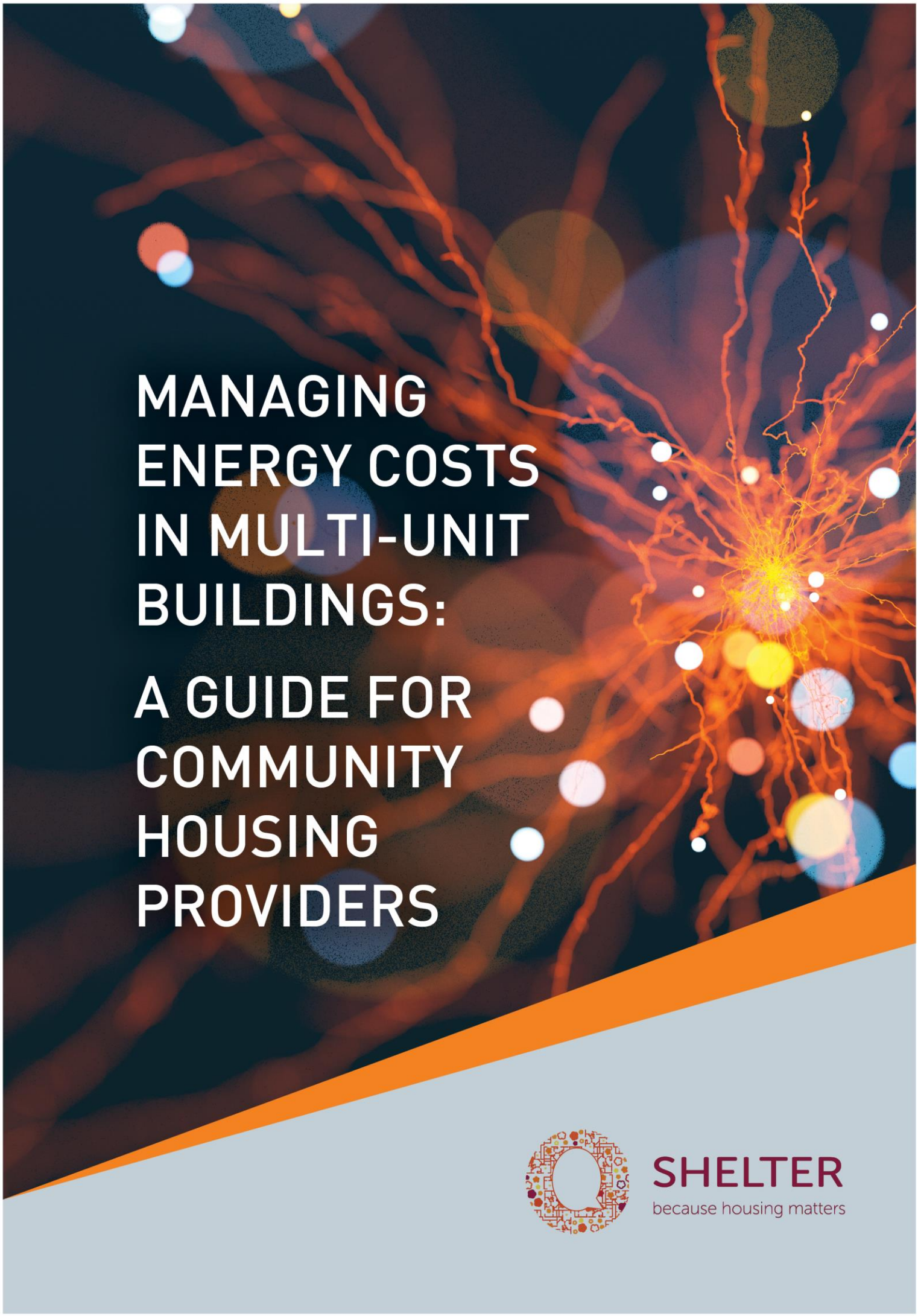

MANAGING ENERGY COSTS IN MULTI-UNIT BUILDINGS:

A GUIDE FOR COMMUNITY HOUSING PROVIDERS

SHELTER

because housing matters

CONTENTS

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The views expressed in this document do not necessarily reflect the views of Energy Consumers Australia.

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OVERVIEW

This guide is intended to assist Community Housing Providers (CHPs) to manage electricity costs in multi-unit dwellings, by setting out options to reduce electricity costs both for tenants and for themselves as landlords, while still maintaining the amenity that electricity provides.

The focus of the guide is on managing affordability rather than on energy sustainability, although using energy more efficiently is likely to improve sustainability.

Energy costs have risen in recent years to the extent that they are now a significant housing cost, particularly for low income households. Low income renters have the added issue of lack of control over their energy supply arrangements, so their capacity to reduce their costs is limited. ***There are many opportunities both existing and emerging for households to reduce their energy costs, particularly solar panels and batteries, but these are unlikely to be available to community housing tenants without the active intervention of CHPs as their landlords.***

Unit blocks, rather than detached dwellings, are examined because of the scope for CHPs, as owners/managers of the buildings, to make changes to the supply arrangements that can assist tenants. However some of the options examined eg for lighting, appliances and heating/cooling are relevant to all dwelling types.

The guide examines options for reducing electricity costs in areas including:

- hot water;
- heating and cooling;
- general appliances including fridges and freezers, washing machines and dryers;
- lighting;
- building design, external and internal paint colour, and shading from trees; and
- solar panels and batteries.

There is also information on electricity-related concessions available to community housing tenants.

Specific recommendations can be found throughout the report and are summarised at the end of this guide.

INTRODUCTION

WHO IS THIS GUIDE FOR?

This guide to managing energy costs has been written specifically for the community housing sector in Queensland. The community housing sector provides rental housing for low-income and vulnerable people, often people who have experienced homelessness.[1] In 2017, there were around 11,700 community housing dwellings in Queensland funded by the state government, another 5,000 dwellings provided by Indigenous Councils, and many more units provided without government funding.[2]

The types of housing provided by the community housing sector range from multi-storey units to detached housing. The age and condition of the housing varies, although a significant amount of new community housing stock (mainly unit blocks) was delivered in the last five years through the Commonwealth Government's Social Housing Initiative.

The guide is targeted to Community Housing Providers (CHPs) who manage unit blocks or other buildings with multiple dwellings. However, some of the energy management options discussed in this guide will also be relevant to other dwelling types.

WHAT IS THE PURPOSE OF THIS GUIDE?

The purpose of this guide is to provide information to CHPs about actions they could take to reduce the cost of energy for both tenants and themselves as landlords. Importantly, cost reduction measures should be possible without losing the amenity that electricity usage provides for heating, cooling, and running appliances. This guide provides general information on the various options available to CHPs and the relevant considerations; however, readers should consider their specific circumstances when considering the options provided.

The energy market is undergoing rapid changes with a range of new opportunities for reducing energy costs beyond traditional energy efficiency strategies and use of renewable energy technologies. The introduction of new tariffs, the emergence of competition in provision of metering, and new business models for the supply of bulk supply of electricity all offer opportunities for cost savings. This guide therefore identifies a wide range of opportunities to reduce energy costs including purchasing more efficient appliances, more careful energy use, better tariff choice, the retrofitting of embedded networks, as well as solar generation and battery use.

This guide focusses on managing the costs of electricity, and less on the costs of gas. This is because gas usage is declining amongst residential users due to its high price.

[1] Productivity Commission: Report on Government Services, 2017 Part G Housing and homelessness. Note: Community housing differs from public housing, which is owned and operated by Government.
[2] Report on Government Services 2017, table 18A.3

WHY SHOULD CHPS LOOK AT ENERGY MANAGEMENT OPTIONS?

Over the past decade, energy costs have risen rapidly, leading to an increased need to focus on energy as a component of living costs for community housing tenants. In 2016, the average household spent $40.92, or 2.9% of their income, on domestic energy and fuel each week. Low income households, by contrast, spent on average of 4.1% of their income, with many households spending considerably more than this proportion.[3] ***Since energy costs are largely unavoidable (and consume a larger proportion of total household income for lower income households), they can be a major contributor to financial stress in households.***

There is also evidence that 'energy poverty'[4] (or energy vulnerability) is growing amongst renters. A recent study based on data from the Household, Income and Labour Dynamics in Australia (HILDA) survey found that Australian rental households were more likely to have trouble paying their energy bills on time (51.33% of households).[5] They were also more often concerned about their ability to pay bills. The 2015 Queensland Household Energy Survey (QHES) asked 1,292 renters and 2,843 homeowners across the state to rate their levels of bills stress. The survey found renters have significantly higher levels of bill stress with 46% expressing they were 'concerned' or 'very concerned' about their bills compared to 36% of owners. The rates of bill stress among renters in regional Queensland were found to be higher still.[6]

A recent Queensland Council of Social Service (QCOSS) study of renters in the energy market highlighted that renters were disadvantaged due to their lower income and lack of choice and control to make changes to their dwelling or supply arrangements.[7] The QCOSS research found the problem extended beyond the efficiency of dwellings and appliances to the ability to take up contemporary energy management opportunitie. For example, they were unable to invest in solar or battery technology, or choosing alternative tariffs that require new metering or the supply type itself (i.e. gas versus electricity, or bulk versus individually supplied units). Their survey of renters found this was also a concern amongst social housing tenants.

[3] Australian Bureau of Statistics. 6530.0 Household Expenditure Survey, Australia 2015-16

[4] There is currently no single agreed definition of 'energy poverty' in Australia. Common measures which are used to indicate energy poverty include an inability to pay bills on time, or where household expenditure exceeds a defined % of income.

[5] Azpitarte, F., Johnson, V., & Sullivan, D. (2015). *Fuel poverty, household income and energy spending: An empirical analysis for Australia using HILDA data*. Fitzroy: Brotherhood of St Laurence. Retrieved from https://www.cuac.org.au/research/external-research/430-fuel-poverty-household-income-energy-spending-an-empirical-analysis-for-australia-using-hilda-data/file

[6] Energex (2015) Queensland Household Energy Survey,

[7] QCOSS with Q Shelter and Tenants Queensland, (June 2017). *Choice and Control: The experiences of renters in the energy market*. Retrieved from https://www.qcoss.org.au/sites/default/files/QCOSS%20Choice%20and%20Control%20-%20the%20experience%20of%20renters%20in%20the%20energy%20market.pdf

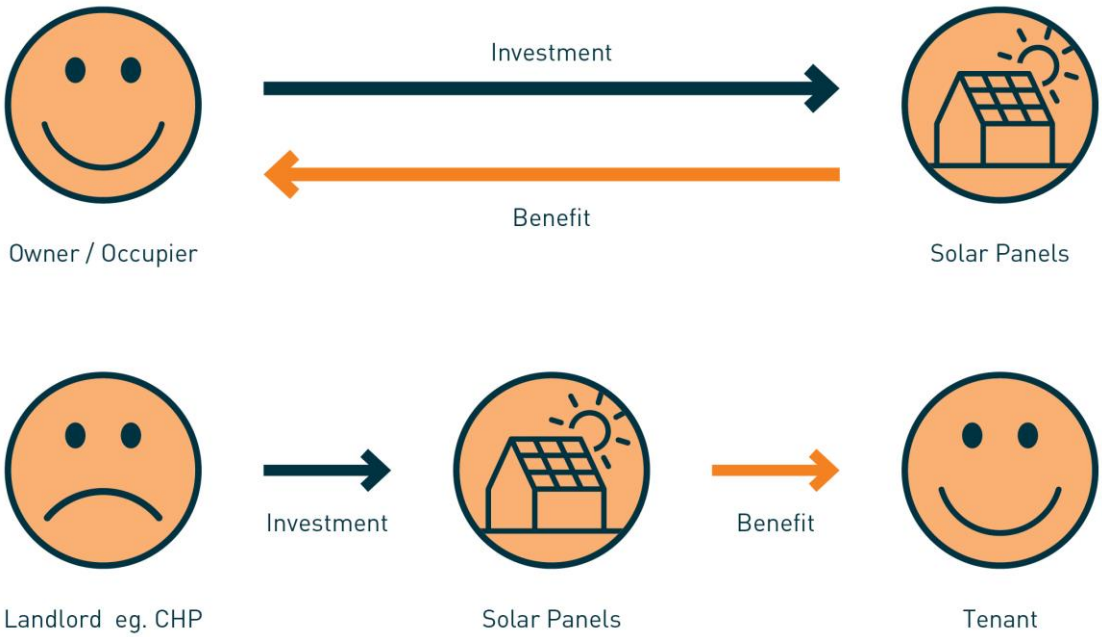
Social housing landlords (for both public and community housing) can play an important role in assisting tenants to reduce their energy costs, and thus make their overall housing costs more affordable. In addition to improving the overall efficiency of buildings and appliances, there are also opportunities for organisations to consider energy supply approaches that are more cost-effective for tenants.

The 'split incentive'

The main reason that renters miss out on improvements in energy efficiency (and associated cost savings) is the 'split incentive', whereby an investment by one party (the owner/landlord) is to the benefit of another party (the tenant). A diagram illustrating the split incentive problem using the example of solar panels is in Box 1 below.

Some of the savings recommended in this guide would accrue to CHPs as landlords, while other savings would accrue to tenants. For example, investments in more efficient appliances and installation of home modifications such as external shading lead to savings for tenants while investments in more efficient insulation may accrue to either (or both) tenants and CHPs, who pay for energy use in common areas.

BOX 1: Split incentive problem



The split incentive is a problem not just for CHPs, but for all landlords and tenants. However, CHPs focus on assisting or providing vulnerable and low-income people with suitable accommodation. As such, the minimisation of overall housing costs for tenants (including both the cost of rent but also the cost of utility services such as electricity) is aligned with this focus.

Therefore, this guide assists CHPs in their consideration of investments where savings accrue to tenants. One example might be where a CHP invests in providing more energy efficient white goods, which are cheaper to run for the tenant.

There are many energy efficiency measures with short payback periods that CHPs could employ to reduce electricity costs. Most of these measures can be incorporated into existing properties, as well as new developments. New-build community housing should be designed to ambitious energy efficiency standards, and the existing stock should be refurbished to improve energy efficiency.

While current building codes impose some minimum standards for housing around energy efficiency, these standards are not onerous and leave significant scope for CHPs to improve the energy efficiency of housing. Building minimum standards relating to energy efficiency are under review, and may be raised in the future[8].

HOW WAS THIS GUIDE DEVELOPED?

As a starting point for this guide, we explored the opportunities for savings in electricity use in two community housing unit blocks. The buildings chosen were located in North Queensland (Cairns) and South-East Queensland (Brisbane) in order to explore the different challenges faced by CHPs across the state. This has enabled the guide to specifically consider North Queensland's hotter tropical climate and the lack of electricity retail competition (Ergon Energy Retail is the sole retailer outside South-East Queensland).

Energy audits were conducted at the buildings, and then energy management plans were developed with options for potential savings.

The energy management plans focussed on identifying sustainable changes in electricity use that could reduce costs while not reducing amenity (cooling, cooking etc.) for tenants or common areas. For example, the benefits of moving to appliances with lower whole-of-life costs as well as tariff arrangements were assessed.

Some of the findings for these two community housing buildings have been generalised and included in this guide. In addition, other potential areas for savings that were not applicable to these particular buildings have been included.

[8] For information on review of the National Construction Code 2019 see https://www.abcb.gov.au/Consultation/Public-Comment-Draft

COMMUNITY HOUSING CONTEXT

The community housing sector faces funding and policy constraints, and options have been examined within this context. There are limited options for CHPs to recover investments in energy efficiency from tenants though rent or service charges. In some cases, tenants may be willing to undertake some of this expenditure themselves. For example if tenants are informed of the benefits, upfront costs are small, and the tenants remain in the property for the medium to long term.

Where properties are head-leased from another owner, often the Queensland Department of Housing and Public Works (DHPW), this guide seeks to provide information to inform discussions around changes or upgrades to the property.[9]

Under the standard lease agreement between DHPW and a community housing provider, CHPs are responsible for responsive and planned maintenance, while DHPW is responsible for upgrades. Depending on circumstances, investments that improve energy efficiency(and thus reduce costs for tenants) may be considered under planned maintenance responsibilities or considered as upgrades. Examples of upgrades could include replacing hot water systems before the end of life or painting buildings a lighter colour to improve thermal properties. It should be noted that planned maintenance programs should include replacement of hot water systems when required, as well as external painting. In these circumstances, agreement will be required between DHPW and the CHP on funding such items.

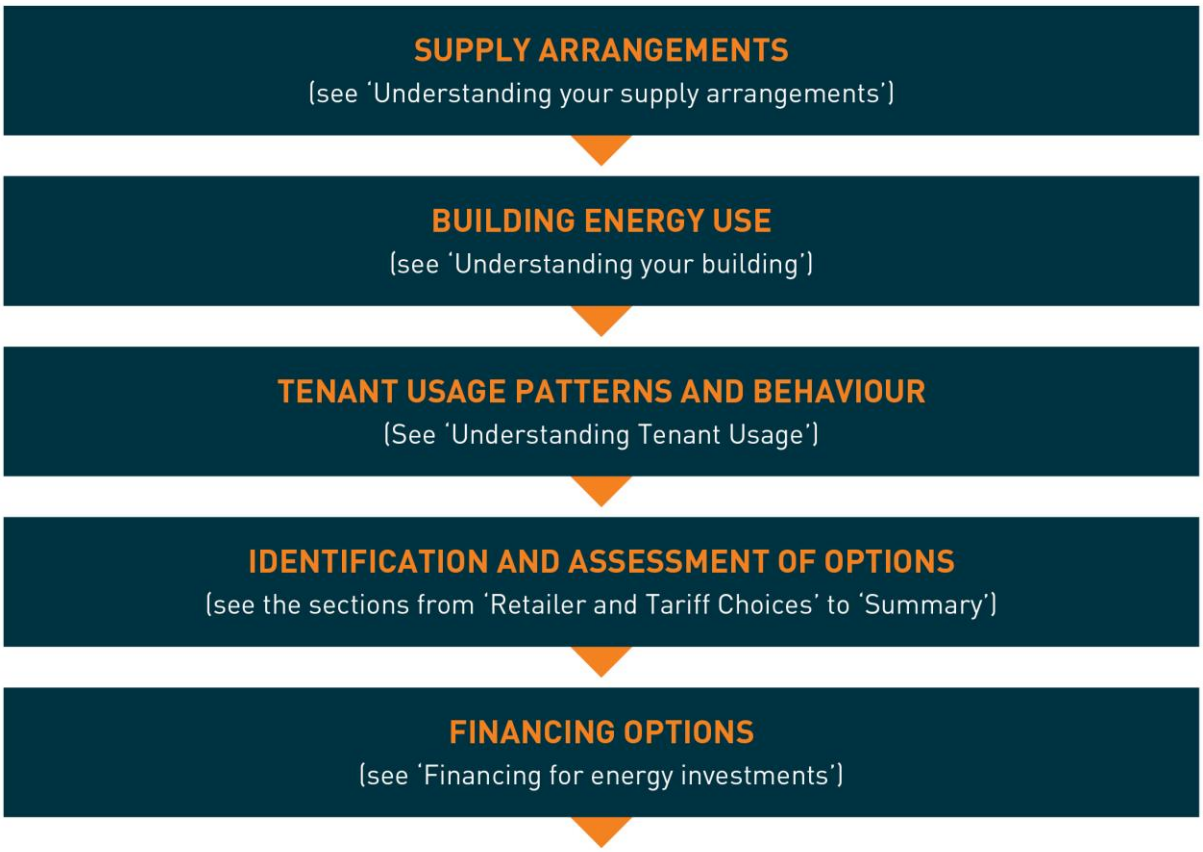
[9] Approximately 6,600 of the properties managed by CHPs are leased from the Department of Housing and Public Works (DHPW).

GETTING STARTED

It is important to understand current supply arrangements and how tenants use energy in order to identify opportunities for savings.

To start the process of identifying savings in energy costs, CHPs need to:

- Understand their existing energy use and specifically the major sources of use in both individual units and common areas;
- Understand what options are available to manage costs;
- Assess energy use by appliances on a whole-of-life basis (where the CHP selects and supplies these appliances);
- Assess whether there are any tariff options that could be cheaper than current arrangements (this includes both the most appropriate tariff options for tenants and the CHP in respect of its own use). These tariff options might include negotiating bigger discounts from retailers; and
- Assess what financing options are available.



UNDERSTANDING YOUR SUPPLY ARRANGEMENTS

There is some baseline information that CHPs should confirm at the start of the energy management process. Where the building was not originally developed or purchased by the CHP, some of this information may not be readily available.

CHPs will need to:

- Investigate and confirm who the current retailer is (CHPs and tenants in South-East Queensland can choose their retailer) and the annual electricity bill.
- Confirm who is responsible for energy use in tenanted units – is it the tenants themselves or the provider?
- Confirm if the tenants are separately metered for their use.
- Determine background information on the building design that affects energy use (e.g. air flow, paint colour, degree of natural shading from trees, orientation of the building).

UNDERSTANDING YOUR BUILDING

Typically, community housing units have the following electricity-consuming equipment:

- Individual or bulk hot water systems.
- Appliances within individual units, including fridges/freezers, televisions, and overhead fans.
- Lighting within units and in common areas.
- Common area appliances such as shared washing machines and cooking facilities (in certain buildings)

Some community housing buildings have solar panels, although this is currently uncommon.

Usually units have individual meters, with separate metering for common areas. Some buildings have common metering for both units and common areas. Supply arrangements at community housing units include:

- Tenants having their own supply arrangements and their own meter, with the CHP having its own supply in respect of common area use (this is the most common situation);
- The CHP providing bulk supply to some or all tenants through a bulk meter;
- Tenants responsible for hot water through their metered use, or the CHP responsible for hot water supply through a bulk hot water supply.[10]

These arrangements are illustrated in Figure 1 below.

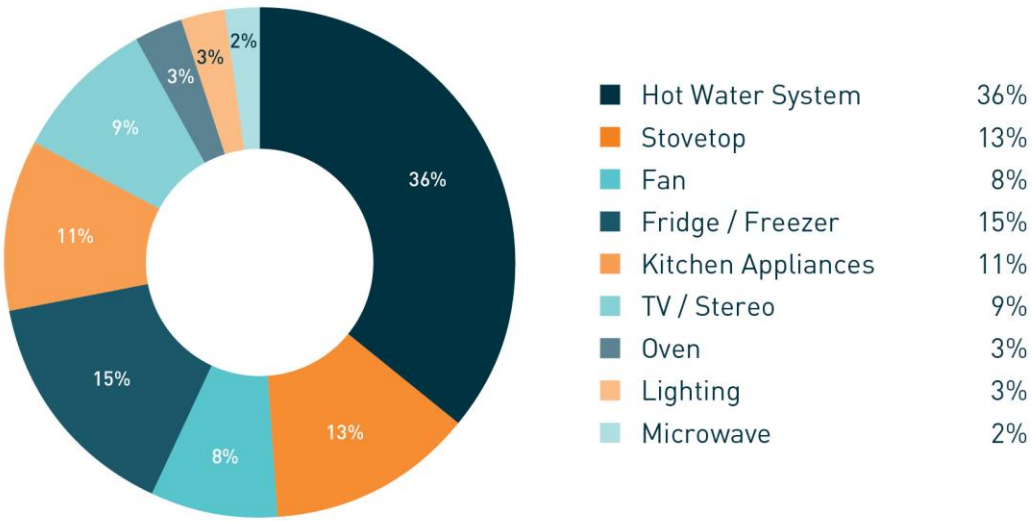
[10] Where the CHP provides bulk hot water, it may allocate a charge to users based on metered hot water use or it may pay the bulk hot water charges itself.

FIGURE 1: Examples of typical supply arrangements

ELECTRICITY SUPPLY		HOT WATER SUPPLY	
CHP provides bulk supply of electricity through a single meter. CHP pays for electricity for tenants and for common areas. eg. in boarding house style accommodation	Tenants pay for electricity themselves and are metered individually. CHP pays for electricity in common areas. eg. in self-contained unit blocks	Tenants have separate hot water arrangements and pay for hot water themselves.	CHP provides bulk hot water and tenants pay through their share of metered use of hot water.

Figure 2 below shows estimated use in units within one individual community housing building.

FIGURE 2: Typical use within individual tenancies at a community housing building



Source: own analysis of CHP

In proportional terms, energy usage by community housing tenants aligns fairly close to typical residential household use in Queensland(although users within community housing spend less on cooling than s typical household use).

Understanding the sources of energy consumption in a building is an important starting point for determining where the most important investments and efforts should be made.

UNDERTAKING AN ENERGY AUDIT

A reliable way of determining a building's energy consumption is by undertaking an energy audit.

Under Australian Standard 3598, there are three levels of energy audit.

A Level Two energy audit is a good starting point for CHPs to understand their existing use and potential cost saving strategies.

The Energy Efficiency Council has a list of members that provide energy audits: http://www.eec.org.au/for-energy-users/find-a-provider#/find-a-provider.

The cost of a Level Two energy audit for a multi-storey building is likely to be in the range of $2,500 to $5,000. Whilst this is a substantial outlay, it may identify savings that more than offset this cost.

UNDERSTANDING TENANT USAGE

To develop a comprehensive energy efficiency plan, it is also important to understand the tenants' energy use – how they use energy and when, and how their specific needs impact on their energy use behaviour. Factors that might impact on energy usage can include:

- The type of household in the building and their needs. For example, single tenants or couples without children are likely to have different needs than tenants who have young children. Parents will have a higher need for use of washing machines, while older tenants may feel the heat and the cold more.
- The physical location of the tenant's unit in the building. Some units may have greater amenity than others. For example, tenants located on a hotter western side of the building may need to use more cooling than tenants who are in units with better air flow or orientation.
- The tenants' understanding of energy and energy use may impact on their consumption and their bills. This includes whether tenants are fully aware of how electricity is priced e.g. both

consumption and daily service charges. Based on their knowledge; some tenants may already be doing what they can to reduce costs, whilst others may have less awareness, interest or capacity to do so.

- Specific medical needs that impact on energy use e.g. inability to operate appliances due to blindness, or the need for additional cooling.

One way to collect information about tenants' energy consumption may be to interview or survey tenants. Another would be to install in-home energy monitors that can be programmed to record energy use on a half hourly basis.[11] Tenants' awareness of their eligibility forconcessions or rebates will also impact on their overall costs.

Alongside the results of an energy audit; a clear picture of tenants' energy needs, behaviour and usage can help CHPs determine the most important and appropriate energy management options to adopt for their building.

This may include actions that are designed to take account of specific tenant needs, or to help tenants better manage energy use. For example:

- A targeted education campaign on more efficient energy use;
- Fitting of energy in-home monitoring devices and education about tariffs;
- Assistance obtaining all available concessions, such as the Electricity Rebate and the Medical Cooling and Heating rebate. (eligibility for the Electricity Rebate expanded on 1 January 2017, with provision for backdating);
- Helping tenants move from quarterly to monthly billing to make it easier to budget for electricity costs; and
- Consideration of the specific needs of tenants with a disability or with health issues that might affect how they use electricity. (e.g. fridges and washing machines with mechanical controls rather than LED displays for vision impaired tenants)

More information on concession arrangements is contained in Appendix A. Information on education programs for tenants can be found later in the guide.

[11] In-home monitors are available from a range of sources, e.g. Jaycar has monitors priced around $90 and $100.

METERING

Smart meters provide more information to consumers about usage (provided at half hour intervals), and can help tenants gain a better understanding of their consumption.

As of December 2017, all new and replacement meters are required to be smart meters. Some retailers are beginning to roll out smart meters to all their customers. However for most customers, if a tenant or a CHP requests the installation of a smart meter, there will be a charge for this.

Smart meters can help consumers to understand their usage and identify ways of reducing their costs.

In December 2017, two changes were introduced in metering:

- Metering was made competitive – this means that meters are no longer installed by electricity distribution companies but instead by metering companies appointed by the customer's retailer; and
- All new and replacement meters must be smart meters.[12]

Using smart meters, customers and retailers will be able to read electricity use in each half-hour of the day. Customers are likely to be able to view their electricity usage online on a daily, monthly or yearly basis and, in time, project their final bills and set alerts to better manage their power use. Retailers should have reduced meter-reading costs and distributors should be able to find faults on the electricity distribution network more quickly.

Across the whole of Queensland, customers now must contact their chosen retailer for all requests in relation to the installation, update or maintenance of metering services. Outside south-east Queensland, the main retailer is Ergon Energy Retail. In South-East Queensland, the larger retailers include Alinta, AGL, Origin, and Energy Australia.

Note that customer access to their own data will be provided via the retailer, who may provide different levels of access e.g. on a monthly or quarterly basis (this has been the experience in Victoria so far).

CHPs should have a policy on allowing tenants to request the installation of a smart meter, including information to tenants on any requirements to seek permission, or inform, the CHP prior to requesting this from their retailer, and in accordance with the requirements of the *Residential Tenancies and Rooming Accommodation Act 2008*. In rented properties, retailers generally consider that they can change meters at tenancy addresses with the permission of the tenant.

[12] Previous metering consisted of accumulation or interval meters, which cannot communicate wirelessly with the meter reader, may not record usage for each half-hour, and are not easily read by the consumer.

Some retailers are offering to install new smart meters at no charge, but usually only in particular suburbs where they are installed as part of a targetted campaign to swap out old metering for new. Tenants have the right to opt-out of these offers and retain their existing meter.

The extent to which smart meters can assist tenants with understanding their electricity consumption, and thus potentially reducing their energy costs, remains to be fully tested; however as 'time of use' tariffs are rolled out, access to time-of-use consumption data should become increasingly useful.

ENERGY SAVVY FAMILIES

Provided smart meters, alongside other measures such as monthly billing, access to 'Reduce your Juice' app and community champions, in regional Queensland during 2017. Targetted to over 5,000 families.

A Joint initiative of QCOSS, Ergon Retail, Citysmart and the Qld Government.

RETAILER AND TARIFF CHOICES

Electricity users in South-East Queensland can choose their retailer. There are discounts of up to 28% (as of March 2018) on the standard tariff (for usage) available to customers.

Time-of-use tariffs are starting to be introduced. These have higher charges at peak times (typically early afternoon to evening) and lower charges at other times. In common areas, CHPs can choose between tariff 11, 20, and 44. Typically tariff 11 will be cheaper than tariff 20 and often cheaper than tariff 44.

Where tenants are separately metered, they may need to make choices about which retailer they will use and which plan and which tariff they want to be on. CHPs can assist tenants by providing guidance and factsheets to tenants on how to choose an electricity retailer and plan.

CHPs will need to consider their choice of tariff for use in common areas (and where the CHP is responsible for supplying electricity to tenants).

SOUTH-EAST QUEENSLAND

In South-East Queensland, there is retail competition, which means that electricity users have the ability to select their retailer.

Outside South-East Queensland (in the areas supplied by Ergon) there is no effective retail competition at the residential level. The Queensland Government may introduce residential retail competition in regional Queensland in the future, but for now, Ergon supplies all residential households, and tariffs/prices are regulated by the Queensland Competition Authority.

Retail competition in South-East Queensland means that tenants (where they are supplied directly) are free to choose the retailer that offers the best terms and conditions. Residential customers can obtain a significant discount offer compared to the standard tariff by shopping around for the best retailer. A summary of recent competitive electricity offers in the market in South-East Queensland is in Box 2 below.

Box 2: Current competitive offers by retailers

During 2017, discounts by retailers have been in the range of 10-12% on usage, however as at February 2018, one retailer (Alinta) is offering a 28% discount on the usage component of bills. There may be conditions related to the discount (such as pay on time), or other charges (such as late payment fees) which must be considered.

Some government websites allow users to search for the best energy deals and will provide a summary of all relevant terms and conditions. Non-government sites may be less trustworthy as they may not provide offers from all retailers.

Two government websites are the Australian Energy Regulator's Energy Made Easy website, https://www.energymadeeasy.gov.au/, and the Queensland Department of Natural Resources, Mines and Energy, https://www.dews.qld.gov.au/electricity/energy-save.

CHPs may also be able to approach retailers on behalf of tenants and ask what discounts retailers could give them if the CHPs arranged a bulk deal with their tenants for a significant number of tenants to move to the retailer.

TARIFF OPTIONS

Tenants and CHPs need to choose which tariffs are appropriate for them.

Tariff choices change over time. This section describes the main choices available to tenants and to the CHPs in respect of use in common areas or shared (e.g. boarding house) accommodation.

INDIVIDUAL UNITS

Tariff 11

Tariff 11 is the standard electricity tariff, which is comprised of a flat consumption charge of 28.479 cents per kWh plus a daily supply charge of 95.846 cents per day (2017-18 rates). The consumption charge does not vary by the time of the day.

One alternative to tariff 11 is a time-of-use tariff. Time-of-use tariffs charge more at peak times and less at off-peak times. This means that users may be able to able to save money if they can use most of their power outside the peak times.

In South-East Queensland, the time-of-use tariff is tariff 12. The peak time is 4pm-8pm on weekdays but the discounts are generally modest (as at November 2017), which means it is generally not worth moving from tariff 11 (particularly given users can get discounts to tariff 11 of up to 25%.)

Outside South-East Queensland, the time-of-use tariff is tariff 12A. Here are the peak times are 3pm-9.30pm on weekdays but just during the three summer months (December to February). The usage charges during peak times are about 3 times as much as tariff 11. However, the usage charges at other times (about 82% of the year), or on summer weekdays outside peak times are about 19% less. Additionally, there are no discounts on tariff 11 outside South-East Queensland.

The charges for tariff 12A are compared to tariff 11 in Table 1 below.

Table 1: time-of-use tariff compared to standard residential tariff outside South-East Queensland

Tariff	Time of use	Use (c/kWh)	Daily service charge (c/day)
11 – standard residential tariff	All times	28.479	95.8463
12A – time-of-use tariff in Ergon area	3pm-9.30pm summer weekdays	67.2507	98.8328
	All other times	23.177	

Note: 2017-18 prices including GST

To be eligible for the time-of-use tariff, users must have a smart meter which can measure use in any given half hour.

Choosing a time-of-use tariff may make sense for tenants outside South-East Queensland, especially if they do not use much energy in the 3pm-9:30pm time-period on summer weekdays or could move most of this use to another time (e.g. by doing their cooking at lunchtime or using their washing machine earlier in the day).

However, there are also risks with moving to a time-of-use tariff. If tenants do use significant energy during the peak period, then they will face higher charges than they would on tariff 11. Another risk is that even if overall annual electricity costs fall, the tenant could see higher costs in summer that could be difficult to manage.

The Queensland Government and Ergon Energy are currently running trials under the Energy Savvy Families program in regional Queensland with low income households to determine whether those households can benefit from time-of-use tariffs.[13]

CHPs should be aware of how time-of-use (and other new tariffs such as demand tariffs) are developing in Queensland.For example, the rates being offered and the outcomes of trials with low income households could determine whether and at what stage these tariffs could provide benefits for tenants. CHPs outside South-East Queensland may wish to consider engage with tenants to see if they want time-of-use tariffs and support them obtaining smart meters if they do. Smart meters will also provide tenants with extra information on how much and when they use electricity.

Tariffs 33 and 31 (controlled load)

Tariffs 31 and 33 are controlled load tariffs that are offered at a significant discount to tariff 11. Tariff 31 is 17.3536 cents per kWh (and tariff 33 is 22.5302 cents per kWh compared to the undiscounted rate for tariff 11 of 28.479 cents per kWh.

Tariffs 31 and 33 are only available for part of each day (18 hours for tariff 33 and 8 hours for tariff 31). These tariffs are not normally available during the peak times (afternoon to evening). These tariffs are known as controlled load tariffs as the distributor controls the load to reduce its peak supply by turning the load off at peak times.

Some meters have the capability to support a primary load such as tariff 11, a controlled load such as tariff 31 or 33, and even a solar PV load. If the existing meter does not have this capability, then a new meter may must be installed. If a new meter must be installed, the cost of this second meter is $11.07 per year.

The tariffs would likely be most suitable for hot water requirement where the hot water is supplied by a tank.

[13] See https://www.dews.qld.gov.au/electricity/saving/digital-meter

COMMON USE AREAS

Generally, CHPs are responsible for energy usage in the common areas, and this is metered separately from use by residential or other (e.g. commercial) tenants.

In some cases, such as larger buildings with mixed tenure such as commercial space, the overall usage metered through these meters will be above 100 MWh per year (equivalent to perhaps 35 or 40 times the annual use of a single tenant in community housing). The business use element may be supplied on a business tariff rather than a residential tariff.

Tariff choices for CHPs in respect of use in common areas are presented in Table 2 below. Tariff 11 will often be the best choice.

Table 2: Tariff choices for common area use

Tariff	Usage level	Usage charges (2017-18)	Note
Tariff 11	No minimum or maximum usage requirement	• Usage - 25.89 cents per kWh • Daily supply charge - 87.13 cents per day	For residential use only
Tariff 20	No minimum or maximum usage requirement	• Usage – 30.49 cents per kWh • Daily supply charge – 132.55 cents per day	More expensive than tariff 11
Tariff 44	Use above 100 MWh per year	• Usage – 16.27 cents per kWh • Daily service charge - $54.63 per day • Peak Network demand charge - $41.54 per kW per month (charged at peak use for any half-hour during the course of the month)	If usage is relatively even over the month, then charges are lower than tariff 44 than tariff 11. Overall tariff 44 can be cheaper than tariff 11 if use is relatively flat, due to its lower usage charges and the fact that it may save on multiple daily service charges across multiple meters on tariff 11.

MANAGING AN EMBEDDED ELECTRICITY NETWORK

CHPs can move to an embedded network by routing all tenant use through a master meter and then through the tenant's individual meters. By doing this, tenants will not have to pay daily supply charges, which are typically $37 per year per tenant meter.

CHPs should seek assistance from a specialist retailer or provider to set up an embedded network as they will become the retailer to the tenants by doing so.

Where tenants are currently individually metered, it may be worth considering moving to what is known as an embedded network.

An embedded network is where all supply is charged at a single 'parent' meter, and then tenants are supplied and charged for their use through their own 'child' meter. The CHP, or a third party acting as a retailer or a meter reading and billing agent, acts as the retailer for the building, and is responsible for billing and collecting payment from the tenants.

Buildings set up as embedded networks have only one fixed 'supply' charge for the property, rather than separate supply charges to each unit. These fixed or daily charges are typically about $1 per day, or $350 per year for customers on tariff 11. Embedded networks also save on meter reading fees and charges, which are about 10 cents per day or $37 per year.[14] Thus tenants can typically save upwards of $300 per year off their electricity bill under the embedded network arrangement.

At present, only a few CHP owned or managed buildings have been set up as embedded networks.[15] However, embedded networks are becoming increasingly common in unit blocks in Queensland, where body corporates either become the retailer, or appoint a third party to provide this service.

Embedded networks may be installed as part of the development of a building, or as a retrofit to an existing building. In addition, they may also have distributed energy resources such as solar photovoltaic (PV) panels, battery storage, or diesel generators located within them.

[14] Meter reading fees may not be listed separately on your existing retailer's account but consist of the costs of installing, maintaining, and reading meters. From December 2017, all new meters must be smart meters, which will be able to be read remotely.

[15] although where all units are supplied through a single or common meter, there is in effect an embedded network in place

The major reasons to move to an embedded network are:

- By moving to a single parent meter - only one set of daily service charges and meter reading charges are payable. The savings are larger for bigger blocks of units;[16] and
- The rate at which electricity is purchased is a bulk rate that is below the rate of tariff 11. Given discounts of up to 25% are available in South-East Queensland, the bulk rate would need to be around this level for the tenants to save money on their usage charges.

Moving to an embedded network does come with a range of requirements that must be met. The requirements are listed below in Box 3. The CHP can appoint a third party to meet these requirements.[17] Third-party providers operate across Queensland.

Box 3: Requirements of an embedded network

The embedded network provider acts as the retailer and has similar obligations to a traditional retailer under the National Energy Consumer Framework. The embedded network provider read individual tenant meters, calculates charges, and provides tenants with the consumer rights outlined in the exempt retailer guidelines.[18]

Obligations include providing customers (tenants) with:

- flexible payment options if they are experiencing financial difficulty;
- clear and set time frames for receiving and paying bills;
- complaints handling arrangements;
- energy charges that are no greater than the standing offer prices a local area retailer can charge contracted customers;
- clear and reasonable disconnection procedures; and
- information on their rights and on the exempt retailers' obligations at the outset of the arrangement.

Where an existing building is being retrofitted to establish an embedded network (as distinct from being set up in a new construction), an 'individual' exemption needs to be applied for. Tenants would need to be consulted and agree with the retrofit.

There are two types of third parties that can be contracted - retailers (such as Locality Planning Energy - LPE) and metering and billing agents (such as Meters2Cash). A retailer like LPE acts as the retailer and fulfils all the obligations of a retailer, including reading the meters, providing a bill, and

[16] It would be possible to have an embedded network just for the unit tenants while leaving supply arrangements for common areas or commercial tenants just as they are.
[17] One provider is Meters2Cash, which charges a daily service charge around 27 cents per day to undertake meter reading and billing functions and bulk electricity purchase and supply to the embedded network.
[18] See https://www.aer.gov.au/retail-markets/retail-guidelines-reviews/retail-exempt-selling-guideline-march-2016. Check the AER website for updates as these guidelines are periodically revised. At present the guidelines are under review.

meeting obligations to register as a retailer in the market. A metering and billing agent like Meters2Cash provides the meter reading and billing functions but is not registered as a retailer. This means that CHPs would need to register as a retailer or seek exemption and maintain oversight of retailer functions.

To set up an embedded network, CHPs would need to (either themselves or with the assistance of the third party appointed as the retailer or metering and billing agent):

- Add a parent meter at the end of the property and wire the existing meters into that parent meter;
- Obtain the consent of tenants to be part of the embedded network;
- Buy out existing individual meters for tenant units from the distributor (Energex or Ergon). CHPs should expect to pay a price which reflects the cost of installation (perhaps around $340) less any depreciation since their installation);[19] and
- Choose a tariff for the parent meter.

In terms of the choice of tariff, one choice would be to stay on tariff 11 for the parent meter (tariff 11 is cheaper than the general business tariff, tariff 20).

As an alternative to tariff 11, CHPs outside South-East Queensland could consider using tariff 12A as discussed at page 20 above.

On either tariff 11 or tariff 12A, tenants would continue to be able to access electricity rebates and concessions that might not be available if a business tariff was used (such as tariff 20, which is the primary small business tariff).

While there are clear cost savings available following the installation of an embedded network arrangement, as outlined in Box 3 above, there are various obligations that are associated with the embedded network provider role that will generate work even when a third-party is engaged. However, with a clear understanding of these obligations and good stakeholder engagement with tenants to ensure they understand the arrangements and the financial benefits; this work should be largely upfront and not ongoing, and can be fairly easily negotiated.

As of 2017, electricity users are now entitled to 'opt out' of an embedded network and choose another retailer. CHPs should be aware of this when planning and implementing an embedded network.

[19] Typically, meters last about 15 years so if a meter was installed 7 or 8 years ago, it might be half of its original value or maybe around $340/2 or $170.

HOT WATER

Electric hot water systems are generally expensive compared to instantaneous hot water systems or bulk heat pumps. It is likely to be worth replacing electric hot water systems early to gain the savings from instantaneous hot water systems or bulk heat pumps.

Bulk hot water systems should be checked to ensure they are operating efficiently and are properly insulated to prevent heat loss.

Heating water is a major component of total electricity costs (generally almost 30% for the average household[20]).

Two aspects are examined below: the flow rate of taps and showerheads and the type of system used to heat water.

TAPS & SHOWERHEADS

For tenants who do not have medical or other needs for high water flow, Low flow taps and showerheads can provide considerable savings. Taps and shower heads are rated for flow by the WELS system, and a WELS rating of 3 indicates a low flow system.[21]

Low flow showerheads cost around $20-35 (including GST).[22] They could reasonably be expected to save around $146 per year (including GST).[23]

Where possible, CHPs should monitor excessive hot water use by individual units and provide advice to tenants where use is significantly higher than average. This is not intended to infringe on privacy but to ensure hot water is not being used inadvertently.

HOT WATER SYSTEMS

In terms of the choice of system, there are several options for reducing the cost of hot water, including:

- *Solar hot water*: These systems heat water using the sun.
- *Heat pumps*. These systems transfer heat from the atmosphere to heat tanks of water tanks.

[20] See Queensland Department of Energy and Water website at https://www.dews.qld.gov.au/electricity/energy-save/electricity-saving-tips

[21] The WELS (Water Efficiency and Labelling Standards) rating system is a system for rating the efficiency of water products. Information on the WELS rating system can be found at http://www.waterrating.gov.au/consumers/water-efficiency

[22] Prices estimated based on a web search of prices at Bunnings.

[23] Based on (i) moving from a standard showerhead using 120L over an eight –minute shower to a water-efficient shower head using 72L over the same period (compare http://www.waterrating.gov.au/consumers/water-efficiency), (ii) the water in the shower is heated from 25°C to 50°C; and (iii) applying tariff 11.

- *Instantaneous electric hot water systems*. These systems use electricity or gas to heat water as required without holding it in tanks.
- *Existing electric storage hot water systems* but moving to economy tariffs (tariff 31 or 33). Electric storage hot water systems heat water in tanks and hold it until it is required.

Analysis indicates that a bulk supply instantaneous electric hot water system is generally the cheapest and most flexible option for supplying hot water, either at the individual or bulk supply level. The analysis is contained in Appendix B.

The analysis in Appendix B finds that instantaneous hot water systems are cheaper or more suitable than the other three systems. This is because:

- solar hot water systems are likely to use too much roof space to be feasible (and do not provide hot water after 1-2 days of cloud cover);
- electric hot water systems are cheaper to install but have much higher costs to operate; and
- heat pumps are more expensive to install and cost about the same to run.

Instantaneous hot water systems are cheap to run as they only heat water at the time it is to be used.

The analysis in Appendix B also finds that a bulk hot water system is cheaper than multiple individual systems. This is because of the economies of scale in larger hot water systems.

To install a bulk hot water system assumes that the hot water systems can be plumbed cost-effectively to supply multiple units, and there is physical space within the unit block to install the bulk hot water systems. Upfront costs of installing a bulk supply system would include new plumbing and metering specifically for hot water (usually measured by litre of water rather than by the energy costs to heat the water).

If it is not physically possible to install a bulk system; then installing individual instantaneous hot water systems is the second most cost-effective option.

Bulk supply would also require the CHP (or an appointed third-party provider) to calculate bills for tenants for hot water based on metered hot water use. Generally, third-party providers (such as those that manage embedded networks) can perform this function. Before installing a bulk hot water system and engaging a service provider, CHPs should shop around and carefully compare options and contract terms since they can vary considerably. Questions to consider include who owns the bulk hot water system, who is responsible for maintenance costs, how long will the CHP and/or the tenants be locked in to the arrangement with the third party, and what are the charging and billing arrangements for tenants.

Implementing new bulk hot water arrangements would also require careful consumer engagement at the outset, as the arrangements sometimes cause confusion for end users. Tenants may not be aware of the usual costs for hot water unless they have previously had a gas bill for hot water or had hot water connected to an off-peak tariff (and had analysed their electricity bill). They may therefore view the cost of hot water, when billed separately, as high. In addition, the usual method for billing

for hot water is per litre of water consumed rather than the unit of energy used to heat the water, and the unit cost itself may be impacted by different factors and can vary.

Bulk hot water is not covered by the usual consumer protection arrangements for electricity, so if tenants have unresolved complaints, they cannot access the dispute resolution services of the Energy and Water Ombudsman.[24] There are also no concession payments available for bulk hot water however, concession customers will still receive the full electricity concession on their electricity bill despite it excluding hot water costs.

For all of these reasons it would be advisable to engage upfront with tenants prior to moving to a bulk supply option, so that the tenants are clear on how the costs are being allocated to them and the financial benefits of the arrangement.

Are existing bulk hot water systems working properly?

Some existing bulk hot water systems may not be performing at their expected level of efficiency, known as their coefficient of performance (COP). For large bulk hot water systems, poor efficiency could be very costly. A reasonable COP would be around 3 and a good COP would be around 4.5.

It is recommended to:

- Check if existing systems are operating at their expected COP, which can be provided by the manufacturer.
- If systems are performing below their expected COP, then investigate the reasons why. Typical reasons include that inadequate cleaning of the condensers and evaporators, a need for more insulation of the pipework, or a manufacturing flaw.
- Where it is not possible to significantly improve the performance of a system operating significantly below its COP, then it may be worth considering replacing the system in whole or in part. For a large bulk hot water system, an improvement in in COP from 1.5 to 3 or 4.5 might justify an investment of many tens of thousands of dollars once the reductions in running costs are considered.[25]

When should existing electric hot water systems be replaced?

If the building currently has an existing electric storage hot water system(s), the benefits of replacement with an instantaneous hot water system should be considered – either now or when the existing systems fail.[26]

[24] They do have access to protections under consumer law generally, and as such could take consumer concerns to the Office of Fair Trading.
[25] The saving would accrue to the party paying the bills for the use of the hot water. This might be the CHP or tenants. In some buildings, the CHP pays for the bulk hot water and recovers the cost from tenants through some method (e.g. estimating tenants' share of costs through their metered hot water use).
[26] CHPs will need to determine whether replacement of a bulk hot water system is their responsibility or the responsibility of the DHPW.

Assuming that replacing a hot water system is within the CHP's responsibility (whether the property is owned or leased), the analysis in Appendix B shows that installing a new instantaneous hot water system will generally result in cost savings, compared to keeping the existing electric hot water system. The savings on installing and running an instantaneous hot water system mean that after less than 3 years, it is cheaper than the costs of running the existing electric storage hot water systems. The payback period may be longer if the existing electric storage hot water system is larger in size. Generally, the payback period will be short enough to justify early replacement of the electric hot water system.[27] There is likely to be a strong case to replace the existing electric hot systems as soon as possible with a bulk instantaneous hot water system, where possible.

Proper insulation of hot water systems

It is important to ensure existing hot water tanks and pipework are properly insulated. Good insulation will reduce heating costs for any type of hot water system.

[27] The analysis assumes a 7% cost of finance and are based on the per litre running costs of a lower cost 300L electric hot water system.

HEATING & COOLING

Overhead fans are a relatively affordable way to cool tenant units. It is important to choose energy-efficient fans when replacing fans.

Air-conditioning is not generally provided by CHPs but can be important for tenants with medical needs or older tenants. Reverse cycle air-conditioning is the most affordable form of air-conditioning.

Heating and cooling can be the second biggest cost after hot water. In Queensland, cooling is generally the primary concern although heating is also relevant in some parts of the State. Most community housing is not supplied with fixed heating or cooling appliances other than overhead fans. This is most likely because of the high running costs associated with such appliances such as air-conditioners (and possibly also the upfront capital costs). However, where tenants find the temperature inside the unit uncomfortable in summer or winter, they may decide to purchase portable units which can often lead to higher costs. For tenants with certain health conditions, including thermoregulatory dysfunction, the ability to alter the internal temperature can be critical to their wellbeing.

When considering the amenity of the property they are providing to tenants, CHPs can consider options to improve comfort levels. This may include options to provide insulation and shading (see section on thermal mass and shading), adding or upgrading overhead fans or providing free standing fans.

Including advice on options for heating and cooling in tenant education programs may also assist tenants to manage comfort levels without unduly increasing costs (for example on the use of door snakes to exclude draughts, and on the costs associated with bar and fan heaters, or window box air conditioners).

OVERHEAD FANS

Overhead fans are efficient compared to air conditioners; however they use a considerable amount of energy if operated for extended hours per day during warmer months – especially for inland and North Queensland.

As with fridges, overhead fans can operate at greater or lower levels of efficiency. However, it is important to consider the effectiveness of the airflow achieved by the fans in making purchasing decisions.

There are some low wattage, high airflow fans on the market. Given the hot conditions in many parts of Queensland, these would be worth considering as the upfront cost would be partially offset by the reduced running costs compared to the existing fans. Some fans fitting this criteria can be found at http://www.fanscity.com.au/product/milano-dc-white-no-light/ and https://aeratronaustralia.com.au/. These fans have wattage at their maximum settings of around 18

or 24 watts, providing a saving in electricity costs of around $24-27 per year compared to inefficient 70-watt fans. [28]

It would be worth selecting new fans based on comparing the operational wattage to the airflow to select the fan with the highest airflow and lowest wattage.

CHPs should also check that the fans can be operated in winter mode (which is usually the case). Winter mode is where the fans can be operated to push hot air generated by a heater back down towards occupants during winter to keep them warmer. The operation of this feature should be explained to new tenants as they will often not know about it.

FREESTANDING FANS

Pedestal or tower fans can be a cheap and effective way of improving personal comfort in hot weather. While there is now a large range of models on the market and at varying prices, an effective fan can be purchased for under $100. Freestanding fans also have low running costs. For example, Choice magazine suggest pedestal or tower fans could generally be run all summer on high speed for about $35.[29] One disadvantage of freestanding fans is the potential safety risk where the fan blades are accessible or of the fan being pulled over.[30] Therefore they may not be suitable for households with young children.

Given the overall low cost of freestanding fans, the key considerations will be amenity rather than wattage. As with overhead fans, different models produce different levels of airflow. However, it can be difficult to find consistent information about airflow in order to compare models. Consumer group Choice have tested various models of pedestal and tower fans and have included airflow as one of the performance measures. Other considerations when purchasing freestanding fans include noise levels and the presence of features such as sleep modes or remote control.

AIR-CONDITIONING

Air-conditioning is generally not provided in community housing, particularly in the cooler climate zones, due to installation and running costs. However, some community housing dwellings (especially those in northern or western parts of the State) do contain airconditioning units or evaporative air cooling systems. In addition, some tenants may decide to install air-conditioning for themselves, while other tenants may need air-conditioning for medical reasons.

There are concession arrangements for people who use air-conditioning for medical reasons. The medical cooling and heating electricity concession, worth $340.85 per year, is available to parties

[28] Based on tariff 11 and estimated use of the fan for 10 hours per day for half the year.
[29] Choice, November 2017.
[30] Dyson has bladeless options available.

with an eligible medical condition who have an air-conditioner or heater at their place of residence. More details on this concession are provided in Appendix A.

When considering running costs, it is notable that air-conditioners have become significantly more energy-efficient in recent years.[31]

The most efficient air-conditioner is likely to be a reverse cycle air-conditioner, as such a system expels or draws in heat from the atmosphere rather than creating cool or hot air. Reverse cycle air-conditioners can operate as heaters during cooler months.

Energex and Ergon currently provide cashback of up to $400 on the price of new air-conditioners where the air-conditioner is installed in such a way that it can be remotely controlled by Energex or Ergon.[32] Under this arrangement, Energex or Ergon can drop the air-conditioners to a lower performance mode at times of peak demand on the electricity network. The cashback is not automatic – it must be claimed after purchase.

EVAPORATIVE AIR COOLERS

Evaporators coolers work by drawing in hot air through wet filter pads supplied with water. The water in the filter pads evaporate drawing heat out of the air, and moist air is then blown through the house. They are available as ducted systems and as window or wall mounted and portable units.

Evaporative air conditioners are not suited to humid conditions (greater than 30% relative humidity) because the water will not evaporate as easily from the pads. They also add humidity to the air. They are therefore not an appropriate choice in most parts of Queensland but may be an option in less humid, more arid inland parts of the State. Relative humidity measures are available from the Bureau of Meteorology website (www.bom.gov.au) for significant towns and centres.

Running costs will vary according to the model. Evaporative coolers use both electricity and water, so the water efficiency of units is also a consideration. As with other cooling systems it is important to ensure the size of the unit is appropriate to the space and to consider the star rating of the unit against other units with similar capacity.

Issues with evaporative air coolers are high maintenance costs and corrosion problems, that they are no more energy efficient than more modern, high efficiency reverse cycle air conditioner, and that they have poorer cooling performance.[33]

[31] See for example, http://www.climatecontrolnews.com.au/air-conditioning/a-decade-of-air-conditioning
[32] $100 for a system under 4 kW, $200 for a system between 4 and 10 kW, and $400 for a system over 10 kW. See Energex's website at https://www.energex.com.au/home/control-your-energy/positive-payback-program/positive-payback-for-households/air-conditioning-rewards. See Ergon's website at https://www.ergon.com.au/network/manage-your-energy/incentives/peaksmart-air-conditioning
[33] See, for example, https://www.theaustralian.com.au/business/business-spectator/why-evaporative-cooling-is-bad-for-energy-efficient-homes/news-story/b5d0267fb339a002b1fbe62387a4d95e

OTHER APPLIANCES

It is important to consider the running costs of appliances rather than just the upfront cost. This can be determined from the energy star rating of the appliance. The Queensland Government is at the time of writing offering discounts to individual households on more energy-efficient appliances.

SELECTION OF APPLIANCES

Where a CHP supplies appliances, such as fridges and washing machines, choice of appliances should take into account whole-of-life costs. The cost of electricity is an important consideration, as well as maintenance and associated costs (such as water costs for washing machines and dishwashers), and the likely lifespan of the appliance.

Star ratings are a good guide to the energy efficiency of an appliance.

For example, lower cost fridges rated only 2.5 stars can typically cost more in whole-of-life terms than 3.5-star fridges, because of the long life of fridges and the high cost of electricity.[34]

The whole of life costs of more or less efficient appliances can be calculated.[35] The comparative payback periods can inform purchasing decisions.[36][37] A payback period of less than around 8-10 years would support buying the more efficient appliance. A shorter payback period may support retiring a less efficient appliance earlier than the natural end of its life.

If a CHP supplies the main household appliances, then any additional upfront costs associated with more efficient appliances would be borne by them. Noting that the tenant derives any benefit from the lower running costs of more efficient but more expensive appliances, it may be possible to come to some form of arrangement, for example that the tenant makes some contribution to the community housing provider to cover the cost of the more expensive appliance (options are discussed below).

[34] Assuming the fridges being compared are otherwise like-for-like e.g. same or nearly the same capacity.
[35] See Ergon Energy website at https://www.ergon.com.au/retail/residential/home-energy-tips/calculators/appliance-running-cost-calculator
[36] For example, if a more efficient fridge is $100 more than a less efficient fridge, then assuming less efficient fridge costs 2c/hour more, then assuming 24-hour operation, the less efficient fridge will cost $175 per year to run and the simple payback period buying the more efficient fridge is about 7 months. A simple payback period is one that excludes the cost of finance, i.e. any borrowing costs of the funds used to finance expenditure
[37] For example, if a more efficient fridge is $100 more than a less efficient fridge, then assuming less efficient fridge costs 2c/hour more, then assuming 24-hour operation, the less efficient fridge will cost $175 per year to run and the simple payback period buying the more efficient fridge is about 7 months.

FRIDGES & FREEZERS

Fridges and freezers collectively consume about 8% of energy within average households but may use a higher percentage in community housing (perhaps up 18%) because community housing tenants tend to use less energy in other areas.[38]

Fridges come in a variety of sizes and with a range of upfront costs and energy efficiency ratings. As fridges tend to last a long time, it is important to consider the running costs and therefore the energy efficiency rating before purchasing a fridge.

For example, two stars is a low efficiency rating for a fridge of around 200-300 litres. Moving to a 3.5- star energy efficient fridge would save around $31 per year.[39] If the fridge lasts 15 years, then the saving in simple terms would be around $465, which would justify paying say $200 to 300 more in upfront costs for a 3.5-star fridge compared to a 2-star fridge.

WASHING MACHINES & DRYERS

Some community housing units are provided with washing machines, and dryers may also be standard in some high-rise buildings where outdoor drying space is limited or non-existent. From an energy-efficiency perspective, it is sensible to select washing machines and dryers with high energy efficiency star ratings (comparing against similar sized units) and which are no larger than necessary for the size of household. Investment in energy efficient washing machines may be more important where tenants in the building are heavy users of these appliances (for example, households with children).

Generally, front loading washing machines are more energy and water efficient than top loaders. Many front loaders draw in cold water and heat it to temperature and when compared with the consumption of heated water from an electric hot water system, this can be more cost effective. However, where the hot water is supplied by a solar hot water system or from electric systems connected to off peak tariffs, it may be more cost effective to purchase a model with a dual water connection.

The water efficiency of the model purchased will also be important to consider in terms of running costs, and this may be of value to either the tenant or the CHP depending on who is paying water consumption costs.

Drying clothes in sunlight is, of course, the most energy efficient means of drying washing. However, it is not always possible to use a clothes line because of a lack of space, weather conditions, or concern about security in communal spaces. Alternatives to using an electric dryer include use of indoor drying racks. The effectiveness of indoor drying can be improved with air circulation using fans.

[38] See Figures 1 and 2 earlier in this guide.

[39] EcoEfficiency energy audit, pp. 13-14 At an estimated 383 kWh per year coming down to 251 kWh per year at the current discounted rate of 23.495 cents per kWh (17.5% discount to standard tariff 11 rate)

There are four main types of dryers on the market. These include vented dryers, gas dryers, condenser dryers and heat pump dryers.

Electric vented dryers are both the cheapest to buy and the most expensive to run.

Condenser dryers are more expensive upfront and are generally no more efficient than vented dryers. However, they can be more suited to situations where ventilation is limited.

Gas dryers are also more expensive; however, they do use considerably less energy and lower running costs could offset the upfront cost in under 10 years. To install them, modifications are often required to the laundry space and the installation costs can therefore extend this payback period beyond an acceptable period.

Heat pump dryers, which operate in a similar way to reverse cycle heating, are the most energy efficient type of dryer on the market. Although a heat pump dryer will be approximately 63% more efficient than a similar sized vented model,[40] the high upfront cost means the payback period is still likely to be greater than 10 years. However, prices are coming down and in situations where there is no alternative to using a dryer and the household is a heavy user, their purchase may soon be cost effective.[41]

ENERGY EFFICIENCY REBATES

The Queensland Government has been providing rebates of up to $300 to purchase an energy efficient fridge, washing machine or air conditioner, however this scheme is now closed (as of 20 March 2018).

[40] Choice, "Payback Time". 03 February 2016. Accessed at https://www.choice.com.au/home-and-living/laundry-and-cleaning/dryers/articles/heat-pump-dryers-getting-cheaper
[41] Choice, "Payback Time". 03 February 2016. Accessed at https://www.choice.com.au/home-and-living/laundry-and-cleaning/dryers/articles/heat-pump-dryers-getting-cheaper

LIGHTING

LED lights are much more efficient than incandescent or fluorescent lights. It is worth replacing existing incandescent or fluorescent lights now rather at the end of their life.

Lighting options include incandescent, fluorescent, or LED lights. Incandescent lights are being phased out due to their high energy use. Fluorescent lights are common in many buildings.

LED lights are much more energy efficient than either incandescent or fluorescent lights. They also tend to be brighter.

Typical fluorescent lights rated at about 36 watts might use about 48 cents per day or $175 per year. Compared to these lights, LED lights rated at 8 watts will cost approx. $22 per year, as well as providing superior lighting. These savings accrue to the party paying for the lighting – typically the tenant inside his or her unit and the CHP for lighting in common areas.

The cost of conversion to LED lights depends on whether the fitting around the current lights would need to be replaced, and whether a bulk rate could be negotiated. Costs may range from $20 to $50 per light. An electrician may not be required to replace fluorescent lights with LED lights.

The estimated payback period is around 1 to 3 years, as shown in Table 3 below. The short payback period indicates that it may be worth replacing existing fluorescent lights now rather than waiting until the end of their life.

Table 3: Simple payback period for converting from fluorescent to LED lights[42]

Wattage	Usage per year at 6 hours per night of use (kWh)	Cost ($)
Fluorescent at 36 watts	79	22
LED at 8 watts	18	5
Saving per year from switching to an LED light		17.5
Simple payback period (based on an installation cost of $20-$50)		1.1 to 2.9 years

DISPOSAL

Note that fluorescent tubes can be recycled, and this is preferable to disposal in landfill. Visit www.fluorocycle.org.au/recyclers.php for a list of recyclers.

[42] Based on own calculations using typical wattages for fluorescent and LED lights and applying tariff 11.

THERMAL MASS, SHADING AND INSULATION

It makes sense where possible to plant trees to shade buildings, and to paint buildings white or a light colour to reflect heat.

The Australian Government has extensive information on designing, building, or retrofitting energy efficient dwellings at http://www.yourhome.gov.au/.

Given the wide variety of housing, in type, climate, and location, it is difficult to be specific about the strategies for improving the energy efficiency of buildings.

Some general measures that could be considered for new buildings or when refurbishing existing buildings[43] include:

- Choosing and maintaining lighter colours for painting of building to reflect heat and light coloured or silver roof sheeting to reflect heat from the sun;
- Choosing lighter colours on internal surfaces to reduce the need for lighting during the day;
- Maximising cross-ventilation using lockable screen doors, transom windows above doors, wide corridors and large windows;
- Putting insulation in roof spaces;
- Planting shady trees, especially on the northern and western sides of buildings;
- Shading such as eaves, window awnings, shutters, pergolas, and verandas;
- Orienting new buildings north and south, except in the hottest part of Queensland;
- Using draft blockers below doors and sealing windows with tape to stop drafts during winter;
- Using materials with high thermal mass (bricks, tiles, concrete) over materials with low thermal mass (timber). High thermal mass materials heat more slowly during the day and cool slowly at night to achieve lower temperature variation over time; and
- Using thick or block-out curtain material on west-facing windows in hotter parts of the State.

[43] It would not be worth replacing existing furnishings ahead of the end of their useful life.

SOLAR PANELS

Solar panels could be considered if there is sufficient north or north-west facing, unshaded roof space. Solar panels are generally economic and will have a payback period under 10 years.

Solar panels are falling in price and improving in efficiency. They typically consist of panels, an inverter, and a meter connection to permit export of electricity that is not being used at the time of generation.

To install solar panels, the building will need suitable/available roof (or other) space for solar panels. Panels need to be facing north (or slightly north-west), with minimal or no shading, and with an appropriate tilt. The tilt can be provided by the natural angle of the roof, or by bracing installed under the panels.

When solar panels are installed on high roofs, there may be additional maintenance costs, particularly if they have a flat orientation, as regular cleaning may be required for them to work at peak efficiency.

Solar panels in Brisbane could be expected to generate an average of 3.7 to 4.2 kWh per day across the year per 1 kW of installed capacity.[44] Panel output needs to be monitored monthly or quarterly to detect any issues such as inverter or panel failure. Estimated output for solar panels installed in other parts of Queensland can be found at the Bureau of Meteorology (http://www.bom.gov.au/jsp/ncc/climate_averages/solar-exposure/index.jsp) and PV Watts (http://pvwatts.nrel.gov/).

If the solar panels are connected to the existing meter from the common areas, then any output would offset the cost of electricity used in the common area. If they were connected to an embedded network, they could provide a saving to tenants in the individual units.

The business case for installing solar panels depends in part on the pattern of existing building energy use. This is because the savings from solar panels take two forms: (i) savings from offsetting energy from the grid; and (ii) savings from excess energy exported to the grid.

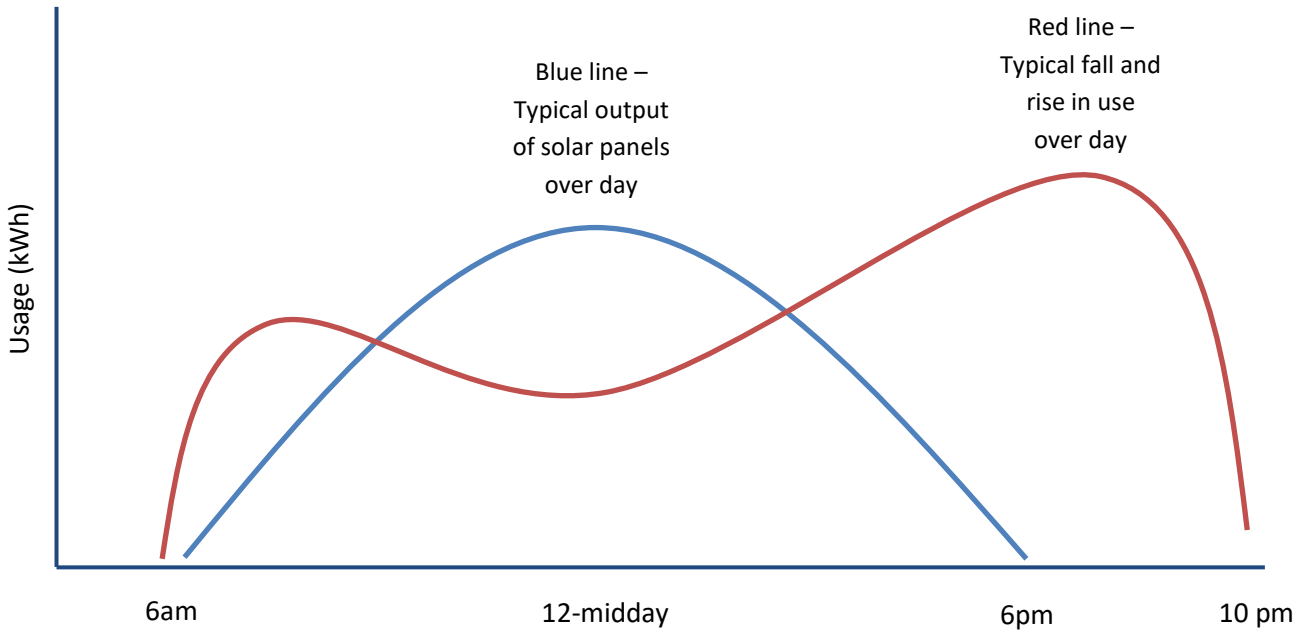
Exported electricity earns what is called the feed-in rate, while electricity from the panels that is used on site displaces electricity from the grid, and therefore essentially earns the same as you pay for electricity. The feed-in rate in South-East Queensland is set by the retailer, while in regional areas it is set by the Queensland Competition Authority (QCA). In 2017-18 the QCA set the feed-in rate at 10.102 cents per kWh (a significant lift from 7.448 cents per kWh in 2016-17).[45] This feed-in rate only applies to small customers that consume less than 100 MWh per year, with grid-connected PV systems not exceeding 5 kWh capacity.

[44] Based on Australian Standards and Bureau of Meteorology/PVWatts data for Brisbane. PVWatts
[45] QCA 2017, *Final Report: Solar feed-in tariff for regional Queensland for 2017-18*, May

As the feed-in tariff is relatively small for new panel installation, the size of the solar panel installation should be designed primarily to offset the energy typically being used during the day (say from 8am to 4pm) when the sun is likely to be shining and the panels are generating energy. The amount of power that tenants and common areas are using during this period can be determined by installing a smart meter which reports on the time of use of power over the course of the day. Most residential users use power predominantly in the 3pm-8pm period, but it is possible that community housing tenants are home and using power more between 8am to 4pm.

This can be illustrated in Figure 3 below. The blue curve represents solar generation over the course of a day, say from 6am to 6pm. The red curve represents typical residential use, with a small peak in the morning around breakfast time and a higher peak in the evening around dinner time. Community housing tenants may or may not use electricity according to this curve of typical residential use. Sizing a solar system so that its peak around midday equates roughly to the typical use at midday (as shown in Figure 3) would tend to maximise the value of solar generation at or around the value of the consumption rate of electricity under tariff 11, currently 28.479 cents per kWh (less under applicable discount).

Figure 3: Typical graph of residential use and solar generation over the day



ASSESSING THE BUSINESS CASE

The Solar System payback calculator can be used to calculate the payback period from installing solar panels: www.solarchoice.net.au/blog/solar-power-system-payback-calculator

If a CHP installed panels to supply a separately-metered common area, then the savings from the panels would accrue to the CHP. Any excess energy would be exported to the grid and would earn

the feed-in tariff. If a CHP installed the panels to supply to an embedded network then the savings would accrue to the tenants drawing power from that embedded network.[46]

To assess the payback period for solar panels, key inputs include the self-consumption ratio, which is how much of the electricity is used on-site, and the solar system efficiency factor, which is the efficiency of the solar panel system.

Generally, a payback period of 5 years or less would provide a strong case for installing solar panels, and a payback period of perhaps up to 10 years may be adequate to justify installation of panels.

SUNNY SAVERS

Selected Public housing tenants in Cairns and Rockhampton are able to enter a power purchase agreement with Ergon Retail to have solar panels installed on their roofs, and benefit from a discounted price (19c per kWh) for the solar generated electricity they consume. Properties are selected for the program on criteria including age and size of dwelling, roof profile, energy consumption.

Under this arrangement, those tenants who use more of their electricity during the day will achieve greater cost savings, estimated to be up to $250 per year. Tenants also get access to online energy monitoring with Homesmart, and help with budgeting. There is a target of 4,000 households for this program, with the Logan trial being rolled out later in 2018.

[46] The fact that in the case of solar panels connected to an embedded network meter the CHP makes the investment but the savings accrue to the tenants is an example of the split incentive mentioned earlier in this guide.

SOLAR POWER BATTERY STORAGE

Solar power batteries are still relatively expensive at the time of writing but should become affordable by 2019 or 2020.

Solar power batteries can be charged from the grid or from solar panels and then used at peak times. The battery could be used to supply some use at peak times, and then recharge at offpeak times. It may also be used to try to reduce the height of the network peak, producing a saving in the network peak demand charge.

A battery can be combined with solar PV generated onsite or electricity from the grid to be used to cover the cost of electricity used in the building. Where a time-of-use tariff is used then the battery power could be used in conjunction with solar power to cover estimated usage during peak times, leaving CHPs and tenants facing only the reduced costs of power used in offpeak times. In addition, such a system may give CHPs more confidence to switch to a time-of-use tariff because it faces little exposure to peak tariffs.

Batteries are steadily falling in cost. One battery currently on the market is the Tesla Powerwall 2, which holds up to 14 kWh, which costs around $10,200 to 11,950 installed.[47] At present, Ergon Energy Retail offers significant discounts for offpeak use on its time-of-use tariff, while the discounts on the time-of-use tariff offered by retailers in South-East Queensland are small. Ergon Energy Retail's time-of-use tariff provides a 19% discount for energy used outside 3pm-9:30pm on weekdays during the 90 days of summer (Dec-Feb), with energy used during this peak time at about 3 times the rate of tariff 11. The big difference between peak and offpeak rates makes for a stronger business case for installing a battery in regional Queensland than South-East Queensland at present.

In regional Queensland under the Ergon Energy Retail time-of-use tariff, if the savings from supplying power from the battery at peak times are combined with the savings from the reduced time-of-use rate at offpeak times, then the simple payback period could be about 10.5 years based on the assumptions in Table 4 below.

This payback period is likely to become shorter as the price of batteries falls (or their capacity rises for the same price). For example, if the price of a battery fell to $8,000 installed with a 21-kWh capacity, then the payback period would fall to 6.4 years on the assumptions in Table 4.

In contrast, the small difference between current peak and offpeak rates for the time-of-use tariffs in South-East Queensland, mean that a battery would have a very long payback period in South-East Queensland.

[47] Plus, any electrical upgrades (if necessary), permit fees, or any retailer / connection charges: see Tesla website at https://www.tesla.com/en_AU/powerwall. Other choices include Redflow and Enphase.

Table 4: Calculation of simple payback period on Tesla Powerwall 2 for customers in regional Queensland (Ergon as retailer)

Installed cost	**$11,075 (midpoint of 10,200 to 11,950 estimated range of installation costs)**
Capacity	14 kWh
Total current common area use	18,724 kWh per year
Peak use	5 weekdays across the 90 days of summer = 5/7*90 = 64 days (ignores public holidays)
Amount of peak use	Assuming average use of 50 kWh per day. Of this, half is assumed to be in the 6:30 hours of peak time during summer, i.e. 26 kWh per day across 64 summer days.
Saving	• 14 kWh of 26 kWh for 64 peak days at the difference between the peak rate and the discount rate for the time-of-use tariff less the 12 additional kWh at peak rates or $104 • Remainder of use over year at reduced rate (19% discount to tariff 11) or $945
Total saving	$1,051
Simple payback period	10.5 years

ENSURING TENANTS ARE GETTING ACCESS TO CONCESSIONS & OTHER ASSISTANCE

It is important to consider all rebates and concessions for which tenants may be eligible. There are a large number of potential rebates and concessions.

Tenants can access multiple concessions at the same time if they meet the eligibility requirements for each concession.

Eligibility for the electricity rebate worth over $340 per year was broadened in 2017 to include unemployed people.

Energy concessions and rebates can provide eligible tenants with a significant reduction to their electricity bills.

There are four State-based concessions that could apply to community housing tenants. Tenants can access multiple concessions or rebates at the same time if they are eligible.

Current as at 30 January 2018, these are:

- *Electricity rebate*, worth $340.85 per year. This rebate is available to parties including age pensioners and low-income earners holding a Commonwealth Health Care Card;
- *Home Energy Emergency Assistance Scheme*. This is a payment of up to $720 once every two years to parties who are facing an unforeseen emergency or a short-term financial crisis. They must hold a current concession card or have an income equal to or less than the Australian Government's maximum income rate for part-age pensioners. They must be part of their energy retailer's hardship program or be on a payment plan.
- *Medical cooling and heating electricity concession*, worth $340.85 per year. This is available to parties with an eligible medical condition who have an air-conditioner or heater at their place of residence; and
- *Electricity life support*, which is for people who are seriously ill, hold a concession card, and use a home-based oxygen concentrator or kidney dialysis machine. The payment is $694.18 per year for an oxygen concentrator, or $464.88 per year for a kidney dialysis machine.

There are instances where CHPs are the named customer for the bill for individual units, and then pass on the charges to the tenants, even though each unit has an individual connection. In these circumstances the tenant can receive the state-based concessions and rebates; however, the CHP will need to claim the concession or rebate on behalf of the tenant using the prescribed form.[48]

Concession arrangements including full details about eligibility, payment amounts, and how to apply are summarised in Appendix A. Where the electricity account is in the tenant's name, the tenant

[48] More details on the prescribed forms can be found in Appendix A.

should approach the retailer directly (with support from the community housing provider as required).

It may be that some tenants at community housing buildings are eligible for concessions such as the Medical Cooling and Heating Electricity Concession but are not aware of it. It would be useful to hold periodic information sessions with tenants (say once every 1-2 years depending on the rate of turnover in tenants) to assess whether tenants are receiving all relevant concessions and rebates.

It is recommended that residents be informed of the four concessions and their eligibility checked every one to two years. Tenants can be eligible for multiple concessions at the same time.

OTHER ASSISTANCE

In addition to assisting customers to access state-based concessions and schemes such as the Home Energy Emergency Assistance scheme, electricity retailers have a specific obligation to assist customers that are experiencing difficulties paying their bills. The National Electricity Retail Laws ('Retail Laws') require retailers to develop, maintain and implement customer hardship policies for their residential customers. The purpose of hardship policies is to set out their approach to identifying and assisting customers who may be experiencing hardship and need assistance. These policies must be approved by the Australian Energy Regular and must meet prescribed standards.

Assistance that might be expected from a retailer under their hardship policy include:

- Flexible payment options – this would include payment plans to pay off debt and the use of payment arrangements such as Centrepay. Many retailers also offer the opportunity to "bill smooth". This usually involves receiving a monthly rather than a quarterly bill. Monthly bills may be based on actual or estimated meter reads depending on the meter capability. Where bills are estimated they will be trued up with each actual meter read.
- Assistance with and notification of appropriate government concession programs and appropriate financial counselling services
- A review of the appropriateness of the customer's market retail contract
- Information or programs to assist customers with strategies to improve their energy efficiency

CHP tenants may not be aware of these obligations, so promotion of this information to tenants by CHPs could give them the confidence to address payment problems they are experiencing.

EDUCATION PROGRAMS

Tenant education programs, including what types of usage may be costly, how they can save energy, and the concessions and rebates that they may be eligible for, have been successful.

An observation from our work with the two community housing projects was that most tenants are generally quite efficient in their use of both electricity and hot water. However, there were some tenants who used far more electricity and hot water than the average. It may be worthwhile to provide some energy and hot water saving advice to tenants with higher than average use.

Education campaigns could usefully focus on appliances that use the most power, especially for cooking and cooling.[49] Suggestions are in Box 3 below.

Box 4: Energy education program

An energy education program could involve factsheets or short demonstration/on-line video on energy efficiency including aspects such as:

- Switching off lights, fans, and other appliances when not in use. Turn appliances off at the wall where possible including microwaves, TV, stereo and other appliances that have a standby mode.
- Opening windows and doors for breeze.
- Reducing cooking time to a minimum especially the oven to reduce heat generation within the room.
- Reducing showers to 4 minutes to reduce hot water use.
- Switching off taps when not needed to reduce hot water use.
- Using cold wash in the washing machines and only wash a full load
- Using washing lines where possible to reduce dryer use.
- Consider energy efficient appliances when replacing old appliances and look for higher energy star rating particularly for large items such as TVs.

Some of the organisations that provide energy saving tips on their website include:

- Ergon Energy, https://www.ergon.com.au/retail/residential/home-energy-tips;
- Energex https://www.energex.com.au/home/control-your-energy/save-money-And-electricity;
- Queensland Department of Natural Resources, Mines and Energy https://www.dews.qld.gov.au/electricity/energy-save/electricity-saving-tips; and
- QCOSS https://www.qcoss.org.au/energy-factsheets.

QCOSS runs workshops and webinars on energy literacy for community sector workers. These classes cover a range of issues such as reading bills, tariffs, energy efficiency, concessions. In addition, some retailers may be willing to accept an invitation to provide an energy efficiency workshop. A

[49] Compare EcoEfficiency energy audit, p. 14

significant number of Hardship/Vulnerable Customer teams within retailers have provided that type of support in the past.

Energy saving tips could be reinforced through the tenant newsletter, say one tip per newsletter, or by posters in the common area.

It is worth noting that some tenants use a lot of electricity and/or hot water because of their specific needs e.g. medical needs. Education alone may not assist tenants in these circumstances and the tenants may need other forms of help from the CHPs or Government. Information on government assistance and concessions/rebates (e.g. the medical cooling and heating rebate, and the Home Energy Emergency Assistance Scheme) is available in Appendix A.

FINANCING FOR ENERGY INVESTMENTS

There are a range of new sources of funding for investing in equipment that will make the cost of energy lower for tenants and for CHPs in respect of common area use.

CHPs may have limited funds to invest in energy efficiency and some decisions on assets and asset replacement are outside of CHPs' control. For example, CHPs often manage housing that is owned by the state government. While CHPs are responsible for maintenance, they may not be responsible for larger upgrade projects. CHPs will also need permission for changes they may wish to make in some circumstances.

Despite these challenges, funding opportunities exist for both CHPs and tenants. Possible sources of funding could be:

- *Energy Savvy Families*. This campaign is being delivered by Ergon Energy. It provides access to free smart meters, monthly bills, online education, and community support.[50] At this stage the program is only open invitation only, and has included both public and community housing tenants. Some CHPs have acted as 'program champions' in their regions, including in Cairns and Charters Towers.

  In October 2017, the Government announced that it was expanding the program by providing $200 off bills per year for another 4,000 regional households who participate in the expansion of the Energy Savvy program starting next year[51] but has yet to provide further detail of who is eligible to participate.

- *Solar panels.* The Queensland Government announced in October 2017 that it would be offering no-interest loans to help Queenslanders without access to upfront capital to invest in solar and batteries. It stated that Queenslanders will be able to apply from March 2018, with savings of up to $700 per year expected for those who take up solar. Further details are yet to be announced.
  In addition, solar panels can be financed by vendors or retailers. The cost of solar panel installation is subsidised under the Small-scale renewable energy scheme (SSRES). This subsidy is normally reflected in a discounted purchase price.[52] Some vendors offer lease programs for solar panels or extended payment terms. For example, Origin offers payment over 24 months.
  In addition, The Queensland Government have allocated funds to promote the uptake of solar panels in the private rental sector.

[50] See Ergon Energy website at https://www.ergon.com.au/retail/residential/support-programs/energy-savvy-families/get-energy-savvy
[51] Media release, October 24, 2017, Minister for Main Roads, Road Safety and Ports and Minister for Energy, Biofuels and Water Supply
[52] Normally the vendor adjusts down the price of installation and retains the benefits of the SSRES.

- *The No Interest Loan Scheme* (NILS) offers people on low incomes safe, fair and affordable loans of between $300 to $1,200 for fridges, washing machines and furniture. There are many NILS providers across Queensland. The NILS scheme could be used to finance tenants to buy new energy efficient appliances.
- *The Clean Energy Finance Corporation* can provide debt finance to the community housing sector to provide energy efficiency products such as solar panels, insulation, LED lighting, energy efficient appliances, and smart meters.[53] The CEFC does not tend to operate at a small scale so loans may need to cover several community housing portfolios.

In addition, in October 2017 the Queensland Government announced that:

- Customers in regional Queensland could go to the Ergon website to register their interest in a new initiative- Ergon's 'Easy Pay Reward' to help businesses and households save on their electricity bills. This provides annual discounts of $75 for Ergon regional household customers and $120 for small businesses that take up direct debit weekly, fortnightly or monthly payment options – as part of Ergon's new 'Easy Pay Reward'.[54]
- An Asset Ownership Dividend of $50 a year will be paid for every household bill over the next two years, starting from January 2018 and showing on bills from the second quarter of 2018.
- Power bills are pegged to average inflation over the next two years.

Private retailers have provided significant funding to support energy efficient advice and appliance programs (e.g. Switched on communities,[55] SA Retailer Energy Program,[56] NSW appliance replacement program[57]), sometimes in conjunction with Government. The Queensland Government has recently been providing rebates of up to $300 to purchase an energy efficient fridge, washing machines or air conditioner, and although this scheme is now closed, it is worth checking for further rebate schemes in future.[58]

[53] See CEFC website at https://www.cefc.com.au/where-we-invest/community-housing.aspx

[55] See QCOSS website at https://www.qcoss.org.au/switched-communities-grants

[56] See for example AGL website at https://rees.agl.com.au/

[57] See NSW Office of Heritage and Environment website at http://www.environment.nsw.gov.au/households/appliance-replacement-offer.htm

[58] Media Release, Minister for Main Roads, Road Safety and Ports and Minister for Energy, Biofuels and Water Supply, 22 October 2017.

SUMMARY

Based on the above analysis some of the options that CHPs could investigate are listed in Table 5 below.

Table 5: Options for electricity cost savings

Item	Action	Upfront cost to CHP	Saving	Saving accrues to
Retail offerings	In South East Queensland, shop around for the best retail deal.	Nil	Retail discounts of up to 25% off standard tariffs are available in south-east Queensland	Tenants in individual units and CHPs in respect of common area use
Energy audit	Consider conducting a level 2 energy audit	Need to obtain quote. Broad estimate: $2,000- $4,000	Varies but generally sufficient to cover the cost of the audit	Tenants in individual units and CHPs in respect of common area use
Use	Install a smart meter to measure the combined use by the individually metered tenants to better understand use. This can guide decisions such as whether to change to tariff 12 or the size of solar panels to install. Monitor the outcomes of the existing Ergon trial of smart meters installed at low income households to see if the tariff is effective in saving money for similar households.	Around $400	There are no current prices for smart meters in Ergon's network. Prices quoted for smart meters available from retailers based on specific circumstances.	NA
Embedded network	Set up an embedded network and hire a third-party provider to provide meter reading and billing services.	Parent meter at $400. Costs of buying any existing meters (perhaps $200-300 per meter). Any cost for obtaining a quote from a third party to set up an embedded network.	Annual savings per meter of around $350 in daily service charges and $37 in meter reading charges less the upfront costs of buying up existing meters and any meter installation and wiring costs for the parent meter.	Tenants
Lighting	Replace fluorescent lights with LEDs	About $20-50 per light depending on whether light fitting needs to be replaced	$22-25 per year per light replaced less purchase price of lights	Tenants in individual units and CHPs in respect of common area use
Hot water 1	For CHPs with bulk hot water supply, investigate and seek to fix any bulk hot water with a low efficiency (COP) compared to its design rating. Consider replacing part or all the system with a higher efficiency system if the COP is below 2 or 3.	Dependent on changes required	Varies	Tenants in individual units and CHP in respect of common area use

Item	Action	Upfront cost to CHP	Saving	Saving accrues to
Hot water 2	For CHPs without bulk hot water supply, consider switching from traditional electric hot water systems to instantaneous hot water/bulk hot water	Need to obtain quote	Depends on existing system and size of hot water use. Switching from a traditional electric hot water system to an instantaneous hot water system could have a payback period of around 3 years (meaning that after 3 years the savings outweigh the cost of installing the instantaneous hot water system)	Tenants in individual units and CHP in respect of hot water used in common areas
Appliances	Consider energy-efficiency when buying and replacing appliances. Claim any government rebates available, including cashback on 'peak smart' air-conditioners.	Cost of appliance (less any rebate or cashback)	Estimated as $50 per year for more energy efficient washing machines or fridges, or $135 per year for more efficient air-conditioners	Tenants in individual units and CHP in respect of hot water used in common areas
Tenant use	Run an education campaign for tenants on energy use targeting tenants with high electricity or hot water use	NA	Variable.	Tenants
Rebates and concessions	Check tenant eligibility for rebates and concessions. Hold periodic information sessions with tenants (say once every 1-2 years depending on the rate of turnover in tenants) to assess whether tenants are receiving all relevant concessions and rebates. Teach tenants about their rights to access retailer hardship programs.	NA	Perhaps $350 in savings for each additional eligible tenant depending on the relevant concession or rebate	Tenants
Ergon Easy Pay reward where appropriate	Encourage tenants to register for Ergon's 'Easy Pay Reward'. This provides annual discounts of $75 for Ergon regional household customers if the customer can take up direct debit payment options	NA	$75 per year	Tenants

Note 1: Based on the Solar Choice calculator assuming a feed-in tariff of 9c/kWh before GST and a tariff 11 consumption charge of 26c/kWh before GST and 70% self-use at a conservative 70% system efficiency: https://www.solarchoice.net.au/blog/solar-power-system-payback-calculator

SUMMARY OF RESOURCES & LINKS

The Queensland Department of Natural Resources, Mines and Energy website has a wide variety of advice about saving money on electricity. This advice can be viewed at https://www.dews.qld.gov.au/electricity/saving.

The Commonwealth Government has information on designing, building, or retrofitting energy efficient dwellings at http://www.yourhome.gov.au/.

The Energy Efficiency Council has a list of members that can provide energy audits: http://www.eec.org.au/for-energy-users/find-a-provider#/find-a-provider.

Links to information on concessions and rebates can be found in Appendix A.

Energy saving tips can be found at websites including:

- **Ergon Energy**, https://www.ergon.com.au/retail/residential/home-energy-tips
- **Energex** https://www.energex.com.au/home/control-your-energy/save-money-And-electricity
- **Queensland Department of Natural Resources, Mines and Energy** https://www.dews.qld.gov.au/electricity/energy-save/electricity-saving-tips
- **QCOSS** https://www.qcoss.org.au/energy-factsheets

ADVOCACY OPPORTUNITIES

There are a range of changes to energy policies in Queensland that could assist the community housing sector including tenants to save on their electricity costs. These include:

- Providing flexibility to CHPs to agree with tenants to charge a fee within rental agreement to cover the cost of solar panels where the output is being provided to tenants
- Adopting some of the schemes available in other States to support the uptake of more efficient energy appliances (e.g. NSW Energy Savings Scheme)
- Expanding the current Queensland Government public housing initiatives for the rollout of solar power and digital meters from public housing clients in detached housing (see page 46) to community housing clients.
- Including some basic energy efficiency measures in new regulations to specify minimum standards for rental properties. The Housing Amendment Bill was passed in October 2017 and it includes now an ability to regulate for minimum standards for rental housing. Public consultation to establish these standards is likely to occur in 2018.

APPENDIX A

A1. Concession arrangements for tenants

Concessions are available at a State and Federal level.

The Queensland State Government currently offers four main concessions available for electricity consumers.

The scope, eligibility, and application process for each concession type is outlined below. More information on these concessions is available at the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/cost-of-living-support/energy-concessions

Where tenants meet the eligibility criteria for more than one concession, they are entitled to each of these concessions.

A2. Electricity and gas rebates[59]

The electricity and gas rebates are open to people who hold any of the below:

- Pensioner concession card;
- Department of Veterans' Affairs Gold Card (and receive the War Widow/er Pension or special rate TPI Pension)
- Queensland Seniors Card.
- Commonwealth Health Care Card (Electricity Rebate only)
- Asylum seeker status (residents will need to provide their ImmiCard details) (Electricity Rebate only)

The electricity rebate is currently $340.85 per year including GST. The Reticulated Natural Gas rebate is $71.30 per year including GST.

The scheme was expanded in January 2017 to Commonwealth Health Care Card holders and asylum seekers. The payment for these parties can be backdated to 1 January 2017 if they apply by 31 December 2017.

To be eligible the tenant must be the account holder and live alone or share the residence with:

- Their spouse;
- Other people who hold a Pensioner Concession Card or Queensland Seniors Card;
- Other people wholly dependent on them;
- Other people who receive an income support payment from Centrelink, the Family Assistance Office, or the Department of Veterans' Affairs and who do not pay rent; or

[59] See the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/cost-of-living-support/electricity-gas-rebates

- Other people who live with the card holder to provide care and assistance, and who do not pay rent.

Electricity users only receive the concession if they apply for it. To apply, they should contact their electricity retailer.

As noted above, tenants must be individually metered to be eligible. Rooms with shared bath/kitchen are therefore not usually eligible for the electricity rebate.

Where an embedded network operates, tenants must be advised that electricity and gas rebates are available and claims the rebates on behalf of eligible residents.[60]

The electricity rebate is available for premises where the proprietor/owner:

- Is the consumer of the energy retailer and has the account in its name rather than in the tenant's name;
- Supplies electricity and/or reticulated natural gas to each of the separately identifiable vans, flats or home units; and
- Charges for electricity and/or reticulated natural gas used by residents based on metered consumption.

In these cases, the proprietor/owner is responsible for submitting the application form.[61] The retailer specifies the process for applying for the electricity rebate. Form 502 must be submitted to the retailer. This form can be found at the Department of Natural Resources, Mines and Energy website at https://www.communities.qld.gov.au/resources/communityservices/community/government-concessions/502-electricity-proprietor-application-form.pdf

A3. Home Energy Emergency Assistance Scheme[62]

The Home Energy Emergency Assistance Scheme is for Queensland households experiencing problems paying their electricity or reticulated natural gas bills because of an unforeseen emergency or a short-term financial crisis. It is a one-off emergency assistance to help with paying home energy bills. The amount of the scheme is up to $720 once every 2 years.

To be eligible, a person must:

- Hold a current concession card, or
- Have an income equal to or less than the Australian Government's maximum income rate for part-age pensioners. This maximum income rate can be advised by Centrelink.

[60] See the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/cost-of-living-support/residential-homes-rebates

[61] Where electricity accounts are in the name of the tenant, then the tenant should approach the retailer directly or with assistance about obtaining the electricity rebate.

[62] See the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/cost-of-living-support/home-energy-emergency-assistance-scheme

- Be part of the person's energy retailer's hardship program or payment plan.

Full eligibility details can be advised by the party's energy retailer.

Parties can apply by contacting their energy retailer, or through their community group or financial counsellor.

A4. Medical cooling and heating electricity concession[63]

The Medical Cooling and Heating Electricity Concession Scheme helps with electricity costs for people who have a chronic medical condition, such as multiple sclerosis, autonomic system dysfunction, significant burns or a severe inflammatory skin condition, which is aggravated by changes in temperature.

The amount of the Medical Cooling and Heating Electricity Concession Scheme is $340.85 including GST per year. This is paid quarterly ($85.22 each quarter).

To be eligible, a person must:

- Be a Queensland resident and
- Have a qualifying medical condition and need cooling or heating to stop the party's symptoms becoming significantly worse. Qualifying medical conditions include:
    - multiple sclerosis
    - autonomic system dysfunction
    - loss of skin integrity or sweating capacity
    - severe compromise of functioning such as mobility at extremes of environmental temperature
    - hypersensitivity to extremes of environmental temperature leading to increased pain or other discomfort or an increased risk of complications and
- Live at a principal place of residence, which has an air-conditioning or heating unit.

The applicant and/or legal guardian of a minor with a qualifying medical condition must:

- Hold a current Pensioner Concession Card or a current Health Care Card and
- Be financially responsible for paying the electricity bill.

Full details of eligibility for the concession including qualifying medical conditions, are listed on the application form. The party's medical specialist must fill out the medical certification section.

If there are multiple applicants living in the same group home with one electricity account, each person can apply separately.

[63] See the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/cost-of-living-support/medical-cooling-heating-electricity-concession-scheme

If a person lives in a residential park, caravan park, or unit complex, he or she can apply and will need to show that his or her electricity usage is metered and billed (he or she should include an invoice or letter from the manager in his or her application).

A copy of the application form can be found at the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/documents/cost-of-living-support/heating-cooling-brochure.pdf.

Parties must reapply every two years, and must notify any changes of address, bank account details, or eligibility for the scheme immediately to Concession Services at Smart Service Queensland.

People should approach Smart Service Queensland (call 13QGOV or 3247 5941) through their doctor to make an application. People may be eligible for both this payment and the Essential Medical Equipment Payment administered by Centrelink.

A5. Electricity life support[64]

The electricity life support concession is for eligible people who are seriously ill and use a home-based oxygen concentrator or kidney dialysis machine.

Parties should contact their retailer and register their house as a life support household.

a. Oxygen concentrators

Parties are eligible if they:

- receive an oxygen concentrator free of charge through the Medical Aids Subsidy Scheme (MASS); and
- have been medically assessed in accordance with the eligibility criteria determined by MASS; and
- hold one of the following concession cards:
    - Pensioner Concession Card
    - Health Care Card
    - Health Care Interim Voucher
    - Child Disability Allowance
    - Queensland Seniors Card.

b. Kidney dialysis machines

Parties are eligible if they receive a home-based kidney dialysis machine free of charge through a Queensland Health hospital.

If the oxygen concentrator or kidney dialysis machine was not supplied by Queensland Health, the party is not eligible to receive the electricity life support concession. The concession is not available

[64] See the Department of Natural Resources, Mines and Energy website at https://www.qld.gov.au/community/cost-of-living-support/electricity-life-support

for any other machines supplied through Queensland Health or other agencies. Continuous Positive Airflow Pressure (CPAP) machine users are not eligible to receive the concession.

Full eligibility requirements for the concession are outlined on the application form.

The application form should be sent within 14 working days of receiving the oxygen concentrator or provided by the Renal Unit at Queensland Health Hospitals.

For eligible electricity users, the payment for each oxygen concentrator is $694.18 per year, or $57.85 per month ($173.55 per quarter), or for each kidney dialysis machine $464.88 per year, or $38.74 per month ($116.22 per quarter).

The concession is calculated monthly and paid quarterly around 1 January, April, July, and October each year.

Changes in address, bank account details, or eligibility must be notified immediately to Concession Services at Smart Service Queensland.

People should approach Smart Service Queensland (call 13QGOV or 3247 5941) through their doctor to make an application. People may be eligible for both this payment and the Essential Medical Equipment Payment administered by Centrelink.

A6. Selected assistance available through Centrelink

Essential Medical Equipment Payment – this payment helps with the additional costs of running essential medical equipment, medically required heating or cooling, or both. The maximum rate is $154 each year. Further details can be found at https://www.humanservices.gov.au/individuals/services/centrelink/essential-medical-equipment-payment?utm_source=eea&utm_medium=web-application&utm_campaign=eea-pf

Crisis payment – People are eligible for this payment if they are in a financial crisis. This one-off payment is equal to a week's pay at the person's existing income support payment rate. People can get up to 4 payments over 12 months. Further details can be found at https://www.humanservices.gov.au/individuals/services/centrelink/crisis-payment?utm_source=eea&utm_medium=web-application&utm_campaign=eea-pf

Special benefit payment – People are eligible if they are in severe financial hardship. The rate is usually the same as Newstart Allowance or Youth Allowance. Further details can be found at https://www.humanservices.gov.au/individuals/services/centrelink/special-benefit?utm_source=eea&utm_medium=web-application&utm_campaign=eea-pf

Appendix B

B1. Analysis of bulk hot water systems

This appendix evaluates the cheapest bulk hot water system, comparing solar hot water, heat pumps, instantaneous electric hot water, and existing electric storage hot water systems.

A bulk size of 300L supplying 4 units has been chosen for comparison purposes. A comparable instantaneous hot water system may be a 27L system. This size qualifies for the controlled tariffs (tariff 31 and tariff 33). Tariff 33, which applies for 18 hours per day, would be suitable as it would be likely to provide sufficient hot water to last through the 6 hours when the systems have no power. Tariff 31, which only operates for 8 hours/day, is not considered likely to deliver sufficient hot water.

A larger bulk sized hot water system is likely to be cheaper on a per tenant basis. Generally, heat pumps will become cheaper compared to other options for much larger demand.

The comparative costs of these four types of hot water systems are set out below in Table B1.

Table B1: Comparative upfront and running costs of different hot water systems

System	Upfront costs for a system for four tenants (note 1)	Annual running cost for four tenants (note 2)	10 year capital and operating cost for four tenants (note 3)	Notes
Solar	$3,500	$335 (tariff 33) $426 (tariff 11)	$9,300	
Heat pump	$2,900	$549 (tariff 33) $697 (tariff 11)	$10,420	
Instantaneous hot water	One system: $1,150	$546 (tariff 11)	$7,415	Tariff 33 does not apply as the unit cannot generate hot water when tariff 33 is not operating.
	Two systems: $2,300	$546 (tariff 11)	$9,370	A single 27L three phase unit may not be sufficient for 4 tenants if they are likely to use hot water all at the same time so 2 systems also included.
Electric storage hot water	1,000	$1175 (tariff 33) $1493 (tariff 11)	13,450	

Note 1: Upfront costs based on web searches compared with Choice website at https://www.choice.com.au/home-improvement/water/hot-water-systems/buying-guides/hot-water-systems for 300L systems (Solahart 302L, Stiebel Eltron WWK 302, and Stiebel Eltron DEL 27 AU three phase instantaneous hot water systems, Rheem 315L), and rounded. Costs do not include installation. Heat pumps and solar systems earn rebates (known as STCs) under the Renewable energy target. For heat pumps, these STCs have been deducted from the upfront cost for heat pumps based on REC Registry estimates of the amount of STCs earned and recent STC prices of $31 to $40/STC. For the solar system, an applied STC value of $27 for a Solahart 302L system was selected based on the STC-rebated price offered by Solahart for that system:

https://www.solahart.com.au/government-incentives/. See the REC registry estimates of STC credits at https://www.rec-registry.gov.au/rec-registry/app/calculators/swh-stc-calculator. Instantaneous hot water systems and electric hot water systems do not earn STCs.
Note 2: Running costs are based on 29.96 c/kWh tariff raising water to 65 Celsius heating 200L and 19 tap turns. Instantaneous hot water costs based on EcoEfficiency analysis of 1.25kWh/day across 4 units at same tariff as other systems (29.96c/kWh). These have been compared against estimates from Stiebel Eltron for different hot water systems, which show that instantaneous hot water system running costs are a little higher than heat pump running costs.
Note 3: The ten-year combined capital and operating cost is calculated by applying an interest charge of 7% per year to the capital cost for each of the 10 years and adding the interest-adjusted capital and operating costs over 10 years. Current electric hot water costs based on 35% hot water contribution and 8kWh/day average use would be $306 per tenant per year.

From the above analysis, and based on the combination of upfront and running costs, instantaneous hot water plumbed to serve multiple units within the individual units or the common area is likely to be the most cost-effective option. On a ten-year basis after combining both the upfront and ongoing costs of operation, instantaneous hot water systems are around the cheapest (on a par with solar hot water systems) and electric storage hot water systems are the most expensive (see the fourth column in Table B1 above).

As a single, large instantaneous hot water system may not be able to supply 4 units if all the tenants were using water at the same time,[65] a conservative assumption has been made to include the cost ranges for the installation of both one and two instantaneous units to supply 4 tenants.

Solar hot water systems may not be suitable as they have a much higher upfront cost and may occupy too much roof area (for example, 40 units would require 10 systems and would require around 44 metres by 4.4 metres of unshaded roof space).[66] They run out of hot water if it is cloudy for a few days.

Electric storage hot water systems are not recommended because, although they have a lower upfront cost than instantaneous hot water systems (about half the cost assuming installation of 2 instantaneous hot water systems across 4 units), they cost about twice or three times as much to run each year. This makes them the most expensive option once running costs are included. The installation of new electric storage hot water systems was banned from 2006 to 2013 due to their high running costs.[67]

Heat pumps cost about twice as much in upfront costs compared to instantaneous hot water systems and the better-quality systems should operate at about the same running cost. Some questions remain over the reliability and maintenance costs of heat pump water heaters.

[65] This is less of an issue for a heat pump as it has a water reservoir to cater for simultaneous use.
[66] The Solahart 302L is 2.48 by 2.53 metres and it is recommended to leave 0.9m on each side for servicing: See Solahart website at https://www.solahart.com.au/products/solar-water-heating/solahart-l-series/302l/
[67] See Department of Housing and Public Works website at http://www.hpw.qld.gov.au/construction/Sustainability/SustainableHousingLaws/Pages/ElectricHotWaterSystemReplacement.aspx

Overall, instantaneous hot water heaters (using tariff 11) are cheaper than electric hot water systems (using tariff 33), after comparing upfront and running costs, after about 2.5 years. They also require less space, as they heat water as required rather than hold hot water in a tank.

A consideration is that instantaneous hot water systems are less compatible with tariff 12A given they cause large spikes in electricity usage when hot water is used.[68] If instantaneous hot water systems are selected, then it would be potentially more costly to use tariff 12A if tenants often used hot water during the 3pm to 9:30pm summer weekday peak time.

For whichever system is chosen, it would be important to insulate the pipework and consider adjusting the thermostat to the lowest possible temperature that tenants are happy with.[69]

As electricity prices rise, electric hot water systems will become less and less attractive compared to the other three hot water systems.[70]

[68] By contrast, the other systems hold water in tanks, so electricity use does not spike.
[69] Thermostat adjustment may depend on the hot water model type
[70] Relative to upfront costs of those systems