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BUILDING CO

BEAUTIFULLY CRAFTED. CONSCIOUSLY BUILT.

Your guide to building a Passive House.

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CENTRAL



WELCOME

We are building a more conscious industry.

Housing is a fundamental component of our quality of life, yet here in New Zealand, our homes are still cold, mouldy and damp, regardless if they have just been newly built. I believe it's simply not good enough to build a brand new home that needs several heat pumps to keep it warm or cool all year around. There is a better way of building and I believe that Passive House principles are the key to improving our homes in New Zealand.

It is crucial that the homes built in New Zealand use less energy and water and be healthy for its occupants. Many New Zealand homes today contribute to health and well-being issues, this simply has to change.

Up to 85% of the total energy consumption and CO² emissions of a building comes from heating and cooling. Energy use in buildings contributes to our country's carbon emissions. New Zealand has committed to being a net-zero carbon emitter by 2050. A Passive home is a significant way your family can do its bit towards reaching that goal.

I believe our clients and our earth deserve better homes. Higgs Building Co is here, to challenge

the way things have always been done, and to create a better future for Kiwi families and the environment. As a family-run business, I want to do better by my children. Our clients and our future generations deserve homes that are dry and healthy, without a big environmental footprint. They deserve a building industry that makes conscious choices; choices that are as beautifully crafted as they are environmentally considered. With each home Higgs builds, we're helping to make this the new standard for building in New Zealand. We're helping to make a future that is Beautifully Crafted. Consciously Built.

I hope this guide will help you on your Passive House journey and if you do have any questions please feel free to contact me directly to discuss your project.

Shaun Higgins

Shaun Higgins | Owner & Certified Passive House Builder



So, what is a Passive House?

A Passive House is a rigorous, voluntary standard for energy efficiency in a building, reducing its ecological footprint. They are designed to optimize the health and well-being of those inside it, while consuming very little energy.

Envision a home that needs minimal energy for heating and cooling. The cost-effectiveness of running such a house is a major advantage. But the benefits go beyond mere savings on your utility bills. The indoor air quality in a Passive Home is nothing short of phenomenal, courtesy of a ventilation system. This feature is a real game-changer, especially for residents with respiratory conditions such as asthma or those plagued by seasonal hay fever.

At a more technical level, Passive House is an open source standard for extremely energy efficient buildings. Utilising no more than 15kW per square metre annually for heating purposes (and a similar amount for cooling, if needed). That's a whopping 81% less energy than what a typical single-family home in Auckland uses to maintain a cozy 20 degrees. And if we venture south to Christchurch, the energy savings soar to an astounding 92%.

Passive House is a process as much as a standard. A Certified Passive House needs commitment to meticulous attention to detail and calculated planning, from the initial design phase through every stage of construction.

“With Passive House, building heat losses are reduced so much that hardly any heating is needed at all. The sun, the occupants, household appliances, and even the heat recovered from used air, cover a large part of the heating demand. The remainder can then often be provided by the ventilation system.”

Wolfgang Feist, Founder and Director of Passive House Institute; Professor, Department of Energy Efficient Construction and Building Physics at the University of Innsbruck, Austria



Five key principles of a passive home

High Performance Insulation

A Passive home is cocooned in continuous high-performance insulation. The insulation's effectiveness depends on its continuity. Minimizing penetrations through the insulation is crucial, but if necessary, low or non-conducting materials should be used. The aim is to eliminate thermal bridges that let heat escape.

Ventilation with Heat Recovery

Clean fresh air is guaranteed in a Passive House, thanks to a continuous mechanical ventilation system. This ventilation system expels stale, damp air from kitchens and bathrooms and supplies fresh, filtered air to living rooms and bedrooms. Its heat-exchange mechanism can recover up to 95% of the energy from the outgoing stale air.

Airtight Building Envelope

A Passive Home's continuous airtight envelope helps maintain indoor temperatures, reducing energy use. This layer prevents heat loss and drafts. During construction, it's important to preserve this airtightness, especially when installing plumbing and cabling. The airtightness is verified with blower-door tests at key stages.

Solar Orientation and Shading

While Passive House projects are not dependent on solar gains to achieve thermal comfort and energy efficiency, they still benefit from careful consideration of the impact of sun paths and shading. The aim is to ensure that any solar gains will make a positive contribution towards meeting Passive House targets without the risk of overheating.

High Performance Windows

Even the very best windows let more energy pass through compared to a wall. High-performance windows and doors are arguably the single most important component to get right in any Passive House project. Passive House certified windows come in various frame materials meeting strict thermal performance and airtightness criteria.



Tips on building a Passive House.

Finding the right architect

Embarking on your Passive House journey begins with finding an architect or designer well-versed in Passive House Design. This design approach requires a deep comprehension of energy flows within structures and an ability to balance these using validated tools. It's crucial for your architect to have access to the Passive House Planning Package (PHPP) software, which allows for accurate and immediate assessment of design alterations.

Ensure you choose a Certified Passive House Designer - a comprehensive list can be found on the Passive House Institute New Zealand (PHINZ) Website. If you're seeking recommendations, Higgs Building Co has a stellar network of Passive House Architects they frequently collaborate with.

Involve the builder as early as possible

When starting your Passive House journey, make sure to select a builder who is a Certified Passive House Builder. This certification guarantees they have undergone rigorous training in Passive House building, assuring you that your home will meet all passive house standards. For instance, Higgs Building Co boasts two such certified builders - Shaun Higgins, the owner, and Sean McKenzie, the Site Foreman.

Creating a Passive House is a team effort. It's crucial to have an experienced team by your side. That's why we recommend ensuring your architect and builder have a strong working relationship from the get-go. Their collaboration will help guarantee a smooth, hassle-free building process.

Passive House Myths

Passive Houses are for cold climates, it's overkill for New Zealand.

Ever heard the misconception that the Passive House concept is only for freezing climates? It's time to debunk that myth. The truth is, Passive House, or 'Passivhaus' as it's known in Germany where it originated, is a globally recognized standard, successfully implemented in varied climates, including temperate ones like California, Vancouver, and Australia.

The beauty of Passive House is its flexibility. It sets a performance standard, not a rigid set of rules. Consequently, building a Passive House in New Zealand, for instance, can be more cost-effective and straightforward than in Bavaria's bone-chilling winters. Factors like insulation and glazing requirements are adjusted according to local conditions.

Even within New Zealand, achieving the Passive House performance target is easier in Northland than in Queenstown. That's the power of adaptive design! The architect or designer tailors the design based on the local climate. This is why having accurate regional climate zones is key to efficient and effective Passive House design.

So, as a Kiwi homeowner, you can enjoy all the benefits of a Passive House, with costs and complexities that scale to your local conditions. It's time to embrace this sustainable, energy-efficient building standard!



Passive House Myths

Passive solar is just as good, without the fancy price-tag

Don't confuse Passive House with passive solar. While these concepts may sound similar, they are fundamentally different in their goals and implementation methods.

Passive solar is a strategy that depends on a north-facing orientation. This method concentrates on maximizing glazing on the side of the house that receives the most sunlight and storing energy in materials with high thermal mass. However, this approach is not always feasible in many circumstances. For instance, it might not work for medium-density housing on small lots where the aspect is not ideal, or when the million-dollar views are oriented towards the south.

Advocates of passive solar design talk about achieving comfortable average temperatures. However, this average can conceal significant and uncomfortable variations in indoor temperature. Passive solar thinking and design has improved since its origins in the 1970s but there is no standard, no independent verification and no way to accurately predict how a building will perform before it is built.

On the other hand, a Certified Passive House uses passive solar gain if it is available but crucially, can calculate the effect of that energy at the design stage and include it in the performance modelling.

Consider the materials that go into your home

Designing a passive house is not only about creating an energy-efficient space, but it's also about choosing sustainable materials that can enhance the overall aesthetics and functionality of your home.

For instance, choosing a carbon-negative timber like Abodo Vulcan for your construction not only is aesthetically pleasing but also helps in reducing your carbon footprint. This unique timber is renowned for its durability and weather resistance, offering exceptional value over time. Another way to make your Passive House environmentally friendly is by integrating circular stormwater and grey water system into your design. Or consider using Structural Insulated Panels (SIPs), a high-performing building material that can reduce construction waste and is an effective way to produce an air tight building envelope.

With an endless array of eco-friendly products available in the market, your architect and builder can help you explore a range of sustainable possibilities.

Getting your Passive House design reviewed

It is vital that your Passive House design undergoes a thorough review by an independent Passive House Certifier. This unbiased, professional certifier ensures your Passive House meets all the necessary criteria to fulfill the principles of Passive House construction. They will assess the design, flag any problems and ask any questions.

At the end of this process, your project passes the pre-construction review, an important milestone. From this point, you have the security of knowing the design is correct and, if built according to the design, will result in a home able to meet its certification target.



Construction and changes to your design

Once you and the Passive House Certifier are happy with the design, you move into the construction stage. Your builder will assess your plans and will visit the site to ensure the build goes smoothly. You might have a change in mind on your design or material for your home. It's important that you discuss these with your builder. They will then ensure any variations to the design are checked for their impact on performance.

During the construction stage, blower door testing is done twice at different stages of construction and the ventilation system is commissioned (tested and adjusted). Key parts of the construction process are carefully recorded with photographs and supporting documentation.

Certifying your Passive House

Passive House certification is embedded throughout the design and build stages, adding significant benefit and quality assurance at every stage. The architect provides records of materials and construction, including on-site test results. This is reviewed by the certifier against the Passive House standard to ensure the home meets the design and performance goals. After submission to the international Passive House organisation, a plaque and certificate are issued.

Certification helps designers and builders maintain focus on required results and construction quality for a Passive House. The minimal extra cost is worthwhile for the assurance it offers. It includes a third-party review, ensuring you get the house you paid for.

Passive House Myths

You can't open the windows in a Passive House—and who wants to live in a sealed box.

One of the most common, and frankly, misguided objections to Passive Houses is the idea that you can't open the windows. This simply isn't true—of course you can open the windows!

Passive Homes can feature large opening doors and windows. These doors can open up a whole wall of the house, creating a seamless indoor-outdoor flow. Whether you want to keep an eye on the kids playing in the yard, enjoy the sound of birds chirping or waves crashing, or simply let in the fresh air, feel free to throw open your windows.

However, if you have neighbors who mow their lawns at 8am on Sunday, come home late at 2am, or if you live on a busy road with constant traffic noise—you might well appreciate how quiet your Certified Passive House is with the windows closed.

Double or triple-glazing offers significant acoustic as well as thermal insulation. But the beauty of a Passive House is that you don't have to open windows and doors to ventilate your home. Your home does it for you, constantly providing fresh, filtered air at the same temperature. This means you'll never feel a draught, and you're not paying to heat or cool air that's escaping outside. The result? Outstanding indoor air quality, no matter what's happening outside.

Higgs Building Co are proud to be Certified Passive House Builders. We build homes that keep you snug and are better for the planet.

We are members of the Passive House Institute New Zealand (PHINZ), we are continually up-skilling. Here, we have access to specialized training and access to a wealth of technical knowledge from leading Passive House experts.

We would love hear about your upcoming build. Reach out to us, let's start the conversation about your project.

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