

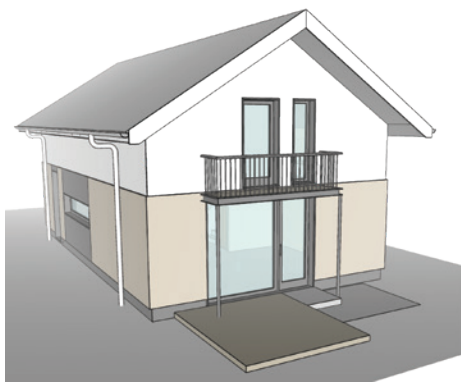
Passive House in Australia – is it too expensive?



Owl Woods Passive House, Trentham, VIC - Talina Edwards Architecture. Photo by Tatjana Plitt

What on earth is Passive House?

Passive House is an international energy standard for any building, from a tiny house to a skyscraper. The fact is that it is easier to achieve Passive House for bigger buildings, and the additional costs are minimal. In Europe, Passive House developers can win the big projects because they are more cost-effective than conventional construction and deliver a higher durability and quality of build.



The 125m² two-storey three-bedroom house with 23m² of windows. The additional investment into Passive House, including a builder's margin, is \$48,000. Pricing is based on 03/2022, Sydney. In this volatile market, pricing can strongly vary by time and location.

In Australia, we are not there yet

Recently I received a quote for Passive House suitable windows for an entire 125m² two-storey house for \$9,211 from Kinzel Industries, whereas four years ago, I could just get a double slider door in the same quality for that amount of money. Australia has already realised certified Passive House buildings for less than \$2,500 per square metre to build. Passive House does not need to be expensive and is ideal for social and affordable housing where the health and sustainability aspect is highly valued.

Today in Australia, the additional cost for a Passive House building is between \$250- \$750 per square metre. Usually, this equals an additional cost of 5-20 per cent for residential buildings and can be as little as one per cent for commercial buildings.

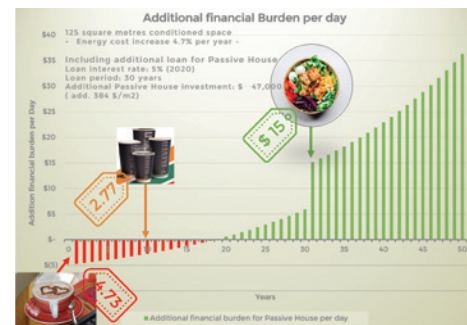
Is it worth spending more dollars to achieve this standard?

Yes! Passive House provides a return of financial investment over the lifetime of the building.

It requires an upfront investment and creates an additional financial burden of about a 'take-away coffee' per day for a 125m² house in the first year. After ten years, the financial burden is down to a '7-eleven coffee'. When the loan is paid off, you become financially free and gain

a free \$15 lunch every single day. The return on investment is usually not the main driver for clients; it's the high comfort levels, healthy living, and low energy bills.

Not getting fried in summer and not freezing to death in winter is a big plus for Passive House. This comfort is provided without the constant humming of the air-conditioning system!

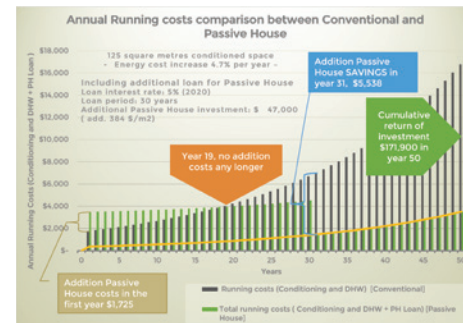


The additional daily financial burden by an additional \$48,000 loan for a 125m² Passive House with an interest rate of five per cent over a 30-year period. Considering 90 per cent savings in conditioning and 60 per cent savings in DHW running costs, as proven with Passive House. In the first year, the additional daily financial burden is \$4.73, in the tenth year it is \$2.77, in year 19 the financial burden flips to financial freedom, and after the loan is paid off in year 30, the daily benefit is \$15. [This is only an example with current costings and a prediction of only 4.7 per cent annual energy cost increase. The household expenditures are based on Australia's national statistical agency]

Does Passive House limit design and building methods?

No, Passive House does not limit design. The budget does, like always.

No, Passive House does not restrict building methods. What construction material is used is up to the builder, designer, and client. Steel frame, concrete or strawbale construction are possible. Passive House is not telling us what to use, it's telling us how it should perform. Achieving the performance is up to the builder's expertise, material costs and availability.



The running costs of a conventional building compared to a Passive House with an additional \$48,000 loan for a 125m² Passive House with an interest rate of five per cent over a 30-year period. Considering 90 per cent savings in conditioning and 60 per cent savings in DHW running costs, as proven with Passive House. The initial energy savings in the first year is \$1,396 with an expected annual energy cost increase of 4.7 per cent. In the first year, the additional total running costs (Conditioning and DHW + PH Loan) for the Passive House is \$1,725, in the tenth year it is \$1,010, in year 19 the financial burden flips to financial freedom, and after the loan is paid off in year 31, the annual benefit is \$5,538. The cumulative savings of a Passive House is \$171,900 after 50 years of operation. [This is only an example with current costings and a prediction of only five per cent annual energy cost increase. The household expenditures are based on Australia's national statistical agency]

How energy efficient is Passive House?

The Passive House standard requires a maximum of 10W/m² for heating and cooling at your location. This means a 1.5kW split system is sufficient to condition a 150m² home. Yes, a 1.57kW baby split system can heat and cool an area of 150m². This is NOT a typo!

Your building is designed for your location. We can get away with a 140mm timber frame in Melbourne and only need a baby split system for conditioning.



Thickness of material required to achieve an R-Value of 4.5 [m²K/W]. R-Value expresses the thermal resistance of a material or build-up. An EPS foam would need to be just 135mm thick. To achieve the same R-Value in timber, a 540mm thickness is required. In the extreme case, a 225,000mm thick steel plate would come to the same R-Value as the 135mm EPS. This shows the importance of understanding your chosen materials to avoid heat transfer between the conditioned space and the outdoors.



Gillies Hall student residence at Monash University, VIC - Jackson Clements Burrows Architects. Photo by Saint-Gobain Glassolutions Isolierglas-Center GmbH

At Charlotte Pass, NSW, where the temperature can drop down to -23°C, a thermal insulation layer of 350mm is needed to achieve the same comfort with a baby split of 1.5kW for a 150m² home.

In Onslow, WA, where the temperature reached 50.7°C on 13 January 2022, a 250mm thermal insulation would be required.

The heat does not know the difference between inside and outside. The same thermal insulation will protect us from hot or cold.

This all sounds great; what stops us from doing this in Australia?

The main reason is the lack of knowledge and education in the industry.

Many professionals believe that the materials are not available in Australia. The opposite is true; multiple suppliers are on the market for each essential material or product. For Heat Recovery Ventilation Systems, we have at least Stiebel Eltron, Zehnder, Villavent or Brink.

There is the myth that Passive House is expensive and difficult to achieve. An additional \$250 - \$750 per square metre is not that much for what you get. Passive House buildings are just normal buildings built better. It's not rocket science. Even the air exchange rate of 0.6 per hour is not difficult if you plan for it.

In Australia, the Scholten Group has already achieved values as low as 0.08, which is nearly ten times better than Passive House requires. "0.6 wasn't hard at all. With a bit of planning, it's easy." — Stewart Scholten

A Passive House building does not need to be an ugly box. Big windows, open living spaces and designer kitchens can all be achieved in Passive House buildings. Leading examples include 'Limestone House' in Toorak, Victoria by John Wardle Architects, and award-winning 'Owl Woods Passive House' in Trentham, Victoria by Talina Edwards Architecture.

Passive House is not limited to homes. Passive House is even better for commercial spaces, offices, hotels, and skyscrapers - like the student accommodation, Monash University Gillies Hall.

Passive House does not restrict you in the use of your building. Passive House gives control to the occupants. You decide if you open or close the windows. If you want to keep the heat or noise out, you can. If you want to let the heat or bird sounds in, you can.

In a Passive House building, you choose, you have the control!



Available professional Passive House certifications in Australia. Accredited course providers in Australia: Smart Plus Academy, the Australian Passive House Association and Box Hill Institute.



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