SMARTER HOMES SMARTER LIVING

HOW TO SAVE MONEY BY BUILDING A SMARTER HOME

INTRODUCTION

Building a home is one of life's most important decisions and the largest financial commitment you will make. By constructing your home to be more energy efficient you will save money, live more comfortably and help protect the environment.

The cost of purchasing your land and building your home is just the start of the financial journey of home ownership. There will also be maintenance costs and upgrades over the life of the building and of course the on-going running costs of power, water and gas.

It is important to understand how your home uses energy and to make the right decisions at the early design stage to ensure you have lower ongoing running costs that will future proof your finances and your lifestyle.

This guide will help you build a *smarter home* that will save you money for years to come. Use it as a checklist during discussions with your builder or designer and refer to the website links for more detailed information.

Cover Image
Photo: Hail Design

Right
Galea Residence.
Architect: Daniel Ash – www.danielash.com.au
Photo: John Tsiavis

PLANNING FOR A NEW HOME

QUICK TIP

Know where north is in relation to your building site

ORIENTATION

The most important thing you can do to reduce the bills in your new home is to orient it to take advantage of the winter sun and provide warmth and abundant natural light year round.

Ideally your home should be placed on the block so that the largest windows and the rooms you spend most of your time in, face north.

North facing living, kitchens, meals, play rooms and home offices all benefit from bright natural light and warmth provided free by the sun. This will increase energy efficiency, and ultimately your comfort and wellbeing.

Bedrooms, bathrooms and utility areas should be located to the south. Outside covered patio areas can be sited to the west to help block the hot, late afternoon summer sun but maximise the late afternoon winter sun.

Avoid placing garages, carports and other buildings or shade structures that may block the sun coming into the living areas on the northern side of the home and try to gain an understanding of how your neighbour's building will affect your access to sunlight.

If access to the north sun is difficult, or blocked by a neighbour's building, consider the use of skylights, windows placed high in the wall, high clerestory roof windows or a courtyard design.

Above Image
Photo: Hail Design

THINGS TO CONSIDER WHEN PLANNING

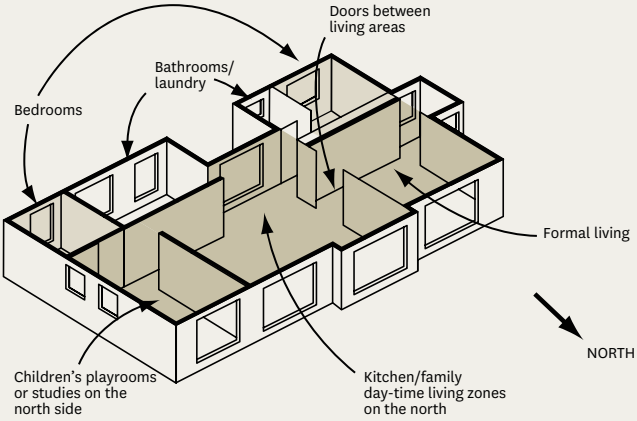
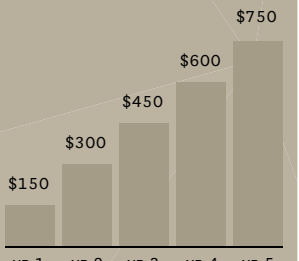


Image sourced from Sustainability Victoria

'A poorly oriented 5-star home in Victoria requires an approximate 26% increase in heating'

SELANDRA COMMUNITY PLACE
SUSTAINABLE HOMES PROGRAM
selandracommunityplace.com.au



PASSIVE DESIGN

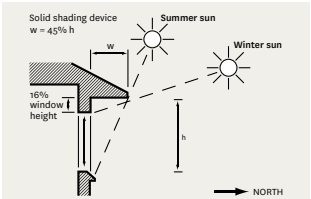


Image sourced from Sustainability Victoria

A passive designed house lets the winter sun in to warm and light your home but blocks out the high summer sun, reducing your need for air conditioning.

Passive design involves a number of elements including orientation, internal layout, window type and placement, and the use of heavy construction materials that have the ability to store warmth from the sun. The comfort of your new home will also be improved by effective draught proofing, weather sealing and high insulation levels.

CATCHING BREEZES FOR COOLING

Designing to catch the cool breezes in summer is equally important as providing appropriate shading to windows in living areas to protect from the high, hot summer sun.

Passive solar design should not cost you any more to build your home but means it will cost you less to light, heat and cool your home all year round.

CHOOSING A HOUSE PLAN

It is essential to choose the plan that not only suits your family's needs but also suits your block of land so that you can ensure the correct siting and orientation of your house. Ask your building designer to make sure your house is properly positioned on the site to maximise the benefits of passive solar design. Consider flexible multi-purpose spaces, reduce wasted space and single use rooms.

FURTHER INFORMATION

yourhome.gov.au
Chapter 4 Passive Design and 4.3 Orientation

yourhome.gov.au/buyersguide
Extensive design checklist

CASE STUDY 1

THE LUCAS FAMILY

Meet the *Lucas family*. Nicole, Stuart and their children Jack (9) and Sam (6) along with their pet yabbie, Jake, have just finished designing their new home to be built in Armstrong Creek.

Nicole and Stuart wanted to build a 7-star home for several reasons. Obviously their impact on the environment was important to them and they have a personal commitment to 'do their bit to reduce their footprint on the world'. But, as with any young family, juggling the household budget was a key concern, so knowing there was a way for them to control the impact of their ongoing running costs and make sure they had lower bills was a driving factor.

The additional upfront costs were slightly noticeable, but knowing their home will be warm in winter and cool in summer meant that the added cost for the double glazing and extra insulation was worth it. The home design they chose already had solar hot water, great eave design and the purple pipe tapped to their toilets and that helped them make the decision of which builder to go with.

The Lucas family had a budget they needed to stick to, so the green features they chose were the ones that were harder to add later. Some features they wanted, like solar power, have had to wait but they want to retrofit it as soon as they can. The most important thing to them, was that they got the layout of their house in relation to the north sun, spot on.

FEATURED ITEMS

INSULATION

While your builder will provide insulation to your house to meet the required standards, by upgrading your insulation to R4 in your ceiling and R2.5 in your walls you will save money on lost heating and cooling that has leaked out of the house. Insulation is the most effective way to improve the energy efficiency of your home by acting as a barrier to heat flow.

DOUBLE GLAZING

Double glazing is like insulation for your windows. It reduces heat transfer from inside to out in the winter while still allowing sunlight in to warm the room. In summer it will minimise heat gain but windows will still need shading or tinting to protect from direct sunlight hitting the glass, which in turn will heat up the inside.

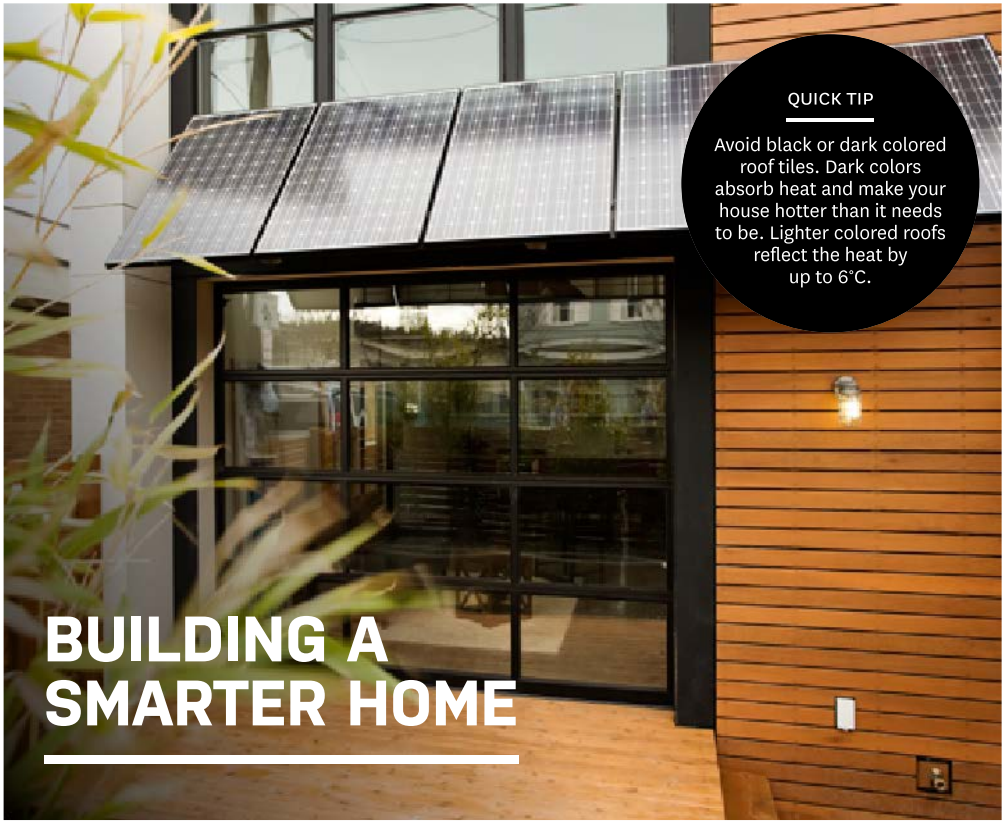
FURTHER INFORMATION

awa.com.au
For the latest in window technology.

Using well designed eaves

SMART TIP

A well designed eave is the simplest and most cost-effective way to shade your windows and minimise heat gain in summer. Eaves also provide better protection than internal blinds.



QUICK TIP

Avoid black or dark colored roof tiles. Dark colors absorb heat and make your house hotter than it needs to be. Lighter colored roofs reflect the heat by up to 6˚C.

BUILDING A SMARTER HOME

A smart home is one that incorporates all of your needs but is also comfortable to live in. Not too hot in summer or too cold in winter and doesn't cost an arm and a leg to run.

During the decision making phase of your journey to design and build your new home there are many things to take into consideration — the selection of your block of land, the size of the house, your family needs, your "wants", re-sale value, your budget and your interior and landscaping schemes.

Usually the benefits of energy efficiency 'upgrades' like double glazing, extra insulation and solar hot water fall off the priority list as you juggle the competing needs within your budget.

Spending wisely

SMART TIP

Spending on sustainability upgrades like extra insulation and double glazed windows at the construction phase will save in long term energy bills.

FURTHER INFORMATION

greensavingscalculator.com

Calculates money saved by investing in green features


QUICK TIP
Your house should work for you, not the other way around.
3

FEATURED ITEMS

DESIGN CONSIDERATIONS

1 NATURAL LIGHT

To make the most of natural light coming into your home, the design and placement of windows is important. Poorly designed windows and skylights can make your house hotter in summer and colder in winter.

We have already recommended larger windows in your north-facing living areas. South windows should be smaller so your house does not lose too much heat in the winter but allow for the catching of cooler breezes in the summer. Kitchens love a bit of early morning easterly sun but avoid or minimise west facing windows as these will over heat your house in summer.

2 A WARMER HOME

Thermal Mass is a term used to describe materials that have the ability to store heat during the day and then release that heat at night time as the temperatures drop. Concrete, bricks, tiles and stone are examples of high thermal mass. Light-weight building materials do not store heat and have a low thermal mass.

For example a concrete or tiled floor or block wall in a well insulated north facing living room is able to warm up as the sun hits it during the day and then provide free heating back into the room at night time. As with windows, it needs to be protected from the sun during summer, another reason to have well designed shading devices.

3 A COOLER HOME

Simply being able to open up windows on both sides of the house allows cooling breezes to be directed through the home. Know where your prevailing breezes come from and position windows and doors so that air flow can purge the house of hot air and you can enjoy free air conditioning. In Geelong, the prevailing breezes come from the south. Consider the use of banks of louvred windows to easily control air flow.

Shank Hill Residence.
Architect:Daniel Ash – www.danielash.com.au
Photo: Trent Perrett Photography

CASE STUDY 2

THE WILKINSON FAMILY

Jan and Don Wilkinson have recently built their new home and are thrilled with the natural light that floods their living, kitchen and dining area and the lower than expected utility bills.

On a very small, difficult block of land with limited access to north light, the Wilkinson's used high light windows to maximise their north glazing, creating pockets of light and a gorgeous courtyard garden. Low-maintenance, sustainable building materials that required little on-going effort, access, a water wise garden and, on-going affordability with rising utility costs were all considerations as they were designing their home.

The owners were also interested in "downsizing" believing that their new home should be smaller and smarter. The living area of this home is 160m^2 and the design of the home allows for flexible use of different spaces and no wasted space. By keeping their house smaller, they found they could afford more green features.

The house has no air conditioning as it uses cross ventilation and the "heat chimney" effect to passively cool the house. This is where hot air rises and is exhausted out of high level windows. During the day, the home temperature is very stable in winter and summer. There is a back up gas fireplace for additional winter heating on the ground floor only.

FEATURED ITEMS

ENERGY EFFICIENT LIGHTING

Choosing compact fluorescent (CFL) globes which are inexpensive and come in a range of fixture styles, including a down light option can be one of the easiest way to reduce your energy consumption. CFL use up to 80% less energy than a standard incandescent light globe and can last up to 10 time longer. LED lights are an even more energy efficient option but are more expensive to install.

CHOOSE CAREFULLY

"Low energy" halogen lamps used in down lights and incandescent globes are not energy efficient.

DRAFT PROOFING

Drafts can account for up to 40% of heat loss from a building, yet so many Australian homes leak air from around doors, windows, skylights vents and down lights. Draft-proofing is one of the easiest, cheapest and most cost-effective things you can do to prevent heat loss, make sure your builder includes weather stripping, caulking of gaps and installs seals around windows and doors.

Circulating air

As hot air rises, opening windows at the highest point in the ceiling or wall will create a vacuum to drag cooler air in from lower down and let the hot air out at the higher exit point.

SMARTER LIVING

QUICK TIP

If you have views to the east, west or south, consider using small windows to 'frame' the view, this will also help with cross-ventilation opportunities without over heating the house.

Wilkinson Residence.
Architect: Sam Smith.
Photo: McGuane Homes.

SUN PROTECTION

External shading devices, such as eaves, pergolas or retractable blinds are an effective way to reduce heat gain through windows in summer. Also consider clever landscaping. Planting deciduous trees provides summer shading on north and west elevations and in winter lets in sun as the trees lose their leaves.

FURTHER INFORMATION

resourcesmart.vic.gov.au/sustainable_housing
Look at Design Build Live interactive link

yourfuturehome.com.au
Tips, information and checklists for building new homes

hia.com.au
Look at the Housing Industry of Australia's 'Green Smart' guidelines

CHOOSING SUSTAINABLE MATERIALS

When designing your home be mindful of the materials, finishes, fixtures and appliances you choose. You should also factor in the ongoing running and maintenance costs, air quality and the health of your family.

- Consider what materials you use in your construction – where they come from and how they are manufactured. Are there more sustainable or healthy alternatives?
- Make sure your builder uses the most appropriate materials for the job and is aware of the need to minimise waste during construction.
- Consider the durability and ongoing maintenance requirements of the materials you build your home with.
- Where possible use recycled, upcycled and recyclable materials.
- Consider using locally made or locally grown products (reduced carbon miles).
- Consider products that are prefabricated or modular.
- Consider designing to suit standard, manufactured sizes to reduce wasted materials.
- Use natural, low or no VOC paints and low-toxic floor finishes and materials for joinery to ensure clean air quality.

SMART ENERGY USE

Architect: Third Ecology.
Photo: Room2view

Smart heating

SMART TIP

Remember hot air rises, so most of your heat loss will be through your ceiling. Install ceiling fans to push the hot hair back down.

A smart home is designed to make the most of the winter sun for warmth and light as well as being protected from the high summer sun and able to capture free cooling breezes. A smart home should not need an additional air conditioning system and only need a supplementary heating system saving you up to 50-60% on your heating and cooling energy bills.

Geelong has a mild, temperate climate. It gets cold in winter and cools down in the evenings for most of the year. For a week or two every year, we can expect extremely hot weather. Creating 'zones' in your house, can allow you to heat or cool each zone separately depending on needs. This gives you the flexibility to only heat or cool the rooms that are being used — the key to energy efficiency.

FURTHER INFORMATION

resourcesmart.vic.gov.au/sustainable_housing
Look at Design Build Live interactive link

yourfuturehome.com.au
Tips, information and checklists for building new homes

hia.com.au
Look at the Housing Industry of Australia's 'Green Smart' guidelines

WHITE GOODS AND APPLIANCES

All new white goods and appliances should come with a star rating which highlights how energy efficient a product is. The star ratings provide information on both water efficiency for dish washers and washing machines and how much power the appliance uses. Choose your appliances well, select models that have the highest star ratings you can afford and select a size that matches your needs.

FURTHER INFORMATION

resourcesmart.vic.gov.au/for_households
Smarter choice: Choosing energy-efficient appliances

ecospecifier.com.au
Information to help select products and finishes

QUICK TIP

Use a clothes line instead of the dryer, it is kinder to your clothes and your power bill. Clothes dryers are one of the most inefficient uses of electricity.

CLIMATE CONTROL

Consider the use of solar slab heating, geothermal, a solar-vented or a heat recovery ventilation system. Selecting a 4 or 5 star rated supplementary system that can be zoned could save you up to 50% on the average home heating bill. Ensure your system is sized appropriately for the area and has a thermostat and a timer so you can adjust the temperature and not have to heat or cool the whole house all of the time.

SOLAR HOT WATER

Heating water accounts for around 25% of the energy use in a household. Upgrading to a solar hot water system can result in up to 60% of your hot water needs for free! These units are generally equipped with a back-up booster to ensure you are never without hot water, even on a cloudy day. Another way to save hot water costs is to use cold water for clothes washing.

Saving on energy

SMART TIP

Select a gas-boosted system that heats up the water as you need it if the sun can't do it for you.

POWER FROM THE SUN

Solar Power systems use energy from the sun and convert it to power to use in your home. If you generate more power than you need it is fed back into the electricity grid and reduces your overall power bill. Often the initial cost of installation is deemed too high for the first home buyer's budget, but if you factor in how much money you will save over the years as energy prices increase, it will pay itself back in no time.

Solar power options

SMART TIP

If installing a solar power system is out of your budget, consider buying Green Power from your supplier from just an extra $1 per day.

LIVING SMARTER

Armstrong Creek has been designed with sustainable lifestyles in mind. The City of Greater Geelong has worked with Sustainability Victoria and Barwon Water to provide Armstrong Creek with public transport, parks, green corridors, community activity centres, schools, shops and places to work.

Residents will have recycled water piped to their homes, blocks of land have been orientated to make best use of the sun and housing design is encouraged to incorporate solar and water efficient principles. Sustainable living is about ensuring our children and grandchildren inherit a planet that is worth living on. To make sure this happens, we need to start being smarter about the way we do things.

FOR MORE INFORMATION ON ARMSTRONG CREEK AND GEELONG GO TO:
www.geelongaustralia.com.au
www.geelongaustralia.com.au/armstrongcreek

PURPLE PIPES

Armstrong Creek residences will have Barwon Water's purple pipe servicing their property. The purple pipe provides recycled Class A water that can be used to flush your toilets, water your garden and wash the car.

FURTHER INFORMATION
barwonwater.vic.gov.au/residential/recycled-water
For more information on the purple pipe

WATER EFFICIENT HARDWARE

As well as star rated dishwashers and washing machines, water can be saved by installing dual flush toilets, water efficient shower heads, and taps with aerators. You may also want to install a small water tank to collect rain water for your veggie garden.

FURTHER INFORMATION
barwonwater.vic.gov.au/residential/saving-water

CLEVER LANDSCAPING

Your garden can help moderate the climate around your house. Deciduous trees can provide shade in the summer and wind breaks from hot northerly winds but let maximum winter sunlight in when they drop their leaves.

Plantings and water elements to the south of the building can help channel, cool and freshen the prevailing breezes as they filter through the house via cross-ventilation. Select indigenous and drought tolerant plant species for your garden. You will find they need very little attention or water once they are established.

Mulch limits evaporation so moisture stays longer in the soil. Soft, permeable surfaces surrounding the house can also reduce summer heat loads and allow for great drainage so as not to over burden the storm water systems.

Consider planting an edible landscape. Fruit trees and a veggie patch are a welcome addition to any home.

TOP 10 THINGS TO TALK ABOUT WITH YOUR BUILDER OR HOME DESIGNER

- ○ Correct orientation of your home on the block to make sure your living areas get free natural light and warmth from the winter sun.
- ○ Correct eave design or sun-shading to the north and west to protect your home from over heating in the high summer sun.
- ○ Allow for cross-ventilation opportunities to drag cool breezes through your home to allow for natural cooling.
- ○ Upgrade your insulation to R4 in the ceiling and R2.5 in the walls.
- ○ Upgrade from single glazing to double glazing.
- ○ If possible, include thermal mass as part of your design, particularly in your living areas.
- ○ Ensure all windows, doors, skylights and vents are weather sealed to stop drafts.
- ○ Install solar hot water.
- ○ Install reverse ceiling fans to push hot air down in winter.
- ○ Use energy wisely by installing energy efficient lighting, choosing energy efficient appliances, heating and cooling systems.

FURTHER INFORMATION

yourhome.gov.au
Extensive technical manual

yourhome.gov.au/buyersguide
and design checklist

resourcesmart.vic.gov.au/sustainable_housing
Look at Design Build Live interactive link

livinggreener.vic.gov.au
Information, how-to's and rebates for sustainable living

hia.com.au
Look at the GreenSmart guidelines

thinkbrick.com.au/designing-for-climate
Look at the Climate Design Wizard

yourfuturehome.com.au
Information and checklists for building a new home

awa.com.au
Check out the latest information on window technology

wers.net
Window Energy Rating Scheme

barwonwater.vic.gov.au
Saving Water at Home and info on recycled water

greensavingscalculator.com
Calculates money saved by installing green features

ecospecifer.com.au
Specifying green products

www.geelongaustralia.com.au
For information about Geelong and council services

www.geelongaustralia.com.au/armstrongcreek
For information about the Armstrong Creek growth area

www.futureproofinggeelong.com
Showcasing sustainability leadership across the Geelong region

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