

ENERGY EFFICIENCY

HOW TO MAXIMISE THE BENEFITS OF SOLAR POWER AND ENHANCE TENANT COMFORT

Background

In recent years, the efforts of the community housing sector to reduce energy costs for tenants have been focused on rooftop solar, due to significant funding opportunities with the Victorian Property Fund and Solar Homes.

However, there are a range of complementary energy efficiency upgrades that organisations can undertake to enhance tenant energy bill savings from their solar system and increase thermal comfort in the home.

Many of the CHOs who took part in the solar-focused upgrade programs funded by the VPF are now looking at energy efficiency improvements as their next step, in some cases considering whether they can be done at the same time as installing solar power.

This paper provides an overview of the types of energy efficiency improvements that CHOs considered, both as part of the VPF upgrades as well as going forward. It includes reasons why an organisation would select each upgrade, and the impact it can have on the energy efficiency of the property. This includes looking at the ways that solar panels can be added to an upgrade package to reduce energy costs for tenants.



Image: Pricewise Insulation

Difference between solar and energy efficiency upgrades

Solar provides low-cost energy, but does not improve thermal properties of the property, which means the amount of energy needed to run it does not change and the home may remain just as hot/cold as before.

Passive efficiency upgrades, such as insulation, can improve the thermal properties of a home, and so reduce the amount of energy required to heat or cool it. It can also be done through active efficiency measures, which improve the efficiency of the fittings and systems within the property. This includes upgrading heating/cooling and hot water systems, installing high efficiency appliances (fridge, laundry) and fittings (lighting, shower heads).

What are typical energy efficiency measures?



Draught proofing/sealing

Gaps in windows, doors and timber floors, as well as exhaust fans

without dampers, can be equivalent to leaving a window open. Effective draught sealing is essential to ensuring thermal comfort, and while low-cost, has to be done right to be effective over time.



Insulation

Ceiling insulation is most important, with underfloor and walls being the next priority,

depending on access.

It is important to ensure the insulation has good coverage, as gaps of 5 per cent can reduce the overall effectiveness by 50 per cent. The right combination of insulation and draught sealing can halve heating and cooling demand, taking a home from 2-star or less to as high as 4-star;



Lighting

Switching to LEDs in common areas is typically very low cost, has fast payback, and

results in significant savings due to longer life and reduced maintenance costs. However, lighting upgrades only have a small impact on bills in most homes. In these cases, lighting upgrades may make most sense where they are intended to eliminate gaps in ceiling insulation, improving thermal comfort overall. Eliminating halogen downlights should be a priority, given high direct energy use, as well as the clearance they require around ceiling insulation. Fully-integrated LED fixtures are generally preferred, including those with an IC-F rating, which means insulation can cover the fitting, eliminating gaps.



Water heater

Nine times out of 10, upgrading to an electric heat pump (space permitting) is the best solution,

and they can be run during the daytime on solar power. For apartments, or very low hot water users, sometimes a small, resistive element hot water system

installed near the point of use has equivalent benefits



Heating/cooling

Split system air-conditioners are increasingly the best solution for heating and

cooling. They have equivalent or lower running cost than gas, and by providing cooling during summer, particularly when solar is installed, are a low cost, effective way of managing heat stress risk



Low-flow shower head

Often overlooked, these are a simple way of reducing hot water demand. But

buyer beware - if flow rates are too low, users won't be happy and may take matters into their own hands!

Other appliances such as fridges and laundry items can result in meaningful energy benefits, particularly laundry upgrades for high use situations, like common area laundry or a large family. Laundry items can be scheduled for daytime use, helping to maximise the benefits of rooftop solar.

Budgets, payback, other considerations

Energy efficiency improvements can start at \$50 for sealing gaps around a door and go up from there. The typical combination of energy efficiency upgrades costs around \$3,000 for a basic upgrade and up to \$10,000 for a more comprehensive one.

For a small home (under 80sqm) or unit, \$3,000 is enough to install ceiling insulation and draught proofing while a heat pump for hot water could cost up to \$2,500 after rebates, and split system air-conditioning a similar amount. Laundry and refrigeration upgrades can be done for under \$1,500 while lighting and shower heads are typically well under \$500 combined for a home or small unit.

CHOs need to be careful when draught-proofing properties that still have open-flued gas heaters, as reducing draughts also increases the risk of carbon monoxide being pulled into the living areas. In these cases, it may be worth replacing the heater with a powered-flue model, or a split system air conditioner, before any draught-proofing upgrades are done.

Whilst the installation of solar systems is usually driven by a CHOs desire to reduce energy costs for tenants, energy efficiency upgrades are also about improving the comfort of residents. By improving the thermal properties of a dwelling or the efficiency of the appliances and fittings within it (such as heating/cooling or the hot water systems), CHOs can reduce the amount of energy tenants require to heat or cool their home.



In some cases, this can result in lower energy bills but for many tenants it gives them the ability to heat or cool their home as much as they need to. For CHL, this was one of the key reasons it included both solar and split-system air conditioners in its upgrade program. Based on tenant surveys CHL knew tenants wanted more heating and cooling, however, the running costs would likely push tenants into energy poverty. In selecting properties to be upgraded, CHL prioritised those properties with the highest proportion of elderly tenants, knowing that pairing solar with split system air conditioners would lead to minimal additional costs and significant health benefits for this cohort.

Estimating paybacks can be difficult, particularly where tenants under-consume energy to save money, which is common in social housing. However, estimates provide organisations with a guide to the relative impact of their investment and can be useful in supporting funding applications. When done right, energy efficiency will normally have better than 10-year paybacks and can be well under seven years in many cases, for example, when hot water, heating or cooling upgrades are done as part of asset maintenance cycles.

Importantly, as CHL's upgrade program demonstrates, energy efficiency can result in improved tenant comfort, with flow on benefits for health and well-being. Historically, improving

winter comfort has been most important in the Victorian context but, with climate change shifting weather patterns, there is an increasing focus on increasing resilience to summer heat stress events which can be fatal for vulnerable cohorts such as the elderly and those with chronic disease.

Energy efficiency or solar – which comes first?

A bit like the chicken and the egg, there is not a single right answer to this one.

Some community housing organisations had previously investigated solar but focused on less expensive upgrades such as draught-proofing until the VPF grants and Solar Homes rebates came around. Others had been thinking about ways to respond to tenants' energy costs but the VPF upgrade program was the push that got them started.

As Tosh from BOOMPower puts it, 'Historically we have focused on doing energy efficiency first, as it has been the cheapest, best way to reduce costs and enhance comfort. But with rooftop solar so cost-effective now, that is no longer the case.'

The main benefit of doing efficiency upgrades first is that it gives you clear visibility over how much energy is required to run the property, allowing CHOs to match the solar design to actual energy demand. However, the size and design of a solar system is often limited by budget and available roof space so this, and not the energy demand of the property, may ultimately drive the decision on how much solar to install.

Sometimes, solar comes first because that's where government funding is focused. When doing solar first it's important to also consider future energy efficiency and fuel switching measures - such as switching from gas hot water and heating to electric. Where planning such future changes, an "oversized" solar system can be justified.

As the sector has demonstrated, doing either option first can work.

'The VPF funding has enabled Uniting to realise its solar dream and provided a great opportunity for members to achieve energy sustainability, reduced energy bills and, importantly, a commitment to climate change.' - Peter Sibly, CEO.

Behaviour change programs

In the context of social housing behaviour change programs focused on reducing energy waste and over-consumption are often not required. Many tenants in social housing are already frugal with their energy consumption and very conscious of not wasting it.

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tenants to maximise the benefits of their solar system. This included switching to daytime laundry and ensuring, where possible, that electric appliances, such as electric hot water, are scheduled to run on daytime solar.

United Housing tenant Tony, a keen environmentalist, has put his hand up to show other co-op members how to

maximise the benefits of solar by timing the use of their electric appliances.

'Some people turn off straight away when you start talking about it,' Tony says. But he thinks seeing how solar can transform debits into credits on power bills may focus a few more minds.

Other housing organisations are thinking about how to assist tenants from non-English speaking backgrounds to operate and trouble-shoot their solar systems, which could include pictorial guides and simple labels on the solar inverter display to verify it is operating correctly.

Where to now?

The community housing organisations who took part in the VPF energy efficiency upgrade program are now focusing on ways they can improve the efficiency and comfort both of the properties that have received solar panels, as well as properties that have not. They are collecting data on the existing efficiency of their portfolios and thinking strategically about building energy efficiency upgrades into their asset management plans.

Says Zoë Blake from Unison, 'It has been the catalyst for our organisation to think more holistically about our carbon footprint and how we can improve the thermal comfort of properties. So, rather than only going in to repair the one issue that has been reported, we are looking at that property as a whole and thinking, if we had further funding available, what could we improve?'

Ravi Koneru from Housing Choices agrees. 'We are using the learnings from this project and are actually building a database and a property pipeline for energy efficient upgrades, along with the normal upgrades for any refurbishments.'

About CHIA Vic

The Community Housing Industry Association Victoria (CHIA Vic) is the peak body that represents the not-for-profit community housing sector in Victoria.

CHIA Vic works to support the growth of community housing as the most effective and efficient means of ensuring more disadvantaged Victorians can enjoy the dignity of safe, secure and appropriate housing.