

How to budget for building a passive house

A detailed guide to budgeting for a passive house: land, architectural project, permits, foundations, materials and construction costs.

The land: great variability

Land is the most unpredictable line item of any residential budget. In Catalonia, land prices range from the 50,000 euros of a plot in a rural area to 300,000 euros or more in coastal or metropolitan municipalities. But the purchase price does not explain everything: the geotechnical characteristics of the ground directly condition the type of foundation and, therefore, the cost of the build.

A preliminary geotechnical study, which usually costs between 1,500 and 3,000 euros, is the best preventive investment there is. It reveals whether the ground has rock, expansive clays or high water tables, factors that can significantly increase the cost of the foundation. In our projects, we always insist on doing it before closing any budget.

Topography also plays a part. A flat plot requires less earthmoving than one on a steep slope, where retaining walls and specific construction solutions will be needed that can add tens of thousands of euros to the initial cost.

The architectural project

The project is the intellectual investment that determines the final quality of the home. For a passive house, the design must be especially careful: it is necessary to optimise the orientation, the proportions, the layout of the openings and the integration of all the passive systems. The fees of the whole technical team usually lie between 180 and 270 euros per square metre built.

This range may seem wide, and it is for a reason: it includes all the professionals required. The architect (preliminary design, basic project, detailed design and works supervision), the systems engineer, the energy consultant and the specific calculations with the PHPP tool (Passive House Planning Package), which requires a certified specialist. In a conventional build, some of these profiles do not take part or do so only superficially. In a Passivhaus, their work is what guarantees that the home will meet the expected efficiency standards.

At PAPIK Group, we have learned that skimping on the project is the most expensive way to drive up the cost of a build. A well-defined project avoids surprises, reduces budget overruns and makes execution on site easier.

Building permit and taxes

The building permit involves paying several municipal fees. The Tax on Constructions, Installations and Works (ICIO) is applied to the material execution budget and stands at around 4% in most Catalan municipalities. To this must be added the urban planning permit fee, which varies depending on the town council.

Altogether, administrative and tax expenses represent between 5% and 7% of the material execution budget. A detail many are unaware of: some municipalities offer ICIO reductions for buildings with a high energy rating, which can mean a significant saving for certified passive houses. It is worth checking with the relevant town council before submitting the application.

Plot development and foundations

Before building the home, the land must be prepared. Development includes earthmoving, the connections to the utility networks (electricity, water, sewerage, telecommunications), the preparation of access points and, where applicable, the retaining walls. For a typical plot with a home of around 150 square metres of built area, this phase comes to around 50,000 euros, although there is great variability depending on the topography and the distance to the connection points.

The foundation deserves a special mention. In a passive house, it must guarantee the continuity of the thermal insulation beneath the building to avoid thermal bridges where it meets the ground. The usual solutions include slabs insulated with extruded polystyrene or foundation systems with a thermal-bridge break. They imply a modest increase compared with a conventional foundation, but they are essential for the overall performance of the envelope.

Construction costs: materials and labour

The core of the budget. For a passive house in lightweight timber frame, the material execution costs (PEM) lie between 1,300 and 1,500 euros per square metre, depending on the complexity, the finishes and the geographic area. This figure includes structure, envelope, systems and interior finishes.

The extra cost compared with a conventional build comes from three main line items: thicker and higher-quality insulation, triple-glazed windows with high-performance frames, and the mechanical ventilation system with heat recovery. Together, these items represent an increase of between 10% and 15%. Put another way: for a 180 m² home, the difference between building conventional and building Passivhaus stands at between 25,000 and 40,000 euros, a figure that is recovered in less than ten years thanks to energy savings.

A critical factor that does not appear in written budgets: skilled labour. The correct execution of airtightness, for example, requires workers who are trained and have specific experience in Passivhaus construction. In our recent projects, such as K-Vall d'Or (280 m²), the site team always included a dedicated airtightness lead. Poor execution can invalidate the entire project, no matter how good the materials are.

Other possible expenses

Beyond construction itself, there is a set of expenses worth anticipating from the outset. Connecting the utilities (electricity and water) can cost between 1,500 and 3,500 euros. The notarial deed and registration in the land registry add a further 2,000 to 4,000 euros. The ten-year insurance, mandatory for new builds, stands at between 1% and 1.5% of the execution budget.

If official Passivhaus certification is chosen, the fees of the certifier accredited by the Passivhaus Institut must be anticipated, standing at between 3,000 and 6,000 euros depending on the complexity of the project. Certification is not mandatory in order to build to passive criteria, but it provides independent assurance that the home meets the standard. In our view, it is an investment worth making: it gives peace of mind to the owner and credibility to the project.

Final total

Putting all the line items on the table, the total cost of a passive house stands at between 1,800 and 2,200 euros per square metre built, not counting the land. This range includes the PEM (1,300-1,500 EUR/m²), the technical fees, the permits, the development, the utility connections, the notarial expenses and the ten-year insurance. For a single-family home of 150 square metres, we are talking about an overall budget of between 270,000 and 330,000 euros, to which the price of the plot must be added.

In our fifteen years of experience, no client has regretted the investment in a Passivhaus. What we have seen is people who regret having saved on details that later condition comfort for decades.

These figures must be weighed in perspective. A passive house reduces the energy bill by between 75% and 90%, which means an annual saving of between 1,500 and 2,500 euros. Over a twenty-year horizon, the cumulative saving far exceeds the initial extra cost. But beyond the arithmetic, there is a factor that no spreadsheet reflects: the quality of life of living in a space with a stable temperature, filtered air and acoustic silence. That is priceless, and we say so from the experience of more than 120 homes delivered.