor the placing of solar heat panels for the production of sanitary hot water.
- Use of highly insulating and thermal inertia materials, central heating system for whole blocks or areas with accumulation capacity.
- Advanced services networks such as the double network to make possible the use of rain water for irrigation.

As a result of all this, Valdespartera has obtained international acknowledgement, and has been awarded two years in a row as world "Good Practice".

Valdespartera is also boosting a wide programme of initiatives with the residents to obtain their positive response for reducing energy consumption in households through the use of technology as complement of a technical management, optimizing the resources, preventing and detecting damages, and allowing us to improve design in future plannings.



Graphic: confrontation of simulation data with real data

A very important factor for a better use of household is human behaviour. Different ways of behaving have been simulated by the group of Energy and Construction of the University of Zaragoza, which aims at presenting the influence of every factor that takes part in the improvement of buildings comparing it to conventional buildings. Those factors are subsequently verified with the measures implemented on comfort in households and different energy consumptions (heating, ACS, electricity and others).

- The correct use of a gallery in the fronts of a block of housings can mean up to 27 % of saving on the winter station.
  - For the obtaining of a few moderate conditions of comfort in the housing in the winter, they must not overcome them 20°C. An increase of 2°C in the temperature of slogan of the housing, he carries an energetic increase of 34 %. In case of the refrigeration, during the summer mese, the comfort is obtained for 25°C. A reduction of 2°C in the temperature of slogan, he carries an increase of 30 % in the energetic consumption.
  - Indoor curtains at the glazed-gallery in summer produces an energy saving of up to 25% if it is accompanied by the airing of the gallery.
- Its use is counterproductive in winter.

- During summer months, **cross airing** produces a decrease of 23% in energy consumption when used preferably at night.
- A saving of up to a 60% can be reached when all the above mentioned actions are combined and compared with the same characteristics abiding current regulations (Technical Building Code -CTE).



Graphic: Greenhouse with curtains or stores inside of the gallery.



Graphic: crossed airing inside of households

Data obtained through the Command networks have already been launched, therefore the results after the monitoring of households are being compared with those from simulations.



## CENTER OF SUSTAINABLE URBANISM, CUS



The Center of Sustainable Urbanism is a new space of applied investigation that puts to the service of the interested citizenship information and results on the behavior of the buildings bioclimatics of Valdespartera, facilitated information through the monitoring of households (141). This allows us to compare the effectiveness and improvements of these buildings with traditional houses. The Center of Sustainable Development shows how an eco-efficient planning of households produces social, economic and environmental benefits, and, at the same time, contributes to a bigger added value to users.

The first results analyzed that have been obtained through temperature and humidity sensors placed at Valdespartera's households show that a good use make possible important energy savings.

Other results obtained from the sensors placed in households give us important data on adequate airing for energy consumption as well as the benefits of cross airing in summer, obtained by the reduction in summer of high temperatures inside of the house when breeze blows at night and avoiding high temperatures by day.

**The own center is an example of bioclimatic building with a foreseen saving in CO<sub>2</sub> emissions of 37 t**

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## PUBLIC SCHOOL CÁNDIDO DOMINGO

Placed at Picarral district, this school was built in 1970 and expanded in 1989. The works included in Renaissance Programme have been these:

- Improvement of thermal insulation in the main building. Actions carried out:
  - Works in the external wall.
  - Change of windows.
  - False ceiling at the porch.
- Installation of photovoltaic panels with a total power of 18kW.



- Development of a programme, "Stop al CO<sub>2</sub>", on public awareness and environmental education addressed to the educational community and families of the centre.

By means of the rehabilitation of the center there has been achieved an estimation of 64 % in the reduction of losses.

**With these measures, the yearly emission of 124t of CO<sub>2</sub> by year will be avoided**



## PICARRAL

This district situated on the left bank of the river Ebro needs to recover and revitalize the households built between 1945 and 1960. Thanks to Renaissance Programme a block of 360 households is being restored (there are 21 similar blocks in the city, with 8,000 households).

Restoration is focusing on the following aspects:

- Analysis of the buildings before and after the works.
- Training addressed to the technical team and the residents.
- Restoration of the blocks of houses, improvement of insulation in covers and façades, change of downpipes and woodwork, and introduction of renewable energies: installation of solar panels (production of sanitary hot water) and photovoltaic panels (production of electricity).
- Suppression of architectural barriers: installation of lifts.
- Central water and heating, as well as gas, water and electricity counters.
- This project in all his intervention has possessed a process of civil participation.

**A reduction of 927 t of CO<sub>2</sub> is foreseen**



**En rojo las obras acabadas**  
**En naranja las obras en marcha**  
**En morado las obras en Proyecto**

## RESULTS

### Valdespartera 616 new households

54% of thermal saving  
41% of electricity saving

### Picarral 358 households restored

46% of thermal saving  
23% of electricity saving

### Public School Cándido Domingo

51'4 % of saving estimated in the energetic demand of the building  
13% of electricity saving

### Center of Sustainable Planning

46% of thermal saving  
23% of electricity saving

**A yearly emission of 5.000 t of CO<sub>2</sub> to the atmosphere is avoided thanks to this and other additional actions**



### WEBSITES

<http://www.zaragoza.es/medioambiente/renaissance>

<http://www.renaissance-projet.eu>

<http://www.concertoplus.eu>