

The state of Passivhaus in Spain in 2013: Micheel Wassouf's assessment of the first certified buildings

Architect Micheel Wassouf's assessment of how the Passivhaus standard took root in Spain, with the first certified buildings and four projects then pursuing certification.

Architect Micheel Wassouf, a leading figure in the Passivhaus certification standard, published an article in January 2013 summarising the situation of the standard in Spain. At PAPIK Group we are revisiting that document, translated from the English original, because it describes with precision the moment when high-efficiency construction began to consolidate south of the Pyrenees. Authorship belongs to Micheel Wassouf, with special thanks to Oliver Style for the translation (Barcelona, 18 January 2013).

A standard beginning to take root

After four years of outreach work by the Passivhaus Building Platform (PEP), the standard had become known among a large number of architects and civil engineers south of the Pyrenees. At that point PEP had more than 150 members and had translated the PHPP calculation tool into Spanish during the summer of 2012. Its activity focused on the annual Passivhaus conference in Spain, with more than 250 participants each year, and on organising technical symposia four times a year.

Alongside this institution, ENERGIEHAUS, a private firm of architects specialising in Passivhaus, had been running Certified Passivhaus Designer (CPD) courses twice a year since 2011 and organised the official PHI examination. It is worth noting that, beyond Passivhaus, Spain had no alternative construction standards linked to energy efficiency. The public administration had not yet grasped the advantages of the standard and continued to hold that energy labelling based on the old EPBD framework was enough to meet the demanding objectives of the recast EPBD legislation, aimed at the nearly zero-energy buildings (nZEB) planned for 2020.

The first certified buildings

At the time of writing there were three buildings with Passivhaus certification in Spain, all of them single-family homes. Two had been certified during 2011, in Navarre and Andalusia, and the third had recently been certified in the Basque Country. The document then reviewed four homes that were at that time pursuing certification, managed by ENERGIEHAUS. The path of each building illustrates how the standard adapts to Spain's own construction method, in both [new build](#) and [energy retrofit](#).

Casa JADE in Jungitu, Vitoria (Basque Country)

Architects: Climatización, Architecture Studio. Builder: Construcciones Urrutia.

The home was developed by a large Spanish contractor, a regular in major residential developments, with the aim of testing the Passivhaus standard in a small-scale building and learning the specific technical challenges step by step. Design or execution errors are less dramatic on a small site. The unusually high levels of insulation in walls and roofs led to particular solutions, such as separating part of the insulation above and another part below the concrete slab. To install the windows optimally within the insulation layer, the fitter travelled to northern Italy to learn from colleagues experienced in Passivhaus window installation. At the joints between concrete beams and brick walls, the contractor fitted natural rubber seals to ensure the greatest possible airtightness.

Heating is provided by a pellet stove installed in the living room. There are no radiators: the heat is distributed directly from the stove and, indirectly, through the ventilation system. Active cooling is not necessary during the mild summers of this region of northern Spain. The building was fitted with consumption meters to record winter and summer data. The Blower Door test returned an excellent result, 0.23 air changes per hour at 50 Pa, attributable to the high motivation of the team of architects, engineers, contractors and executing companies. The family moved in during the summer of 2012 with a very satisfactory level of comfort. The construction cost turned out to be 15% higher than the usual standard, a premium that will have to be reduced in future.

Casa Farhaus in Castellterçol

Architect: Jordi Fargas Soler. Builder: Farhaus.

A carpenter specialising in Passivhaus construction wanted to live in a passive house himself, now in the certification phase. The first summer confirmed good performance in summer conditions, bearing in mind that the home is located some 50 km north of Barcelona. There is no air conditioning, nor is it needed to maintain comfort, thanks to the cool summer nights at around 600 metres above sea level. The particularity of this construction is the use of windows that do not fit the official Passivhaus transmittance definition (maximum U_w of $0.8 \text{ W/m}^2\text{K}$). For this reason ENERGIEHAUS justified the solution by calculating a thermal bridge that shows no moisture problems at the critical details, and verified that the average temperature on the coldest day meets the comfort criterion of the ISO-EN-7730 standard, not falling below 17°C . The project serves to test the hypothesis that passive houses are also a reasonable solution for warm, humid regions such as the Mediterranean coast, where there is still much to do to convince architects and engineers of the standard's viability.

Casa MZ in Barcelona

Architect: Calderón-Folch-Sarsanedas. Builder: M. Folch.

This case shows the challenge of taking an existing building towards the passive house standard. The home is part of a terraced house built at the beginning of the 20th century, with very poor energy efficiency before the intervention, around 171 kWh/m²a of heating demand according to PHPP calculations. The retrofit reached factor 10 of the renovation standard, since the current heating demand is 17 kWh/m²a. The result was possible thanks to a special effort by the architect to improve construction quality as much as possible while keeping a contained works budget. Natural materials, such as the timber structure, the windows or sheep's wool as insulation, add value to the project. Passivhaus certification was not achieved in this case, as the Blower Door test did not reach the rate of 1.0 air changes at 50 pascals required by the EnerPHit standard. The experience confirms that this result is only achieved in efficient retrofit with flexible execution and experienced contractors, still hard to find in Spain.

Casa EntreEncinas in Asturias

Architect: Duquezamora architects. Builder: EntreEncinas bioclimatic developments.

This home was built in northern Spain, near the Atlantic Sea. The owner wanted a passive house combined with natural materials to ensure a very low environmental impact. Walls and roof are made of solid CLT timber boards, which do not on their own ensure airtightness, so that level was resolved with an additional vapour barrier on the outside of the CLT structure, which forms the interior finish layer of walls and roof. A south-facing glazed gallery acts as a heat-capturing space in winter and stays open during the summer. A very large sliding window connects the gallery with the living room and complicated reaching the target of 0.6, finally achieved after adjusting the opening. The gallery itself was not simulated in PHPP, so the real behaviour is, very probably, better than calculated. Summer comfort is ensured by the mild summer temperatures, so overheating of this building is not a problem.

Original source: ENERGIEHAUS.

Each of these four homes demonstrates the same principle: the Passivhaus standard does not impose a single way of building, but adapts to the climate, the materials and the craft available in each territory.