Yarra Ranges Council

Energy Resilience and Electrification in the Yarra Ranges

Yarra Ranges Council acknowledges the Wurundjeri and other Kulin Nations as the Traditional Owners and Custodians of these lands and waterways.

We pay our respects to all Elders, past, present, and emerging, who have been, and always will be, integral to the story of our region. We proudly share custodianship to care for Country together.

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Contents

Glossary

Climate

The average weather over the last 30 years.

Electrification

The process of replacing devices or appliances that are powered by fossil fuels (e.g. gas water heaters and petrol cars) with electric devices.

Energy efficiency

The ability to achieve optimal results in any activity while using the least amount of energy resources. The higher the energy efficiency of a home, the less power is needed to perform the same tasks. For instance, swapping out incandescent light bulbs for LED bulbs can boost your home's energy efficiency, as LED bulbs consume less energy.

Energy resilience

The ability to cope with and recover from unplanned power disruptions. This often involves putting contingency measures in place in the event of a power outage.

Resilience

The ability to withstand and recover from extreme or challenging events or situations.

Weather

The brief, rapidly changing condition of the atmosphere at a particular place and time. This can change from hour to hour and place to place.

Introduction

Save money and increase the comfort of your home while helping the environment!

This booklet aims to:

- Increase your knowledge around energy transition, electrification and energy resilience and their importance.
- Provide you with relevant information to make informed decisions for your household.
- Provide practical actions for you to build resilience and electrify and increase the energy efficiency of your home.

Extreme weather events are becoming more commonplace and communities experiencing storms, extreme heat, fires, and floods often find themselves without power for extended periods of time.

Building energy resilience whilst electrifying your home can bring the dual benefit of reduced disruption to energy supply and financial savings, whilst also supporting a more sustainable community.

Energy resilience focuses on ensuring a reliable and stable energy supply, which can be enhanced through energy efficiency measures like upgrading infrastructure and reducing energy waste. Electrification, particularly with renewable energy sources such as solar and wind power, provides a cleaner and more sustainable energy solution that goes hand in hand with resilience and efficiency.

Climate Change

Yarra Ranges Council recognises that we are facing a global climate emergency requiring urgent action by all levels of government. Scientists state that climate change is causing more chaotic and extreme weather events in Australia including longer, hotter and more frequent heat waves, longer and more ferocious fire seasons, and flooding rains.[1]

Climate Action and Climate Change Solutions

To combat climate change, Australia must reduce its greenhouse gas emissions along with the rest of the world. The most impactful ways to do this are:

Electricity

Rapid transition away from fossil fuel generated electricity to renewable energy and storage technologies (e.g.. batteries).

Transport

Electrify our transport systems — buses, cars, trains and trams — and power them with renewable electricity. Emissions can also be reduced by improving public transport systems, encouraging active transport like walking and cycling, and building infrastructure like vehicle charging stations to encourage people to use electric vehicles.

[1] bom.gov.au/state-of-the-climate

Fossil fuels

Actively transition away from fossil fuels such as coal, oil and gas. Australia is the fourteenth largest emitter in the world, with the burning of fossil fuels being the largest emissions contributor.

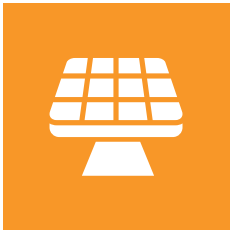
Example of a city powered by renewable energy

Energy Resilience

Extreme weather events are one of the largest risks to a secure supply of electricity in Australia. Electricity systems that rely on large sources of power from coal and gas power stations that is transported over long distances through power lines are vulnerable to extreme weather events. In a municipality such as the Yarra Ranges, which is vulnerable to extreme weather events and has a mix of rural and urban areas, power outages can be a frequent occurrence. So how do we become more energy resilient in the Yarra Ranges?

Preparing for and managing power outages

Consider backup power



Islandable solar + battery systems

Installing a solar system with battery storage that can disconnect from the grid in the event of a power outage could allow you to continue to use essential electrical appliances.

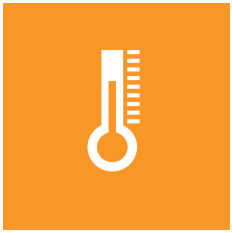
Generators

You could use a portable generator to power essential appliances in your home (don't use these inside – make sure generators are outdoors in a well-ventilated area protected from the weather).

Manage energy usage

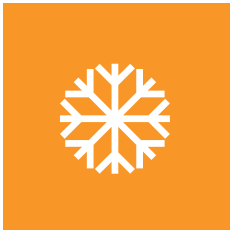
If you choose to install a backup power source, consider choosing energy-efficient appliances and limit your electricity usage to essential appliances.

Work with the weather



Hot weather

Close windows and window coverings during the day and use the night air to cool your home. You could also hang wet towels to cool down the air in the room.



Cold weather

Draught proof your home and spend time in rooms with north facing windows. Insulate your floor by laying down rugs, towels and blankets and close curtains at night to prevent heat from escaping. Wear layers of clothes.

Keep cash on hand in the event electronic payment systems go down during an outage.

If you have an electric water pump, keep several large bottles of water on hand.

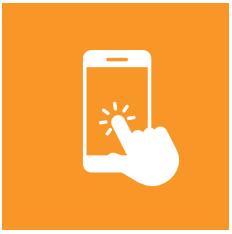
Ensure battery packs are charged at all times.

Use a gas BBQ as a backup cooking solution.

Store battery-operated torches, radios and spare batteries where they can be easily accessed.

Check ABC radio station for emergency updates.

Know how to manually operate electric garage doors and gates.



Use AusNet's Outage Tracker to report outages and learn outage timeframes.

Keep your contact details up to date with your electricity retailer to receive outage alerts.

Check on your neighbours

Solar PV

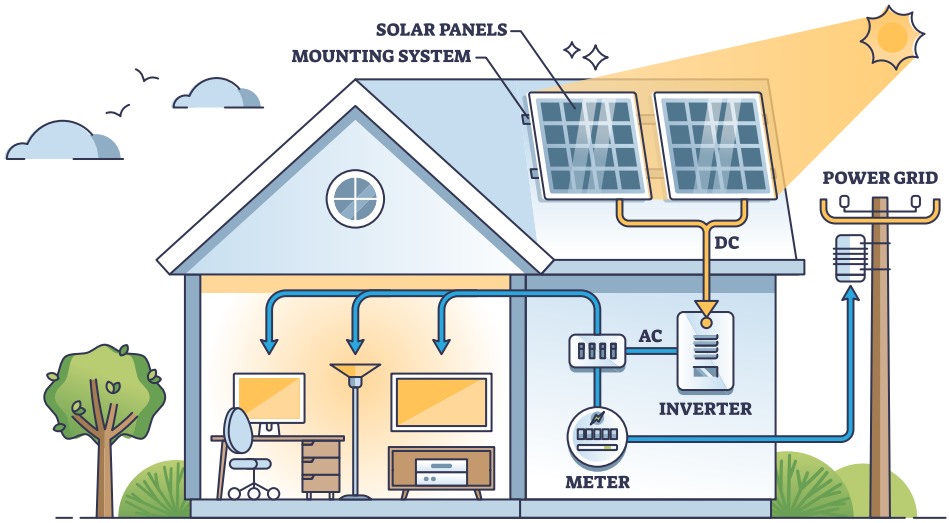
What is Solar PV?

A solar photovoltaic (PV) system, also referred to as solar panels or solar power, generates renewable electricity by converting energy from the sun into electricity. The solar panels usually sit on a roof facing north so that they get good access to the sun, but they can also sometimes be installed to face in other directions when there is limited north-facing roof space.

One in three Australian households now have rooftop solar PV.

Financial benefits

If you use electricity generated by your solar panels to power appliances in your own home, you will need to purchase less energy from the grid.



Example of a home solar system

If you shift some of your electricity usage to the middle of the day when the sun is shining and the solar panels are generating electricity, you will be able to make much better use of the solar energy you generate. Adding batteries to a solar system allows you to store unused energy to be available later in the day when the solar panels are not generating energy.

Environmental benefits

Although solar panels have an environmental impact through the resources required to produce them, they create a much smaller environmental impact than electricity generated by fossil fuels. Also, greenhouse gases are not created when generating electricity.

Excess unused solar generation can be sent back to the electricity grid and made available to other households, reducing their environmental impact.

Can’t install a solar system?

Achieve environmental benefits by buying GreenPower - a government accredited renewable energy product offered by most electricity retailers to households and businesses in Australia.

GreenPower provides an environmentally friendly alternative for people who are not able to generate their own renewable electricity. You can also increase your home’s energy efficiency to save money on electricity bills (see Home Energy Efficiency section of this booklet).

Grid-connected vs battery backup

Grid-connected solar systems

In Australia, solar PV panels are usually connected to the electricity grid for reliability; if your solar system fails or isn’t producing enough energy to power the devices being used at a given time, your house will draw electricity from the grid to meet your consumption.

Unless you have a hybrid solar system with a battery, your grid-connected solar will not continue to operate in the event of a grid power outage. For grid-connected systems, any excess energy is exported to the electricity grid.

Solar + Battery systems

Installing a battery alongside a solar PV system allows excess energy to be stored and used at night or when there isn’t enough sunlight. This may allow electrical appliances to continue to operate during a power outage, offering energy resilience.

Your system will require a hybrid inverter to disconnect from the grid in a power outage.

Steps to installing Solar PV

1. Work out how much energy you use — find your daily average usage on your electricity bill in kilowatt-hours (kWh). Compare bills to see how this varies over a year.
2. Consider switching gas devices to energy-efficient electric ones to save money on your energy bills. You will need to consider this when planning your solar system as this will increase your energy usage.
3. Find out what size solar system you need based on your energy usage by using SunSpot's Calculator to estimate your system size, cost and how much you'll save.
4. Choose a reputable retailer or installer.
   - Your solar system must be installed by an accredited installer for you to access Australian Government rebates. Check their accreditation through Solar Accreditation Australia saaustralia.com.au/accreditation-status-check
   - Consider the company's reputation and whether they have technical and sales support in Australia. A local, accredited installer is likely to be readily available for follow-up services— ask your neighbours for recommendations. Search online for reviews about a solar retailer or installer.
   - Obtain three quotes for the same size system and the supplier's recommended system size. A higher price could be reflective of higher quality components, so don't immediately go for the lowest quote! Check the warranty (the longer the better!).
   - Ask your installer if they can organise connection to the grid, how much it will cost, what's included in your warranty and who to contact in case of a fault.
   - They should provide you with warranties for your panels (usually about 10 years) and their power output (should be at least 80% of its original rating after 25 years), your inverter (5 years at a minimum), and the installation of the system.
5. Get the most from your rooftop solar system by increasing your home's energy efficiency.

Batteries

A battery can store energy for use when your solar panels are not generating enough electricity (e.g.. at night or on a cloudy day). This allows you to maximise the use of your solar, potentially lowering costs and reducing your reliance on the grid.

Benefits

- Reduce dependence on grid: batteries allow you to use energy generated by your solar panels during peak hours when electricity rates can be higher.
- Cost savings: by using the solar energy stored in your battery, you will spend less on electricity drawn from the grid.
- Backup power: if your system is configured to disconnect from the grid during a power outage, it may provide backup power to your home.
- Grid stability: batteries support the grid by reducing strain during periods of high demand, supporting overall energy resilience in the community.

Lifetime and quality

Solar batteries don't usually require much maintenance, but it is important to monitor their performance to make sure that they are functioning correctly.

Most batteries will come with a product warranty — about ten year which reflects the average lifetime of the battery — and a workmanship warranty which is about five years.

Battery backup during outages

A battery can provide backup power during an outage, but it must be configured correctly. Not all battery systems have this capability.

Standard system

The solar inverter shuts down during an outage, and the battery supplies electricity until it is discharged. Once the battery is empty, there is no more power until the grid is restored.

Islandable solar and battery system

This system disconnects from the grid during an outage and continues to power your home. It can also charge the battery when it's sunny using your solar panels. This option is more expensive but offers more energy resilience.

Depending on the type, size, and setup of your battery, it may provide backup to the entire property or only to selected circuits (e.g., lighting, refrigeration).

In parts of the Yarra Ranges, power outages are a regular occurrence. In these areas, it could be worthwhile purchasing a battery so that you have access to electricity in the event of a power outage.

Choosing the right battery for your home

1. Assess your energy usage and determine how much energy you want to store for later use.
    - Battery capacities: usually measured in kilowatt hours (kWh), which are a way to measure how much energy something uses over a period of time. Battery capacities can range from 4kWh to 14kWh for residential systems. The size of battery that you need depends on how much energy you consume, and how much energy you want to store to use later. Consider the expected lifetime of the battery.
2. Check the warranty conditions.
3. Read online product reviews.
4. Talk to Solar Savers or a licensed retailer/installer who is accredited for battery installation and organise to have your battery installed.

Electric vehicles as battery backup

Using electric vehicles (EVs) as home batteries is an emerging technology in Australia, also known as vehicle-to-grid (V2G) or vehicle-to-home (V2H). This technology allows EVs to draw power from the grid and supply power back to your home or to the grid to increase your energy resilience and possibly reduce electricity costs in the same way that a battery would.

To use an EV as a home battery, you need a bi-directional charger that can handle both the charging of the EV and the discharging of electricity back into your home or into the grid. Not all EVs currently support this technology but it is becoming more common. Depending on your setup, the EV could provide backup power to your home in the event of a power outage.

Modern EV batteries are designed to handle many charge cycles and there are ways to manage the charging and discharging to minimise negative effects on the battery. In future appliances may be able to be plugged directly into an EV battery!

Solar Savers – not just for solar!

Knowing which installer to trust can be a daunting process when researching solar and battery systems which is why Yarra Ranges Council has joined the Solar Savers program along with many other Victorian councils.

Solar Savers is a local government initiative designed to help residents to install quality solar systems and electric appliances and access government rebates that they may be eligible for. Solar Savers streamlines what can be a confusing and complicated process.

Solar Savers can help you to install:

- solar panels
- batteries
- heat pump hot water systems
- split system heating/cooling

The program aims to help households reduce energy bills, future-proof against rising energy costs, and support the transition to clean, renewable energy.

How Solar Savers Works

Registration

Register your interest at **solarsavers.org.au** or phone **1300 548 598**. Have recent electricity bills and photos of your switchboard and meter ready.

Eligibility check

Solar Savers will assess your eligibility and determine if you qualify for any government rebates.

Consultation and commitment-free quote

An accredited installer will contact you to discuss suitability and provide a commitment-free quote.

Review and approval

Review the costs and approve the system proposal or reject it if you have found a better offer.

Installation

The installer will guide you through the installation process, ensuring quality and satisfaction.

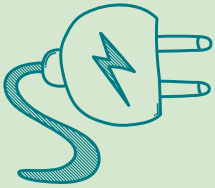
Government rebates and incentives

Visit energy.vic.gov.au/victorian-energy-upgrades for heating/cooling and hot water, and visit solarsavers.org.au for solar and batteries.

"I needed to know that people were on top of things. Everybody that I spoke to knew what they were talking about."

James, Healesville Solar Savers Customer

Electrification



Join the Yarra Ranges community in building a clean energy future by transitioning to an all-electric home. A clean energy future relies on us getting off gas and transitioning away from fossil fuels, instead using clean, renewable energy to power our homes. Energy-efficient electric devices could reduce your electricity bill and are better for the environment than gas-powered appliances.

Getting off gas is not only good for the environment, it's also usually cheaper to run, safer to use and better for your health. Unlike electricity, gas can release nitrous oxide, carbon monoxide and sulfur dioxide into your home. In fact, cooking with gas is estimated to be responsible for up to 12% of the burden of childhood asthma in Australia, according to the Medical Journal of Australia[2].

How to electrify your home

- You don't need to electrify everything all at once! The process of transitioning to an all-electric home can take weeks, months or years.
- Prioritise replacing appliances that are more than 10 years old to fast track your transition to an all-electric home.

[2] mja.com.au/journal/2018/208/7/damp-housing-gas-stoves-and-burden-childhood-asthma-australia

Go Electric Plan

Using a ‘go electric’ plan will help you prepare for when an appliance needs replacing so that you are ready to make the switch to an efficient electric appliance.

Current appliance	Age of current appliances (years)	Go Electric with an	Rating	Cost	When could I replace?
Gas heating		☐ Split system reverse cycle air conditioning	**Best**	$–$$	
		☐ Ducted Reverse Cycle air conditioning	Better	$$$	
		☐ Heat pump hydronic heating	**Best**	$$$+	
		☐ Electric heater	Good	$	
Gas hot water		☐ Electric hot water heat pump	**Best**	$-$$$	
		☐ Electric storage (with solar and timer)	Better	$	
Gas cooktop or gas oven		☐ Induction cooktop	**Best**	$-$$$	
		☐ Electric cooktop	Better	$-$$	
		☐ Electric oven		$-$$$	
Petrol or diesel car		☐ Electric bike		$-$$	
		☐ Electric vehicle		$$-$$$+	
		☐ Walk or ride more		$	
		☐ Take public transport		$	

$ less financial outlay
$$$+ higher financial outlay

Home Energy Efficiency

The higher the energy efficiency of a home, the less power is needed to perform the same tasks. Using less energy can save you money on your energy bills, reduce your environmental impact, and can increase the comfort of your home by keeping it cool in summer and warm in winter.

Check out Sustainability Victoria's Household Energy Action Guide for practical actions that you can take to increase the energy efficiency of your home.

Energy efficiency for homeowners

- When old appliances are coming to the end of their life, invest in energy-efficient electrical appliances such as a heat pump hot water system, induction cooktop, and split system heating and cooling.
- Add external shading to keep the sun off your windows and to improve your home's summer comfort. North windows can be shaded by horizontal blinds that stop the high summer sun from hitting the glass but allow the lower angled winter sun in. Vertical shading (e.g. Bamboo blinds or a canvas awning) is best for East and West facing windows to protect against the low summer sun.
- Invest in double-glazed windows or thick curtains with pelmets to prevent heat from entering the house in summer or escaping in winter.
- Insulating the floor, ceiling and walls of your home can keep warmth in and cold out in winter, and do the opposite in summer.

Energy efficiency for renters and apartment-dwellers

For many people, including renters and apartment-dwellers, installing a solar system is not a viable option. There are still things you can do to increase your energy resilience, reduce your environmental impact, and save on energy bills.

- LED lighting: replace incandescent bulbs with more energy-efficient LED lights.
- Insulation and draught-proofing (don't do draught-proofing if you have an unflued/open-flued gas heater):
  - Draught-proof gaps in doors and windows with adhesive rubber or felt – a windy day is a good opportunity to see where draughts might be coming in.
  - Use a 'DraftStoppa' to seal bathroom fans when not in use.
  - Install thick, long curtains to prevent heat loss or gain through the windows of the house – this can be almost as efficient as double-glazing.
  - Put bubble wrap over the windows to provide insulation and reduce the influence of the outside temperature in your home.
  - Fill gaps in the floorboards using a caulk or sealant.
  - Seal wall vents with clear plastic adhesive.
- Choose energy-efficient electrical appliances when replacing or upgrading appliances such as fridges, dishwashers, TVs, washing machines etc.
- Ready to take the next step? Start a conversation with your owner's corporation about installing solar on your building or visit solar.vic.gov.au/solar-systems-apartment-buildings.

My Energy and Water Saver Kits

Assess the energy efficiency of your home by using Yarra Ranges Council's My Energy and Water Saver Kits, available to borrow for free from libraries across the Your Library network yourlibrary.com.au

The tests and equipment included in the kits can help you check for water leaks, high energy items, costly behaviours and other building design flaws that could be contributing to your water and energy bills. The kits will guide you through actions that you can take to increase the efficiency of your home.

Each kit contains:

- Thermal Imaging Camera
- Power Meter
- Stopwatch
- Thermometer
- Instruction Guide

Home Energy Efficiency Advice

There are two local community energy groups that offer free home energy assessments for members. These assessments are conducted by trained volunteers and will provide you with tailored advice to increase the energy efficiency of your home.

Repower the Dandenongs

A community energy group looking to encourage residents of the Dandenongs to reduce their carbon footprint and promote innovative renewable energy technologies. Annual membership is $10.

Find out more at repowerthedandenongs.org.au

Healesville Community Renewable Energy (CoRE)

Healesville CoRE aims to support the uptake of solar for Healesville residents, businesses and not for profits, striving for a future where Healesville produces more energy than it consumes. Annual membership is $25.

Find out more at healesvillecore.org.au

Further Resources

Residential efficiency scorecard

A government-backed program that offers an energy efficiency star rating for your home and tailored energy efficiency advice. An accredited scorecard assessor who is an expert in home energy efficiency will come to your home and provide you with a clear pathway to reducing your energy costs and emissions and making your home more comfortable. This service costs between $250-$500.

homescorecard.gov.au

Sustainability Victoria –
Household Energy Action Guide

Discover simple, cost-effective ways to reduce your energy bills by taking action around your home. What could you be doing more to save energy and money?

sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home

Solar information from the state government

Find information about rebates, saving on your energy bills and building a clean and renewable future in Victoria.

solar.vic.gov.au

Solar consumer guide

To dive deeper into installing and maintaining solar and battery systems, along with lots of handy tips and considerations, visit this Solar Consumer Guide website.

energy.gov.au/solar

Join a community group

There are many environmentally focused community groups around the Yarra Ranges, with several focusing on renewable energy and electrification. Find your local group to seek support or to take action alongside your community!

yarraranges.vic.gov.au/envirovolunteer

Greener living information book

The Greener Living Booklet is a resource to help you live more sustainably by connecting you with local programs, groups and community resources.

Search ‘greener living information book’ at yarraranges.vic.gov.au or for a printed copy email sustainability@yarraranges.vic.gov.au

Council climate change information

Find out more about what is happening at Council around climate change.

Visit yarraranges.vic.gov.au/environment/climate-change

For more information about this book contact
sustainability@yarraranges.vic.gov.au