



Building a sustainable home

Choose wisely, build right, live well

April 2024



Part of Energy Queensland

Climate smart

a guide to a low energy home

Energy smart

a guide to a low energy home

Water smart

a guide to designing a water smart home

Nature smart

a guide to designing a nature smart garden

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More and more Queensland residents are embracing sustainability into their lifestyles.

Never before has it been more important to think about ways to reduce your on-going household costs and future proof the biggest investment you will ever make.

The wise choices you make today will determine how well your home copes with your local climate as well as having a significant impact on the ongoing energy and water costs of your new home.

This booklet provides advice on simple choices to help you make your new home more sustainable and cheaper to run.



Making sense of it all

As household costs rise, the need to live more sustainably has never been greater. The good news is that there are many ways you can save on your household electricity and water bills. A very effective way to help you minimise the impact of these cost increases is to choose an energy efficient home design.

These days there are rules in place to increase home energy and water efficiency. All new homes in Queensland must have a seven star energy rating or better. Water saving shower heads and water taps are mandatory and appliances such as air conditioners must now meet higher energy efficiency standards.

This booklet informs you of a range of choices available that can increase your home's efficiency, and in turn, reduce your home's energy costs.

Whilst some of the recommendations in the booklet will not cost any extra, some of the choices you make may cost a little more – we ask that you weigh those decisions against savings down the track. These are one-off expenses that can be implemented in the most cost effective way at the building stage to ensure you minimise your ongoing energy costs.

Buyers are becoming more aware of the long term cost of energy, so an inefficient design could affect your property's value in the future. Houses built right today are already showing an improved value for each added energy rating star.

The wise choices you make today will affect your future cost of living and home value, as well as the way you use and enjoy your home.



Choose wisely

To keep your home comfortable and your energy bills down, consider the following options.

Orient your home correctly

Simply orienting your living areas and having cross ventilation to capture the summer breezes can reduce your reliance on air conditioning. This is especially important in tropical or humid areas. Also, locating your main living areas on the north-eastern side of the home will minimise the impact of the hot afternoon sun and allow you to maximise warmth from the sun in winter months. If you are unable to orient your house in this way, there are a range of other measures that you can take to help compensate.

Choose light colours

Light colours reflect the sun, while dark colours absorb its heat. Carefully place your hand on a dark coloured car in summer at midday and then do the same on a white car and you will feel the difference. The same goes for choosing the roof and wall colours of your house. You may think dark colours look better but they will cause higher temperatures inside your home.

Ventilate and insulate your roof

If not properly ventilated and insulated, your roof can act as one big heater, trapping the heat of the day in your house for longer. This could be an advantage in colder climates, but for the majority of Queensland in summer, it can be like sleeping with a blanket on top of you.

Choose your hot water system wisely

Water heating is one of the biggest energy users in your home, so it is important to choose your hot water system wisely when building. Key things to think about are the number of people in the home, the upfront costs of your hot water system and on-going running costs. Electric storage and gas hot water generally have lower initial installation costs while solar and heat pump units cost more to install but should have lower running costs. If you are installing electric, solar or heat pump, make sure you size the unit to allow it to be connected to an economy tariff or operated to make the best use of rooftop solar - 'solar soaking' (if you plan to install a solar PV system).

Choose your air conditioner wisely

Opt for the highest star rating system that you can afford, knowing that it will reduce your running costs for the life of the system. Also, choose PeakSmart ready models and claim cashback incentives for each eligible unit installed. PeakSmart air conditioners help us to reduce demand on the electricity network during peak times.

Connect to an economy tariff

Economy tariffs are cheaper than standard tariffs, in return for your electricity supply being able to be interrupted temporarily, to help us manage load on the electricity network during peak times. They are suitable for appliances that do not require a permanent supply of electricity - like hot water systems, pool pumps, some air conditioners and electric vehicle chargers.

Economy tariffs costs up to 40% less than standard daytime tariffs. Economy Tariff (sometimes referred to as Tariff 33) is available for a minimum of 18 hours per day. Super Economy Tariff (sometimes referred to as Tariff 31) is available for a minimum of 8 hours per day (generally between 10 pm and 7am).

Even if you choose not to connect appliances to an economy tariff straight away, it's recommended that you instruct your builder or electrical contractor to set up the house wiring so that appliances that could be suitable to go on to an economy tariff are on their own circuit.

Include water saving features

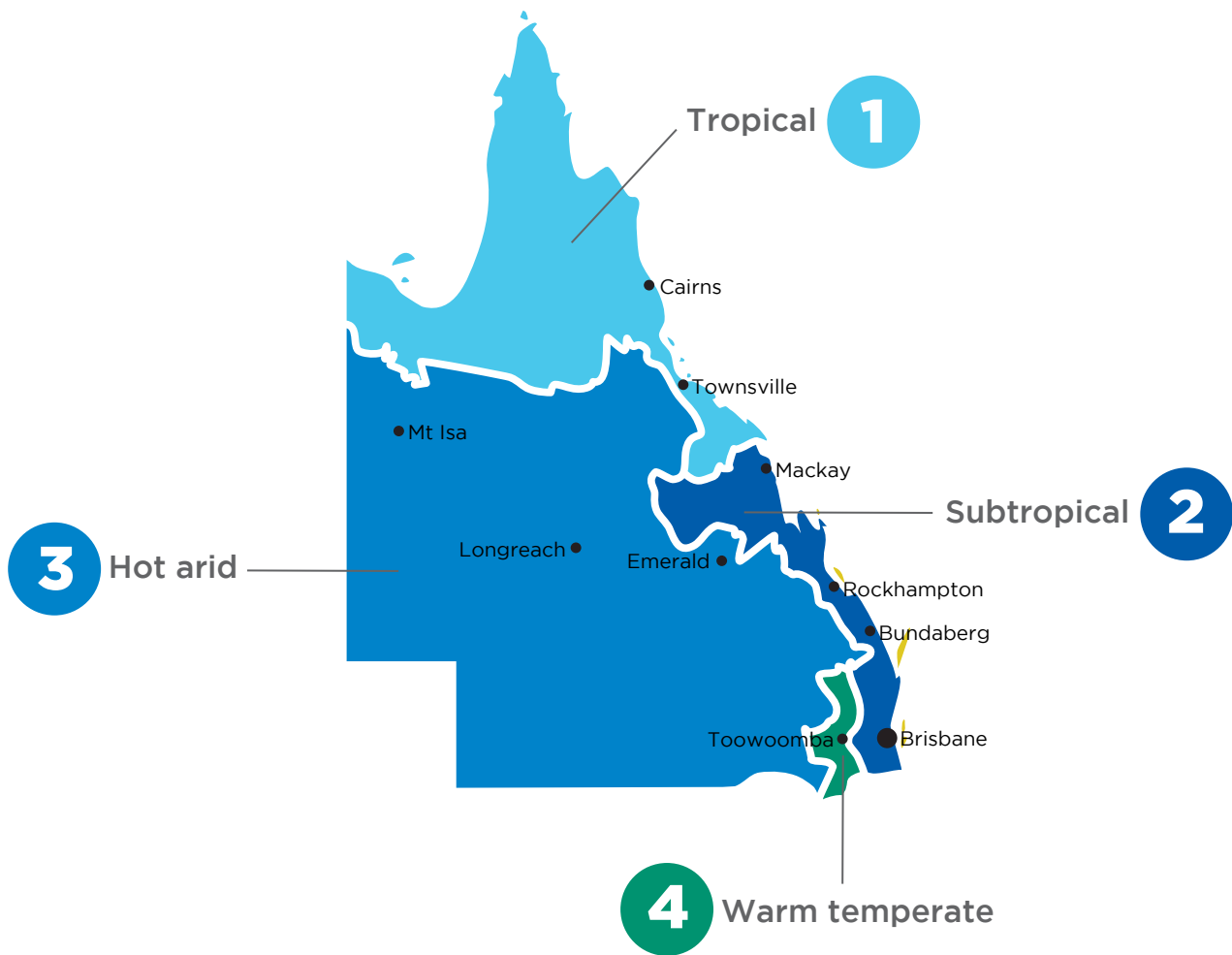
Save water and energy by installing water efficient showers, toilets, and taps. You can reduce outdoor water use by opting for drip irrigation in your garden and choosing drought resistant plants. Consider installing a water tank or greywater system; and if you have a pool, install a cover to reduce evaporation when not in use.

Landscape properly

Correctly locating shade trees, constructing a garden to create a cool zone around your outdoor areas, or using landscaping to shade your western wall can have huge impacts on the livability of your house. Planning and planting the right plants provides more than just an enhancement to the street appeal of your house; it can cool your home as well.

Our climate

Queensland officially has four distinct climate zones known as tropical, sub-tropical, hot arid, and warm temperate. To help you understand what each climate zone means for making a house more comfortable to live in, here's a summary of the zones:



Zone	Location	Description	Average January mean temperature	Average July mean temperature
Tropical	The coastal zone north of Mackay	This zone is characterised by hot humid summers, warm winters and high summer rainfall.	31.5°C	25.7°C
Sub-tropical	The coastal zone south of Mackay	This zone is characterised by warm humid summers and mild winters.	29.4°C	20.4°C
Hot arid	Western Queensland	This zone is characterised by hot dry summers and cold winter nights.	35°C	19.5°C
Warm temperate	Darling Downs region	This zone is characterised by cool winters and warm summers.	27.6°C	16.3°C

Climate smart



Climate smart

In Queensland, in summer, your priorities should be to minimise solar radiation and capture air movement; with openness and shading the dominant characteristics of a well constructed building. In winter, particularly in temperate, hot arid and southern sub-tropical regions, your priority should be to reduce heat loss from the building and take advantage of the winter sun.

All of these climate-responsive design features can be included into the design of your home to create a comfortable living environment and reduce your reliance on air conditioning. And regardless of the orientation you eventually choose, at the planning stage you also have the option of re-arranging the rooms in your home to maximise natural cooling.

Cooling breezes

Depending where you are building, prevailing breezes can come from various directions. Cooling breezes are important for cooling the home during hot or humid months so it is important to make sure you get your new home orientation and room placement right.

Sun movement

Because Queensland is such a vast state, depending on where you are located, the sun's position in the sky can vary considerably. For example, at Townsville's latitude the sun in mid-summer rises about 20 degrees south of east, moves almost overhead at midday and sets about 20 degrees south of west (Figure 1, left hand side). This directs the worst of the heat on the south-eastern, southern and south-western aspects of the house for several hours in the morning and afternoon.

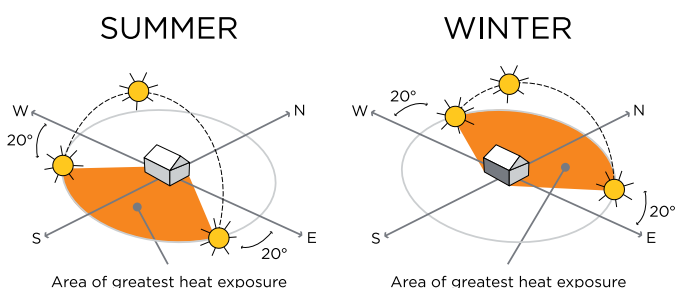


Figure 1: The picture on the left shows the daily path of the sun in the summer in Townsville and the picture on the right shows its path in the winter.

By mid-winter, the sun has moved to the northern sky. It then rises about 20 degrees north of east, moves to about 50 degrees above the horizon at midday and sets about 20 degrees north of west. Winter warmth therefore falls mainly on the north-eastern, northern and north western aspects through the day (Figure 1, right hand side). Figure 2 shows the sun path for Toowoomba in summer and winter.

Conversely in Toowoomba, the mid-summer sun rises about 30 degrees south of east, and by midday moves slightly past directly overhead, into the northern part of sky (figure 2, left hand side). Therefore summer sun impacts mostly on east and western orientations, and any unprotected northern walls. It then sets about 30 degrees south of west. In mid-winter, the sun rises around 30 degrees north of east, and sets around 30 degrees north of west (figure 2, right hand side). Winter warmth gains are predominantly on the northern side, with some early and late gains on the north east and north west orientations.

Even if you can't re-orientate your house, you may be able to re-arrange rooms to the best energy efficient arrangement.

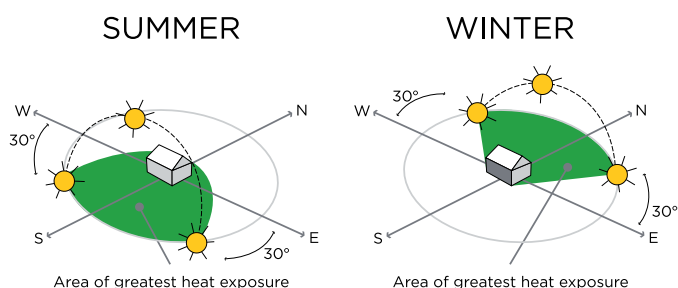


Figure 2: The picture on the left shows the daily path of the sun in the summer in Toowoomba and the picture on the right shows its path in winter.

Positioning your home

You can position your home to take advantage of passive cooling on most allotments regardless of their size, shape and orientation.

Your home layout should consider the following:

- position your home as close as possible to the southern and western boundaries of your block. This will leave the northern and eastern sides for gardens and outdoor living. These areas are cooler in summer and warmer in winter
- place garages, laundries and bathrooms (rooms where the least amount of time is spent) on the hot western side and living areas on the cooler north eastern side
- try not to locate large windows on the western side of your home, if you must, ensure they are very well shaded outside and can be sun-blocked from the inside
- take care not to reflect light and heat into your new home from large landscaping features or light coloured pathways next to the building
- position your main living areas and bed rooms to catch the cooling breezes in summer and design for cross ventilation - it will ensure you draw the breeze into your home.

Shading your home

Shading the building and outdoor spaces will reduce the temperature inside your home. You can use artificial shading (such as awnings and full length verandas) and natural shading (plants and shrubs strategically placed), or combine them (pergolas with vine cover or green walls).

Consider:

- wide patios to provide shade to the internal rooms
- shading western walls
- making sure your roof eaves are at least 600 mm wide (900 mm is better)
- shrubs / greenery to provide natural shade
- window tinting, especially for western windows.

FACT

When sunlight passes through glass into your home it is absorbed by building materials and furnishings, which then re-radiate heat. The heat becomes 'trapped', just like in a greenhouse, resulting in higher temperatures indoors compared to outdoors.

Building materials and construction

It's important for you to consider the thermal property of your building materials - the extent to which they absorb and hold heat and transfer it into your home. In tropical or sub-tropical areas, to reduce the heat that your home absorbs, it is preferable to choose materials that:

- release unwanted heat quickly once the sun has gone and the temperature has begun to cool down - e.g. lightweight wall materials such as timber and fibro-cement sheeting
- keep out the heat during the day by using appropriate insulation and light colours for roofs and external walls.

TIP

Make sure you get the orientation right. Otherwise, your new home's overall efficiency will be limited, even if all other energy efficient and sustainable criteria are met.



FACT

Cooler surfaces translate directly to cooling energy savings. Comparative studies identify 20 to 40 percent cooling energy saving potential relative to design.

For temperate climates, characterised by cooler days and cold nights in winter months, materials with high 'thermal mass' can be beneficial. Concrete block walls exposed to the sun can hold significant heat then release it in the home during the night. However, if block walls are shaded throughout the hottest parts of the day they remain cool and can have a cooling effect.

Areas of thermal mass adjacent to the house such as driveways and nearby roads will re-radiate heat and add to the heat load on your home if not properly shaded, so consider this when you set your house. You could also consider a thermal 'break' between the exposed driveway and the house slab.

Your roof

Your roof is the largest surface area in the home and is exposed to the sun all day. Inevitably it will get hot.

Consider:

- light colours (white is best) to reflect heat and keep it out of your home. Dark colours absorb heat and pass it into your home
- steel roof sheeting, such as corrugated iron, loses heat quickly as soon as the sun stops shining on it. Installing the right insulation under the roof sheeting helps to significantly reduce heat entering the home from the hot roof during the day and reduce heat escaping from your home at night.

FACT

Roof tiles absorb heat during the day and then slowly re-radiate it into the home at night. If you choose tiles, make sure to use reflective foil under the tiles to reduce the slow release of heat into your house overnight.

Your roof space

Poorly ventilated roof spaces will get hot and then super-heat the air in the roof space, resulting in your living space getting hot too.

Ask your builder how your roof space can be ventilated to remove or reduce heat buildup. Options include eave vents, ridge vents and mechanical ventilation. These days there are locally made, low profile ventilation options available. There is an increasing number of solar powered roof vent systems available whereby a small solar panel powers a fan that sucks the hot air out of the roof space.

FACT

Poorly ventilated roof spaces get incredibly hot and can reach up to 70°C. When the sun hits the roof it transfers heat down and super-heats the trapped air in the roof space raising the temperature in your living spaces.

Your insulation

In summer months, insulation is one of the most important factors in helping reduce the amount of heat entering the home and also helps seal cool air in. In cooler climate zones, insulation is critical to keeping the dwelling warm by reducing heat loss from inside the building and retaining any warmth from the sun. A well designed insulation system can pay for itself in electricity savings in two to three years, and you can keep reaping the benefits for as long as you live in the home.

There are two types of insulation; reflective and bulk.

Reflective insulation is placed immediately under the roof cladding and reflects heat away preventing 95% of infrared "radiant" heat from entering the ceiling below.

Bulk insulation is installed directly on top of the ceiling and reduces the amount of heat transferred from the roof space into the home. It works by resisting the amount of heat flow between the hotter air in the roof space to cooler air inside the home.

The best solution for tropical, hot-humid, or sub-tropical climates is to put reflective insulation under the roof tiles or sheets and bulk insulation directly on the ceiling. However, care should be taken in warm climates to reduce unwanted heat gain in summer through walls and windows which could then be trapped by the bulk insulation on the ceiling.



FACT

Outdoor living areas on the western side of a property will receive the worst of the afternoon sun and should be avoided if possible. Wide eaves or shading on the western side of your home will reduce the amount getting into your home.

Your outdoor living

One of the great advantages of the Queensland lifestyle is that we can spend a lot of time outdoors and most homes have an outdoor living area.

When locating your outdoor areas, consider:

- the best locations for outdoor living areas are on the north and north-east sides of the house. These areas get the prevailing breezes making them the coolest spaces in summer and are least affected by the low-angled sun in the hot afternoons
- east and south-east locations are also good for outdoor living spaces as they often receive direct breezes and will be fully shaded in the afternoons. It's important to think about shading these spaces from the low, early morning sun.

When designing outdoor living areas, consider:

- two outdoor living areas – one to use in summer and one for winter
- a high ceiling will create a cooler environment for you and your family by promoting a feeling of airiness, allowing the hot air to rise and cool air to circulate. For this to occur, the ceilings (or underside of roofs) of outdoor living areas should be at least 2.7 metres high
- stacking slider doors which retract onto each other (leaving as much of the wall space open as possible) are a good solution for indoor living areas adjoining outdoor spaces. These days, you can still get insect screens to use with bi-fold or stacked doors.
- use ceiling fans in your patio area to circulate air on still days
- natural shade is important to reduce heat radiating into your home. Why not plant a shade tree or garden close by – the air under shady trees and shrubs is cooler!



Energy smart



When you look at which home appliances are driving up your power bill, the usual suspects turn up time and again. Left unchecked, these appliances can quietly drain your energy and burn a hole in your pocket, without you noticing. Understanding how to choose the right appliances for your home and using them efficiently means they'll work better, last longer and save you money.

It's important to be sensible about the way you use electricity to help save on your electricity bills, so here are some ideas:

Hot water

To choose the system that is best for you, first estimate your hot water needs. This is usually based on the number of people that live in your house. You can also estimate this based on the number of bedrooms you are building - 250 litres or 315 litres are the most common sizes.

- **Electric hot water** - Electric hot water systems are usually the cheapest to install and if connected to an economy tariff (Tariff 31 or 33), can help manage your electricity costs. If you are planning to install a solar PV system, you can maximise the value of your investment by setting it to heat water when your solar PV system is generating electricity. This will offset the need to use electricity from the grid.

By installing electric only appliances throughout your home, you will avoid additional fees and charges for gas connections.

- **Solar hot water** - With a solar hot water system the sun will heat most of your water. An electric booster can be used on rainy or overcast days, or when your consumption exceeds your stored hot water. For the best value, install a one-shot relay.

A one-shot relay is a smart way to control the electric boosting of the tank, as it will turn the booster off once the water is heated. This ensures that you don't inadvertently leave the booster running longer than necessary. Connecting the booster to Tariff 33, will save up to 25% on electricity running costs[#].

[#]Based on latest retail electricity prices.

- **Heat pumps** - Heat pumps are a low-cost way of generating hot water, using about one third of the energy of a standard electric hot water system. Make sure you connect your system to Tariff 33 to save up to 25% on electricity running costs.

- **Gas hot water** - There are two types of gas hot water systems: gas storage and gas instantaneous. Gas storage systems involve heating the water in the tank for later use. A gas instantaneous system is more efficient as it only heats the water that you need, when you need it.

If you are considering gas cooking, installing gas hot water can make more sense. However, having gas appliances will mean an additional energy bill with extra standing/daily charges for a gas connection. There will also be the extra cost during construction for gas pipework and outlet(s).

Air conditioning

Air conditioning is expensive and has a large carbon footprint. If you design your home to incorporate the suggestions in the "Climate smart" section of this booklet, cooling your house in summer will be more manageable.

It is a good idea to design your home so the use of fans and open windows can cool it down naturally wherever possible. This will also go a long way to reducing your reliance on air conditioning.

When purchasing a new air conditioner, look for a unit that has the highest star rating for the size of the unit required. We recommend you choose a model that is PeakSmart Ready. PeakSmart Ready air conditioners have been designed to receive a signal from us that tells the air conditioner to cap electricity use for short periods of time. Similar to the economy setting on your air conditioner, the air conditioner continues to produce cool air so you should not notice a difference to your comfort levels. By installing a PeakSmart Ready air conditioner you may be eligible for a cashback from us.

Air conditioners that are PeakSmart Ready must meet Australian Standard AS4755.3.1. Check with your retailer or air conditioner installer to make sure the air conditioner you are thinking of buying is PeakSmart ready, or go to our website and search for 'PeakSmart air conditioner models'.

When you are using air conditioning, having the fans on a low setting will move the cool air and you will notice a greater sense of comfort. This will allow you to set the temperature of your air conditioners higher than what you normally would. This will greatly reduce electricity running costs.

Rooms should be positioned to take advantage of ventilation from the prevailing breezes. And fans should be located in the parts of the room where the main activities are, for example, where people sit to watch TV or eat a meal.

Higher ceilings and the right choice of windows (casement windows and louvres are best) will also help keep your house cool. As air heats, it rises, so if casement windows or louvres are open and located close to the ceiling, this will assist hot air to escape from the house on summer days.

FACT

Air conditioners use much more energy than fans. A ceiling fan is one of the lowest energy consuming devices in your home, with some using as little as 80 watts of energy, compared to over 2000 watts for a living room sized air conditioner.

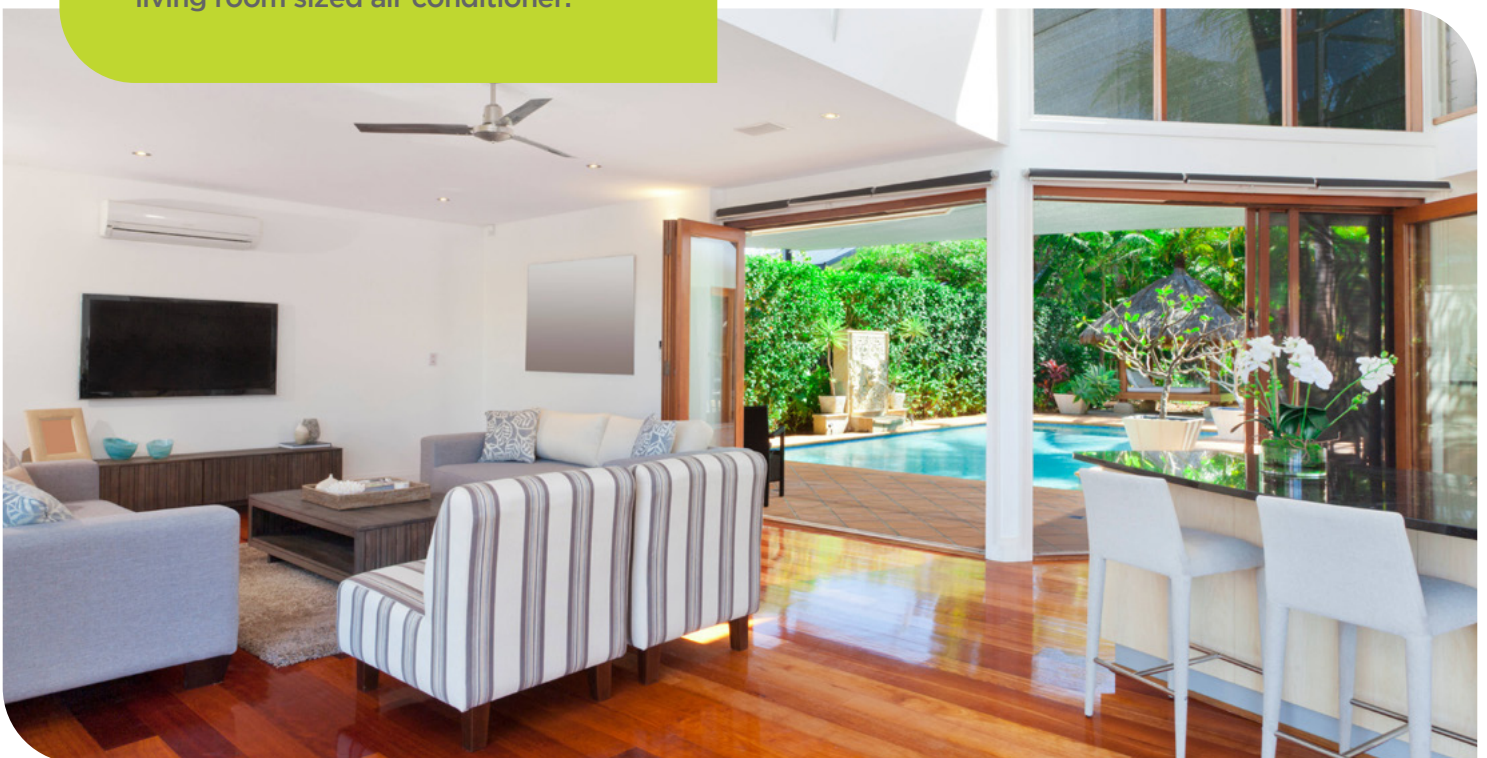
Another way to help keep your new home cool is to include a breezeway in its design. A breezeway is an architectural feature similar to a corridor that allows the passage of a cooling breeze. It could be as simple as a roof connecting two structures (such as the main house and a detached garage, shed or parent's retreat) or it could be closed in with lattice work on either side.

In summer, if the home is well designed, it may be beneficial to keep it closed up during the day to prevent the home heating up from outside temperatures that are hotter than inside the home. If the home can benefit from breezes that are sufficient to keep the occupants comfortable, and/or the outside temperature drops in the evening, it may be beneficial to open windows and use fans. Then, if you do decide to use air conditioning, the internal temperatures should be lower and the air conditioner won't need to work as hard to keep you cool.

Conversely in winter, particularly in cooler climates, it is important to take advantage of the daytime sunlight to warm up the home. It may be beneficial to open curtains and/or windows to take advantage of increasing ambient temperature. Then in the evening, or when the outside temperature drops, ensure the home is closed up and blinds or curtains are drawn, to help keep the warmth inside and reduce the reliance on space heating.

Even with ceiling fans and natural ventilation, high temperatures can make the summer very uncomfortable, particularly in coastal, humid areas. This is when you will be reaching for the air conditioner controller. You can ensure you get the best effect from your air conditioner by designing your interior areas to allow them to be partitioned off. This will contain the cool air for longer.

All new air conditioners must meet a minimum tested average Energy Efficiency Ratio (EER). For best long term results, choose a unit with the highest efficiency.



Lighting

Under current Queensland building regulations (Queensland Development Code 4.1—Sustainable buildings), new houses, townhouses and units must have energy efficient globes installed to a minimum of 80% of the total fixed light fittings, including attached garages, balconies and decks.

Energy efficient lights include:



Compact fluorescent tubes (CFLs), which use about one quarter of the energy that incandescent lights use.



LED lights, which use about half the energy of CFLs and are suitable in most light fittings.

Other lighting types include:



Incandescent bulbs, which are the old-style lights. They have been phased out as they were very inefficient.



Halogen downlights, were popular once, but consume a lot of energy. Direct replacements with LED's are available for most fittings.

Light type	Energy sense	Consider these factors
CFL	Good choice	Limited options for dimming
LED	Even better choice	Best option where halogens are generally used, should last 5 to 10 plus years and they don't heat up
Incandescent	Phased out	Halogen lights that look similar to incandescent lamps are available, but these are still less efficient than CFL or LED lamps
Halogen downlights	Expensive to run	The transformer uses a lot of energy and the lamps get very hot. LED equivalent downlights are now common
IRC Halogens	Better than normal halogens	Infrared coating (IRC) means they use almost half the energy of traditional halogens

Making sense of energy star ratings

When buying new appliances for your home, it makes sense to check the star ratings. Generally, the higher the number of stars an appliance has, the more efficiently it will operate. The kilowatt-hours used by the appliance will also be on the label. By comparing this measure between appliances, you can assess which will use the lowest amount of energy, if used in a similar way.

Fridges

Refrigerators and freezers can account for a large amount of electricity used in some households.

There is a big difference in energy consumption between the best and worst models for many types of refrigerators. In some cases, the best models use only half the energy of a similar, less efficient model.

Decide on the size, type and features you want and don't buy something that's too big for your needs. If you're not keeping a fridge at least two thirds full, or a freezer at least three quarters full, it's probably too big and wasting energy.

Washing machines

The standard energy labelling test for clothes washers specifies a warm wash so the majority of the energy shown on the label is for heating the water. Choose a model that has low water consumption and choose the cold wash option when possible – this saves both energy and water!

Televisions

Televisions can also be big users of electricity in some households so choose an appropriately sized TV for your room. Large screen TVs will generally use significantly more electricity than their smaller screen equivalents. Look for a TV unit with an LCD or LED screen or other energy efficient technology.

FACT

If you choose the highest star rating for all your new appliances you could save hundreds of dollars per year.¹

1. For more information and to calculate potential savings go to energyrating.gov.au

Generate your own power

Installing solar power generation in your new home will reduce your energy costs.

You will need to check with your installer on the latest rebates for solar PV systems.

If you choose solar power, it's wise to ensure the house and roof is constructed to maximise the amount of sun that reaches the solar PV panels.

Solar PV panels capture the sun's energy as direct current (DC). This is then converted to AC power by an inverter.

To get the most benefit from your solar power system, using discretionary appliances (e.g. pool pumps, electric vehicle chargers, washing machines, dishwashers, ironing, etc) while the solar PV system is generating will help reduce your need to purchase electricity from the grid, thereby lowering your bill.

You must apply for pre-approval to connect a solar PV system to the electricity network from either Ergon Energy Network or Energex.

Electric vehicles, batteries and home energy management systems

When you are building your home is the perfect time to allow for the future installation of an EV dedicated charger, home battery system, or home energy management system. Installing the appropriate electrical and communication cables will make installing these technologies easier in the future.

We've got more detailed information on technologies in our The Smart Energy Home guide available on our websites under Renovation and Building

FACT

The energy that your solar PV panels produce is either consumed on-site, or any excess is fed back to the electricity grid. Your electricity bill will show how much energy your solar PV system has exported. Your retailer may offer a feed-in tariff for the purchase of excess electricity you feed into the grid.



Water smart



There are strong connections between water and electricity:

- Most of Queensland's electricity comes from coal-fired power stations which use an enormous amount of water to generate electricity
- Water is pumped to your new home using electricity
- Making clean drinking water is energy intensive.

You can reduce your water consumption by installing a water tank for rainwater, or a grey water system, or both. The water you get from either of these systems can be used to water your garden in the dry season.

You can also reduce your water consumption and save on your energy bills at the same time, by installing water efficient washing machines and dishwashers.

Reusing grey water

Wastewater from baths, showers, basins, laundries and kitchens is called grey water.

Reusing grey water on the garden can significantly reduce water demand for an average home. As well as reducing pressure on drinking water supplies, using grey water has other benefits:

- Lower fertiliser use
- Improved ground water maintenance
- Reclamation of nutrients
- Reduced demand on electricity used to supply drinking water.

A typical Australian household generates an average of 100 litres per person per day of grey water that is suitable for watering gardens. At this rate, over a week a four-person household will generate enough grey water to irrigate 100m² of garden.

To reuse grey water, you will need to install a grey water diversion device and subsurface irrigation. You may also need to install surge tanks and/or pressure pumps if there is insufficient elevation. The diversion device consists of a manual switch and coarse filter which a licensed plumber connects to the waste plumbing of the laundry basin and bath etc. The facility must be installed externally to allow easy access for maintenance.

Council approval is required to install a grey water re-use facility in a new home. Also, it must be installed by a licensed plumber. There are a range of suitable grey water systems on the Queensland Government's approved list. For information about how to get approval, talk to your local Council.

FACT

- **Choose garden-friendly cleaning products. This will keep your garden green and healthy.**
- **Maintain your grey water reuse facilities. This can be as simple as changing or cleaning a filter in the diverter device or pump.**
- **Ensure the grey water application area is undisturbed and preserved in its approved form.**

Pools

If you are putting in a pool you will be able to take advantage of the cooling effect of air passing over the water, so locate your outdoor living next to the pool.

Pool pumps consume a lot of energy. Make sure you talk to your pool installer about putting your pool pump on an economy tariff, particularly if you don't have a solar PV system. This way, the electricity you use will cost up to 40% less. There are also energy efficient variable speed pool pumps on the market that can further reduce your electricity use (look for 5 stars or better pool pumps).

Unlike standard (fixed speed) pool pumps that operate at one speed only, energy efficient (variable speed) pool pumps are the most energy efficient option available as they allow the speed of the pump to be matched to the task being performed (that is, normal filtering, vacuuming, backwashing), and the layout of your pool and piping.

Try to keep the water level of your pool halfway up the skimmer opening. Overfilling the pool stops the skimmer working efficiently and wastes water. You should also make sure you install the correct size pool pump. Check with a pool equipment supplier to ensure the pump is the correct size for your pool.

A pool cover is a clever way to reduce evaporation and the need to regularly top up your pool's water level. Without a cover, most of the water in your pool can evaporate over a year.

Unless the pool is used all year round, it is important to adjust the pool pump running time from summer to winter. For most pools, 6-8 hours/ day in summer or 2-4 hours/ day in winter is sufficient, but speak to your local pool shop for advice on running times suitable for your pool.

Water wise gardens

There are several ways in which you can reduce the amount of town water that your garden needs:

- Use greywater
- Choose water wise plants – many native plants and introduced plants cope well with minimal watering during the dry winter months
- Apply deep mulch to your garden – this improves the soil and reduces water loss through evaporation
- Improve the quality of the soil – choose a suitable soil improver that makes the soil retain moisture better
- Consider a drip irrigation system. It will cut wastage by making sure the water goes only where you need it
- When deciding on a lawn type, go for a slow growing, water saving variety. They have deep roots for drought tolerance and they don't need mowing as much as other varieties.

For more tips about landscaping to conserve water, check out the next section of this booklet – Nature smart.



Nature smart



Landscaping

Landscaping should form an integral part of a sustainable home. It can help shade your home from the heat and promote cooling breezes as well as making outdoor living areas more attractive.

In your private garden, native species are more likely to grow faster, look healthier, require less maintenance, and more importantly provide for native wildlife.

Your local Council may have more information for you on specific plant varieties that are suitable for your area.

Landscaping for shade

Facing north:

- On the north-facing side of the house, trees with a high horizontal canopy and exposed trunk teamed with low shrubs and groundcovers are most effective in providing shade and allowing the prevailing north easterly breezes to cool your house - particularly important in a northern, tropical climate zone. In temperate climates, it is advantageous to allow the northern sun to enter your home and provide a natural warming effect
- Pergolas are also an effective landscaping device to use on north-facing areas. In areas that experience cold winters, having adjustable awnings or deciduous trees can be a good option.

Facing east and west:

- On the west and east-facing side of the home, the sun will be low in the sky, penetrating deep into the garden and onto the unprotected walls and windows of the house
- Landscaping that will offer the best protection will be vertical and dense in form and shape
- Mixed-height planting composed of tall-growing shrubs together with trees or multi-stemmed palms are also useful for shading west and east-facing areas
- If space is limited, vertical structures, such as trellises or screens covered with climbers can be just as effective
- Shade large paved areas such as driveways and parking areas with shade sails, pergolas or shade trees to reduce radiating heat and glare
- A tree can take up to five years to reach the height needed to provide the required shade. Consider installing a sail or similar structure to provide instant shade while the landscaping becomes established.

Landscaping for breezes

- In northern climates, an option is to plant sparsely, or select species that allow breezes to filter through on the property's north-east areas, where prevailing breezes come from
- Position swimming pools and water features to the north or northeast (upwind) of your home and shade where possible. Breezes will increase the rate of evaporation over a body of water, resulting in cooler air passing through the garden and house
- Locate driveways and uncovered car parks (which can get hot) away from the path of the prevailing breeze
- Locate structures, such as garages, carports, sheds and greenhouses away from the path of prevailing breezes.

TIP

Plants give cooler shade than artificial shade structures. This is because of the transpiration and evaporation of water from the plant's leaves. The shade associated with transpiration created by vegetation can lower the temperature by an estimated 3-5°C.



TIP

Landscaping correctly can create a cool micro-climate close to the home. This is because plants affect the air temperature and moisture content (humidity) as well as provide shade.

Star rating system

Rating systems for homes provide a star rating on a scale of 0-10, based on the design features (excluding appliances) and their suitability to the climate zone.

Reference guide

The table below outlines some features that may help your home meet the various levels of star rating. This is a guide only and the actual star rating of any house design can be assessed via the **Nationwide House Energy Rating Scheme (NatHERS)** tools.

Sustainable features	6 star	7 star	8 star	9 star	10 star
R2.1 insulation (on the entire ceiling)	✓				
Reflective insulation	✓	✓	✓	✓	✓
Roof space ventilation	✓	✓	✓	✓	✓
Light coloured roof	✓	✓	✓	✓	✓
R3.5 insulation (on the entire ceiling)		✓	✓	✓	✓
Light/white roof and external walls			✓	✓	✓
Light/white walls and vents			✓	✓	✓
Shading to the western walls			✓	✓	✓
Correct orientation			✓	✓	✓
Breezeway designed for maximum exposure to prevailing breezes				✓	✓
Tinted windows				✓	✓
Fixed building shading				✓	✓
Blocked off western wall				✓	✓
Correct room orientations				✓	✓
Air-flow maximisation					✓

What questions should you ask your builder?

How to plan for an energy efficient home

You can ask your builder the following questions when designing your new home:

- How is my home oriented?
- What is the best orientation for my home design on my block?
- What is the best orientation for rooms in my design?
- Can you re-arrange them to suit?
- Will there be a cost to change my plan to suit the best possible orientation?
- What level of insulation is included in my home design? Does it cover the patio and garage areas?
- What will it cost me to upgrade my insulation type for the house and patio to R3.5?
- What would it cost to upgrade the air conditioning included in my home design to a four or five star inverter model? Is the air-conditioner a PeakSmart Ready model?
- How much will it cost me to upgrade to low-e or mid-tint glass so I can keep my house cooler in summer?
- If I want a white roof so my house is cooler in summer, is there an additional cost for a different trim if I choose it?
- Will appliances such as the hot water heater and pool pump be connected to Economy Tariff 33 or Tariff 31? Alternatively, can these appliances be separately wired to the switchboard to allow connection to an economy tariff in the future?
- What star rating will the house be designed and constructed to – noting that it needs to be a minimum of 6 stars under Queensland Building Regulations.?

For more information

Manage your energy

Go to ergon.com.au/network or energex.com.au and click on “Manage your energy” for lots of useful information on how to save energy at home.

For more on smart technologies to use in your home see our The Smart Energy Home guide available on our websites under Renovation & Building.

The energy efficiency of a wide range of household appliances like air conditioners, washing machines, refrigerators and TVs is rated at energyrating.gov.au. This site also lists minimum energy performance standards for products like hot water heaters and light bulbs.

Sustainable housing

The Queensland Government provides information on sustainable housing regulations that apply in Queensland, and other useful information. Go to hpw.qld.gov.au and search for “Sustainable housing laws for the building industry”.

More detailed information on sustainable housing can be sourced through the Australian Government’s “Your Home” service. Visit yourhome.gov.au to find out more.

Water sense

Visit qld.gov.au and search for “waterwise home” to incorporate water saving principles into your home and garden.



	Ergon Energy	Energex
General enquiries (7am – 5pm, Monday to Friday)	13 74 66	13 12 53
Power outages	13 22 96	13 62 62
Life threatening emergencies only triple zero (000) or	13 16 70	13 19 62
	ergon.com.au	energex.com.au



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