

Home Energy Improvement Handbook

June 2020



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Cardinia Shire Council
Environment and Heritage Unit
in association with students at Federation University



Published June 2020

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What is in this Handbook?

This handbook has been designed to provide the reader with a number of benefits these are;

1. An understanding of why a handbook like this is required by Cardinia Shire residents and what benefit it will be to you as homeowners and tenants.
2. An understanding of where energy comes from and how it is used in households across the country.
3. Recommendations regarding ways in which residents can increase their home's energy efficiency through making physical and structural changes to their homes. These recommendations will be broken up into the different sections relating to areas of energy usage around the home.
 - a. Each section will have a number of recommendations at different price points. These price points will be labelled as shown below
 - i. \$ = Low cost option
 - ii. \$\$ = Medium cost option
 - iii. \$\$\$ = High cost option
4. There will also be some simple behavioural recommendations that will help residents to reduce their energy consumption by changing the way they use energy around your house.

Note: This handbook has minimal focus on behavioural changes and as such the behavioural recommendations are brief

5. A brief introduction to generating your own power using solar panels and wind turbines, how they work and how your household may benefit from installing them.
6. Ways you can monitor the effectiveness of changes you make within your home using readily available information such as your power bill.
7. Additional resources that you can use to better understand how you and your family can improve the energy efficiency of your home, decrease your carbon emissions and lead a more sustainable lifestyle.

Why is this Handbook Necessary?

In recent years Australian consumers have seen a rise in both electricity and gas prices resulting in more expensive energy bills.

Many people may not understand why these rises are occurring, or what they can do to save themselves money. Not only this but people don't know how they can do their part for the environment.

The main reasons driving the need for this handbook are:

1. Victorians have been experiencing an increase in electricity prices mainly as a result of the retirement of a number of low-cost fossil fuel power stations as well as an increase in electricity demand. The Australian Energy Market Operator predicts a small decrease in power prices in the coming years before prices begin to rise again.
2. Victorian consumers are also facing rising gas prices due to climbing network costs and increased export of natural gas. The 2016 National Gas Forecasting Report claims that gas prices will continue to rise for the foreseeable future and as such reductions in usage will save households on their gas bills.
3. As consumers of electricity all Victorians have a social and environmental responsibility to try and reduce carbon emissions and limit the impact your energy demand has on the environment. The Intergovernmental Panel on Climate Change has found that the climate change being experienced on Earth is a result of human behaviour and as such reductions you make to your household's energy usage today could help reduce environmental damage in the future.
4. Cardinia Shire is growing rapidly, with a projected expansion from a population of 80,709 in 2012 to 155,619 by year 2031. With this population growth, total carbon emissions of the council area will soar, and as such it is the responsibility of Council to help educate residents on what you can do to reduce your carbon emissions so that the council as a whole can act in an environmentally responsible manner.
5. Council has set a goal in the [Aspirational Energy Transition Plan](#) of reducing per capita emissions by 36% from 2012 levels by the year 2024, a goal that can be helped along by residents who choose to follow some of the recommendations laid out in this handbook.

Where is energy used?

Victoria's energy comes from a range of different sources, the main two being fossil fuel power stations and a large natural gas network carrying natural gas into homes across the state.

Electricity is generated in the power stations across Victoria and sent to homes through the national electricity grid, a network of transmissions cables and wires used to deliver the electricity straight to homes across the state.

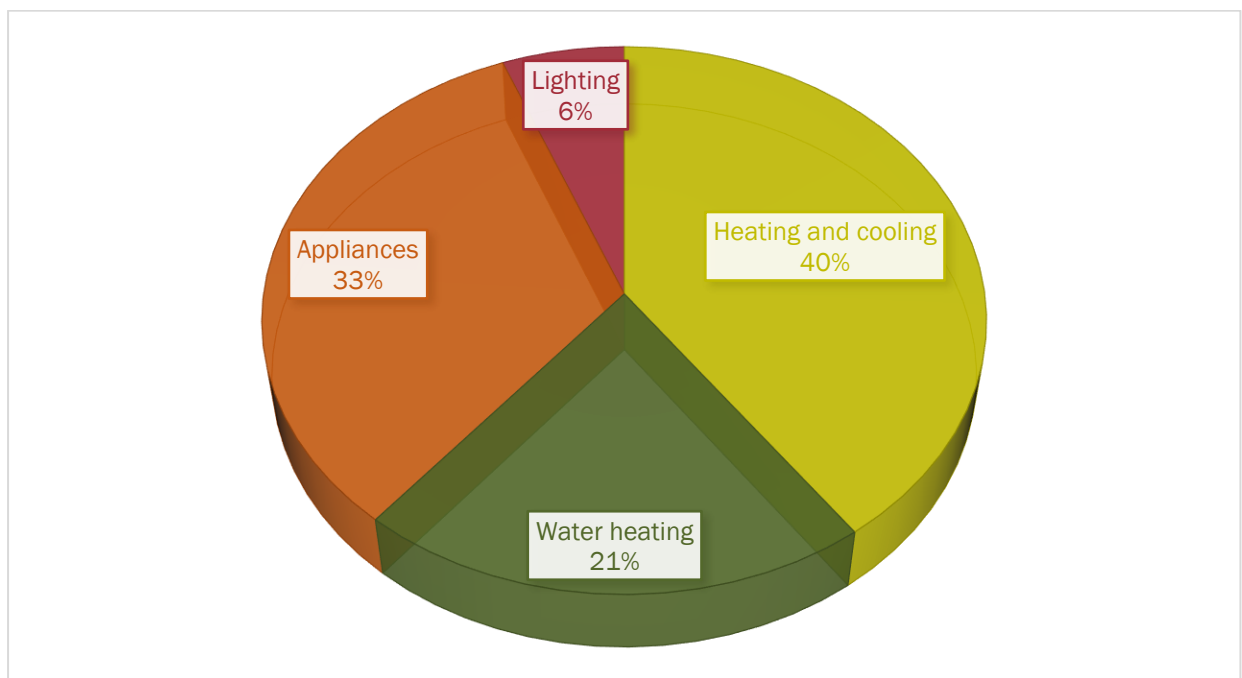
Natural gas is pumped to homes across Victoria through a reticulated gas pipeline network. This gas is then combusted and used to heat water, run heating systems or supplied to your cooking appliances.

The average Victorian home consumers roughly 15 kilowatt hours (kWh) each day but this figure will vary based on

- Number of people
- Size of house
- Hours per day spent at home
- Age of the house
- Efficiency of the home
- Energy usage behaviour of residents

Figure 1 shows the breakdown of where the average household in Australia consumes its energy. These are the areas that this handbook will focus on making recommendations around.

Figure 1. Average household energy usage per sector 1986-2020¹



¹ Source: <http://www.yourhome.gov.au/energy>, retrieved April 2019

Recommendations

Heating

Heating along with cooling is responsible for much of energy used in houses across Australia at roughly 40% of the average total bill, as such it is a major area in which to start making savings.

\$ Prevent unwanted draughts throughout your house

- Draughts through poorly sealed doors, windows, exhaust fans and skylights can increase heating costs by 25% by letting warm air escape from inside the house.
- Draught excluder (door snake).
 - Can be a single tube or double tube and are generally fabric filled with some sort of insulative material that will help block draughts under doors
 - If used properly, they will stop the airflow underneath the doors in your home
 - Make your own door snake www.ecomatters.org.nz/diy-door-snake/
- Draught seal tape
 - A tape that is used around your windows or door frames to stop draughts coming in through the gaps
 - It is easy to install and can be purchased from any local hardware or home improvement store
- Ceiling exhaust outlet cover
 - Used to cover exhaust fan outlets on your roof and exhaust outlets through walls and can be purchased for all different sizes
 - These covers allow exhaust to leave the house as intended but close under their own weight when not in use to stop draughts existing or entering the house

\$\$ Installing or updating roof, wall and underfloor insulation

- Inadequate floor and ceiling insulation can be a cause behind up to 45% of heat loss from a home during winter months.
- Many older homes are under-insulated, either due to an insufficient amount of installed insulation or degradation of the insulation over time.
- Not only will proper insulation help to keep your house warm in winter, it will have the additional benefit of reducing cooling costs in summer.

Insulation comes in two different forms, each with a specific purpose.

- Bulk insulation (fibreglass batts, polystyrene, etc)
 - works by reducing the flow of heat through your roof, floor or walls
 - the air voids that fill these materials do not conduct heat well and as such it takes a long time for heat to transfer through the batts
 - batts are given an R value, this is a measure of how well the insulation performs, the higher the R value the longer the heat will take to transfer through
- Reflective insulation
 - works by reducing the transfer of radiant heat
 - rather than allowing heat to transmit through the material, the reflective face will reflect the heat away stopping it entering your living spaces
 - is easier to install in a house during construction but can certainly be retrofitted into existing homes

In Cardinia Shire, a minimum R value for roof and wall installation are 4.1 and 2.8 respectively

\$\$\$ Retrofitting glazed windows

- This is by far the most expensive option that can be used by households as glazing technology is still quite expensive to produce and purchase.
- Glazed windows can help minimise the amount of heat lost from your home in cool conditions, they can reduce heat loss by up to 30% compared to single glazed windows.
- Glazed windows also have the added benefit of saving on cooling costs in the hotter months
- Consider replacing only some of your windows with double glazing, particularly focussing on north facing windows or windows with no other coverings to prevent heat loss.
- Also consider replacing windows with double glazing if the old windows have deteriorated and need replacing anyway. This saves on the total cost of the double-glazed window upgrade as the cost of removal of the old window won't be part of the upgrade.
- Keep an eye out for the emergence of triple glazed windows as they become commercially viable. They may be some time off but are well suited for conditions in Cardinia Shire and the rest of Victoria.

\$\$\$ Updating older heating system

- New heating systems are much more efficient than older units and come with functions that allow for greater efficiency in heating your home.
- The main options for residents looking to have one system for their whole house are gas ducted heating, gas hydronic heating and ducted reverse cycle systems.
- If you are looking to just heat individual sections of your house, you could consider reverse cycle split system air conditioners. These individual units can be used to heat or cool one area and could be cheaper and more efficient than installing a whole house heating system.
- Both options can allow zoning of individual areas to ensure energy usage is optimised. Being conscious of heating only the areas of the house you are using will reduce your heating costs.

Cooling

Along with heating, cooling accounts for roughly 40% of energy used within households.

\$\$ Install ceiling fans

- Ceiling fans have the lowest operating costs of the main cooling options and they can help reduce the need for air conditioners.
- They create draughts which work to cool you down without the need for cool air or can be used with air-conditioners to increase the flow of cool air around the room.
- Ceiling fans can also be put in reverse in winter to push the warm air near the roof down closer to where you are to make the conditions more comfortable.
- Ceiling fans will need to be installed by a licenced electrician so talk to them about which fan will best suit your needs.

\$\$ Install external blinds/awnings

- North facing windows are exposed to the sun for most of the day and in summer causes significant heat transfer through the glass, heating up the inside of the house.
- Installing some sort of cover like blinds, awnings or roller shutters allows for the window to be temporarily covered to block out the intense summer sun.
- As it is not a permanent structure it can be removed or retracted to allow the winter sun in to heat your home.
- Some options such as roller shutters can also act as additional security for your home and may be an additional factor to consider when deciding which external shading is best for you.

\$\$\$ Updating older air-conditioning or evaporative cooling systems

- Outdated systems can use unnecessary amounts of energy compared to newer models.
- There are a couple of options available to homeowners looking to install cooling systems in their home, these are, evaporative cooling systems and air-conditioners.
- Evaporative coolers can be cheaper to run than split system air conditioners and are suitable for use in areas like Cardinia Shire as the weather tends not to be too humid for effective operation in summer.
- If split system air-conditioners is being used to cool your home, ensure you can zone off areas of the house that don't need cooling to avoid additional costs and energy usage.

Appliances

On average, appliances contribute to about 33% of a household's energy usage.

\$ Install a standby power controller to your home entertainment system or computer

- Appliances in standby mode still use electricity, this power usage is known as Vampire energy.
- A standby power controller is an easy way to switch off unused appliances, reducing wasted power. They reduce the amount of time these devices spend in standby mode and switch them off when they are not in use.

\$\$\$ Upgrade your older appliances to higher efficiency appliances paying attention to energy rating labelling

- Appliances like washing machines and dryers, while only being used intermittently, still draw a lot of power on each cycle.
- For each additional energy rating star, energy usage is decreased by 26% in washing machines. Similar figures are seen across other appliances.
- Table 1 shows the comparison between two washing machines. They are made by the same manufacturer, both are 10kg top loaders, the only difference is their Energy Star Rating. As you can see, the 1.5 difference in star rating equates to an annual saving of operational energy costs of \$96.35 at current power prices*.

Table 1. Comparison of the energy costs associated with the operation of two washing machines

	Product 1	Product 2
Energy Star Rating	4	2.5
Energy Usage per Hot Water Wash	1.05 kWh	1.90 kWh
Energy Usage per Year	384 kWh	693 kWh
Operating Costs per year	\$119.73	\$216.08
Annual Operation Savings	\$9	\$6.35

**Note: Values calculated using the assumption that the washer is used for one warm cycle daily and an electricity cost of 31.18c/kWh. These values do not consider the cost of water used or the purchase prices.*

- Fridges are often overlooked but older fridges draw much more energy than their newer counterparts. Selecting the right sized fridge for your needs will help reduce unnecessary energy wastage.
- More information about energy ratings of appliances can be found at www.energyrating.gov.au/label

Hot water systems

Hot water systems on average account for upwards of 20% of a household's energy bill. Hot water is a necessity for many of the things we do daily from showering to washing our clothes, as such it is important that we maximise the efficiency of the hot water usage in our homes.

\$ Fix leaking taps

- Leaking taps are a simple fix and will not only reduce the amount of water wasted it will also save on energy as hot water usage will decrease.
- Fixing leaking taps is generally a simple task that you can perform yourself. The link below is to Environment Victoria's guide on how to replace a tap washer.
<http://environmentvictoria.org.au/wp-content/uploads/2009/10/How-to-fix-a-dripping-tap.pdf>
- If you cannot stop your tap leaking by yourself do not hesitate to call a licenced plumber. A tap that leaks one drop per second will waste upwards of 20,000L per year which is bad for both your finances and the environment.

\$\$ Install low flow shower heads

- In many households, showers are the largest user of hot water. By installing low flow shower heads less water is being used therefore less water needs to be heated.
- Depending on your current showerhead, low flow options can significantly reduce the energy used by your hot water system.
- According to the Water Efficiency and Labelling Standard (WELS) a 3-star shower head uses as little 6L of water per minute. Keep this in mind when selecting showerheads for your home.
- Low flow showerheads are a simple way of reducing your hot water usage. They can also be installed without a plumber saving you on labour costs.

\$\$\$ Upgrading current hot water system

- Older electric or gas storage hot water systems can be using large amounts of unnecessary energy each day as they are continuously heating the same water over and over.
- Upgrading to a high efficiency gas instantaneous or solar boosted hot water system will significantly reduce energy usage and produce around 75% less carbon emissions compared to electric storage tanks.
- New technology heat pumps are also another option becoming more popular in recent years. These heat pumps use electricity rather than gas to operate and draw heat from the surrounding air to heat the water in your home. These pumps will be less efficient in cooler months than in the warmer months and are not suited to climates that have regular frosts.

Lighting

Lighting accounts for only 6% of the average household's energy usage but should not be discounted as an area of your home in which you can make significant savings

\$ Replace older style halogen globes with more efficient compatible globes

- Halogen globes are a type of incandescent globe that are common in houses across Australia.
- LED (Light Emitting Diode) or CFL (Compact Fluorescent Lamp) globes use as little as 20% of the energy of equivalent halogen globes resulting in significant savings per globe that is replaced.
- Compatible LED globes have longer lifespans and produce less heat than their halogen counterparts.
- Table 2 shows what LED globe you would need to purchase to replace an old halogen globe. Candescent globes were sold showing the number of watts they used whereas LEDs show the amount of light they produce, the table should help you to work out the conversion.

Table 2. LED substitute for incandescent bulbs²

Incandescent bulb	Light output in lumens (220-240 volts) LED
25 watts	250 lm (3-4 watts)
40 watts	500 lm (5-8 watts)
60 watts	800lm (8-12 watts)
75 watts	1100 lm (11-17 watts)
100 watts	1500 lm (15-23 watts)

- When looking for replacement globes there are a few things to look for
 - Compatibility to your fittings
 - A suitable light output (Table 2)
 - The Regulatory Compliance Mark showing electrical compliance for Australian standards (right)
 - A lifetime expectancy of no less than 15,000 hours of running time
 - A product warranty of at least two years
 - A bulb efficiency of at least 60 lumens per Watt (lm/W)



\$\$ Install skylights to allow more natural light to enter the house

- Skylights are a great option to allow natural light into the home, letting in up to three times as much light as a vertical window of the same size.
- Tubular skylights are a cheaper alternative to the traditional skylights and easier to retrofit to existing homes.
- Due to their impact on the thermal envelope of your home, try to keep skylight installation to rooms which require additional light and lack natural light sources.
- Look for skylights with good insulative properties like double glazed glass to ensure that the impact the skylight has on the insulation of your home doesn't outweigh the benefits of installation.

\$\$\$ Retrofit your house with an LED downlight system

- Halogen lamps are most common in downlights so some older downlight systems may not be compatible with newer CFL or LED globes.
- If your home's fittings are not compatible with the newer globes it may be worth calling an electrician to swap the fittings allowing you to install more efficient lamps.
- Installing sensors with the new system will help to save energy as lights will switch off if the room is unattended.

² Source: www.energyrating.gov.au/document/fact-sheet-consumers-guide-buying-quality-leds, retrieved April 2019

Generating your own power

Solar panels

What are solar panels?

Solar panels use photovoltaic technology to convert sunlight into electricity to be used in your home. These panels capture the energy in the sunlight and generates DC power which is then transformed by an inverter into the 240V AC power used in homes across Australia.

This power can be used in your home instead of mains power, fed back into the electricity grid and sold back to your electricity supplier, or with new battery technology, stored and used by your home later on. For a more detailed explanation check out this video.

www.youtube.com/watch?v=hCVhPLJZugk

Currently only 20% of Australians have solar panels installed, but with advances in solar panel and battery technology these systems are becoming more affordable and more people are beginning to install them in their homes.

How to pick the right size for your home

Each house will benefit from different sized systems. Which sized system is right for your home will depend on a number of factors including but not limited to;

- Your average daily electricity usage
- Roof area
- Time of day you use electricity
- Budget

A good contractor will consult you on your requirements and restraints and will help you to select the correct system. Additionally, you can use this to estimate the sized system you will get the most benefit from <https://solarcalculator.com.au/solar-system-size/>

Payback period

The payback period of your home's solar system will vary depending on the installation cost, electricity usage habits, feed in tariffs and power prices in the future.

5kW systems in Victoria have been found to pay themselves off in around 8 years, much less than the life span of such a system. Panels have an estimated lifespan of around 25 years and inverters a lifespan of around 10 years.

Wind turbines

What are wind turbines?

Wind turbines harness wind energy converting it into electrical energy to be used in your home. Wind turbines work by using blades or vanes to help capture wind causing them to spin, this drives a small generator which converts the mechanical energy of the spinning blades/vanes into electrical energy. Depending on your system type this energy can be used, stored or sent back into the grid.

For a more detailed explanation of the operation of wind turbines, check out this website www.energy.gov/energysaver/buying-and-making-electricity/small-wind-electric-systems.

There are two main types of wind turbines used for residential purposes these are the most common horizontal axis and the less common vertical axis. Both have different advantages and disadvantages, but the operational principles are the same.

Is a wind turbine right for your home?

A wind turbine is a useful addition to a house if a number of criteria and requirements are met. Not all houses will be suited to a wind turbine so do your research first to see if it is right for your house.

Wind turbines need a certain average annual wind speed to be worth installing, this speed will vary depending on the system size. As such ensuring you have the correct wind speed by seeking wind speed data from various local or national weather sources is crucial. Ensure the data is recorded at a similar height to the intended installation of your turbine.

Wind turbines work best and are most efficient in non-turbulent winds. Installing wind turbines where there are lots of obstructions like trees, cliffs or built up urban areas will result in turbulent winds hitting your turbine causing a loss of efficiency and unnecessary strain to the system. As such it is recommended that you install wind turbines on the top of tall towers in clean wind.

Wind turbines also can produce noise that can be problematic in urban areas. In high density housing areas like housing estates, noise from a wind turbine may cause disruptions to surrounding houses. This is a factor that needs to be considered when considering installation.

Urban areas are not a good place for the installation of wind turbine with the current technology available. It is recommended you only install one if you live in an area with plenty of open space or have enough land and the necessary permissions needed to construct a tower high enough to put your turbine in non-turbulent air. Large acreage properties in flat coastal areas would be ideal locations for residential wind turbines.

Battery technology

Battery technology is still quite new and as such prices are still relatively high. This doesn't mean you shouldn't buy them now if you think they are worth the investment.

Battery storage can be coupled with both solar panel systems and wind turbines to help store excess power generated by your renewable energy systems. This can then be used at a later stage when needed like when the sun is not out or there is no wind.

Continue to keep an eye on battery storage technology in the future as it is a rapidly evolving industry and soon many more homes will be able to afford the technology.

Indicators

All these recommendations can be implemented in houses across Cardinia Shire but their effectiveness may vary from household to household and that's where having a list of indicators will help you know if the changes you are implementing are working or not.

Using your electricity bill

Whether you receive your power bills monthly, quarterly or half yearly they are a valuable source of information to help you track whether changes you are making to your energy usage are successful or not.

The following section will help you to understand how to make sense of your electricity bill. Although electricity bills aren't the same as gas bills the basic concepts outlined in this section will apply to both. If you can understand the basics of reading an electricity bill, a gas bill should also make sense to you.

Reading your bill

Many people just receive their power bill, look at what they owe, and pay the balance. The problem with this is there is much more information available on your bill that you could use to better understand how you are using your energy.

Figures 2 and 3 is a sample of a real-life bill. Points of interest have been identified and each will be explained below. Not all bills look the same as different providers will have their own layout, but on every bill the same general information will be available.

Figure 2. Sample bill front page

LUMO ENERGY Whatever makes you shine.


Electricity
Tax Invoice [Redacted]
Lumo Energy Australia Pty Ltd ABN 69 100 528 327

1. Client Service / Complaints 1300 11 5866
8am-8pm Mon-Fri, 8am-5pm Sat
Electricity Faults – 24 Hours 13 20 99
United Energy

Previous Account	Payments / Adjustments	Balance	New Charges
\$202.74	- \$202.74 cr	\$0.00	+ \$158.88

2. **Account Details**

Account Number [Redacted]
Total Amount Due **\$158.88**
New Charges Due **19 Dec 2017**

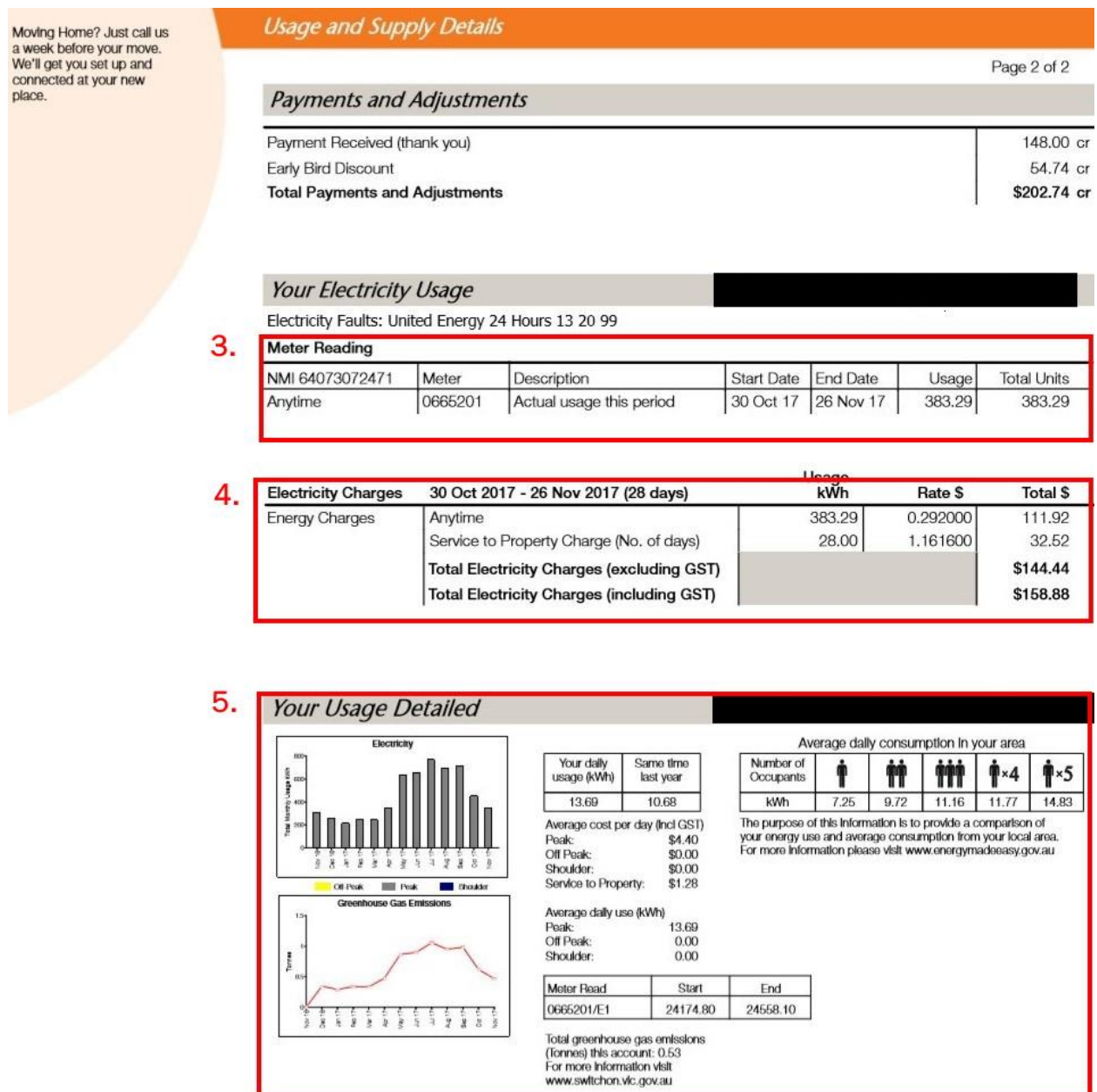
OR
Receive an Early Bird Discount and save 
Simply pay by 5pm 19 Dec 2017
and only pay \$115.98
Includes 27% Electricity discount \$42.90

Usage and Supply *See over page for details*

Electricity charges (30 Oct 2017 to 26 Nov 2017)	\$158.88
Total new charges due	\$158.88
GST included in new charges	\$14.44
GST included in Early Bird Discount	\$3.90

1. These are the contact numbers for your energy supplier for both information and fault reporting. If you believe there is an issue with your bill or your supply charges be sure to contact your provider to seek clarification or rectification.
2. Your account details are generally the one part of the bill people look at. This gives you your individual account number which is used to identify you. It is also where you are told the amount owed from this usage period and the due date. Make sure this isn't the only section you look at, understand what is behind the charges.

Figure 3. Sample bill back page



3. This is the meter reading taken by your electricity supplier. This gives the start and end dates of the usage period as well as the units of energy consumed by your house during this time. For your electricity bill these units will be kilowatt-hours (kWh). This is one of the key figures you need to be keeping an eye on.
4. This section is where the actual charges associated with your usage are calculated. Here is where you will see the rate you are being charged per kilowatt-hour as well as additional charges like 'Service to Property Charge' which is the cost of having electricity supplied to your property.
5. This section gives a breakdown of your usage to better help you understand how you are using your electricity. Here you get your average daily usage figures, as well as a comparison to help you see where your household's usage sits in relation to houses of similar sizes. It also shows you your monthly usage figures which is another statistic to look out for.

What you should be looking at

Using the information given to you by your supplier is one of the easiest indicators you have access to. This information will allow you to understand more about how your household's energy usage is changing.

The main points to look at are;

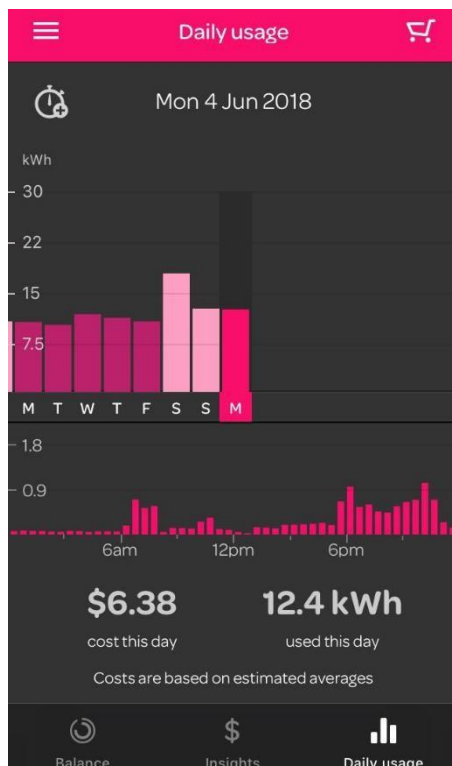
- Is your energy usage going down after making changes? You may see your energy prices rising but this may be due to an increase in supply charge. Remember, the cost of your bill is not a reliable indicator of your energy usage, always check your usage.
- Although checking to see that your usage is dropping is good, it is more reliable if you compare data from the same time each year. Your usage may be significantly lower in March than it was in February and as such you think changes you are making are working effectively. This decrease could be due to you not using your air conditioner as much in March as you did in February. As such it would be a good idea to compare your usage from one month this year to your usage from the same month the year before that.

Using your electricity provider's mobile app

If you are with an electricity supplier who has a mobile application available, you can use this to help you better understand the way you use energy and how some of your changes may be impacting your energy usage.

Figure 7 shows the app from the power supplier Powershop. This app allows the user to see not only their daily energy usage but also their usage in half hour intervals across the day. Different power suppliers may have different features on their apps but like with power bills, the information on these apps should all be fairly similar.

Figure 4. Sample of Powershop data



Use this information to see if changes you are making are having an effect. The more precise nature of the monitoring will allow you to have a better understanding of what it is in your home using electricity and how much it is using.

The suppliers in Victoria that currently have mobile applications like this one are:

- AGL
- Origin Energy
- Energy Australia
- Simply Energy
- Powershop

If your supplier is not on this list and you have checked and cannot find their mobile app it is recommended that you contact them and find out if there is any way you can get access to your energy usage interval information.

Calculators

There are several on-line systems you can use to help you determine if the recommendations in this handbook are worthwhile implementing in your home.

Payback period calculators

There are several simple payback calculators online which can help you to determine how long it will take to make back the money spent on upgrades through the savings these upgrades are providing.

There are also some more specific calculators focused on solar panel payback and lighting upgrade payback.

- Simple payback calculator www.calculator.net/payback-period-calculator.html
- Lighting upgrade calculator www.robusled.com.au/robus/detail/energy-saving-calculator
- Solar panel payback calculator <https://solarcalculator.com.au/>

EPA Australia greenhouse calculator

The EPA's Australian greenhouse calculator lets you explore the way you use energy and the greenhouse gas emissions you contribute to the environment.

You can use this calculator to compare your current emissions to the emissions of your house after you make some of the recommended changes. www.epa.vic.gov.au/AGC/home.html

Behavioural change

While this handbook is focussed on providing you with recommendations around physical changes you can make to your home to increase energy efficiency, behavioural changes can be used in conjunction with these structural changes to further reduce the amount of energy used by your household.

These recommendations can be implemented at no cost to your household and as such may be a good place for you to start on your energy efficiency journey.

If you find these behavioural recommendations to be beneficial you may then decide to move onto implementing some of the physical/structural recommendations outlined in this handbook.

1. Set the heater to 18°C-20°C in winter and the cooling to 23°C-26°C in summer. Reducing your thermostat's temperature by 1°C in winter and increasing it by 1°C in summer can save up to 10% on heating and cooling costs.
2. Reduce shower times to lower your water heating costs. 4-minute showers are recommended as a maximum time but shorter will save even more energy.
3. Turn off appliances when they aren't in use. Things like TVs, computers, and game consoles in stand-by mode still draw considerable amounts of energy.
4. Let clothes dry outside in the sun before relying on your dryer or turning on your heater.
5. Turn lights off when you leave a room or when they aren't required.
6. Open windows and use natural ventilation where possible instead of air-conditioners or fans to cool your house down.
7. Involve children in the energy saving process. Teaching kids about the importance of being energy efficient will help to propagate the ideas and lessons learnt from this handbook.

Additional resources

This handbook cannot cover all aspects of energy efficiency and sustainable housing but there are many helpful resources that can be accessed that can help you learn more about what you can do to make your home more energy efficient and reduce your carbon emissions.

Additional Information

Sustainability Victoria, You and Your Home gives tips on how you can increase the sustainability of your home. www.sustainability.vic.gov.au/You-and-Your-Home

Australian Government, Your Home is Australia's guide to environmentally sustainable homes. www.yourhome.gov.au/

Victorian Government, Energy. An online resource to learn more about where our energy comes from and how it gets to your house. www.vic.gov.au/environment-water/energy.html

Tools

South East Council's Climate Change Alliance (SECCCA), New Home Energy Advisory Service. If you are looking to build a new home the New Home Advisory Service can help by providing in depth advice around designing a house that is energy efficient and includes renewable energy while still fitting your budget. www.seccca.org.au/project/new-home-energy-advisory-service/

Victorian Energy Saver, Victorian Residential Efficiency Scorecard. This service helps residents to better understand the energy performance of their homes and assists in making well informed choices around things like renovations, ways to reduce energy bills or purchasing a house. www.victorianenergysaver.vic.gov.au/scorecard

Victorian Energy Compare allows you to compare both gas and electricity suppliers in Victoria to ensure you are getting the best deal. <https://compare.switchon.vic.gov.au/>

The Energy Rating Calculator. A calculator that allows you to compare the energy usage of a range of appliances to help you select the right one for your home. www.energyrating.gov.au/calculator

Incentives

DELWP, Victorian Energy Saver Savings for Households can show residents how to save money on their bills as well as who they can contact to be part of government subsidised energy upgrades. www.victorianenergysaver.vic.gov.au/victorian-energy-upgrades/savings-for-households

Disclaimer

Not all recommendations in this handbook will be applicable to every house and it is the responsibility of the homeowners/residents to decide which they believe will be most effective for their home.

These are merely recommendations, and each should be thoroughly considered by residents before making the decision if they are right for them.

All products shown in this handbook are merely for a visual representation, no one product is recommended over another and it is the responsibility of the reader to do their own research into which product best suits their needs.

Acknowledgement

This information was produced in collaboration with students at Federation University.

