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Energy management plan – 124-126 McLeod Street, Cairns

Engineroom and Elucid

A plan for managing energy cost-effectively at 124-126 McLeod St community housing

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1. Introduction

1.1. Purpose

The purpose of this energy management plan (EMP) is to identify actions at 124-126 McLeod St, Cairns that could reduce the cost of electricity for tenants and Access Community Housing without sacrificing the amenity of electricity usage in heating, cooling, and running appliances. This plan recommends a set of actions that could save tenants and Access (in relation to common area use) money in relation to electricity supply charges.

The energy market is undergoing rapid changes, and there are now 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 EMP 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, and solar generation and battery use.

It also identifies options for funding energy investments by Community Housing Providers (CHPs) and briefly outlines some of the concession arrangements available for tenants.

Some of the savings recommended in this report accrue to Access, while other savings accrue to tenants, e.g. savings from more efficient fans, fridges, or reduced energy costs for cooling from installation of external shading. This is known as a 'split incentive'.

It is important for community housing providers to ensure energy costs for tenants are as low as feasibly possible as the running costs of a home are ultimately just as important as the rent charged in making sure housing is affordable. In fact, if tenants face high energy costs, then these costs may negate the benefit of lower rents at community housing properties.

This plan acknowledges this split incentive by identifying against specific savings measures, whether the saving is enjoyed by Access or the tenants. Savings to both tenants and Access are important in moving towards reducing the cost of electricity without reducing tenant amenity.

There may be limited options for Access to recover this expenditure from tenants under tenancy agreements. Tenants may be willing to undertake some of this expenditure themselves if they are educated about the benefits and the upfront costs are small.

1.2. Process

The process used to develop this EMP between May and October 2017 included:

- Consultation with Access Community Housing to understand both the characteristics of the site and energy infrastructure, including energy management strategies undertaken to date, and of the housing services provided.

- Arranging for an energy audit of the McLeod street property by qualified and local energy auditors experienced in the North Queensland context (The EcoEfficiency Group). The EcoEfficiency audit included a site assessment of McLeod Street to determine existing energy use and provide recommendations about potential savings. The results of the energy audit were presented separately to Access.
- Conducting on-site interviews with eight tenants to gain an understanding of how tenants at McLeod Street are using energy, their attitudes towards and understanding of energy costs, and individual or group characteristics that impacts on their energy use. The interviews sought to identify typical usage levels, times of use, and appliance type. Tenant interviews were conducted over two days in early June. Seven interviews were conducted in the tenants' homes, while one was conducted over the phone. Five of the tenants also provided access to their bills and usage to enable an analysis of their usage and billing patterns.
- Undertaking further research and investigation of the costs and benefits and business models associated with various energy management options, for example the operation of embedded networks.

All these inputs were used to inform the recommendations provided in this plan.

2. Context

2.1. Property

The property consists of 32 studio units (across 2 buildings) and 8 rooms with shared bath/kitchen (within 1 building). The 8 rooms are single occupancy, with 4 shared toilets/showers. The common area contains a communal kitchen and common laundry. The laundry has 2 coin-operated washing machines. There are no lifts or pool and there is minimal garden area with a limited irrigation system. The buildings are 3 and 4 storeys high. The building is close to the centre of Cairns.

The building is offered for community housing under the Community Managed Studio Unit (CMSU) program, which is a Qld government program (see further information below). The rooms are intended for single people.

The units are leased from The Department of Housing and Public Works (DHPW). Under this arrangement, Access Community Housing is responsible for responsive and planned maintenance, while DHPW is responsible for upgrades and major renewals and refurbishments. The lease is not clear on whether Access Community Housing or DPHW would pay for upgrades of appliances for efficiency purposes where current appliances are still functional. Installing new insulation would be considered an upgrade and therefore fall within the responsibility of the DHPW, but DHPW has absolute discretion regarding whether it proceeds with any upgrades. Painting is the responsibility of Access Community Housing, but only for maintenance purposes, while responsibility for repainting the building a lighter colour to improve the thermal properties of the building is also unclear. It is likely that Access and DHPW would need to discuss upgrades, particularly those that change the fabric of the building.

The main electricity consuming equipment within the individual units is:

- Hot water system (80 litre system for each unit)
- Lighting
- Cooking facilities including stovetop, oven, fridge/freezer, toaster, jug
- Fans
- Portable air conditioners (in a small number of some units)
- TV, radio, sound system, computer facilities and mobile charging.[1]

The main electricity consuming equipment in the communal area building is:

- Communal hot water system (160 litre) for the washing machines, common kitchen and bathroom.
- Two coin-operated washing machines and one coin-operated dryer (out of service at the time of the audit).
- Communal kitchen with a microwave, two stovetops and two ovens (generally for use by the 8 rooms).
- Lighting including night-time security lighting.
- Recently installed security cameras
- Appliances within the 8 rooms which include fridges/freezer, television, lighting and fans.

The units were all originally connected to a common meter. However, about 1 year to 18 months ago, the 32 studio- and one-bedroom units were fitted with individual meters and the occupants of the studio units now have individual bills. All the meters are in one place at the entrance of the building and are accessible without entering a unit.

The 8 rooms and the common areas are on a single meter in Access Community Housing's name.

There are no solar panels on the property.

2.2. Baseline usage

Electricity is the only energy source for the unit block at McLeod Street.

The units and the common areas are all on tariff 11, which is general residential tariff offered by Ergon Energy Retail. Tariff 11 has a usage charge of 28.479 cents per kWh including GST and a daily service charge of 95.846 cents per day including GST. In addition, users must pay a metering charge which in 2017-18 was $35.91 per year including GST. There are no other retailers in North Queensland at present for either the tenants or the building manager to choose from.[2]

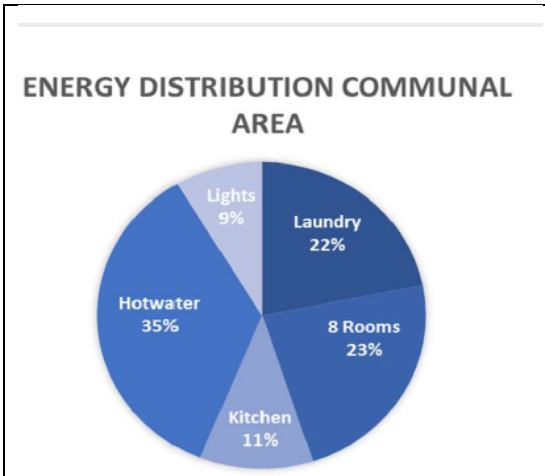
[1] EcoEfficiency energy audit, pp. 1-2
[2] The reason for the absence of other retailers is discussed below in section 5.1.

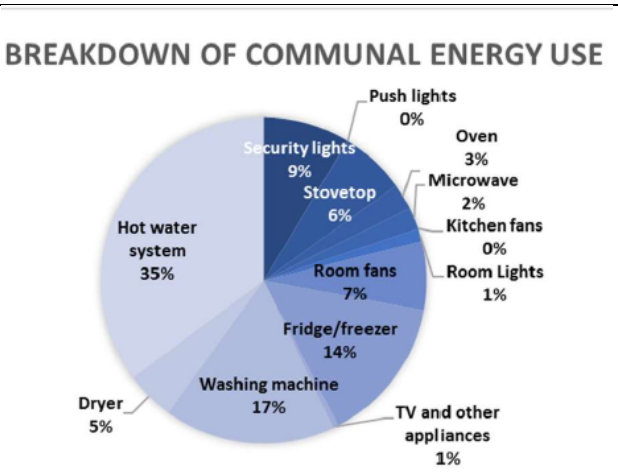
The EcoEfficiency energy audit presents information on use and trends for both the common areas and the individual units.

The common areas include the eight individual rooms and common areas such as corridors, outside lights, and the common kitchen and laundry. Usage over 2016-17 was 18,724 kWh for a cost of $5,430 (at an average use per day of 51 kWh). The daily service charge ($359.62 for the year) was 6.6 per cent of the total usage charge.

A 37 per cent downward trend in usage was noted over June 2016 to June 17. It suggested the installation of more energy efficient lighting in March 2017 and occupancy rates might be factors in this downward trend.[3] EcoEfficiency identified the allocation of energy use at per Figures 1 and 2 below.

Figures 1 and 2: Energy use in common areas





The individual units consist of 18 studio apartments (living room plus bathroom/laundry) and 14 single bedroom apartments (living room, bedroom plus bathroom/laundry). These units have been individually metered since May 2015.

EcoEfficiency analysed energy use for 5 units for June 2016 to June 2017 where the tenants agreed to provide the information. The average energy consumption for these units was 2,857 kWh. At the average daily use of 7.82 kWh, the annual cost including metering costs and after rebates was around $850.[4] The daily service charge ($359.62 for the year) was 42.4 per cent of the total usage charge, or

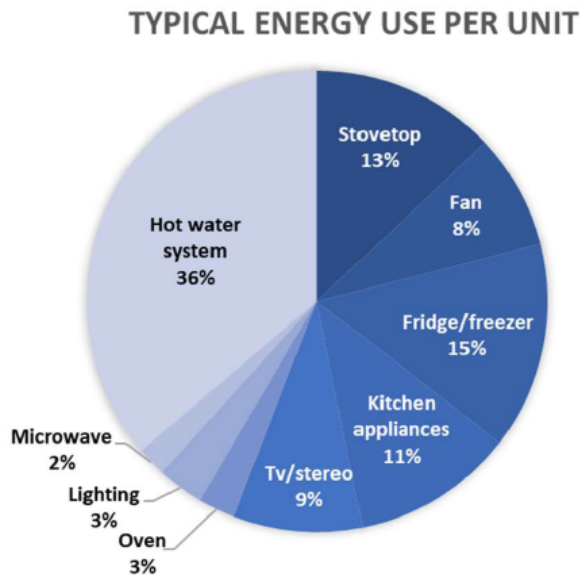
[3] EcoEfficiency audit, p. 2

[4] This assumes that the tenants are eligible for the electricity rebate (currently $340.85 including GST per year).

around 30 per cent of the total charges before rebates. This compares to an average use in the Cairns region for a one-person household of approximately 9.5kWh per day.[5]

Lower than average usage at McLeod Street can most likely be attributed to a lack of air-conditioning.[6] However tenant use at 124 McLeod St is higher than the other single-occupancy community housing tenancies studied in Brisbane, where consumption averaged 5.9 kWh including an allowance for bulk hot water.[7] This suggests there are opportunities to reduce use at McLeod St, especially through introduction of bulk hot water. However, lower consumption should not result in reduced amenity for tenants as they are already generally careful users of energy. Figure 3 provides a breakdown of how electricity is used in the units.

Figure 3: Typical energy use in the units[8]



The high estimated contribution of hot water to total use at 36% makes it a prime target for savings.

[5] EcoEfficiency audit, p. 4 citing Australian Energy Regulator, *Energy Made Easy, Understand and compare your home based on electricity usage for one-person household in the postcode region of 4870*: www.energymadeeasy.gov.au/benchmark

[6] EcoEfficiency energy audit, p. 4

[7] Tenant use averaged 4.5 kWh per day, and each tenant's share of bulk hot water was a further 1.4 kWh per day, for a total average use of 5.9 kWh per day. The tenants in this community housing project occupy studios or one-bedroom unit with a separate toilet/shower.

[8] This is based on assumptions and estimates detailed in the EcoEfficiency report about the types of appliances and systems used. The breakdown does not consider those units with their own air-conditioning or washing machines.

2.3. Tenants

The tenant interviews were held with residents in the one bed room units rather than in the transitional rooming accommodation as these were the tenants receiving energy bills. The length of tenure of those interviewed varied from 6 months to 19 years.

Tenants had a range of personal circumstances, particularly health issues, which affect their overall energy use. In some cases, these needs would need to be considered before adopting specific measures to ensure they are not disadvantaged. For example, where individuals have thermoregulatory issues choices around heating and cooling will be important. Further, where tenants have limited discretion about the time and quantity of consumption, this may be a factor in determining the suitability of strategies such as changing tariffs.

Although two of the tenants worked (one doing casual shift work) many of the tenants did not work and therefore used energy throughout the day. Subject to the caveats above, this might suggest a time-of-use tariff could be suitable given these tenants have some ability to shift the time of some energy consumption to off peak periods.

There was variation in the tenants' interest in, and understanding of energy efficiency and energy costs. Some tenants were interested to discuss what they could do to reduce energy usage, while others believed they had already taken all the actions that they could.

While the majority indicated they were currently managing their energy costs, they also reported initial financial disruption when they first started receiving bills, especially from the $170 security deposit required by Ergon. Ergon discontinued charging the deposit when the National Energy Consumer Framework commenced in Queensland in July 2015.

Tenants generally preferred the idea of monthly billing to quarterly billing as it was easier to budget for. Tenants were receiving the electricity rebate, but the two tenants seen as eligible for the medical cooling and heating electricity rebate were not aware that it existed. The medical cooling and heating electricity rebate concessions can be applied on top of the electricity rebate giving the tenant a total discount of $681.67 per year.

Familiarity with electricity bills varied significantly among the tenants. Some tenants were not familiar with the fact that electricity was charged based on a consumption and daily charge, meaning that they thought that if they used minimal electricity they could avoid being charged, without realising that they would still be charged the daily charge. This low level of understanding of energy charges would need to be addressed in adopting some strategies outlined in this plan, for example if suggesting tenants change to a time of use tariff.

3. Tariffs

3.1. Retail competition

The units at 124 McLeod Street are in the retail area for Ergon Energy Retail. Currently, no other retailers are active in North Queensland because the cost of supply has been subsidised to below actual cost under the Queensland Government's uniform tariff policy. Under this policy, the Government sets the maximum tariff that can be charged by Ergon Energy Retail at the same tariff that applies in south-east Queensland.

The cost of supply in North Queensland is higher than in south-east Queensland because of higher distribution costs due to the lower number of customers and the large distances over which electricity is supplied.

At some point in the future, the Queensland Government may redirect the subsidy under the uniform tariff policy from Ergon Retail to Ergon Distribution. This would make it possible for other retailers to be supplied by a subsidised Ergon distribution network and compete with Ergon Retail on retail margins.

At present, competition among retailers in south-east Queensland has driven tariffs down to about 75 per cent of the uniform tariff that applies in North Queensland.

At that time, it would be worthwhile for Access and tenants to look for better retail deals. A website such as the Australian Energy Regulator's Energy Made Easy website allows electricity users to compare retail electricity offerings from different retailers (see https://www.energymadeeasy.gov.au/).

3.2. Tariff selection

Currently, the tenants at 124 McLeod St are on tariff 11, which is the standard residential tariff.

Tariff 11 is comprised of a flat consumption charge of 28.479c per kWh plus a daily supply charge of 95.846c per day. The consumption charge does not vary by the time of the day.

Other possible tariff choices are detailed in EcoEfficiency's energy audit (p. 6), and include:[9]

- *Tariff 12A, a time of use tariff* that charges more for use at peak times (summer weekday afternoons and evenings) and less for consumption at other times.
- *Tariff 33 – an offpeak tariff,* that provides power for a minimum of 18 hours per day. It is suitable for appliances that can be interrupted for some part of the day, such as some types of hot water systems. It has a usage charge of 20.482 c/kWh (a 21% discount on the tariff 11 usage charge) and has no daily service charge. It can only be used in conjunction with another tariff, such as tariff 11 or tariff 12A.

[9] The EcoEfficiency audit examines several other tariffs, but rules them out: see p. 6

- *Tariff 31 – a super offpeak tariff* is like tariff 31, but where supply is available for only 8 hours per day (generally these eight hours will be between 10pm and 7 am). Usage is 15.776 c/kWh (a 39% discount on the tariff 11 usage charge). It may be suitable for some hot water systems.

Tariff 12A (time of use tariff)

This tariff charges a significantly higher peak charge for use during the period from 3pm to 9:30pm on weekdays in summer (December to February). This charge is 67.251c per kWh. It also charges a slightly higher daily supply charge (98.833c per day compared to tariff 11 – 95.846 c per day). It charges a significantly lower consumption charge for use at times other than peak times (23.177 c per kWh, which is about 81 per cent of the usage charge under Tariff 11). Tariff 12A requires installation of smart meters to tell the time of day that electricity is being used.

This tariff might be worth considering depending on when individual tenants use their power. Assume for example that tenants currently use 8 kWh per day, and in summer half of this is at peak times (i.e. 4 kWh). If tenants could reduce use at peak times from 4 kWh to 2.7 kWh, then their bill would be about $67 per year lower under Tariff 12A than Tariff 11. This is because the saving of about 19% on usage charges applies for 82% of the days in the year (all days except summer week days), and this saving offsets the much higher rate on usage at peak times.

However, to access Tariff 12A a smart meter would need to be installed, and tenants would risk potentially much higher electricity charges if they used a lot of power at peak times. Existing accumulation meters, as available currently at McLeod Street, do not support tariff 12A.

It is difficult to determine if Tariff 12A is suitable for communal areas. On the one hand Access, as the building manager, lacks control over the times at which the kitchen, laundry, and 8 individual rooms are used. However, Access may be able to meter these areas and decide if it considers use at summer peak times is sufficiently low to justify the cost of installing a smart meter.

Under the Energy Savvy program, Ergon is currently conducting a trial of smart meters in low income households to see if they enable households to better manage their electricity use and costs. Access could monitor the outcomes of the Ergon trial to see if Tariff 12A is effective in saving money for households in a similar position to the tenants at 124 McLeod St. Ultimately a decision to switch tariffs in the individual units would be a choice made by those households; however, Access could assist tenants with information about this tariff option including how they might assess whether it was suitable for them.

Tariffs 33 and 31 (controlled load)

Tariffs 31 and 33 are only available for part of each day (18 hours for tariff 33 and 8 hours for tariff 31). Generally, these tariffs will not be available at peak times (afternoon to evening). These tariffs are known as controlled load tariffs as the distributor controls the load to reduce its peak supply.

The fact that tariff 31 and 33 are not available for a significant period of the day means they are not likely to be suitable for most appliances, fans, lights, ovens or stovetops.

Tariffs 31 and 33 may both be suitable for hot water systems which operate by holding a large reservoir of hot water that is unlikely to run out during the time when the hot water system is not working.

However, a bulk hot water system is likely to be a lower cost option for supplying hot water to tenants. Specific recommendations around the use of tariff 31 or 33 for hot water are discussed below in section 7.2.

4. Moving to an embedded network

Embedded networks are private electricity networks that serve multiple customers and are connected to the distribution network through a parent meter. The embedded network is owned and operated by the building manager.[10] The embedded network provider acts as the retailer and has similar obligations to a traditional retailer under the National Energy Consumer Framework.

If Access set up an embedded network, it would have to read the individual tenant meters and charge the tenants for services. Access would also need to provide tenants with the consumer rights outlined in the exempt retailer guidelines. Many of these obligations can be provided by a third-party provider for a fee.[11] Third-party providers operate across Queensland, including the areas supplied by the Ergon network in North Queensland.[12]

The major reasons for Access to set up 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; and
- The rate at which electricity is purchased is a bulk rate that is below the rate of tariff 11.

At 124 McLeod Street, tenants currently pay 32 sets of daily service charges (a total of $11,194 per year). These service charges are substantial - about 30 per cent of total charges for tenants using an average amount.[13] They also pay a meter service charge of almost $37 per year. By moving to an embedded network, tenants would collectively save about $12,000 per year.

Meters2Cash, a company that is currently providing metering and billing services to embedded network managers, suggests that a bulk rate for electricity could be 10 to 30 per cent below the rate for tariff 11. A separate meter for hot water on tariff 31 or tariff 33 may be able to be retained; however, doing so

[10] The embedded network could also be operated by a building owner or a third-party.
[11] 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.
[12] Discussions with a third-party provider which states that it has many customers in North Queensland.
[13] Based on the average 7.82 kWh/day of the 5 tenants that provided access to their bills

may reduce total use to the point where the discount for all other use may be smaller. It is understood that Meters2Cash charges about 27c per day per tenant to provide metering and billing services. This means that paying a third party such as Meters2Cash, tenants would save around $8,900 in net terms.[14]

To set up an embedded network, Access would need to:

- 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;[15] and
- Choose a tariff for the parent meter. Staying on tariff 11 for the parent meter is one choice. Tariff 11 is available where total use is under 100 MWh per year (100,000 kWh). At say 8 kWh/day, 32 units would use in total 94 MWh per year. Access could choose to maintain 2 parent meters to cover the risk that total use would exceed 100 MWh/year. Alternatively, Access could consider tariff 12A as discussed in section 4.2 above. ON either tariff, 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).

Access may also need to buy the existing individual meters for the 32 units off Ergon depending on which entity owns them.

While there are clear cost savings available following the installation of an embedded network arrangement, there are various obligations that are associated with the embedded network provider role which 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 easily negotiated.

Arrangements for the eight rooms with shared bath/kitchen

If 124 McLeod St became an embedded network, then no daily charge would be levied on individual meters behind the master meter. Under these circumstances, it would likely be worthwhile to place individual meters on the eight rooms with shared bath/kitchen to make the usage in these rooms eligible for concessions. For example, the meters could be placed to measure only the electricity use within the eight rooms rather than in the shared kitchen/laundry communal areas. Doing this would reduce the cost of usage in the eight rooms to zero assuming the consumption charge for the eight unmetered rooms was less than the electricity rebate (presently $340.85) per year and the tenants were eligible for the electricity rebate.[16]

[14] $11,994 less $3055
[15] From Dec 2017, there will be new rules to make it easier for tenants to leave embedded networks.
[16] Where tenants use less than $340.85 per year in their room, then only their actual charges are rebated.

5. Concession arrangements

Access to all the concessions and rebates that tenants are entitled to could significantly reduce their electricity bills.

There are four State-based concessions that could apply to tenants at 124 McLeod St.

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.

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 should approach the retailer directly (with support from the community housing provider as required). From the tenant interviews, it seems that a few tenants at 124 McLeod St appear to be eligible for 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. Parties can be eligible for more than one concession at the same time.

6. Recommendations in specific uses

This section reviews the opportunities for savings in a range of areas of energy use within tenant flats.

6.1. Selection of appliances

It is important to choose appliances based on minimising the whole-of-life costs of appliances. The cost of electricity is an important consideration in the selection of appliances. Other whole-of-life considerations include maintenance and associated costs (such as water costs for washing machines and

dishwashers), and the likely lifespan of the appliance.[17] For instance, the EcoEfficiency energy audit notes that lower cost fridges rated only 2.5 stars typically cost more in whole-of-life terms than 3.5 star fridges, because of the long life of fridges and the cost of electricity (see section 6.3 below).

The running costs of the less efficient and more efficient appliance can be worked out.[18] The difference in running costs can be compared with the difference in upfront costs between the less efficient appliances and more efficient appliances to determine the simple payback period on buying the more efficient appliance.[19] 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 Access buys the main household appliances, then any additional upfront costs associated with more efficient appliances would be borne by Access. 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 further in section 9 below).

6.2. Hot water

Heating water is a major component of total electricity costs (about 36 per cent). Each of the individual units has an 80L hot water system, while the communal area has a 160L hot water tank. [20]

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.
- *Instantaneous electric hot water systems*. These systems use electricity or gas to heat water as required without holding it in tanks.
- *Existing electric hot water systems*, but moving to economy tariffs (tariff 31 or 33). Electric 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 the cheapest option. The analysis is contained in Appendix B.

[17] EcoEfficiency energy audit, p. 15
[18] See Ergon Energy website at https://www.ergon.com.au/retail/residential/home-energy-tips/calculators/appliance-running-cost-calculator
[19] 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.
[20] EcoEfficiency energy audit, p. 12

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.

It is understood that the Department of Housing and Public Works (DHPW) is interested in instantaneous hot water systems for its public housing. Access could contact DHPW for their view on the best hot water system (Anthony Bourke and Craig Ingram have been suggested as contacts at DHPW).[21]

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).

Bulk supply would also require Access (or a 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. 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 to understand that the overall cost will be lower.

The experience in other community housing complexes where bulk water is that tenants can be confused by the variable rate that often applies (i.e. the unit cost will change according to the volume consumed although the costs are being recovered proportionate to use). Without clear information, tenants may believe they are being overcharged or incorrectly charged. This risk is higher where tenants do not understand the costs of hot water, for example because their hot water has been on the same tariff as the rest of their energy use (i.e. Tariff 11) rather than an off-peak tariff.

A further risk to note is that tenants are not provided with concessions for bulk hot water, so assistance such as the Home Energy Emergency Assistance Scheme would not be available in relation to a bulk hot

[21] Instantaneous hot water systems could be more expensive under time-of-use or demand-based tariffs as they generate spikes in use. Some users have experienced problems triggering hot water flow from instantaneous hot systems while using low flow showerheads.

water bill. Tenants would however still receive the same amount of concession for their (lower) electricity bill because Queensland has a flat rate rather than consumption based concession for electricity. Consumers of bulk hot water also do not have access to the Ombudsman in respect of disputes about their supply or billing, although they are able to take complaints to the Office of Fair Trading.

If it is not physically possible to install a bulk system, then installing individual instantaneous hot water systems is the second cheapest option.

When should the existing hot water systems be replaced?

The issue arises whether the existing electric hot water systems should be replaced with bulk instantaneous hot water systems now or only when the existing systems fail.

We note that the cost of the existing 80L electric hot water systems has already been spent, and these systems are in working order.

The analysis in Appendix B shows that installing a new instantaneous hot water system now would be cheaper than persisting with 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 hot water systems. This is true even when the upfront costs of installing instantaneous hot water systems are included but the costs of the existing electric hot water systems are not included.[22] This makes a compelling case to replace the existing 80L systems as soon as possible with a bulk instantaneous hot water system.

Other hot water savings

Noting that hot water is a major use of energy in tenant units:

- Low flow shower heads could be installed in the tenant units to minimise hot water use. Tenants could be offered the choice of switching over or staying with their current shower heads, noting that low flow shower heads may not be suitable for some tenants for medical reasons. Installing low flow shower heads could reasonably save around $146 per year (including GST) while costing about $20-35.[23]
- Insulating existing hot water tanks and fixing existing hot water insulation would reduce heat losses through pipework.

[22] 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.

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

6.3. Fridges/Freezers

The fridges/freezers use about 15 -16 per cent of energy for the individual units and for the common areas.

The fridges are selected based on upfront cost. They have a low energy rating (2.5 stars) which means that they have higher whole-of-life costs when running costs are considered. EcoEfficiency estimated 3.5-star fridge/freezers would save around $23-41 per year, while costing perhaps $150 extra initially.[24] This equates with a simple payback period of 3.5 to 6.5 years.

The saving does not justify replacing the fridges prior to the end of their natural life as the simple payback period would be over 13 years.[25]

Having said that, the Queensland Government announced in October 2017 that it would provide rebates of up to $300 to purchase an energy efficient fridge, washing machine, or air conditioner starting from January 2018. It estimated that this could provide bill savings of up to $50 a year for an energy efficient washing machine or fridge or $135 a year for an air conditioner. This initiative could bring the simple payback period down to about 7.5 years assuming an energy efficient fridge with a sticker price of $600 (before the $300 discount) and a saving on electricity costs of about $40 per year.[26]

6.4. Overhead fans

Overhead fans use a considerable amount of energy given they are operated up to 24 hours per day during warmer months.

The current overhead fans are rated 70W. EcoEfficiency noted that if 45W fans could have a simple payback period of 2 years based on a $19/year saving and a $40 upfront cost.[27]

Access could offer tenants the choice to replace the existing 70W fans early with 45W fans. The savings in energy costs justify replacement from a financial perspective. However, the potential loss of amenity must also be considered in the face of a saving of only $19 per year. Given how hot it can get in North Queensland, moving to 45W fans may cause the flats to become too hot for tenants in summer. If it is considered that 45W fans are acceptable to tenants, some tenants have medical issues that may require larger, more powerful 70W fans.

There are some low wattage, high airflow fans on the market. Given the hot conditions in Cairns, 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/.

[24] EcoEfficiency energy audit, pp. 13-14
[25] Even at the higher $41 saving per year.
[26] (600-300) cost/40 per year energy savings
[27] EcoEfficiency energy audit, p. 14

These fans have wattage at their maximum settings of around 18 or 24 watts, providing a saving in electricity costs of around $35-40 per year.

If fans are replaced, then EcoEfficiency recommends selecting new fans based on comparing the operational wattage to the airflow to select the fan with the highest airflow and lowest wattage.

6.5. Lighting

Most of the lighting has been switched to LEDs, which are the most efficient lights from an energy-use perspective.

The EcoEfficiency audit notes that there are still a few 36W fluorescent lights in the laundry, walkway, and some security lights that have yet to be converted to more efficient LED lights. These lights could be converted to LED lights. The estimated cost of the new LED lights would be $20, and if they are on for 8 hours per day then the saving might be $22 per year,[28] meaning a simple payback period[29] of less than one year.[30] Given these cost savings, it makes sense to install the new LED lights right away rather than waiting until the existing bulbs blow. The new bulbs do not need to be installed by an electrician.

6.6. Thermal mass shading and insulation

EcoEfficiency's energy audit suggested some measures to reduce heat entering the building including:

- Insulation in the roof space to prevent heat penetrating the roof and heating the upper storey apartments and to retain heat during winter months. Ergon notes that the Building Code of Australia recommends ceiling insulation is rated R4.1 or greater in the Cairns area.[31] A study cited by Ergon found that in 2012 dollars, ceiling insulation would save average users about 634 kWh per year and $105 per year at a 7 per cent cost of finance. In 2017-18 prices, those savings could be more given the fast rise in electricity prices since 2012 compared with expected rises in the cost of installing insulation;[32]
- Additional shading on west-facing balconies. Fabric or aluminium fixed louvres are low cost options for external shading.[33]
- Choosing lighter colours for future painting of the building to reflect heat and light coloured or silver roof sheeting to reflect heat from the sun;
- Choosing lighter colours internally to reduce the need for lighting during the day;
- When replacing curtains, using thick or block-out curtain material.

[28] At the tariff 11 usage rate assuming use of 12 hours/day.
[29] A simple payback period is one that excludes the cost of finance, i.e. any borrowing costs of the funds used to finance expenditure.
[30] EcoEfficiency energy audit, p. 15
[31] See Ergon website at https://www.ergon.com.au/network/manage-your-energy/home-energy-tips/renovating-and-building/insulation
[32] Calculated as 634 kWh at 28.479 cents per kWh
[33] See http://www.ecospecifier.com.au/knowledge-green/setting-priorities/eco-priority-guide-external-shading-devices/

The audit notes there is little potential for extra shading from planting trees. That may be an option at other Access properties.

7. Solar panels and batteries

7.1. Solar panels

The EcoEfficiency report notes the roof space is suitable for the installation of solar panels and notes that the roof space is oriented primarily north-west rather than due north.

In general, solar panels are best directed to the north for maximum sun exposure across the middle of the day. However, there is also a view that orienting them slightly to the north-west can be beneficial so that their peak generation moves to later in the afternoon when most users are using electricity at peak use.[34]

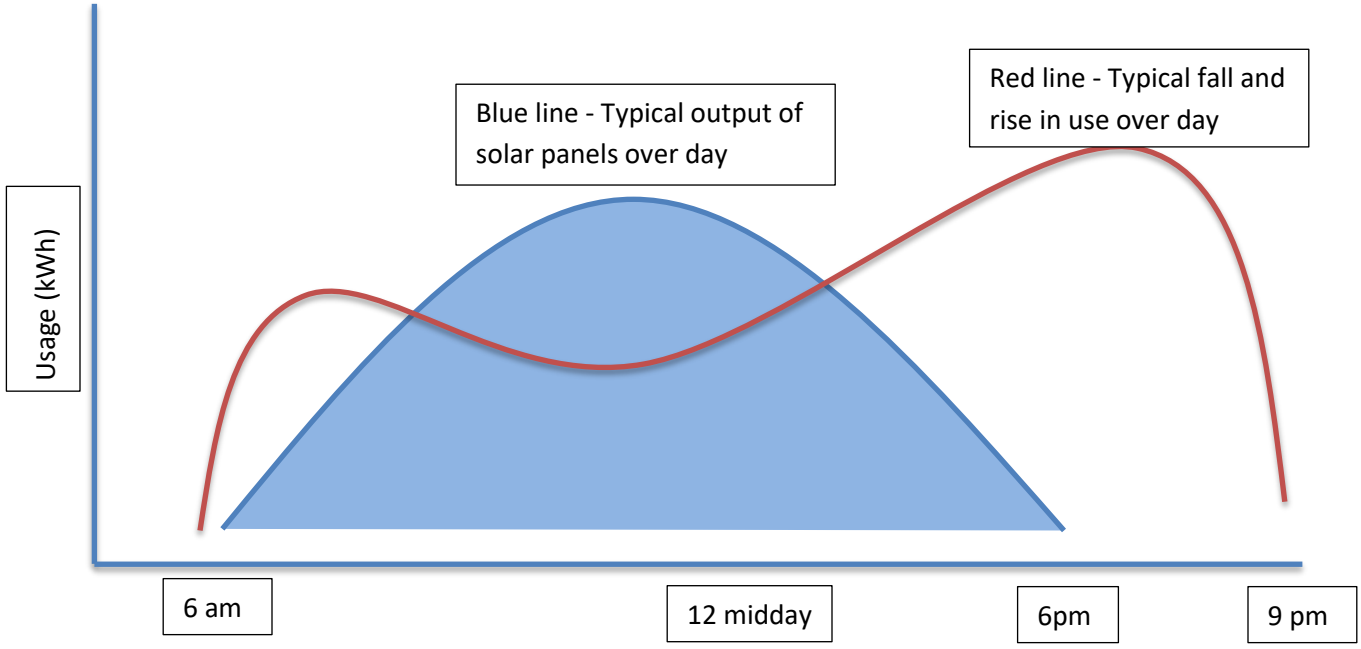
Solar panels generate power for use on site with the remainder not being used at the time of generation being fed into the grid. The energy from the panels used on site is valued at the prevailing usage rate (for tariff 11, this is 28.479 c/kWh), while the excess energy fed into the grid is valued at the prevailing feed-in tariff (which is only 10.102 c/kWh).[35] As a result, it is sensible to design the solar panel system to be large enough to cover on-site use.

This can be illustrated in Figure 4 below. The normal curve represents solar generation over the course of a day, say from 6am to 6pm. The other 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 in Figure 4) would tend to maximum the value of solar generation at or around the value of the consumption rate of electricity under tariff 11, currently 28.479 c/kWh.

[34] The time that tenants use the most power could 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.

[35] See Ergon website at https://www.ergon.com.au/retail/residential/tariffs-and-prices/solar-feed-in-tariff

Figure 4: Typical graph of residential use and solar generation over the day



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 would provide a saving to the tenants in the individual units.

EcoEfficiency examined installing solar panels to cover usage in the common areas. EcoEfficiency estimated that solar panels around 10 MW would do this, although it also looked at solar panels sized to deliver the same total amount of output as the common areas use.

EcoEfficiency's analysis showed that solar panels for the common areas could have a simple payback period over around 4.2 years.[36]

As noted, the exact payback period for Access in respect of use in the common area depends on the extent to which the output is consumed on-site. This requires information on when electricity is being used in the common area over the course of the day, which could be gathered by installing a smart meter.

At an assumption that 70 per cent of the output is used on-site, with the remainder earning the feed-in tariff, then using the Solar System payback calculator,[37] EcoEfficiency finds that the payback period from

[36] See EcoEfficiency energy audit at pp. 17-19
[37] See www.solarchoice.net.au/blog/solar-power-system-payback-calculator

installing panels to cover use in common areas, based on reasonable assumptions about the amount of the solar output that is used on-site, would be 3.4 years.[38] Again, this depends on knowing when electricity is used on-site and whether this matches the time of output of the panels. For example, if the self-consumption rate was lowered to 50 per cent of the solar output, then the payback period would lengthen to 4.5 years, which is still very much acceptable. Generally, the payback period seems acceptable for input values for the Solar System payback calculator within a reasonable range.

If an embedded network is adopted, or tariff 33 is used for hot water, then the average price of electricity under current arrangements would fall. This would cause the payback period to lengthen to 5.4 years, which would still be acceptable to support the investment in panels.

The payback period is sufficiently short to justify installing the panels sized to cover electricity use in the common areas during the daytime (when the panels are generating).

7.2. Batteries

Batteries are coming down 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.[39] Combined with solar panel system of around 20 kW, a single battery of this size would significantly offset usage in the common areas (which averages 51 kWh per day).

A battery could be combined with solar PV generated onsite or electricity from the grid to be used to cover the cost of electricity used in communal areas. 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 Access facing only the reduced costs of power used in offpeak times. More importantly, such a system may give Access the confidence to switch to a time-of-use tariff because it faces little exposure to peak tariffs. If the savings from supplying power from the battery at peak times is 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 1 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 1.

Table 1: Calculation of simple payback period on Tesla Powerwall 2

Installed cost	$11,075 (midpoint of 10200 to 11950 estimated range)
Capacity	14 kWh
Total current common area use	18,724 kWh per year

[38] See EcoEfficiency energy audit at p. 19

[39] Plus, any electrical upgrades (if necessary), permit fees, or any retailer / connection charges: see Tesla website at https://www.tesla.com/en_AU/powerwall

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 51 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

8. Education programs

The EcoEfficiency report suggests an education program to assist tenants to adopt energy conservation practices and the rebates that they may be eligible for, including the electricity rebate, the medical cooling and heating rebate, and the Home Energy Emergency Assistance Scheme (as noted above).[40] The full list of rebates and concessions is outlined in Appendix A below.

The EcoEfficiency report notes how important it is to educate tenants, especially about more costly appliances within their units, namely fridges/freezers, and overhead fans.[41]

Box 1: Education program

The 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.

Ergon Energy and QCOSS provide energy saving tips on their websites.[42]

[41] Compare EcoEfficiency energy audit, p. 14

[42] See Ergon Energy website at https://www.ergon.com.au/retail/residential/home-energy-tips and QCOSS website at https://www.qcoss.org.au/energy-factsheets

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

9. Funding for energy investments

Community Housing providers may have limited resources to invest in energy efficiency as they often rely solely on income collected from rent which is lower than market value. At the same time, Government policy relating to community housing providers can constrain their ability to innovate and generate additional revenue.[43] Some decisions on assets and asset replacement are also outside of providers' control. For example, providers often manage housing that was built and is owned by the state government. While providers are responsible for maintenance, they may not be responsible for larger upgrade efforts which involve replacement of appliances or other renovations. Providers will also need permission for changes they may wish to make in some circumstances. This financial and policy context presents barriers that may need to be addressed concurrently with implementation of this plan, to realise the objective of providing affordable housing for tenants.

Despite these barriers opportunities exist for both providers 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.[44] At this stage the program is only open to public housing households by invitation only. In October 2017, the Government announced that it was expanding the program by providing $200 off bills per year for another 4000 regional households who participate in the expansion of the Energy Savvy program starting next year[45] but has yet to provide further detail of who is eligible to participate.
- *Solar panels.* The Queensland Government announced on 24 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.[46] Some vendors offer lease programs for

[43] Ideally, providers may like to introduce more flexible rent policies, or own housing assets so that they can borrow against them.

[44] See Ergon Energy website at https://www.ergon.com.au/retail/residential/support-programs/energy-savvy-families/get-energy-savvy

[45] Media release, October 24, 2017, Minister for Main Roads, Road Safety and Ports and Minister for Energy, Biofuels and Water Supply

[46] Normally the vendor adjusts down the price of installation and retains the benefits of the SSRES.

solar panels or extended payment terms. For example, Origin offers payment over 24 months. The Queensland government announced in October 2017

- *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 four NILS providers in the Cairns area. The NILS scheme could be used to finance tenants to buy new energy efficient appliances.
- *The Clean Energy Finance Corporation* can provide capital to the community housing sector including for solar panels. It can provide finance on 10-year terms. CEFC is targeting the community housing sector to provide energy efficiency products such as solar panels, insulation, LED lighting, energy efficient appliances, and smart meters.[47] The CEFC does not tend to operate at a small scale so loans may need to cover several community housing portfolios.
- *Queensland Government support*. The Queensland Government is currently providing funding support for a trial of solar panels on public housing.[48] However, at this stage, only detached public housing is eligible.
- *Tenant rental increases*. This would involve Access upgrading appliances for tenants' benefit or providing low cost loans to tenants to support energy savings e.g. like the NILS. Loans could not be rolled into rental charges at present without a policy change from the Queensland government.

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

- Customers in regional Queensland could go to the Ergon website from today 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'.[49]
- 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,[50] SA Retailer Energy Program,[51] NSW appliance replacement

[47] See CEFC website at https://www.cefc.com.au/where-we-invest/community-housing.aspx
[48] See Department of Energy and Water Supply website at https://www.dews.qld.gov.au/electricity/solar/solar-future/public-housing

[50] See QCOSS website at https://www.qcoss.org.au/switched-communities-grants
[51] See for example AGL website at https://rees.agl.com.au/

program[52]), sometimes in conjunction with Government. As noted above, the Queensland Government announced in October it would provide rebates of up to $300 to purchase an energy efficient fridge, washing machines or air conditioner starting from January. [53]

10. Summary

Based on the above analysis the recommendations in Table 2 below are made.

Table 2: Recommendations

Item	Action	Upfront cost to Access	Saving	Saving accrues to
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 12A or the size of solar panels to install. Could also 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 will be available from December 2017	NA
Solar panels	Install solar panels such that their estimated output is equivalent to either the midday use of the common area or the midday use of the block	$12,900	Annual savings of $3,412 for a 10 MW system (note 1)	Access (if solar panels connected to the common area meter)
Embedded network	Set up an embedded network and hire a third-party provider to provide meter reading and billing services. Alternatively, consider recommending tariff 12A to tenants based on the information about use in peak times (3pm - 9:30pm on summer weekdays).	Parent meter at $400. Costs of buying any existing meters. Any cost for obtaining a quote from a third party to set up an embedded network.	Annual savings of around $8,900 in net terms (savings less third-party fee). The savings could be more if the eight units currently part of the common area are included in the embedded network	Tenants
Hot water	Where it is possible to plumb multiple units to a single hot water system, install bulk hot water arrangements based on instantaneous hot water system (or perhaps a heat pump). Consider using a third-party provider to allocate the costs of bulk hot water.	Need to obtain quote	Around $102 per year per tenant for moving from individual electric hot water systems to bulk instantaneous hot water systems	Tenants

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

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

Item	Action	Upfront cost to Access	Saving	Saving accrues to
Low flow shower heads	Replace shower heads with low flow shower heads except where tenants do not agree or have medical requirements for high flow shower heads	$20-35 per showerhead	$146 per year less purchase price of $20-35	Tenants
Fluorescent lights	Replace remaining 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	Access
Tenant use	Run an education campaign for tenants on energy use	NA	Difficult to quantify	Tenants Access (in common areas)
Ceiling insulation	Install ceiling insulation rated at R4.1 or above	Need to obtain quote	Estimate of $105 per unit per year	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	NA	Perhaps $350 in savings for each additional eligible tenant depending on the relevant concession or rebate	Tenants
Meters on common area	Consider installing meters on the eight rooms in the common area with shared bath facilities and include these rooms in the embedded network (the rooms need to be separately sub-metered to be part of an embedded network. Tenants in the eight rooms would then have responsibility for paying metered charges – these charges could be offset by reductions in rental charges.	Around $3,000 for installation of the meters (more if significant wiring required)	If the meters are included in the embedded network, then the potential savings is the electricity rebate each year for each metered point (around $340 per year) and the cost is a one-off cost for installing a new meter of around $367 installed plus any on-going costs for third-party services	Access
Encourage customers to register for Easy Pay reward where appropriate	Go to the Ergon website 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 weekly, fortnightly or monthly 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

This EMP differs from the EcoEfficiency energy audit in two areas:

- *Embedded networks* – additional research identified additional savings from moving to an embedded network, specifically savings in the usage rate and in meter reading costs. This makes the case to move to an embedded network more compelling.
- Tariff 12A – this EMP is more positive about the possibilities for tariff 12A, given it provides a 19 per cent discount for use over about 82 per cent or more of days in the year.

11. 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 community housing providers 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
- Improving access to tariff 31 and tariff 33 by reducing the minimum qualifying hot water capacity requirements
- Introducing retail competition in the Ergon franchise area to allow for competition at the retail level and the possibility of additional services
- 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 section 9) to community housing clients.
- Providing a simpler and more efficient process for providers to access electricity concession payments on behalf of tenants, than the current process (filing a form 502 every month or quarter) provides.

Appendix A

A1. Concession arrangements for tenants

Concessions are available at a State or Federal level.

At a State level, there are 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 Energy and Water Supply 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 can get receive each of the concessions for which they are eligible.

A2. Electricity and gas rebates[54]

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 $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

[54] See the Department of Energy and Water Supply 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 retailer.

As noted above, tenants must be individually metered to be eligible. This means that the eight rooms with shared bath/kitchen are not therefore currently eligible for the electricity rebate.

Owners or proprietors of residential home parks or multi-unit residences that operate an embedded network and retail or 'on-sell' to tenants are required to advise residents that electricity and gas rebates are available and claim the rebates on behalf of eligible residents.[55]

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.[56] 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 Energy and Water Supply 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[57]

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

[55] See the Department of Energy and Water Supply website at https://www.qld.gov.au/community/cost-of-living-support/residential-homes-rebates
[56] 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.
[57] See the Department of Energy and Water Supply website at https://www.qld.gov.au/community/cost-of-living-support/home-energy-emergency-assistance-scheme

- 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.
- 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[58]

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 party 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.

[58] See the Department of Energy and Water Supply website at https://www.qld.gov.au/community/cost-of-living-support/medical-cooling-heating-electricity-concession-scheme

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

If a party 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 Energy and Water Supply website at https://www.qld.gov.au/community/documents/cost-of-living-support/heating-cooling-brochure.pdf.

Parties must reapply every two years. Parties 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[59]

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.

[59] See the Department of Energy and Water Supply website at https://www.qld.gov.au/community/cost-of-living-support/electricity-life-support

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 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 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.

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)
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	1,150-2,300 (1-2 systems)	$546 (tariff 11) Tariff 33 does not apply as the unit cannot generate hot water when tariff 33 is not operating. 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.	7,415 – 9,370 (1 to 2 systems)
Electric 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 tenancies or the common area are 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 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,[60] a conservative assumption has been made to include the costs of both 1 and 2 instantaneous units to supply 4 tenants.

Solar hot water systems have not been recommended as they have a much higher upfront cost and may occupy too much roof area (32 units would require 8 systems and would require around 35 metres by 4.4 metres of unshaded roof space).[61]

Electric 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 double to triple to run each year. It is worth noting that the installation of new electric hot water systems was banned from 2006 to 2013 due to their high running costs.[62]

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.

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.

[60] This is less of an issue for a heat pump as it has a water reservoir to cater to simultaneous use.
[61] 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/
[62] See Department of Housing and Public Works website at http://www.hpw.qld.gov.au/construction/Sustainability/SustainableHousingLaws/Pages/ElectricHotWaterSystemReplacement.aspx

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.[63] If instantaneous hot water systems are selected, then it would be riskier 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 their pipework and consider adjusting their thermostat to the lowest possible temperature that tenants are happy with.[64]

As electricity prices rise, electric hot water systems will become less and less attractive compared to the other three hot water systems.[65]

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