

## THREE LOW ENVIRONMENTAL TERRACED HOUSES: A CASE OF GOOD PRACTICES IN A CENTRAL REGION OF SPAIN

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Topic III: Best practices and failures in realized SB projects in Mediterranean section

The purpose of this paper is to present a POSTER PRESENTATION about a good practice, which will be presented with plans, photographs and text in A0 poster.

The good practice is composed by three terraced houses of low environmental impact built in Valladolid, a medium size Spanish city. The research about the reduction of CO<sub>2</sub> emissions on this project has been awarded by the Obra Social of Caja España de Inversiones, Caja de Ahorros y Monte de Piedad, in their Research Prize Convocation for renewable energies in 2003. The three houses has been finalized in 2004. Every houses have a floor area of 190 m<sup>2</sup> each one, with conventional family program, from a private promotion in a residential area. The technical construction level is an average between light or high techno.

In the design and construction of the houses, a great variety of tools known for low environmental impact have been used. From a point of view of design solutions, the houses show **bioclimatic design**. Passive solar energy systems are included in this chapter: the *trömb*e walls and the greenhouse. They are also provided natural strategies for summer conditions

A thorough selection of **construction materials of less environmental impact** has been used on buildings. That is the case of wood on roof structure, windows and frames, floor and wall tiling of low burning, paintings water based, varnished non derived from oil and chemicals, etc. There is no PVC in pipes, insulation ducts and electrical connexion boxes, using an electric wiring low in halogens. PVC has not been used for the plumbing and services, using polythene and polypropylene instead. Natural cork has been selected as thermal insulation, in walls, floors and roofs.

The buildings are also provided with **active solar energy systems**. Thermal solar energy has been applied to produce hot water and electric energy by means of photovoltaic solar energy, with a connexion to the mains. The photovoltaic system is a complete system, integrated in roof, triple-junction thin film silicon technology, total capacity 4,608 Wp

And finally, a carefully **water and plants systems has been studied**. The recollection of rain water in a tank in the basement is also planned to be later used, as well as low consumption sanitary fittings and air valves in the taps. Plants and vegetation carry on a very important role in the design of the buildings. The landscape architecture with sunshades, pergolas, canopies and the gardening to separate and design the free garden space, is used as architectural barrier to separate the building, provide shades and create microclimate.