Energy Saving Makeover!

Improving the energy-efficiency of a rental property

Sebastian Crangle, Aug 2021

I'm a firm believer that people who rent deserve a comfortable, energy-efficient place to live. All too often landlords do nothing to improve the energy efficiency of their investments, simply because they don't have to live there (or pay the energy bill!) It's a phenomenon known as "split incentive" – perceiving that only the tenant will reap the benefits of investing in energy-efficiency.

I'm writing this piece to show how easy it can be to improve a rental property's energy efficiency, using my own 'granny-flat' as a case study. I'll give examples of a broad range of actions you can take, from simple, low-cost measures, to higher impact options with a higher capital outlay. I'll use the results from 'Scorecard' assessments (Ref i) to show the impacts of these improvements on the flat's star rating, including energy use and carbon emissions.

And if you are a tenant yourself, there are some temporary, removable options you can do yourself, with or without the blessings of your landlord.

I would like to start by briefly looking at **why** landlords have good motivations to invest time and/or money in improving the efficiency of their rental properties:

1. Better attract and retain tenants: by providing a property with features that make it more comfortable (easier to maintain comfortable temperatures) and is cheaper to run (uses less energy).
2. Improve the value of the property for resale (for the same reasons above). There have been studies to demonstrate that a property with a high energy efficiency rating consistently attracts a higher return, up to 9.4% for a 7-star house (vs 3 stars). (Ref ii)
3. For compassionate reasons: rental tenants are more likely to live in properties that are inherently inefficient and cost more money to heat and cool (iii). A home with poor thermal efficiency can be uncomfortable and even unhealthy to live in, and yet the tenant has limited powers to improve the home themselves.
4. Environmental: your carbon footprint as a landlord extends to investment properties because you have the capacity to make permanent improvements to those properties that reduce their inherent energy demand, and hence carbon emissions – regardless of who lives there.

Our 'Granny-flat'

It's more and more common for homeowners to rent out a part of their house (or secondary dwelling out the back) to help pay the mortgage. I live in Northern NSW where housing affordability is at a crises level and it seems every second house has a granny flat that they rent out to those who can't afford to buy or rent a whole property to themselves. In my case I rent out the ground floor of my split-level house, a 60m2 self-contained flat. We're renting this space to a gentleman in his 70s, living on the pension.

Note that the examples in this blog could relate to any rental apartment or even a house.

After the past few years I've been working on improving the energy efficiency of the whole house, and have included the granny flat in these retrofits, despite some of the 'split incentives' of doing so.

The low-cost, low hanging fruit

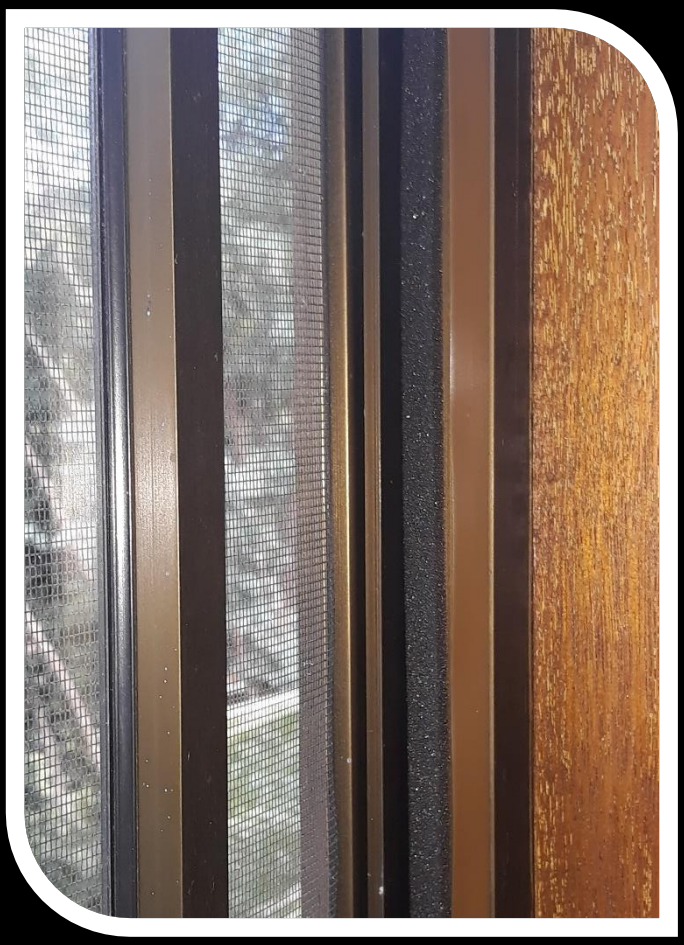
Here's a brief description of improvements I've made to the place which don't cost a lot of money, and aren't very difficult to implement. I won't go into a lot of detail of how they were done, because there's plenty of tutorials online. If you don't have the time or know-how to do them yourself, there would be services available for professionals to do them for you, especially if you live in one of the big cities.

In summary:

1. Draught proofing
2. Curtains
3. Window insulation
4. Showerhead upgrade

1. **Draught proofing:** I won't say a lot on ***why*** you should draft proof your property, except for this quote: *"Some houses are so draughty that the effect is like having a window open all the time, making it difficult to maintain a comfortable temperature and increasing heating and cooling bills"* ATA, 2018 (ref iv).

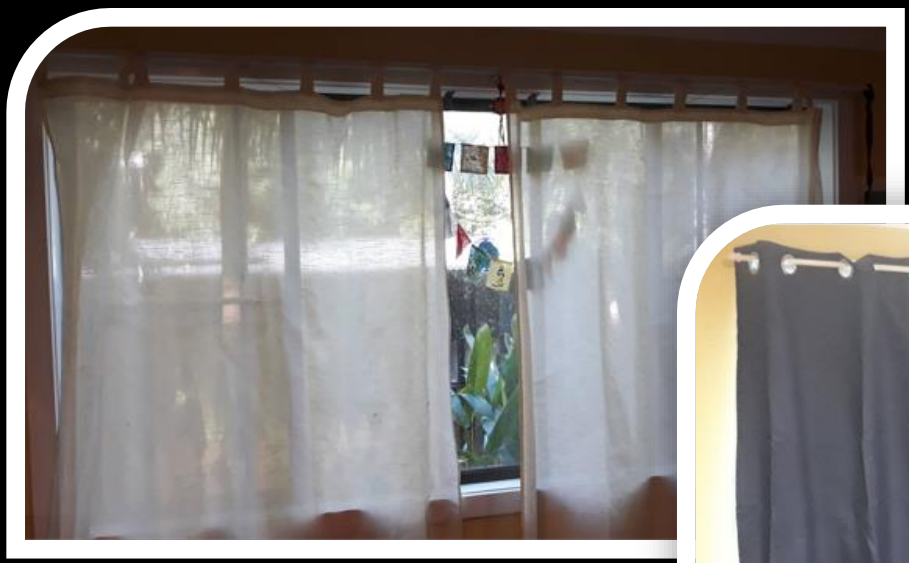
   In this case what I did is 'weather strip' all the doors and windows, using a variety of purpose made self-adhesive draft stopping products. Some of these are available for purchase in hardware stores, or otherwise from online shops such as Eco Master or Tight House.



Draft seals on a sliding window:

a foam product from Raven and some self-adjusting perimeter seal, known by some as 'EMV'

2. **Thick Curtains:** curtains can make a big difference when it comes to keeping in warmth, reducing the effect of windows to conduct cold into your home. In this case I replaced thin, sheer curtains with thick, heavy drapes with a thermal lining – on glass sliding doors and some wide windows:



before

after

3. **Window insulation:** a well-known hack for renters wanting to improve the thermal performance of their home – simply applying bubble wrap to a window. Of course it's ideal if it isn't a window you want to look out of, but at least it still lets in light, and some visibility. It's certainly a cheap fix, and quite effective, especially given that up to 40% of a home's heating energy can be lost through windows (ref v).

Bubble wrap windows may not be an action that's appropriate for a landlord to suggest to a tenant, rather something the tenant could do themselves, if appropriate. If however you're a landlord who's willing to spend more to improve their investment, secondary double glazing is a good option, especially in colder climates.

There are many tutorials on online for how to do bubble wrap insulation, see references below (vi).

4) **Shower-head upgrade:** changing a showerhead with a lower flow rate not only saves water, it also saves energy – because less hot water is needed. In this granny flat I replaced a standard shower head (using 12 litres per minute) to a 3 star head that uses 7 litres/m (a Methven Kiri Satinjet). That's a 37% saving in water and energy for the same length shower, at a cost of around $130.

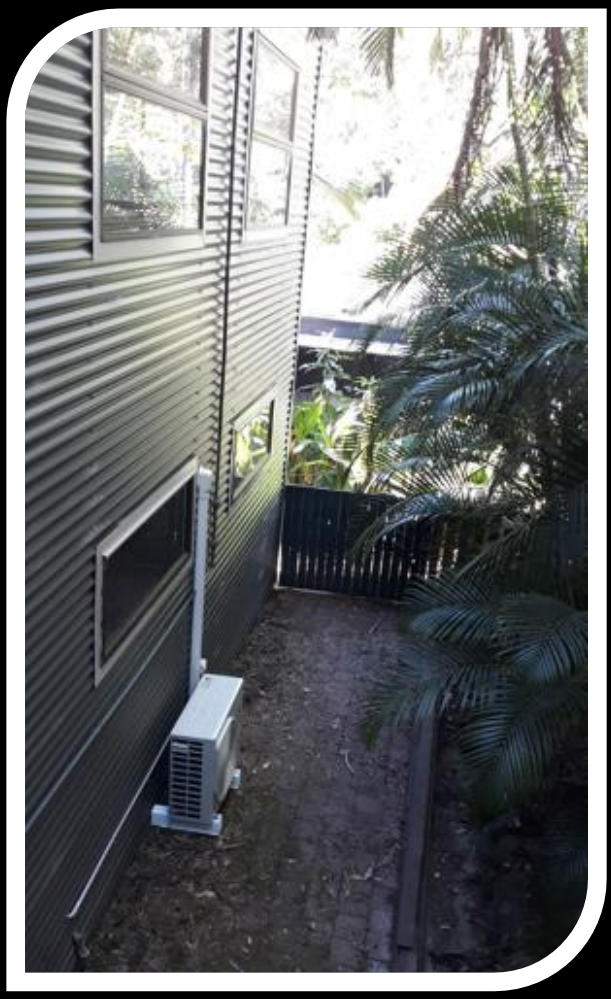
So, what positive effect did these **low cost/effort actions** have on the amount of energy needed to keep the apartment comfortable? (warm in winter, cool in summer). The short answer is that these improvements would make the unit about **19% more efficient**, with a saving of approximately 1389 kWh of energy and **670 kg of CO2** (two thirds of a tonne of CO2!) each and every year thereafter.

[These estimates come from doing before-and-after assessments in the training version of the National *Scorecard assessment tool.* I'll include more detail on those calculations down below, for those interested]

Higher-impact improvements

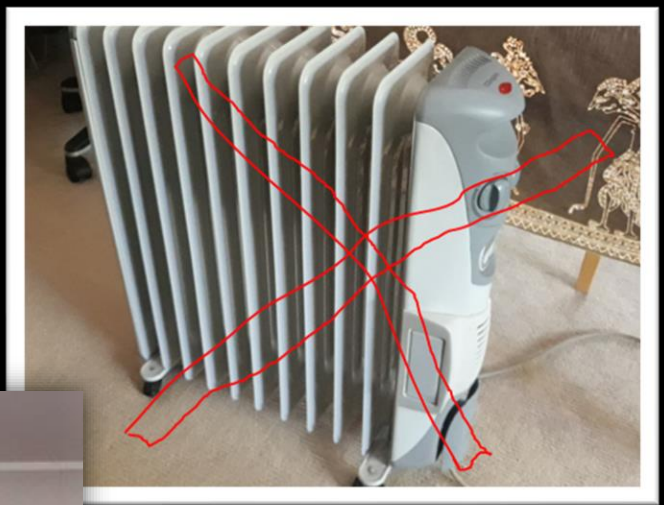
Here are some other improvements I've made to the energy efficiency of the granny flat over the last few years - which cost more but had a bigger impact on energy costs and carbon emissions. If you want more information on any of these upgrades, do a search in MEEH.

1. Efficient reverse cycle air conditioner
2. Wall insulation retrofit
3. Heat pump hot water system
4. LED lighting, replacing halogen
5. Solar PV



1. Efficient reverse cycle air conditioner

Before I stalled AC in the granny flat my tenants had been using a combination of fan heaters and panel (oil) heaters, all of which are relatively inefficient and costly to run due to high energy consumption. By comparison, a well-rated AC uses around one fifth of the energy to produce the same amount of heat. The upfront cost was $1600 for an efficient 3kW unit. I calculated that the energy it would save would equate to about $1.20 per day in energy costs, on days when other heaters would have been used. So at this scale it isn't something that would "pay for itself" as people expect solar PV system to do, and the tenant would receive the savings. But I did it anyway, for the reasons given at the start of this blog.



'Radiant' heater – inefficient & expensive

Reverse cycle air conditioner, 5 times more energy efficient than a radiant heater

2. Wall insulation retrofit

A few years back we re-cladded the southern and eastern walls of the house (photo above), due to rotting weatherboards. In the process I made sure to have insulation added to the wall cavity. As the house was built in 1984 it otherwise had no insulation. That was an opportunistic efficiency upgrade but it is possible to have insulation pumped into wall cavities through temporary holes in the cladding – without having to remove or replace it (see other posts on the topic).

3. Heat pump hot water system

Last year we replaced our standard electric hot water system (resistive storage) with a 'heat pump' system (Hydrotherm). This technology pumps heat from the outside air into the water, using 4 times less energy than a standard system. We also put it on a timer to heat from our solar PV during peak production each day.

This was another improvement that benefitted the whole house, ourselves and our tenant included. However it wouldn't be out the question to replace a hot water system on an investment property, especially if it's at the end of its life. The question is more whether you are willing to spend considerably more for a heat pump, to reap the benefits of 4-5 times less energy consumption to heat the same amount of water.

4. LED downlights replacing halogens

A few years ago the granny flat had over 20 halogen downlights, each using around 60 Watts of power. With LED replacements that use 10 Watts, the energy use for lighting is decreased by over 80%. Replacing LED downlights can be expensive but the energy savings 'payback' the cost in a short time, likely one or two years. If you live in NSW you may also be eligible for the government rebate: https://www.energysaver.nsw.gov.au/households/rebates-and-discounts/discounted-energy-efficient-lighting-households

5. **Solar PV:** over the last few years we've added 5.4 kWhp of solar to the house, with our tenant receiving a share in the financial benefits of our subsidised energy bills.

What impact did these **'big ticket'** energy improvements make to our rented granny flat? The Scorecard modelling indicated a whopping **73% improvement** in energy consumption and carbon emissions, and that is even when not including solar PV (which would knock them out of the park!).

Using the Scorecard system, the apartment now rates at **7.2** stars (out of 10).

To put that rating in context, the average home is **3 stars**, and the highest a home can score without solar PV is 8 stars. The Scorecard star rating is a measure of the ***cost*** to run the fixed appliances in a home whilst keeping it at healthy, comfortable temperatures (Ref i).

Improvements to energy savings (and carbon emissions!)

If you're interested in the finer details, here's the details on how the apartment would have rated at different stages in the improvements made to it, using the modelling from the National Efficiency *Scorecard*. To get these figures I did 3 retrospective assessments of the apartment in the Scorecard tool, in these stages:

1. The original apartment, prior to all improvements (c. 2018)
2. Then with just the low cost/effort improvements (shower, draught stopping, curtains).
3. Then with all high impact improvements (insulation, heat pump hot water, AC, LED lights, but excluding solar)
4. Lastly, with both low and high-cost improvements.

[see over for the figures]

		National Scorecard Star rating	Energy use /year (MJ)	Carbon emissions per year	Energy savings (MJ/year)	Carbon savings (kg/year)	% energy & carbon savings	
1	Original flat - before improvements (2018)	3.8	13875	3566				
2	With low cost actions only: efficient shower head, thick curtains, draught proofing.	4.2	12486	3209	1389	670	19%	*(ie % improvement after low cost actions)*
3	With high impact/cost improvements only: AC & heat pump hot water, LED lights, wall insulation retrofit.	6.9	3750	963	10125	2603	73%	
4	*With **both** high &* low cost actions (i.e. the apartment as it is **now**):	7.2	3366	865	10509	2701	76%	*(compared to before any improvements, in 2018)*

Plse note: these figures don't accumulate, I believe due to diminishing returns.

Summary table of savings, with figures from retrospective Scorecard modelling

The apartment's overall star rating in 2018, prior to any of the improvements described above

The "Cold Weather Rating" for the apartment as it was in 2018, with improvement options

From the appliances section of the Scorecard Certificate, prior to upgrades, including recommendations

And finally, the latest Star Rating for the flat as it now is, with all improvements made (but excluding solar).

Conclusion

I hope this brief case study will provide some motivation (and ideas) to rental property owners in a position to improve the energy efficiency of their properties, either by investing in higher cost/return capital improvements, and/or a range of low cost, low effort initiatives. And for people currently renting, I hope you learnt some ideas for improvements you can make yourself, or request of your landlord.

There are many resources available online for more information on this topic of improving the energy efficiency of rental properties. Please see the references below for a few that have helped me on my own energy efficiency journey.

References:

(i) Factsheet - Introduction to Scorecard: https://www.victorianenergysaver.vic.gov.au/__data/assets/pdf_file/0031/509548/N-01-0520-FS1_Intro_to-Scorecard.pdf

(ii) Property prices and energy efficiency:
   a. https://msd.unimelb.edu.au/thrive/projects/listings/green-lemons-energy-efficiency-disclosure-and-house-prices
   b. https://discover.agl.com.au/your-home/increase-property-value-with-energy-rating/

(iii) https://www.acoss.org.au/images/uploads/ACOSS_ENERGY_EFFICIENCY_PAPER_FINAL.pdf

(iv) Renters Guide to Sustainable Living 2nd edition, Alternative Technology Association (ATA), March 2018. Online: https://renew.org.au/publications/renters-guide-to-sustainable-living/

(v) Windows: https://www.yourhome.gov.au/passive-design/glazing

(vi) Bubble wrap insulation tutorials:
   a. https://www.betterrenting.org.au/energy_efficiency_renting
   b. https://www.youtube.com/watch?v=7wq3WcdrF_I