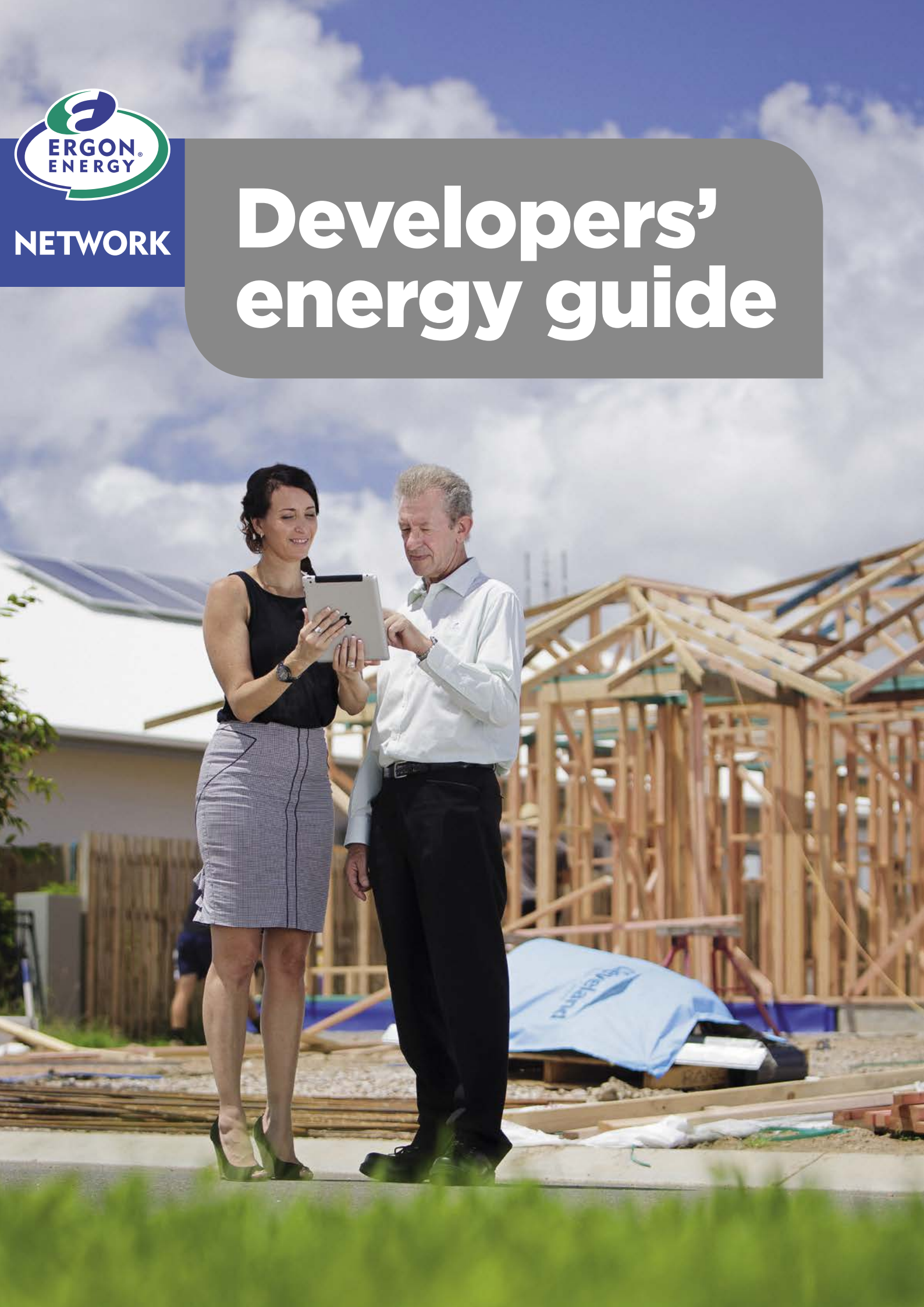
ERGON ENERGY

NETWORK

Developers' energy guide



Introduction

Developers make a number of key infrastructure decisions when designing and constructing a new housing development. One of these is the type of energy to supply the development. This decision will have implications for both the developer and the eventual owners.

A good developer will consider current and future trends in energy supply costs and technologies to "future proof" their homes.

We hope this guide will help you to make informed and smart energy decisions throughout the life of your developments. In this guide we will look at:

What's changing in the energy market

Key considerations when choosing energy supply

The pros and cons of electric vs gas appliances

Measures to "future proof" homes in your developments

A changing energy market

There are rapid changes underway in the energy market, with new and emerging energy technologies likely to significantly impact the way energy is used in homes. While solar power systems that generate electricity for use in homes or to export to the grid are already common, emerging technologies like batteries, home energy management systems and electric vehicles are expected to further change the way consumers use energy.

In recent years there has been a major shift in the way customers use electricity. In response, we are changing the way we charge for electricity, to ensure we can continue to meet everyone's electricity needs into the future for the best possible price.

These changes are in both the structure and pricing of electricity tariffs, with greater emphasis being placed on cost reflective tariffs. One type of cost reflective tariffs is demand tariffs. Demand tariffs include a consumption charge (measured in kWh), plus a charge based on the demand (measured in kW), which the customer's electricity use places on the electricity network during peak periods – usually in the late afternoon/evening.

A smart development will be ready to take advantage of technology shifts and tariff changes. Developers that are ready for these changes will be able to offer homes that are:

- Cheaper to run
- Easier and cheaper to incorporate new technologies ("future proofed")
- Can generate and use their own energy
- Can take advantage of new electricity tariffs.

Energy supply – electric only vs electric plus gas

Developers will consider whether the energy supply will be electric only or electric plus gas. In residential developments, gas (reticulated natural, piped LPG or bottled LPG) can be provided as an alternative energy source for water heating and cooking. Known as “dual fuel”, these developments are common in Queensland, driven by a range of commercial, regulatory and historical factors. For example, for a number of years electric storage hot water systems were banned in new homes under the Queensland Development Code, however, this ban was lifted in February 2013.

There was a time when many consumers preferred gas for cooking, particularly for cooktops. However, improvements in appliance technology and changes in energy prices have made electric ovens and induction cooktops a more attractive and often a lower cost option, making modern electric cooking fast and efficient.

Also, running costs for heating water by electric storage, heat pump or solar PV (electric boosted) is usually cheaper than gas, especially LPG. However, we don’t recommend instantaneous electric hot water systems as they have a very high demand and may not be suitable for demand tariffs.

More and more developers are now considering single fuel, electric only developments. Advantages for using electric appliances only are:

- One energy bill for homeowners
- No gas connection costs
- No ongoing fixed charges for gas supply
- On-site generation of electricity from solar PV and battery storage can be used to run electric appliances
- They are easily incorporated into a smart home and controllable by a home energy management system.

The pros and cons of gas vs electric appliances

Appliance	Pros	Cons
Gas oven and cooktop	Excellent heat control Reach desired cooking temperature very quickly Available during a power outage	Mains gas connection required for piped LPG and natural gas Fixed and usage charges apply for piped LPG and natural gas making gas cooking expensive (bottled gas may reduce fixed charges)
Electric oven and cooktop	Modern electric ovens and cooktops are as fast at reaching desired temperatures as gas Similar temperature control to gas cooktops Electric cooktops are easier to clean	Induction cooktops require magnetic cookware (alloys such as aluminium are not suitable), and homeowners may need to upgrade their cookware
Gas hot water - storage and instantaneous	Instantaneous gas is efficient Instantaneous gas installation costs are similar to electric Instantaneous systems are far smaller in size than gas and electric storage units Lower greenhouse gas emissions than electric systems purely using grid electricity	Extra costs for the mains gas connection for piped LPG and natural gas Fixed and usage charges apply for piped LPG and natural gas (bottled gas may reduce or eliminate these fixed charges but the gas price is usually higher and gas bottles need to be refilled or replaced when exhausted) Can't use electricity generated from solar PV to offset costs Gas costs have the potential to fluctuate in the future more than electricity prices
Electric storage, heat pump or solar (electric boosted) hot water	All systems can be connected to economy tariffs saving up to 42% on electricity running costs Heat pump and solar hot water systems can save up to 85% in electricity running costs [1] Can use electricity generated from solar PV and battery storage Technological innovations are underway that will assist in incorporating electric hot water systems with home energy management systems	Solar hot water and heat pumps have higher installation costs Solar hot water and heat pumps may require more maintenance due to more complicated plumbing and/or moving parts Some heat pumps are noisy and care must be taken when choosing the location for installation

1 Source: Queensland Government **Energy Wise Queensland** and Australian Government **Heat Pump Water Heater Guide for Households** documents.

“Future proofing” new developments

Master planned housing developments are often conceived, designed and implemented over 5 to 10 years and longer. Big changes are taking place in the energy industry around electricity tariff reform, smarter appliances, self-generation through solar PV, battery storage, electric vehicles and home energy management systems. Developers should consider making decisions that enable their customers to benefit from emerging technologies, both now and in the future.

A master planned development that includes smart housing could have a competitive advantage over other developments. These smart developments feature technologies and design approaches to make homes more comfortable and use less energy and water. Following is a list of measures that could be incorporated or specified by developers of smart housing developments, either directly or through partnerships with builders, equipment providers or covenants. Many are simple to implement and at no or low additional cost (refer key energy measures checklist).

Install solar PV

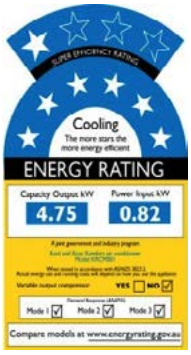
Solar PV is a great way to reduce greenhouse gas emissions while providing savings on the electricity bill. With significant price reductions since 2010, a solar PV system for the average size home now costs between $4,000 and $5,000 after subsidies. Depending on how the electricity generated is used or stored, the average solar PV system could save the householder $500 to $1,000 each year[2] on the electricity bill. For more on solar PV visit **ergon.com.au/solarpower**.

The electricity generated by solar PV can be used in a number of ways:

- **Within the home** – this reduces the amount of electricity purchased from the electricity retailer
- **Exported to the grid** - excess solar electricity not used in the home during the day can be exported back to the electricity grid and sold to the electricity retailer
- **Stored in batteries** - excess generated electricity can be stored in batteries for later use, usually during the evening.

We recommend solar PV be connected to Residential Tariff 11. To maximise the use of electricity generated from solar PV, some appliances like hot water systems and pool filters that are not connected to a Controlled Load (or Economy) tariff, can be programmed to operate between 9am and 3pm. There are a range of devices available to do this, from inexpensive switchboard timers ($50 to $100) to home energy management systems that start from around $300 to $400. These can also be used to maximise the amount of solar energy used in the home.

Install PeakSmart air conditioning



PeakSmart is a device installed in the air conditioner that helps manage peak demand on the electricity network. The majority of air conditioner brands offer a range of PeakSmart compatible air conditioners (which comply with AS4755.3.1), and have done so for the past few years.

PeakSmart air conditioners are able to have a small signal receiver retrofitted. Once the receiver is fitted the air conditioner is able to receive and respond to a signal from the electricity network to temporarily reduce its energy demand. This signal is only sent on the few days of the year when the electricity network is under stress. The impact on the air conditioner's performance and the householder's comfort is negligible as the air conditioner continues to produce cool air (the effect being similar to the air conditioner being in economy mode).

We recommend PeakSmart air conditioners be specified for inclusion in new homes. PeakSmart air conditioners cost no more than "normal" air conditioners. The key benefit for homeowners is they may be able to take advantage of cashback incentives offered by us now or in the future.

Eligible PeakSmart Ready models have a tick in each "mode" box at the base of the Energy Rating label. For more on PeakSmart air conditioning or to see areas where there are cashback incentives available, visit **ergon.com.au/peaksmart**.

2 Based on a 5kW solar PV system producing on average 20kWh/day, of which 50% is used in the home, and Tariff 11 consumption is charged at the 2016/17 rate of 27.071c/kWh.

Connect to Off-peak Controlled Load tariffs

Off-peak Controlled Load (or Economy) tariffs are great for appliances like hot water systems, pool filters and electric vehicles that don't need a constant supply of power.

These tariffs are cheaper because we control the times when power is available. The times of day this will occur may change from day to day and vary in duration.

For appliances where you need power on a constant basis or at a regular time each day, you may prefer to connect them to Residential Tariff 11 which gives you power 24/7.

To take advantage of off peak controlled load tariffs in new homes appliances need to be on dedicated circuits wired back to the switchboard. If you aren't putting these appliances in the home yourself, make sure dedicated circuits are installed at the time of construction to the area where these appliances will be connected.

The type of metering needs to be considered as these tariffs require dual element meters. Make sure you request a dual meter, not a standard meter, during the connection process.

It's best to set up the home for off-peak controlled tariffs at the time of construction, as the upfront costs for a dual element meter are only slightly more than for a standard meter. If a standard meter is installed and the customer subsequently applies to connect an appliance to an off-peak controlled load tariff later, they will be charged for the full cost of having a dual element meter installed and they may have unnecessarily paid for two meters, potentially costing them hundreds of dollars extra.

Get ready for electric vehicles

Whilst still in its infancy, electric vehicles (EVs) are starting to appear on our roads. They are expected to increase in popularity as more models become available and prices come down over the next 3 to 5 years. Whilst some developments now include public charging points, home based charging is considered a necessity so EV owners can charge their vehicles overnight.

EV charging requirements vary between makes and models. In some cases, charging an EV in the home can be done via a standard electric power point (240 volt AC/15 amps). Dedicated EV charging units that offer a faster charge are another option for use in the home. These usually have a higher power draw and require higher rated i.e. thicker, electrical cabling and must meet other electrical safety requirements. In some cases, these fast charge units require a three phase power supply to the home. For more on EVs visit **ergon.com.au/electricvehicles**.

Similar to hot water systems and pool pumps, we recommend EV charging points are on a dedicated circuit to the switchboard. They can then be easily connected to an off-peak controlled tariff in the future for the cheapest charging rates or so the charging can be controlled via a Home Energy Management System (HEMS). It's far cheaper to install a dedicated connection point (usually in the garage/carport) at the time of construction, than to retrofit later.

Note: EV charging points must comply with the relevant Australian Standards and the Queensland Electricity Connection and Metering Manual (QECMM) sections 4.2.5, 6.3, 6.5 and 8.1.

Install a home energy management system

Home energy management systems (HEMS) are smart devices that monitor, analyse and control energy in the home to help home owners keep energy costs down. While building management systems have been common in commercial buildings for a number of years, residential HEMS have generally been restricted to simple home automation systems, and due to high costs, only in high end homes.

As with battery storage and electric vehicles, HEMS are expected to become more prevalent over the next few years as the number of both large manufacturers and smaller companies launch new systems onto the market.

HEMS start from a few hundred dollars for a basic system that will monitor energy consumption and production. More complicated systems that cost $500 to $1000 will also control appliances and provide some automation in the home. Some HEMS are being used to maximise solar use on-site, control batteries, and adjust electricity consumption to match tariff pricing signals.

HEMS are made up of two main components: hardware that is installed in the home (normally in or near the switchboard), and a software application. HEMS transmit and receive signals through the home's Wi-Fi or its own modem.

Typically HEMS:

- Monitor and display energy usage and generation in the home (online/via an app)
- Control circuits or individual appliances to optimise energy use e.g. in the form of "set and forget" timers and/or manually switching appliances on or off via a smart phone app or website
- Act as a gateway device that can "talk" to other Internet of Things (IoT) devices such as air conditioners, smart appliances and door locks.

Install a battery energy storage system

Energy storage in homes is becoming a reality thanks to improvements in battery technology, increasing numbers of suppliers, and reductions in cost. While still a questionable economic decision in most cases, downward price projections indicate many households will consider battery storage in the coming years. For more on battery storage visit **ergon.com.au/batterystorage**.

Battery systems in homes are becoming a reality largely due to the falling costs of solar PV. Solar PV affordability is allowing customers to install large solar PV systems that generate more electricity than can be used during the day. Batteries are able to store this excess energy for use during the evening and night. Depending on the electrical configuration, battery energy storage systems may also be able to provide electricity when there is a power outage.

Currently, a typical home battery system costs between $5,000 and $15,000. The size of inverter (power), battery bank capacity (energy) and battery chemistry (lithium ion being the most common) all impact cost. The design of your home and construction requirements to comply with various emerging standards for installation should also be considered.

Key energy measures checklist

Measure(s)	Optimal time to implement	Who's responsible	Benefit
Install electric ONLY appliances for cooking/ water heating	At time of house design/ construction	Home owner/ builder	One energy bill, no gas connection costs, no ongoing fixed charges for gas, tariff options
Install solar PV	At time of house design/ construction. Can also be done later with little cost impact	Home owner/ builder	Lower electricity bills
Install PeakSmart air conditioners	At time of house design/ construction	Home owner/ builder	Access to CASHBACK* incentive payments now or in the future
Install dual element meter	At time of house design/ construction	Builder	Save additional meter costs
Connect major appliances like hot water systems and pool pumps to dedicated circuits	At time of house design/ construction	Home owner/ builder	Gives customer option to connect to off-peak controlled and time-of-use tariffs for lower electricity bills or manage energy use through a HEMS
Connect major appliances to off-peak controlled tariffs	At time of house construction or during the connection process	Home owner/ builder	Lower electricity bills
Install dedicated circuit for future electric vehicle (EV) charging connection	At time of house design/ construction	Home owner/ builder	Minimal cost if done during construction, "EV ready" home
Install home energy management system (HEMS)	At time of house design/ construction. Can also be done later with little cost impact	Home owner/ builder	Monitor and control energy use to reduce energy costs
Install battery storage or pre-wire for later installation	At time of house design/ construction	Home owner/ builder	Store and use excess solar PV generation during peak times and power outages (if configured to do so)

* Eligible areas only

For more information

There are a range of resources available to help you develop smart housing solutions:

- For information about energy efficient building designs visit **ergon.com.au/renovating**
- For more about solar PV, battery storage, and electric vehicles visit **ergon.com.au/smarterenergy**
- Check out the Australian Government's Your Home – Australia's guide to environmentally sustainable homes at **yourhome.gov.au**.

Also available is The Energy Sense Home guide for customers and addresses key design and construction issues in new housing. You can request copies to give to customers visiting your display homes. You can view **The Energy Sense Home** guide on our website.

For more information about this guide email **demandmanagement@ergon.com.au** or call us on **1300 550 766**, 9am to 5pm Monday to Friday.

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Office of the Customer Advocate

PO Box 264 Fortitude Valley QLD 4006
DistributionCustomerAdvocacy@ergon.com.au

ergon.com.au

Ergon Energy Corporation Limited ABN 50 087 646 062

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