

Building a Sustainable House

A brochure to help inform the design of your new house or retrofit of your existing house.

Site Planning

Good house orientation, combined with a well considered layout and design, can substantially reduce household energy consumption and costs, while improving the comfort of your home.

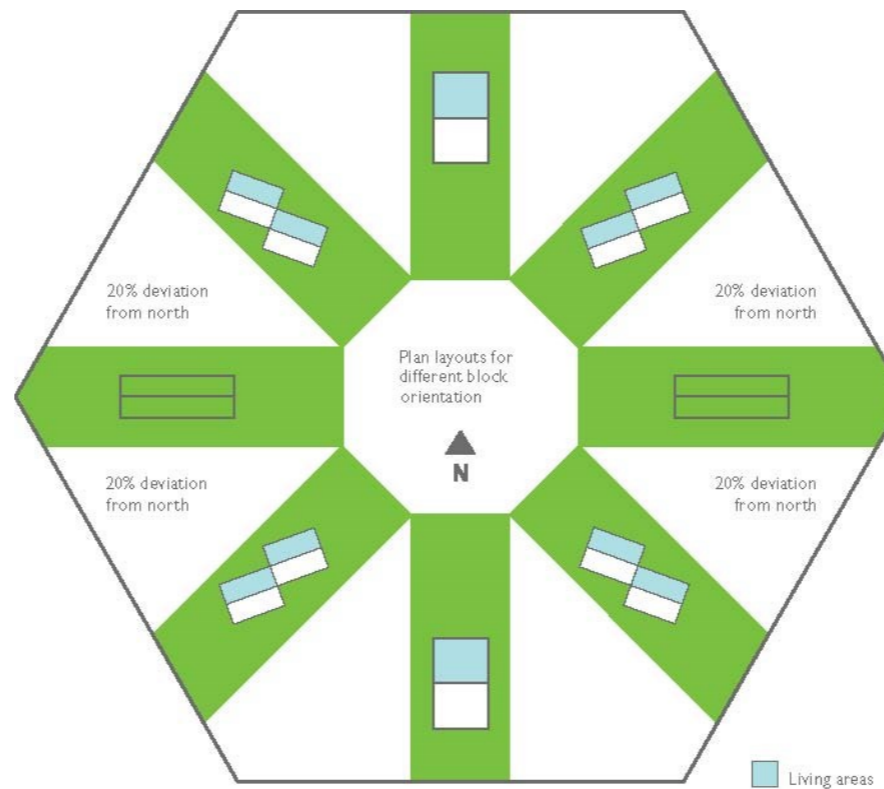
Orientation

If your house has a longer north-side orientation, greater opportunity exists to take advantage of winter sun for warmth and natural lighting.

While longer north-side elevations are ideal for maximum energy efficiency, the diagram below shows how any house can be positioned to capture the benefits of passive solar design.

House Layout

North-facing rooms are ideal for living areas such as family rooms, lounge rooms and kitchens. Grouping similar rooms allows for easier control of heating and cooling within your home. Similarly, grouping wet areas (bathroom, toilet, laundry) can reduce plumbing and hot water costs.



Windows and Ventilation

Correctly placed windows and well planned natural ventilation can substantially reduce cooling and heating costs.

Minimise windows in east and west elevations to avoid excessive heat gain, as these windows are exposed to morning and afternoon sun for longer periods of time. Eaves and verandas on the east and west side of your house will also help protect against unnecessary heat gain.

When planning door and window locations for your house, consider which directions breezes come from and place openings in these areas. Locating windows opposite each other will allow air to flow more readily through your house.

If possible, windows on the prevailing breeze side of the house should be lower than those on the opposite side to assist natural air flow.

Insulation

Roof-space insulation is a great way to improve your house's energy efficiency, and is also a Building Code of Australia (BCA) requirement for all new houses. Consider insulating other parts of your house, for example insulating walls (including the cavity in double brick walls) will help prevent heat gain in summer and heat loss in winter.

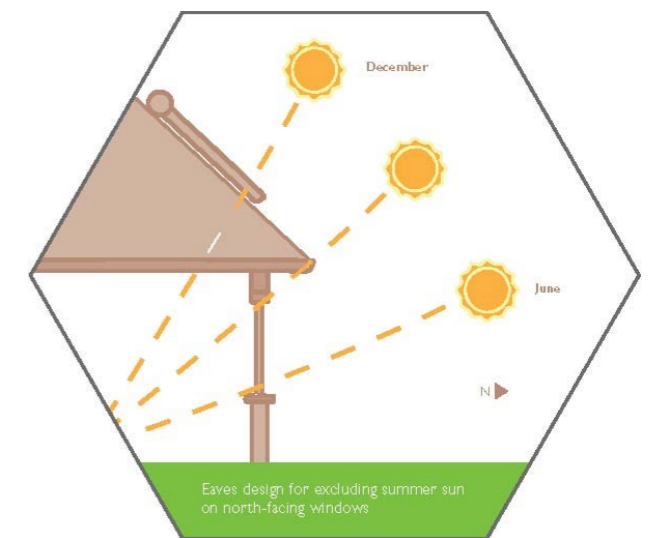
When selecting insulation, compare the 'R' values, which are a measure of resistance to heat transfer. Generally the higher the 'R' value, the greater the resistance.

Sealing

External doors should be sealed to keep cool air in during summer and out during winter. Window frames should also be well sealed to minimise heat loss in winter and heat gain in summer.

Floors

Concrete and tiles store heat longer than timber floors, and are very useful in absorbing winter sun on the north side of a house when the sun's rays penetrate from a more northerly angle.



Colour and Exteriors

Light colours reflect heat while dark colours absorb it. Combined with insulation, lighter roof and wall colours can significantly lower the internal temperature of your house – a particularly important feature in the South West's temperate climate.

Shading and Landscaping

Trees that lose their leaves in winter are great for letting the sun into your garden and house. Plant them on the north side to enable solar access in winter while providing shade in summer.

Permaculture principles offer a valuable guide for designing sustainable gardens, incorporating organic food production as well as enhancing local ecosystems. Use native species around the house to reduce heat gain. Plants that are common to your soil type and local area provide habitat for native animals and require less water and nutrients.

Material Selection

Carefully analysing and selecting environmentally friendly materials in the construction phase can significantly improve the health, comfort, cost effectiveness and energy efficiency of your home. Also consider the lifecycle of materials and the processes adopted to extract, process and transport them to the site. Informed decisions about materials and construction systems can reduce the environmental impact of a home without adding to the cost. The following guiding principals should be considered:

Where possible, use fully recycled materials or materials with recycled content.

Understand how chemicals used in the manufacture of some materials might affect your health.

Consider how and where the materials are sourced and the impacts this causes.

Design and build for de-construction, re-use, adaptation, modification and recycling.

Appliances

Enhance the sustainability of your house by using energy efficient appliances. Check with a builder or your local Council for the latest requirements for shower heads and toilets, in accordance with the Building Code of Australia.

Gas-boosted solar hot water systems or heat pump systems save hundreds of dollars on energy bills annually, compared to standard electric systems. Consider star ratings when purchasing appliances.

Solar Power

Sufficient sunlight falls on Australia to provide the nation's total energy needs. Solar power systems use solar photovoltaic panels on the roofs of buildings to capture the sun's energy to generate electricity cleanly and quietly. Solar power technology has been used to power homes for many years, and now a growing number of Australian households are looking to it as an affordable option for reducing power bills and generating clean electricity.

A range of government rebates and support schemes are available for the installation and ongoing use of solar photovoltaic panels, details of which can be found on the relevant websites listed on the back of this brochure.



Water Consumption

Water is our most precious natural resource and one that is often taken for granted. There is a growing awareness of the importance of water to our survival and its limited supply in a place as dry as Western Australia. Cutting back our fresh water use can significantly reduce household water bills and demands on public water supply.

Rainwater Tanks

Collecting water from the roofs of buildings and storing it in rainwater tanks for later use directly and significantly reduces our reliance on water storage dams and other expensive alternate technologies (for example, desalination plants).

Collected rainwater can be used for toilets, laundries, pools, gardens and even for drinking if treated correctly (contact the City's Environmental Health Department for detailed information regarding drinking rainwater). Using rainwater is free and can greatly reduce your water bills.

Due to recent innovations in water tank design, it is now possible for the majority of households and buildings in cities and towns to be self-sufficient in water supply – not just in rural areas. Rainwater tanks now come in many shapes, sizes and materials, and as both aboveground and underground tanks. Even relatively small residential lots can use rainwater tanks, for example by fitting under eaves or below a house or deck.

Government rebates and support schemes are available for water tanks, details of which can be found on the relevant websites listed on the back of this brochure.



Greywater

Wastewater from non-toilet fixtures such as showers, basins and taps is known as greywater, and with proper treatment it can be used for laundries, toilet flushing and irrigation of plants and lawns. Recycling greywater benefits the whole community, as it reduces the amount of wastewater entering sewers or on-site treatment systems.

Reusing greywater can potentially save thousands of litres of fresh water usually used every year for watering gardens or lawns – especially beneficial during long periods of hot, dry weather when water conservation is essential. The nutrients found in greywater, including phosphorus and nitrogen, are an excellent food source for a wide range of plants. When treated correctly, greywater can even be used to irrigate food-producing plants.

Only water from the bath, shower, washing machine and bathroom sink can be used as greywater. Kitchen wastewater contains fat, oil and food residues which pose a potential health and environmental risk.

The Western Australian Department of Health provides a large list of suitable greywater reuse systems approved for domestic use. A landowner wishing to install a greywater recycling system must first submit an application to the City of Busselton Environmental Health Department for assessment, in compliance with council and state government requirements.

Government rebates and support schemes may be available for greywater reuse systems, details of which can be found on the relevant websites listed on the back of this brochure.

Resources

For further details regarding sustainable housing information and Government initiatives please refer to the following websites:

<https://www.synergy.net.au/>

<https://www.yourhome.gov.au>

<http://www.yourenergysavings.gov.au/>

<http://www.ata.org.au/>

http://healthywa.wa.gov.au/Articles/U_Z/Water-tanks-on-your-property

<http://www.busseltonwater.wa.gov.au/>

<https://www.watercorporation.com.au/>

<http://www.environment.gov.au/>

Acknowledgements

Information used in preparing this brochure was supplied by the following sources:

City of Cockburn Sustainable House Brochure

Sustainable Earth Technologies

<https://www.smartwatermark.org/>

<https://www.yourhome.gov.au>

Rising greenhouse gas emissions, the cost of energy use, concerns about the impacts of climate change and global financial uncertainty means that we all need to make changes to the way we live. To help you adjust, we're suggesting ways to create the most sustainable home possible.

Sustainably designed homes use less energy and save you money by reducing the need for artificial heating, cooling and lighting. A sustainable home provides for naturally comfortable living and many aspects of sustainable design don't need to be expensive.

The City of Busselton is committed to sustainable development. In line with this commitment, we encourage you to use the principles outlined here in the design and construction of your home.

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