

Building A Sustainable Future

12 Tips For Building A
Sustainable Home And
How Craft Homes Can Help

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*High performance home in Red Beach, Auckland. Designed by
Construkt and built by the Craft Homes team.*

What is a sustainable building?

A sustainable building is one that minimises the environmental impacts of constructing and running a home.

A standard build process is, typically, not very environmentally friendly. A significant amount of energy and materials are used to build or renovate a home and there's often a lot of waste left over.

To construct an energy efficient, sustainable home, a range of alternative techniques need to be employed to:

- 1 Minimise the negative environmental impacts of both the construction and running of the finished home**
- 2 Reduce energy consumption during the day-to-day running of the home**
- 3 Create a healthier, more comfortable environment to live in**

At Craft Homes, we've seen first-hand how small changes can offer big results. So, whether you're looking for a fully sustainable fit out, or just want to include a few simple features to help make your home more efficient, we can help boost the sustainability rating of your home. Here are our top tips for a sustainable build.



Passive solar home in Ruakaka designed by Duncan Firth from Solarei and built by the Craft Homes team

Tip 1. Plan, then do

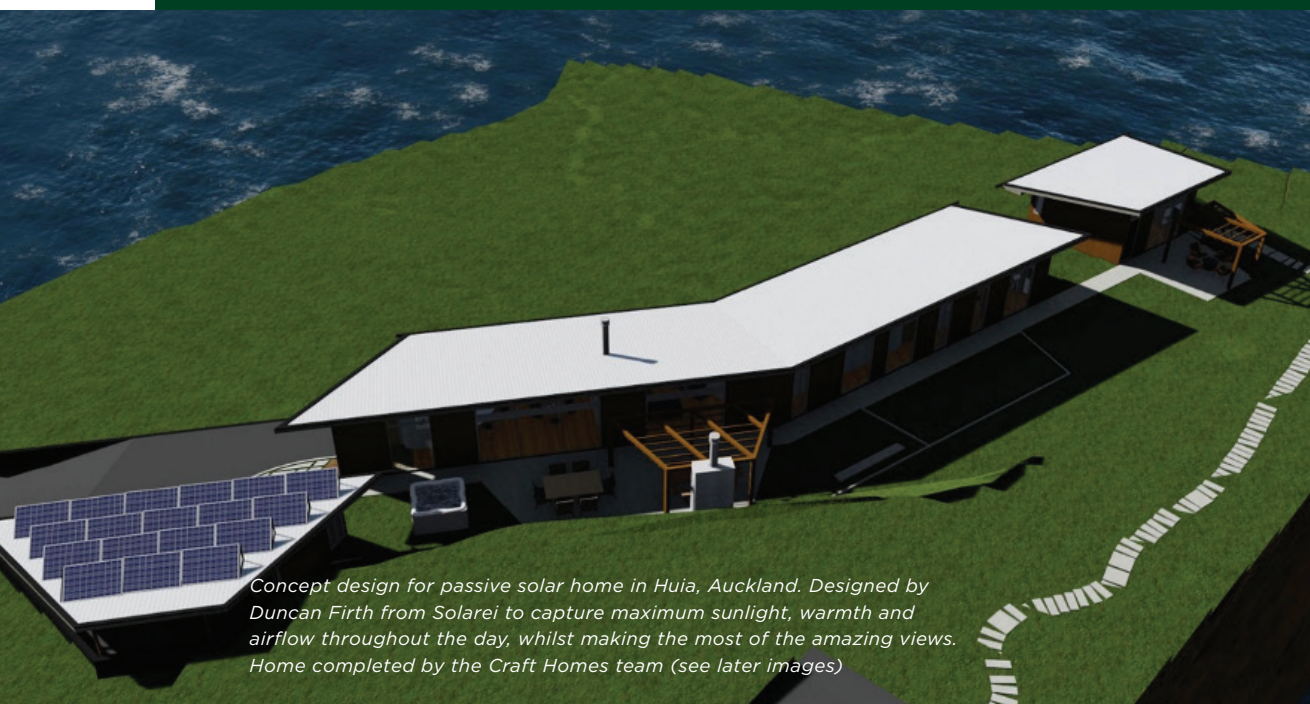
Sustainable homes don't just happen. They require thought and planning to ensure they're both functional and friendly to the environment. Building or renovating your home is going to be one of the biggest investments of your life, so you want to do it right first time.

We suggest engaging an integrative design team to kick-start the process. This initial team should include an architectural designer and builder and, where appropriate, an engineer and suppliers too. It is important that all elements of sustainability and energy-efficiency are considered as part of this holistic approach.

It's worth doing some research into local architectural designers and builders who specialise in sustainable construction. Make sure the professionals you choose for your project are certified in sustainable design and building techniques and can provide you with the education and guidance you need to achieve your goals.

Getting this relationship right from the start will enable you to make choices that best fit your desired location, budget and timeline.

At Craft Homes we are New Zealand Homestar® Practitioners and Assessors and we're Certified Passive House Trade qualified too, giving you independent assurance that we are qualified sustainable builders.



Concept design for passive solar home in Huia, Auckland. Designed by Duncan Firth from Solarei to capture maximum sunlight, warmth and airflow throughout the day, whilst making the most of the amazing views. Home completed by the Craft Homes team (see later images)

Tip 2. Get to know your build/renovation site

Whether you're looking for the perfect building site, or renovating on an existing site, there are some key factors you need to understand and consider.

Ask yourself:

- How big is my site?
- Where is the view I want to maximise?
- Where is due north? And where will the sun rise and set each day?
- What prevailing winds affect the site?
- Am I surrounded by protected trees or plants or wildlife?
- How will I access local amenities such, as shops and schools?

You will also need to consider:

- Budget: What's the maximum amount you can afford to spend on your new build or renovation?
- Council planning rules: Including the percentage of site coverage that's allowed and how far set back from the street the building needs to be.
- Covenants: Including rules around the look, size or shape of the build.
- Subdivision rules that may apply to the site, such as the minimum size of home you can build.

Understanding the answers to these questions allows you to choose a site that compliments the overall goals of your build.

Craft Homes provides a FREE, no obligation site meeting to help bring to life your dream of a sustainable home.



Architecturally designed new build home in rural Waimauku, Auckland. Built to maximise the private, rural outlook and harness natural light and warmth from the northerly aspect, with protection from the prevailing winds. Designed by Darryl Quadling and built by the Craft Homes team.

Tip 3. Be smart about space

It's worth taking some time to consider how you want to use your home on a daily basis.

A good design will make efficient use of space, will provide optimal flow between living spaces and will support your unique, everyday living habits.

The footprint, or floor area, of your home has a significant impact on your overall cost to build, or renovate. The bigger the floor area, the more materials and time required to create your space. One of the best tricks for building a high-performing, sustainable home on budget is to minimise the overall floor area and invest in the features that will make your home efficient and enjoyable to live in.

As a starting point, consider what you use on a day-to-day basis. Do you really need that spare bedroom that may only be used a few days a year by guests? Or could you better direct your funds towards some smarter building materials?

Craft Homes can work with you and your architect to ensure the size and scope of your home fits both your needs and your budget. See our website for how we can collaborate with you.

The fundamentals of a sustainable home.

A sustainable home's high standard of energy efficiency and comfort is primarily achieved by crafting a high-performance building envelope, or building shell. The following elements are crucial to achieving this.

When combined, these features can deliver a world-leading home that is comfortable, well ventilated and requires very little energy to run.

Architecturally designed new build home in rural Waimauku, Auckland with open plan living, dining and kitchen opening out on to a covered outdoor area and pool. Designed by Darrell Quadling



Tip 4. Invest in insulation

To prevent heat loss and to stabilise the internal temperature of your home, foundations, floors, walls and ceilings should be thoroughly insulated.

Think of insulation like a thermal blanket that you wrap around your house to trap the heat inside. Any gaps in your blanket means heat can escape.

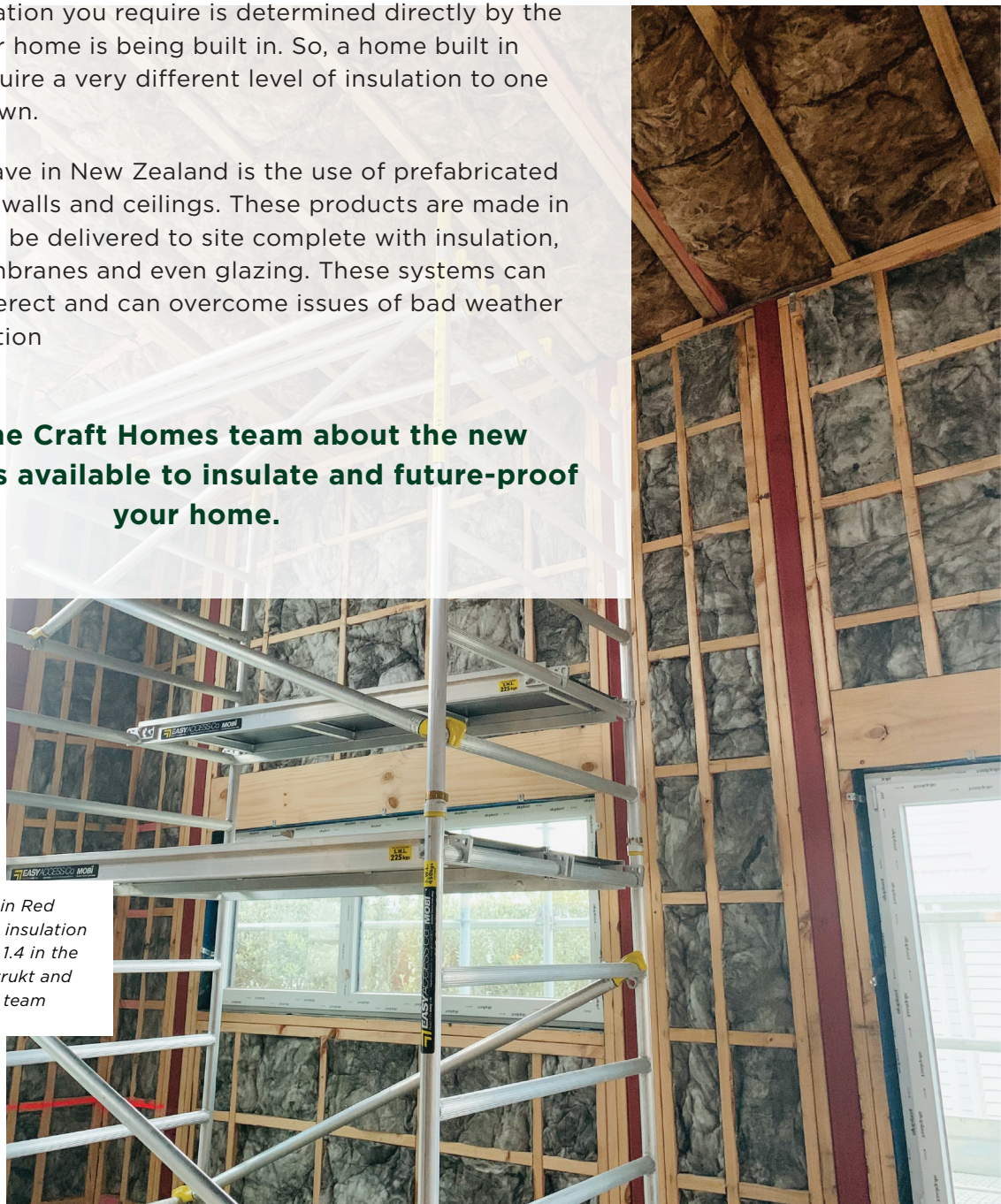
By focusing on insulating your home to a high standard, you'll maximise energy savings in the day-to-day running of your home.

The level of insulation you require is determined directly by the climate zone your home is being built in. So, a home built in Auckland will require a very different level of insulation to one built in Queenstown.

One option we have in New Zealand is the use of prefabricated panels for floors, walls and ceilings. These products are made in a factory and can be delivered to site complete with insulation, air tightness membranes and even glazing. These systems can be very quick to erect and can overcome issues of bad weather slowing construction

Talk to the Craft Homes team about the new technologies available to insulate and future-proof your home.

High performance home in Red Beach, Auckland with R5 insulation in the roof and R2.8 plus 1.4 in the walls. Designed by Construct and built by the Craft Homes team



Tip 5. Look for high performing windows

Windows, in particular, often represent the weakest link when it comes to the thermal efficiency of a building.

To ensure optimum thermal performance and airtightness, windows and doors must meet strict criteria.

1

Double glazing is a national minimum standard and, in some parts of the country, triple glazing may be specified.

3

Rebating windows within the wall frame (the warm part of the wall), as opposed to installing them flush with exterior cladding, is vital for reducing heat loss and condensation.

2

Window framing is another important element to consider. Energy efficient windows can now be crafted from a range of different frame materials, all of which are produced in New Zealand.

4

The orientation, size and shading of windows also makes a difference. For example, a large window facing north with no shading may lead to overheating in summer.



High performance home in Red Beach, Auckland. German made Neuffer windows, supplied by Enveloped. UPVC/aluminium, thermally broken design with windows rebated within the wall frame to maximise energy efficiency.

Tip 6. Maximise airtightness

The more airtight your home, the better. Maximising airtightness will enhance the energy efficiency, health, comfort and durability of your home.

Gaps or 'leaks' in a building envelope can allow for heat loss and draughts, as well as unwanted moisture inside the building's structure, increasing the likelihood of mould and mildew developing.

We recommend setting an airtightness target as part of the initial design process with your design team. A good home design will include an air barrier. This barrier, which can come in different forms, such as a vapour control layer or rigid air barrier, wraps around the interior of the building envelope, with a second weathertight layer on the exterior.

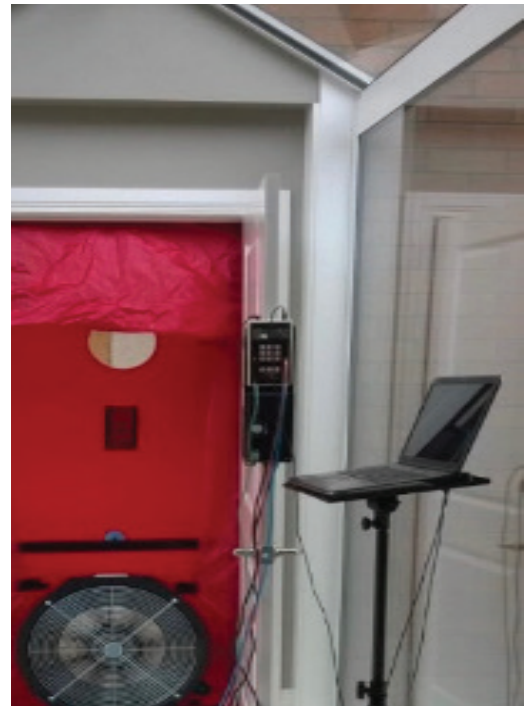
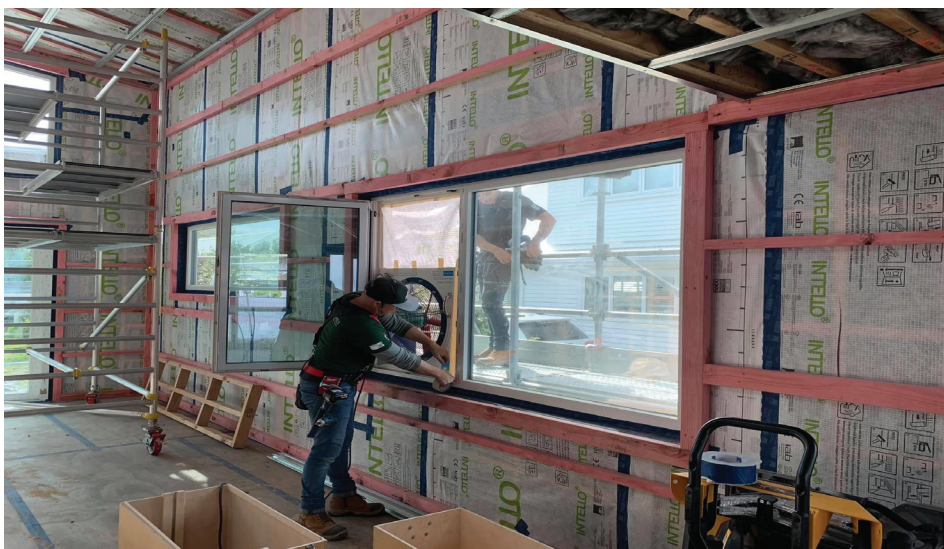


Image of a blower door test to assess for air tightness (image from "Passive House for New Zealand" by Jason Quinn, 2019).



Pre-measure of air tightness at Red Beach, Auckland using WINCON inspection device. This test was carried out prior to the blower door test.



Tip 7. Houses need to breathe too

Efficient ventilation is vital for creating a healthy, warm, and dry living environment, as well as for ensuring the durability of the building structure.

A continuous mechanical ventilation system is the only way to achieve this in an airtight home. There are several systems to choose from, all of which function by drawing in fresh air from outside and filtering out any dust, pollen and pollutants before distribution it throughout the house using a ducted system.

These ventilation systems also remove stale air from inside the house, as well as extracting any residual heat and using it to warm the incoming air. Additional heating or cooling elements can also be added to manage temperatures.

Using passive design principles, natural air flow can be harnessed to help ventilate a home. See Tip 12 for more information.

Ruakaka passive solar home. Top light windows were used on the western side of the house to create a natural stack effect, in which hot air rises and naturally ventilates and cools the house in warmer months. Operable windows allow cross ventilation through the home.



Tip 8. Be choosy with your materials

When choosing products and materials for your home, there are some key elements to consider.

1. What's in the product or material?

Go for non-toxic ingredients to ensure a healthy home. For example, look for paints with the low or no VOC stamp.

2. Where is the product manufactured i.e. what distance does it need to travel to reach your site?

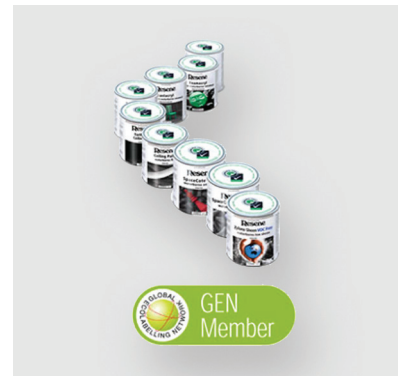
Buying local, New Zealand made products can substantially reduce the overall carbon footprint of your build, with the additional bonus of supporting NZ businesses

3. Are the materials environmentally friendly?

Environmentally friendly products should carry an environmental certification or endorsement, such as timber from the Forest Stewardship Council.

4. Is the product recycled or can it be recycled?

Consider choosing products that are easily recyclable, such as timber, or products crafted from a recycled material, such as constituted stone.



The Craft Homes team will be happy to advise you on the best products to use for your home's design, location and budget.

Tip 9. Be water smart

Reduce water waste by installing the highest water rating taps and fittings you can afford. In addition, install a hot water system that heats up quickly and efficiently.

You can also conserve water by using a grey water treatment system. These systems can separate grey water (wastewater from showers and laundry machines) and black water (wastewater from toilets and kitchens). Doing this allows you to manage grey water separately and re-use it for irrigation.

Rainwater collection is already common across many rural areas of New Zealand, and it can be utilised in urban environments too.

Rainwater tanks are typically cheap and easy to manage, and are great for helping to irrigate and water gardens. Many also use collected rainwater for tasks including washing clothes and flushing toilets and for drinking.



An extensive renovation of this grand Remuera villa included a full bathroom refit. The home was re-designed by Annlouise Bates from Atelier Tech and built by the Craft Homes team.

Tip 10. Waste not, want not

To achieve a sustainable build, you need a Site Waste Minimisation plan in place with your builder. The aim of this plan is to recognise and encourage effective waste management practices during construction, and therefore reduce the volume of waste going to landfill.



You can achieve this by clearly labelling recycling bins on site for different purposes, avoiding over-ordering materials, reducing the number of offcuts and reusing offcuts.

You can also plan to reduce the waste you create whilst living in your home. This can form part of your integrated design plan and can include things like grey water treatment systems (discussed above) or composting toilets



Huia passive solar home. The external cladding is Innowood, which is a sustainable timber alternative. This product is a composite of recycled wood waste and resin, which is low VOC, 100% recyclable, durable and lightweight. This material can be ordered in selected lengths, which significantly reduces off cuts.

Tip 11. Look for the energy stars

Choosing high star energy ratings for all fittings and appliances will ensure your appliances are as efficient as possible. It is worth the small upfront investment to choose appliances with low to very low energy usage. Look for products with a high Minimum Energy Performance Standard (MEPS) as well as ones that display an Energy Rating Label (ERL)

Smart electrical design can also greatly improve the energy efficiency of a home. Place switches at rooms' exits to encourage people to turn lights off, or consider 'smart' light switches that use movement sensors to turn lights off when no one is in the room. Solar powered illumination for outside areas and security lights are also great options.

Often, the cost of installing renewable power sources, such as solar panels or wind turbines, can be offset by a lifetime of energy savings.

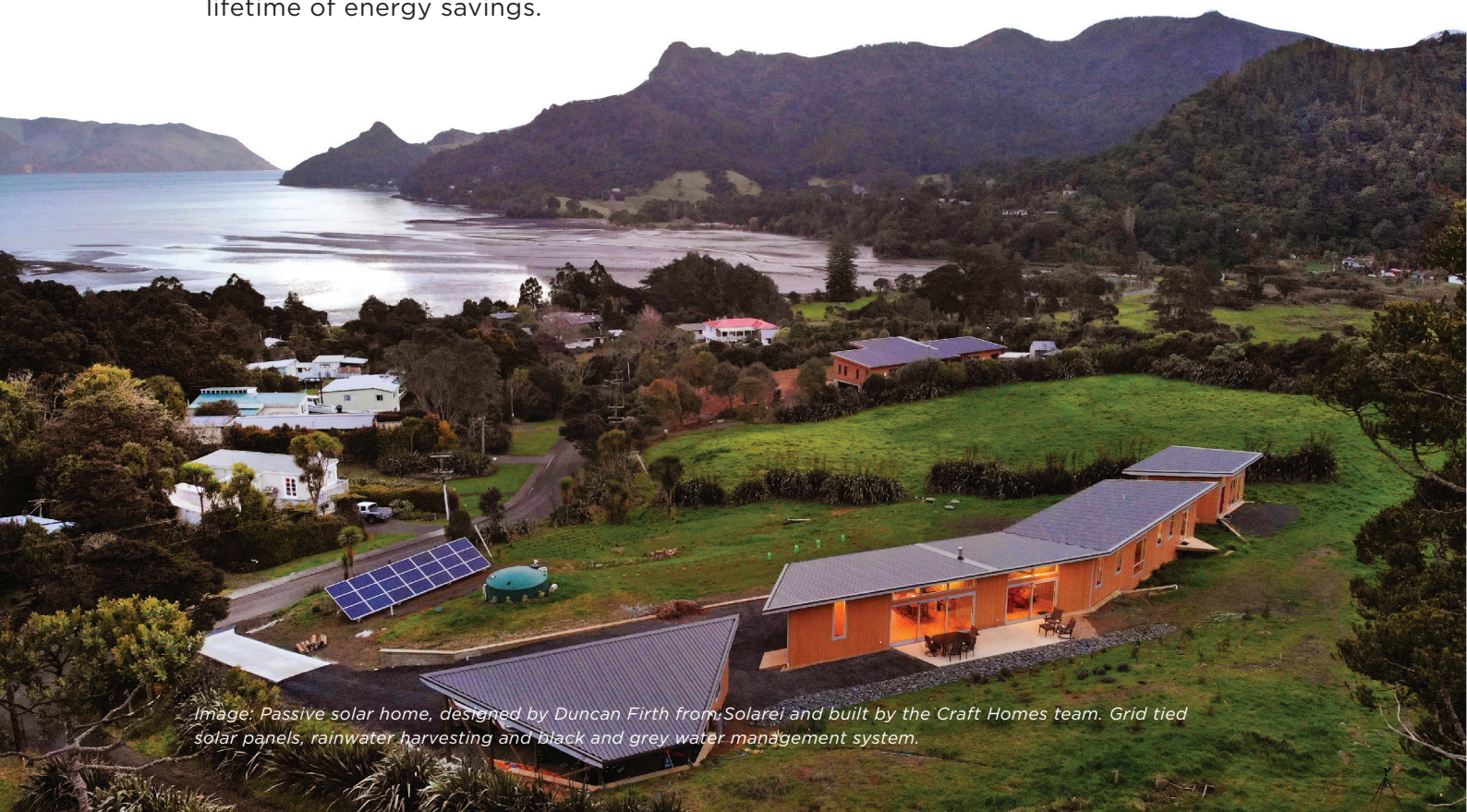


Image: Passive solar home, designed by Duncan Firth from Solarei and built by the Craft Homes team. Grid tied solar panels, rainwater harvesting and black and grey water management system.



Image: Passive solar home, designed by Duncan Firth from Solarei and built by the Craft Homes team.

Tip 12. Consider Passive Solar Design

Passive solar design is all about harnessing the air's natural movement and the sun's natural light and warmth to heat, cool and ventilate your home. How you position your house in relation to the sun's path and prevailing winds is crucial in getting this right.

Passive solar design also considers thermal mass. This is the ability of materials, such as concrete, brick or tile, to absorb the sun's warmth during the day and release it slowly at night. Using these materials in certain areas of your house can provide you with another free heating source.

These tricks reduce the need for mechanical heating or cooling and provide significant energy savings, all year round.

Talk to the Craft Homes team about the products and materials you can use in your home to enable passive solar design.



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