

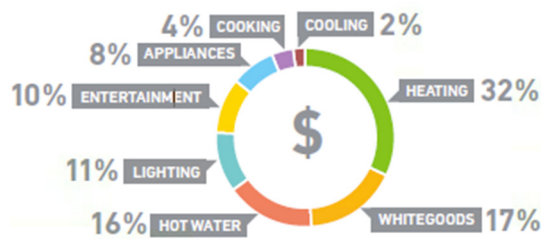
OVERCOMING THE BARRIERS TO ENERGY AND WATER EFFICIENT HOUSING

HOME RETROFIT COSTS AND SAVINGS

An average home can be upgraded at a cost of approximately \$2,000 per star increase in performance rating. An efficient home can cut its energy bills by 40 percent or about \$1000 of the average annual bill of \$2,800.

How do Victorian homes use energy?

Victorian households are among the highest energy users in Australia, reflecting our cooler climate and greater reliance on space heating compared with other states. The average Victorian household spends around \$2,800 on their energy bills every year, with more than a third of costs going on heating (predominantly gas) alone.¹



Household energy use is influenced by:

- The quality of the building shell (thermal performance)
- The efficiency of lighting and appliances, particularly space and water heating;
- Behaviour, or how we use lighting and appliances.

What do household upgrades cost?

The average Victorian home built before 2005 averages less than 2 stars (1.81) in terms of energy rating performance. A recent Sustainability Victoria investigation of retrofit options and cost-effectiveness across 60 pre-2005 homes in Victoria concluded that an improvement of 3.69 stars could be achieved through building shell upgrades alone (excluding double-glazing) at a cost of \$2,570 per 1 star increase in performance (see Table 1).

Measure	Star increase	Av. energy saving (MJ/Yr)			Av. cost (\$)	Av. saving (\$/Yr)	Payback (Yrs)
		Gas	Elec.	Total			
Draught sealing	0.69	7,942	225	8,167	\$1,037	\$157	6.6
Ceiling insulation (easy)	0.84	8,210	277	8,487	\$1,130	\$165	6.8
Ceiling insulation (difficult)	1.14	4,891	204	5,095	\$1,119	\$102	11.0
Wall insulation	1.02	5,561	136	5,697	\$4,167	\$108	38.6
Drapes & pelmets	0.58	2,209	54	2,263	\$2,036	\$43	47.5
Double glazing ⁹	0.63	2,278	66	2,344	\$12,145	\$45	269.9

Note: Upgrade measures modelled, applied in a specific order and costed at commercial rates. Changing the order could affect the outcomes.

Table 1. Average costs and energy savings for modelled building shell upgrades²

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Incorporating lighting and appliance upgrades should lower costs further as lighting and appliance upgrades are more cost-effective overall than building shell upgrades.

And, as the cost of renewable energy continues to decline while gas prices have risen in recent years, going gas-free and making homes 'zero net emissions' through a combination of efficient appliances (eg. reverse cycle air-conditioners used for both heating and cooling), efficiency measures and renewable energy is now a realistic option.³

It is important to note that the study found a wide diversity energy savings achieved in different houses, and that occupant behaviour played a significant role. Hence, undertaking a comprehensive assessment to determine the most appropriate mix of measures and educate householders about energy and water-saving behaviour, is likely to deliver the most cost-effective outcomes.

Furthermore, taking the opportunity to incorporate energy and water-saving measures as part of renovations can drive costs down even further. About 20 percent of homes are renovated each year, but several key efficiency opportunities are routinely missed, including improving insulation, draught-sealing, and choosing efficient windows and doors, lighting and appliances.

How much can a retrofitted home save in bills?

The Sustainability Victoria study found that an efficient household could save around 40 percent of an average household's energy cost. Applying all practical energy efficiency upgrade measures (building shell, lighting and appliance upgrades), could achieve annual average savings of:

- 35,800 MJ of energy
- \$990 on energy bills
- 3.4 tonnes of greenhouse gases.

Furthermore, for homes in Victoria which already have an efficient reverse-cycle air-conditioner installed, using this unit for heating instead of gas could achieve savings of \$658 a year.⁴ When paired with rooftop solar, 'fuel-switching' can contribute to greenhouse emission reductions as well as cost-savings.

¹ SV (2014) *Household Energy Report*, Sustainability Victoria

² SV (2014) Table 3, p. 10

³ *Zero Carbon Australia Buildings Plan* at www.bze.org.au/buildings

⁴ Forcey, T. (2015) *Switching off gas*, Melbourne Energy Institute