

UNLOCKING
**SUSTAINABLE
STRATA**
A GUIDE TO
ELECTRIFYING
YOUR APARTMENT
BUILDING OR
TOWNHOUSE

UNLOCKING SUSTAINABLE STRATA

We all deserve efficient, safe, comfortable and healthy homes. Unlocking Sustainable Strata brings together collaborators to learn, trial and design effective solutions that make it easier for people who live in apartments and townhouses to retrofit sustainability technologies. We are working for systemic change and on-ground action.

Acknowledgement

We respectfully acknowledge that every apartment building in Australia exists on traditional Aboriginal lands which have been sustained for thousands of years. We pay respect to the Traditional Custodians and Owners of this land and recognise their ongoing connection to and care for these lands.

Disclaimer

This document and any information provided have been prepared in good faith based on the best and most up-to-date advice available. The costings, energy use and payback periods are indicative only, based on information current at the time of publication and will likely fluctuate in the future.

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FOUNDING PARTNERS

HIP V. HYPE Sustainability

HIP V. HYPE Sustainability provides advice that is commercially grounded, yet ambitious. We pursue exceptional outcomes that are socially, economically and environmentally sustainable and enable action across government, institutions and organisations.

Our responsibility is to leave our cities and regions in a better condition than we found them.

Merri-bek City Council

Merri-bek City Council, located in the inner north of Melbourne, five kms from the central business district, are a leader in sustainability and are always looking to improve services to create a better future for our planet, our city, our community and our children.

Strata Community Association Victoria

Strata Community Association Victoria SCA (VIC) is the pre-eminent member-based association for the Victorian Owners Corporation industry. With almost 800 members, SCA (VIC) represents more than 80% of all professional owners corporation managers, along with industry suppliers.

The Knight

The Knight is an Owners Corporation, Strata and Body Corporate management company with offices in Melbourne and Geelong. We pride ourselves on our commitment to strong family values and real hands-on experience. This enables us to give you a more personal, supportive and effective Body Corporate service.

City of Yarra

City of Yarra is an inner metropolitan municipality, home to a diverse community of approximately 100,000 people. Yarra was one of the first Council's to declare a climate emergency, recognised the planet's climate is already too hot and that effort is needed across all levels of government, businesses, and communities to address the climate crisis.

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We are living in the clean energy revolution.

Rooftops are now resources and in the near future, an electric vehicle will act like big battery. Our homes will be all-electric, powered by renewable energy. Our homes will have cleaner indoor air that's good for our health.

It's important that apartment buildings aren't left behind.



It's time to electrify

IT'S TIME TO ELECTRIFY

Be part of a clean energy future by moving your apartment building to all-electric.

Everyone can enjoy the performance leaps electric appliances have taken over the past few years. That's cheaper heating, cooling, hot water and cooking.

And it doesn't have to be all at once. You can switch over appliance by appliance, accumulating benefits and savings as you go.

Take time to prepare so that when appliances, like hot water, need replacing, you and your owners corporation are ready to make the switch.

This guide will help you plan for your all-electric future and identify the opportunities to electrify your apartment and your common area infrastructure.

How to use this guide

This guide provides a step-by-step process to transition to all-electric for both common areas and your home, be it an apartment or townhouse.

Choosing the best electric products - be it a new heater, cooktop, hot water system - can be confusing but this guide makes it simple by providing product recommendations. The benefits and considerations for each product are outlined and then given a rating of **Best, Good and OK**.

Where possible, upgrade to products in the 'Best' category as they will be more efficient to run, saving you energy and money across their lifespan. If your budget is limited, don't worry. You'll still gain energy savings, financial and health benefits by upgrading to a product in 'Good' or 'OK' category.

Please share this guide with your owners corporation committee and your neighbours. Together, we can electrify everything.



Everyone is doing it. Recognising that gas is no longer serving our health, environment or back pocket, the Victorian Government has developed a Gas Substitution Roadmap to support us all to make the switch to all electric homes.

Under the Roadmap the State Government is introducing new incentives for switching to efficient electric appliances, changing planning provisions so new properties do not have to be connected to gas, and supporting the move to a 7-Star minimum standard for more efficient new home construction.

The switch has already started. Don't get left behind.

ELECTRIFY
COMMON AREAS &
INFRASTRUCTURE

Getting to all-electric in your building doesn't mean doing everything from day one. In fact, it's much better doing things in logical order, starting with the lowest hanging fruit.

Preparing a plan to transition to all-electric makes sense from both a cost and implementation perspective. Working with your committee, you can work out your timeline, consider financial implications and engage the right technical experts to help you get there.

This section — Getting to all-electric for common areas and infrastructure — will guide your owners corporation to electrify the building-wide systems, including those that service individual apartments.

When is the best time to upgrade?

From a cost perspective, aligning common area or centralised system replacements with the end-of-life of existing gas systems, or upon failure is most prudent.

The timeline of other planned works should also be considered. Undertaking all-electric retrofits concurrent with other major building works (e.g. facade, structural works or major renovations) can save on trades, equipment and potentially access equipment to roofs.

Of course, if funds are available, your committee may choose to expedite the retrofitting of all-electric systems in recognition of the efficiency, environmental, health and long-term economic benefits of making the switch.



STEP 1: REVIEW & ENGAGE

It's important to have a good understanding of what systems in your building are currently running on fossil fuels, such as gas.

It may be your building's common areas and centralised systems have very little gas use, for example just a gas hot water system. This makes things straightforward.

More complex systems, such as those with centralised gas heating and owners corporations wishing to add EV charging, will take a bit more effort and planning.

Start by looking at and reviewing the building systems and services in the common areas and those that are centrally serving dwellings. Make a list of these services and systems noting:

- When they were installed
- How long until they are at their end of life
- Whether they are gas or electric

The Maintenance Plan for your building should outline when existing systems will reach end of life.

STEP 2: PLAN & PREPARE

Agree on the technology to be retrofitted

Working with your committee, Owners Corporation Manager and if applicable, your Facilities Manager, map out the timeline to upgrade each system. Add into the timeline the technology intended for each retrofit.

This Guide provides a range of suggested all-electric technologies but your committee may wish to get specialist advice for your building.

Planning ahead and agreeing on what technology will be retrofitted is critical in case you have an unexpected failure of existing systems. Typically, systems are replaced like-for-like on failure and you don't want to miss the opportunity to upgrade to future-proofed, all-electric technology.

Understand the electrical capacity of your building

Understanding how much electrical capacity is in your building is the next step. Engage a professional electrical contractor to undertake a review of the electrical services, switchboards and substations. Share your retrofit timeline with the contractor so they can calculate the new electricity load, given the intended technology retrofits.

Remember that over time, it's likely owners will electrify their apartments and their transport (e.g. installing induction cooktops and installing EV charging). So, when estimating future electrical loads, it is important to consider the building as a whole, common areas and infrastructure, plus the apartments themselves.

If electrical capacity in the building is limited, energy efficiency opportunities can be explored to reduce the overall building peak load or the electrical infrastructure can be upgraded.

Once you have your plan, you may like to inform your owners corporation members and help them understand the benefits.

STEP 3: DELIVER

Source at least three quotes from reputable installers and tradespeople. Work with your committee to confirm the most appropriate installer to match the needs of your Owners Corporation and budget.

Give fair notice to occupants and owners as to when the works will be done and how long they are expected to take. Describe the likely interruptions occupants might experience and don't forget to inform them about the benefits of the new infrastructure.

STEP 4: OPTIMISE

Once the works have taken place, let occupants and owners know and report on any upgrades undertaken in the committee report at the AGM. Ensure anyone who will use or manage the equipment has access to user guides and other documentation. This might include your committee, facility manager and in some cases building occupants. Your Owners Corporation Manager may also want a copy for their files.

If the services are major, such as centralised heating or hot water, have them fine-tuned over the first 12-months. This will ensure they are working at their optimum.

STEP 5: TURN OFF THE GAS

Following the replacement of all gas services, it's time to plug the pipe. Jump on the phone to the gas company and have your service disconnected. This will mean your owners corporation will no longer pay gas supply charges or gas bills, however some companies do charge a once off fee to have your gas disconnected.

Congratulations, you've electrified everything!

Decision-making and funding for your common area retrofits

To undertake retrofits in your common area, your owners corporation or committee will need to agree on completing the retrofit, and decide how it will be funded. Decisions about small, low-cost retrofits (e.g. switching a common area BBQ from gas to electric) can generally be made by your committee by ordinary resolution.

Larger, more expensive retrofits (e.g. replacing your central hot water system) may require a special resolution (agreement of 75% of all lot owners for a final resolution or 50% for an interim resolution). If you're not sure what type of decision is needed, please seek advice from your Owners Corporation Manager.

As well as agreeing on the retrofit itself, you will need to agree on how the work will be funded. Your owners corporation or committee may choose to pay for the retrofit from the maintenance fund. In this instance:

- An ordinary resolution is required for money to be paid out of the maintenance fund for items listed in the maintenance plan
- A special resolution is required for payments from the maintenance fund for a matter not listed in the maintenance plan
- Alternatively, you may decide to fund the retrofit through a special levy, loan or in the case of something like EV charging, under a user pays approach.

For more information about decision-making and funding of projects in owners corporations, visit the [Consumer Affairs Victoria Owners Corporation webpage](#).

IDENTIFYING GAS IN YOUR BUILDING

Where might you find gas in your building? Typical uses for gas include space heating, hot water and cooking. An outline of typical gas powered systems are described here.

Heating

Heating is often supplied to buildings using gas as the heat source. Typical sources of gas heating include gas fired boilers supplying hydronic radiant heating or fan coil units, gas ducted heating and wall mounted gas heaters.

Domestic Hot Water

Domestic hot water is traditionally supplied via gas fired storage, instantaneous or condensing type centralised plants. Some apartment buildings have gas boosted solar hot water systems. In this case, the gas component of the system should be switched out.

Cooking

Some shared entertaining areas and terraces in apartment buildings include gas cooktops or gas fired BBQs.

All electric substitutes

On the following pages you will find:

- Recommended all-electric technology that can be retrofitted in place of gas powered systems
- Renewable energy technology for apartments
- Advice on electric vehicle charging solutions

MAXIMISE THE BENEFITS OF ELECTRIFYING EVERYTHING

Making the switch to all-electric means your building can be powered with 100% renewable energy thanks to:

1. Solar Photovoltaics (PV)

The addition of solar PV to an all-electric building will enhance the operational affordability of running costs and help lower the emissions footprint by generating renewable energy onsite.

Technology advances have now made solar accessible to all residents within an apartment building. See page 19 for more information.



2. GreenPower

To round out an all-electric building offering and move to a net zero energy position, GreenPower or certified renewable energy can be purchased through your electricity retailer. See page 20 for more information.

In larger apartment buildings with significant common areas or community facilities, heating may be supplied via gas fired boilers that supply hot water to units that heat spaces.

These types of larger centralised heating systems can be replaced by a number of electric alternatives such as air-sourced heat pumps or refrigerant based technologies like Variable Refrigerant Flow (VFR) reverse cycle airconditioners.

REVERSE CYCLE AIRCONDITIONING

Best | Good | Ok

Suitable for: Single rooms that require heating

The most straightforward replacement for any heating system is a reverse cycle split system airconditioner. This type of system also has the added benefit of cooling as well as heating.

A reverse cycle airconditioner consists of an outdoor unit (condenser) and an indoor unit (head unit). The two units are connected via pipework containing refrigerant. The outdoor unit requires good ventilation in order to operate efficiently.

Installation of the unit requires both an airconditioning technician and an electrician and typically can be undertaken in a day.

For larger spaces and common areas, a ducted split system may be more appropriate, where several head units are used throughout the space, all connected to the single outdoor unit.

Installation considerations and advice

- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings
- Larger capacity reverse cycle systems require a dedicated 3-phase electrical circuit
- Requires a specialised airconditioning installer and electrician
- Well ventilated external space required for outdoor unit
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R32 (see page 13 right)

Benefits

- Straightforward installation for most typologies

Upfront Costs

- Single 7.5kW split system: \$1300-2100
- Installation cost: \$750-1000

Running Costs

- A single unit for a medium to large common area typically costs \$280 per year for both heating and cooling



Image: HIP V. HYPE. Split System Air Conditioning ©

GLOBAL WARMING POTENTIAL (GWP)

Don't worry if terms like global warming potential and R32 don't mean much to you. You don't need to be an expert. Just ask the airconditioning company for a model that uses R32 or another low or zero GWP refrigerant.

Want to know more? Here's a brief summary.

The Global Warming Potential (GWP) is a measurement scale that compares the global warming impacts of different gases, including refrigerants.

Traditional refrigerant gasses have a high GWP, meaning they are highly polluting and contributing to climate change. Some newer refrigerants, including R32 and R744, have a low or zero GWP, and are much better for us and our environment.

VRF AIRCONDITIONING SYSTEM

Best | Good | Ok

Suitable for: Large areas or multiple rooms, common areas, lobbies etc.

VRF systems are basically a larger version of a split system airconditioner. They have a large outdoor unit that absorbs or rejects heat. The outdoor unit is connected to multiple indoor head units, where the conditioned air is blown into the room.

The primary difference between a reverse cycle system with multiple indoor units is the ability to set different temperatures in different rooms.

A VRF system can be used to replace a boiler heating system and typically has very high efficiencies.

Installation considerations and advice

- Rooftop plant room availability
- Increased peak electrical demand
- Dedicated 3-phase electrical circuit
- Requires a specialised airconditioning installer and electrician
- Well ventilated external space required for outdoor unit
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R32 (see page 13)

Benefits

- Ability to individually control the temperature in each space or room
- Highly efficient in operation
- Neat installation, with grilles in the ceiling or bulkheads

Upfront Costs

- System serving 5 large rooms: Approximately \$25,000

Running Costs

- The above system used for both heating and cooling, approximately \$550 per year

AIR SOURCED HEAT PUMP

Best | Good | Ok

Suitable for: Large centralised heating systems

The closest like-for-like replacement of a centralised gas boiler heating system is an air-sourced heat pump (ASHP). An ASHP works in the same way as a typical air-conditioner- drawing heat from the external air, and using refrigerants, transfers that heat to the space to be warmed.

An ASHP will require a significantly larger space than a gas boiler, therefore plant room size will need to be considered, as well as the requirement for ventilation.

Installation considerations and advice

- Increased plant space required, potentially 3x gas boiler
- May need to replace existing heating coils and pipework due to temperature and flow changes
- Requires a specialised airconditioning installer and electrician
- Well ventilated external or roof space required
- May result in an increased peak electrical demand. In order buildings, an upgrade to switchboard capacity might be needed
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R32 (see page 13)

Benefits

- Highly efficient in operations, low running costs
- Health benefits from no pollutants from gas
- Can provide both heating and cooling

Upfront Costs

Total Replacement Costs: Replacement costs vary significantly depending on the system being replaced, associated building services infrastructure, site of the system, and capacity

Running Costs

40% cheaper than gas boiler system

It is common to find centralised domestic hot water systems in apartment buildings that serve the entire building.

These type of systems are typically gas fired instantaneous or condensing systems with storage tanks attached.

Point of use hot water units may also be located in small kitchens or end of trip facilities.

The most efficient and reliable alternative for centralised gas systems is a heat pump. Local gas units are best swapped out for electric instantaneous units.

CENTRAL HEAT PUMP HOT WATER SYSTEMS

Best | Good | Ok

Suitable for: Centralised systems in apartment buildings

The most appropriate replacement for a gas fired hot water system is the equivalent capacity in electric heat pump system. These units work similarly to a split system air conditioner.

Storage capacity allows a heat pump system to produce hot water constantly and store it for use in peak demand times. Heat pumps operate far more efficiently than traditional hot water units, which results in annual savings in hot water energy costs.

Installation considerations and advice

- Straightforward swap over with existing gas centralised systems
- Will require a larger area for heat pump units, up to 3 times the footprint of condensing boilers
- Requires ventilated plant room or rooftop plant space
- Sizing of heat pump should be considered in conjunction with storage capacity rather than directly on peak demand
- May require additional storage tanks to cater for peak demands
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R744 (see page 13)

Benefits

- Extremely low running costs, which can be passed on to individual tenants
- Lower temperature water in operation results in safer maintenance procedures
- Ability to add solar booster in the form of PV panels or solar thermal collectors
- If coupled with solar PV and water heating is timed to run with peak solar generation, hot water cost can be close to zero

Upfront Costs

Supply & Install: Replacement costs vary significantly depending on the system being replaced, associated building services infrastructure, site of the system, and capacity

Running Costs

- Approximately \$160 saving per dwelling per year when compared to a condensing boiler system

Indicative Payback Period

- As little as three years

ELECTRIC INSTANTANEOUS

Best | Good | Ok

Suitable for: Localised facilities, shared kitchens, end-of-trip

An electric instantaneous unit can be installed inside and are useful for small point of use demands such as shared kitchens and end of trip facilities.

Installation considerations and advice

- Some systems require a dedicate 3-phase electrical supply which will require new switch boards and metering
- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings

Benefits

- Small unit footprint, can be housed under a sink or in a cupboard
- Water is heated as you need it, so no storage losses or water wasted waiting to heat up
- Small pipe runs and minimal infrastructure

Upfront Costs

- Single Unit Cost: \$1400
- Installation Cost: Varies significantly depending on whether the electric infrastructure needs upgrading. Be sure to get a quote for installation prior to purchasing

Running Costs

- Comparable to a gas storage unit, depending on usage patterns
- \$230 saving per unit per year when compared to an electric storage unit

Indicative Payback Period

- No payback on gas storage unit
- 6-year payback on electric storage unit

\$230

Saving per unit per year when compared to an electric storage unit



Electric Instantaneous DHW Unit.
Photography courtesy Stiebel Eltron. ©

Some common area facilities contain small kitchen amenities for shared use amongst the residents as well as outdoor dining amenities that may contain BBQs.

Modern appliances for electric cooking are easily sourced and available. Electric induction type cooking appliances offer the best option as a replacement for gas-type cooktops whilst the market for quality electric BBQ options is forever expanding.

ELECTRIC BBQ

Best | Good | Ok

Suitable for: Outdoor kitchens, rooftops

For some outdoor common area cooking facilities provided include gas fired BBQs. The range of electric alternatives to grilling and BBQ-ing have significantly improved in recent years.

Some electric grills now include steam and smoking options to enhance the electric cooking and grilling process and add additional flavour.

Installation considerations and advice

- Straight swap over, no spatial impacts
- Smaller models can plug straight into standard electrical outlets
- Larger models may require an electrician to install

Benefits

- Easy to install and easy to use
- Higher efficiency than gas
- Easy to clean compared with a gas grill
- Health benefits due to removal of gas

Upfront Costs

- Benchttop electric BBQ: \$600-1000
- Installation Cost: No cost for smaller plug in models. \$500-750 to hardwire a large electric BBQ

Running Costs

- Approximately \$0.65 per hour of use compared to \$1.70 per hour of a gas or LPG equivalent BBQ



INDUCTION COOKTOPS

Best | Good | Ok

Suitable for: Shared kitchens

Whilst induction cookers have high peak energy demands, their efficiency at transferring heat whilst cooking is far superior to all other types of cooktops, around 90% compared to 40% for gas. This allows induction cooktops to operate at much lower costs than electric cooktops and also gas cooktops. An additional benefit of this type of cooktops is safety. Induction cooktops are safe to touch and do not generate heat on the cooking surface.

Installation considerations and advice

- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings
- Spatial benefits when giving consideration to additional completely flat surfaces which can be used for food preparation
- New compatible cookware with a ferrous bottom (stainless, cast iron or steel)
- Larger cooktops with 6 burners may require a dedicated 3-phase electrical supply which will typically require electricity circuit upgrades

Benefits

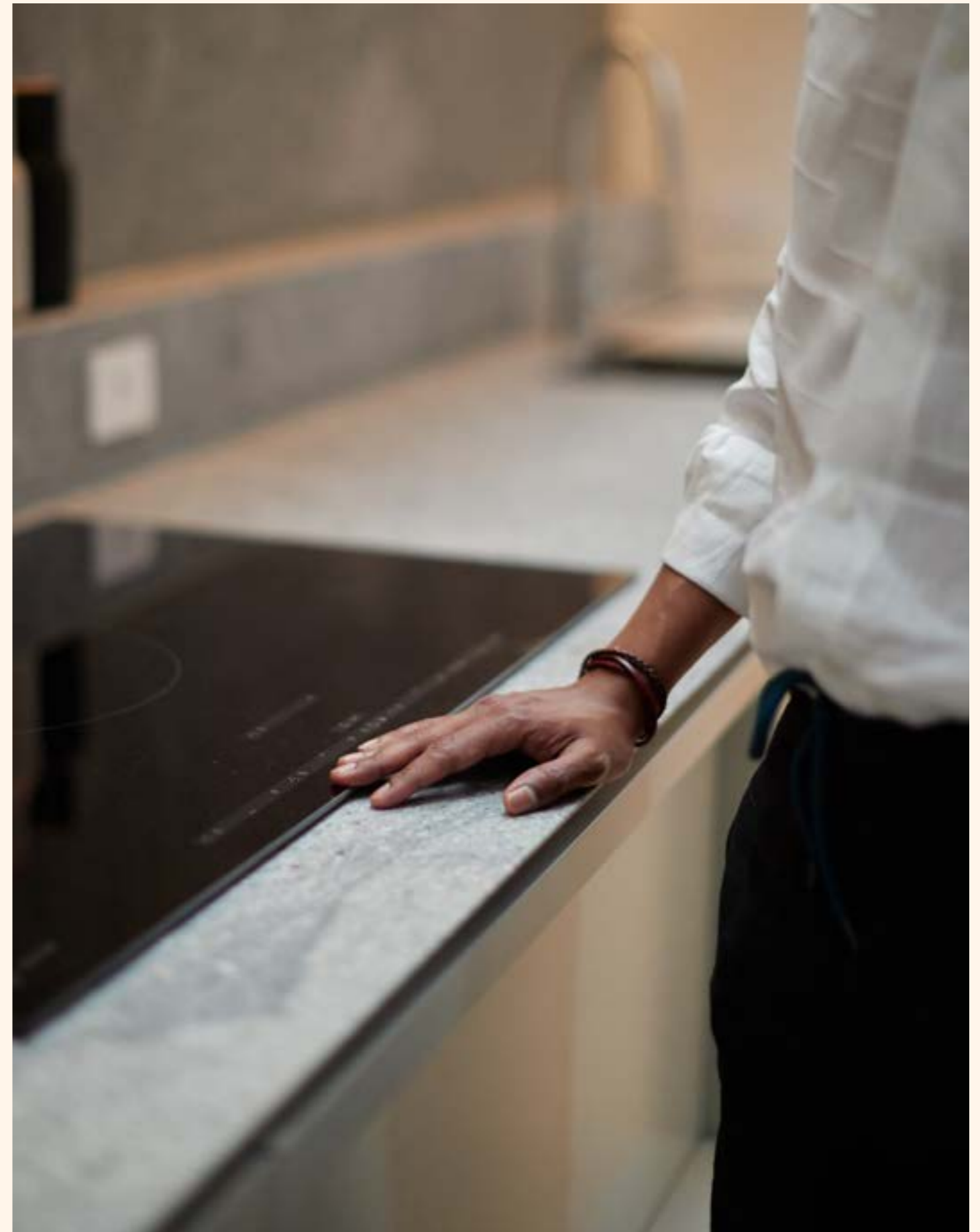
- Safer than gas because there's no open flame
- You can typically set cook times (so if you forget, it switches off)
- Higher quality indoor air, lowers risk of respiratory illnesses
- Reduced internal cooling loads
- Easy to clean due to completely flat glass surface

Upfront Costs

- Induction cooktop: Typically \$600-\$2200 but luxury models can be up to \$8000
- Installation Cost: Varies significantly depending on whether the electric infrastructure needs upgrading. Be sure to get a quote for installation prior to purchasing

Running Costs

- Up to \$95 per annum savings when compared to a gas equivalent cooktop
- As little as 5 year payback time



INSTALL SOLAR PV

Installing solar PV will increase the desirability of your building, reduce running costs over the long-term and power your building with clean, renewable energy.



The vast majority of Australians want their homes powered by renewable energy. The 2021 Climate of the Nation research report found that 8 in 10 Australians (79%) rank solar energy in their top three preferred energy sources, compared to 15% for coal and 19% for gas.

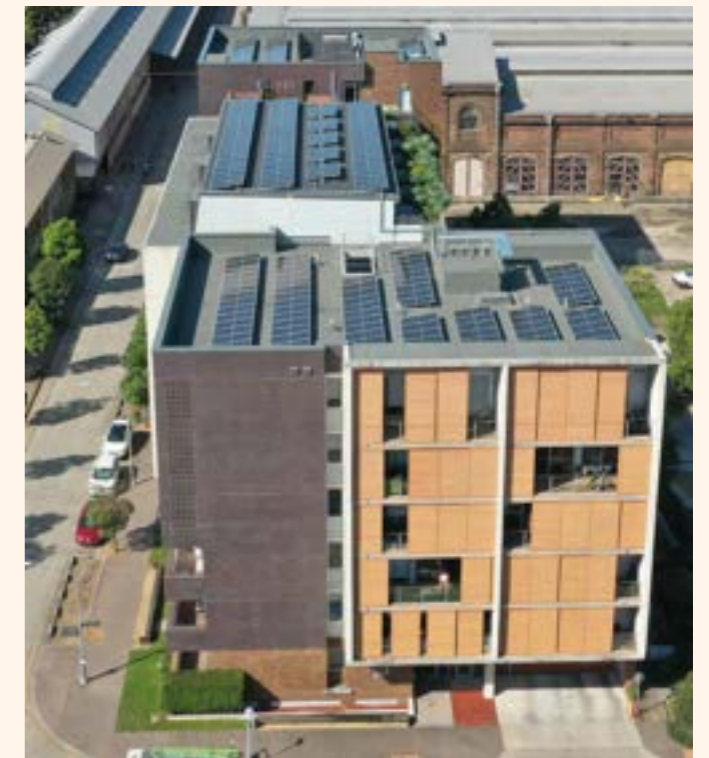
79%

of Australians rank solar energy in their top three preferred energy sources

Historically, solar PV has only been available to power common areas of apartment buildings. However, new technology is making it possible for owners corporations to install one solar PV system to power the common area and individual apartments. This makes installing a solar system more desirable as residents will see a tangible reduction in their personal electricity bills.

To share the benefits a solar PV system amongst residents and the common area, a distribution system is needed to allocate solar energy to apartments as needed. [Allume's SolShare system](#) is the locally available solution which couples solar PV with a distribution box, directing the solar energy to multiple apartments behind-the-meter simultaneously. It optimises the solar delivery based on who needs the energy at any point in time, while also ensuring that every apartment receives the same amount of solar over the course of each month.

For more information, download the [Yarra Energy Foundation's Guide to Solar for Apartments](#).



PURCHASE RENEWABLE ENERGY

To complete your clean energy revolution, switch to renewable energy by purchasing GreenPower.

When you buy Greenpower through your electricity retailer, you can tap into clean, reliable renewable energy.

When you buy accredited GreenPower, your retailer will purchase the equivalent amount of electricity from accredited renewable energy generators, which generate electricity from sources like wind, solar, water and bioenergy.

By purchasing GreenPower, you will support Australia's renewable energy sector and the transition to a green economy.



Image: Louis Manley ©. Rooftop solar



Embedded Networks

Historically apartment residents and owners corporations have had limited access to GreenPower due to long-running contracts with embedded network operators. The Victorian Government is in the process of rewriting the rules and regulations around embedded networks.

The Victorian Government has set clear regulations for new embedded networks which will commence at the start of 2023 and require operators to ensure:

- 100% of electricity consumed at the site by residential customers is met from a mix of on- and off-site renewable sources; and
- A minimum of 5% of electricity consumed by residential customers at the site is met from on-site renewable energy generation.

Unfortunately updated regulations for existing embedded networks will not be developed until 2024. However, early indications are that the updated regulations for existing embedded networks will also make it easier for residents and owners corporations to access renewable energy and more competitive energy offers in general.

Some embedded network providers are already offering GreenPower. Contact your embedded network retailer to enquire about how your owners corporation and residents can purchase GreenPower through the embedded network.

If your provider does not currently offer this, let them know that once their current contract is up, your owners corporation will move to a retailer who can provide GreenPower.

Standalone contract

If you are on a standalone electricity contract, you can simply contact your current retailer and ask them about their GreenPower offers. Alternatively, you can switch retailers to make sure you are buying from a highly reputable renewable energy retailer. The [Green Electricity Guide](#) can help you find a retailer that fits your energy goals.

Image: Greg Brave ©. Wind farm

INSTALL ELECTRIC VEHICLE CHARGING

The transition to electric vehicles (EVs) has already begun. The Australian Electric Vehicle Market Study Report, published by Clean Energy Finance Corporation and ARENA, reported that EVs are expected to match petrol vehicles on both upfront price and range by the mid-2020s. Once EVs reach this price parity with internal combustion engine vehicles, sales of EVs are expected to rapidly increase.

International trends and Australian smart charging trials demonstrate that 80% of EV charging will occur at home or work, as this is where we spend most of our time. Given these trends, the need for EV charging is a matter of when, not if.

EV Charging

Whilst installation of an EV charger into a freestanding home is relatively straightforward, apartment buildings usually have a unique set of challenges and requirements. Generally these include where to put communal chargers for electric cars, whether there's enough spare electrical capacity to accommodate them, who pays for the installation and how to introduce user-pays systems for the energy use.

Older walk-up style apartment buildings from the 60s and 70s will face the biggest challenge, with typically much lower electrical capacity.

There are lots of myths and disinformation about EV charging and strata that confuse people, which has commonly left the conversation in the too hard basket.

Some points of consideration are highlighted below, however, it is highly recommended to engage the technical expertise of an experienced EV retrofitting technician.

A guide to electric vehicle ready buildings

The NSW Government [guide to make commercial and residential buildings EV ready](#) covers:

- Why is it important?
- Collective vs. individual approach
- Costing your upgrade
- Engaging a supplier
- Safety precautions



Installation considerations and advice

- How many car spaces will have EV charging, consider current and planned charging stations
- What type of charging provisions are catered for. Both rapid chargers and trickle chargers have very different demand requirements
- Demand management systems and how charging is controlled
- Charging times allowed and how this aligns with the peak building loads and peak solar generation
- The total building electrical system capacity
- Increases in electrical load requirements in specific buildings may trigger the need for a substation upgrade
- Often requires earthworks such as boring or trench work to run electrical infrastructure
- What are the expectations of users for charging times, both time of day/night and time taken to perform a full charge

Upfront Costs

Approximately \$75,000 for an apartment building with 20 car spaces using Level 2, 7.2kW medium speed chargers

Running Costs

- Various options available, depending on how the EV charging network is set up
- Can be provided by a third-party supplier such as ChargeFox or JetCharge

Providers

- [ChargeFox](#)
- [JetCharge](#)

ELECTRIFY
YOUR APARTMENT
OR TOWNHOUSE

Getting to all-electric doesn't mean doing everything all at once. By planning ahead to switch to all-electric, you can manage costs and potentially roll upgrades into planned renovations.

This section — Getting to all-electric in your apartment or townhouse — will help you select the best fit, electric solutions for your home and budget.

When is the best time to upgrade?

From a cost perspective, replacing your gas appliances as they fail is the most cost effective. Aligning upgrades with planned renovations can also reduce costs.

If funds are available, you may choose to expedite the retrofitting of all-electric systems, given they are more efficient, better for your health and better for the environment.

Certainly if you are concerned by the negative health impacts of burning gas in your home, switching out your gas cooktop should be the first priority.



STEP 1: REVIEW SYSTEMS

Firstly, you will need to understand which systems are currently running on gas.

It may be your home has very little gas use, isolated for example to just cooking, making things straightforward. Or perhaps you have a gas heater and a gas instantaneous or storage hot water unit, which might take a bit more planning.

Start by looking at and reviewing the appliances and services in your apartment or townhouse that are under your control (i.e. excluding any systems that are managed centrally as part of the common infrastructure).

Make a list of these appliances and services.

What about payback periods?

If you're looking to maximise financial gain, start by replacing equipment likely to quickly pay for itself in savings.

While payback periods are site specific, typically heating and hot water systems will offer the shortest payback periods.

STEP 2: PLAN & PREPARE

Decide on the technology to be retrofitted

For each of the gas powered appliance or service in your home, decide which electric alternative you will replace it with. This Guide provides a range of suggested all-electric technologies to help you make your decisions.

Make sure you plan ahead so if one of your current gas appliances fails unexpectedly, you can replace it quickly and efficiently with an all-electric alternative.

Understand the electrical capacity of your home

If you have a goal to move to all-electric, understanding the electrical capacity of your apartment or townhouse is an important next step. Engage a professional electrical contractor to undertake a review of the electrical services and switchboard.

If electrical capacity in your apartment is limited, energy efficiency opportunities may need to be explored to reduce the overall peak load in your home, otherwise the electrical infrastructure can be upgraded.

Before engaging an electrical contractor, talk with your committee to check if electrical loads in the building have already been investigated. If your owners corporation is moving towards all-electric for common areas, they may have done the work for you. And if not, be sure to share the insights from your electrical contractor so that others in your building can follow your lead.

Check for any available rebates

The Victorian Government offers a range of rebates through the [Victorian Energy Upgrade Scheme](#), [Home Heating and Cooling Upgrades](#) and [Solar Victoria](#). Rebates are regularly updated so always check what's on offer before commencing your upgrades.

Check with your committee

Before progressing your upgrades, you may wish to inform your owners corporation committee as a courtesy. If many people in your building begin upgrading to all electric solutions, the overall energy demand for your building will change, which could have impacts beyond your apartment. Alerting your committee and sharing this guide can help ensure your overall building is prepared for the inevitable switch to all-electric.

STEP 3: DELIVER

Source three quotes from reputable installers and tradespeople and decide upon the most appropriate option for your needs and budget.

STEP 4: OPTIMISE

Once the works have taken place, take the time to understand the new appliances and services, and how to operate them most efficiently. The instruction manuals should help with this.

STEP 5: TURN OFF THE GAS

Following the replacement of all gas services, it's time to plug the pipe. Jump on the phone to the gas company and have your service disconnected. This will mean you no longer pay gas supply charges or gas bills, however some companies do charge a once off fee to have your gas disconnected.

Congratulations, you've made it!

GAS IN YOUR APARTMENT OR TOWNHOUSE

Where might you find gas in your apartment? Typical uses for gas include space heating, hot water and cooking. An outline of typical gas powered systems are described here.

Cooking

It is extremely common for apartments and townhouses to include a gas cooktop in the kitchen.

Heating

Heaters, especially in older apartments and townhouses, may be gas fired hydronic radiant, gas fan coil units or wall mounted gas heaters.

Domestic Hot Water

Some apartments and townhouses may have a small gas instantaneous or gas storage hot water system installed. The gas fired water heating unit is typically mounted on an outside wall. If the system included a storage tank, this may be located inside in a cupboard or cavity, or outside near the heating unit.

All Electric Substitutes

On the following pages you will find:

- Recommended all-electric technology that can be retrofitted in place of gas powered systems in your apartment or townhouse
- Renewable energy technology for apartments and townhouses



Image: Andrea Davis ©. Gas cooktop

MAXIMISE THE BENEFITS OF ELECTRIFYING EVERYTHING

Making the switch to all-electric means you can power your apartment or townhouse with 100% renewable energy thanks to:

1. Solar Photovoltaics (PV)

The addition of solar PV to an all-electric building will enhance the operational affordability of running costs and help lower the emissions footprint by generating renewable energy onsite.

Technology advances have now made solar accessible to all residents within an apartment building. See page 19 for more information.



Images: HIP V. HYPE (above) ©, Greg Brave (below) ©

2. GreenPower

To move to a net zero energy position, GreenPower or certified renewable energy can be purchased through your electricity retailer. See page 20 for more information.

Kitchens are a great place to start when changing out gas. Not only are induction cooktops more efficient, but have great flow-on benefits to improved indoor air quality and health impacts.

Modern appliances for electric cooking are easily sourced and available. Electric induction type cooking appliances offer the best option as a replacement for gas-type cooktops whilst the market for quality electric BBQ options is forever expanding.



INDUCTION COOKTOPS

Best | Good | Ok

Suitable for: Apartments or townhouses

Whilst induction cookers have high peak energy demands, their efficiency at transferring heat whilst cooking is far superior to all other types of cooktops, around 90% compared to 40% for gas. This allows induction cooktops to operate at much lower costs than electric cooktops and also gas cooktops. An additional benefit of these type of cooktops is safety. Induction cooktops are safe to touch and do not generate heat on the cooking surface.

Retrofitting induction cooktops is a straightforward process, with only minor modifications. They can be plugged into a power point or hard wired into the electrical system. An electrician will be required to ensure the relevant electrical circuit has enough capacity to support the induction cooktop.

Installation considerations and advice

- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings
- Spatial benefits when giving consideration to additional completely flat surfaces which can be used for food preparation
- New compatible cookware with a ferrous bottom (stainless, cast iron or steel)
- Larger cooktops with 6 burners may require a dedicated 3-phase electrical supply which will typically require electricity circuit upgrades

Benefits

- Reduced risk of burns
- Higher quality indoor air, lowers risk of respiratory illnesses
- Lower running costs
- Reduced internal cooling loads
- Easy to clean due to completely flat glass surface

Upfront Costs

- Induction cooktop: Typically \$600-\$2200 but luxury models can be up to \$8000
- Installation Cost: Varies significantly depending on whether the electric infrastructure needs upgrading. Be sure to get a quote for installation prior to purchasing

Running Costs

- \$95 per annum savings when compared to a gas equivalent cooktop
- As little as 5-year payback period

Health Impacts

Children in homes with gas cooktops are 42% more likely to develop asthma than those with electric alternatives.

ELECTRIC COOKTOPS

Best | Good | **Ok**

Suitable for: Apartments or townhouses

Also known as radiant cooktops, electric cooktops have an electrical current that flows through a metal coil underneath the glass or ceramic surface. Once they are switched off, they remain hot for a significant period of time, so many models have an indicator light to let you know that the burner is still warm.

An electric cooktop is only recommended if you have a very limited budget to make the purchase.

Installation considerations and advice

- Straight swap over, no spatial impacts
- Requires an electrician to install
- Typically, slightly lower electrical load than an induction cooktop
- Lower efficiency than induction, so costs more to run

\$46

Saving per year when compared to a gas cooktop equivalent

Benefits

- Easy to install and easy to use
- Provide some residual heat that can help keep food warm or for simmering
- Straight swap over, no spatial impacts

Upfront Costs

- Electric Cooktop: \$300-\$900

Running Costs

- Savings of \$46 per year when compared to a gas cooktop equivalent
- Approximately 9-year payback time

ELECTRIC BBQ

Best | Good | **Ok**

Suitable for: Apartments or townhouses

If you are looking at replacing your gas BBQ on your balcony or outdoor area, an electric BBQ is the answer. The range of electric alternatives to grilling and BBQ-ing have significantly improved in recent years.

Some electric grills now include steam and smoking options to enhance the electric cooking and grilling process and add additional flavour.

Installation considerations and advice

- Straight swap over, no spatial impacts
- Smaller models can plug straight into standard electrical outlets
- Larger models may require an electrician to install

Benefits

- Easy to install and easy to use
- Higher efficiency than gas

Upfront Costs

- Benchtop electric BBQ: \$600-1000

Running Costs

- Approximately \$0.65 per hour of use compared to \$1.70 per hour of a gas equivalent



In apartments and townhouses, heating can be supplied by a number of gas units including gas ducted heating, gas wall heaters and gas radiant heaters.

Using gas for heating is inefficient and can pollute your indoor air causing health issues. In particular, open-flued gas heaters can lead to carbon monoxide poisoning.

When replacing your gas heating, give consideration to your budget and type of heating system you need. Are you heating your entire home, or do you just need some heating in the living area?

REVERSE CYCLE AIRCONDITIONING

Best | Good | Ok

Suitable for: Apartments or townhouses

The most popular replacement for any residential heating system is a reverse cycle split system airconditioner. This type of system also has the added benefit of cooling as well as heating.

A reverse cycle airconditioner consists of an outdoor unit (condenser) and an indoor unit (header) that blows the conditioned air into the room. The outdoor unit requires good ventilation in order to operate efficiently.

Installation of the unit requires both an airconditioning technician and an electrician and typically can be undertaken in a day.

For larger spaces, a ducted split system may be more appropriate, where several head units are used throughout the space, all connected to the single outdoor unit.

Installation considerations and advice

- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings
- Some larger capacity reverse cycle systems require a dedicated 3-phase electrical circuit
- Requires a specialised airconditioning installer and electrician
- Well ventilated external space required for outdoor unit
- The system compressor, located outside, typically admits a soft hum. Placement should consider noise implications for you and your neighbours
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R32 (see page right)

Benefits

- Very low running costs
- Good energy efficiency
- Provides both heating and cooling in one unit
- Straightforward installation for most apartments

Upfront Costs

- Single 5kW split system: Range \$900-1600
- Installation cost: \$600-750

Running Costs

- A single unit for a 2-bedroom apartment typically costs \$150 per year for both heating and cooling



Image: HIP V. HYPE Split System Air Conditioning ©

GLOBAL WARMING POTENTIAL (GWP)

Don't worry if terms like global warming potential and R32 don't mean much to you. You don't need to be an expert. Just ask the airconditioning company for a model that uses R32 or another low or zero GWP refrigerant.

Want to know more? Here's a brief summary.

The Global Warming Potential (GWP) is a measurement scale that compares the global warming impacts of different gases, including refrigerants.

Traditional refrigerant gasses have a high GWP, meaning they are highly polluting and contributing to climate change. Some newer refrigerants, including R32 and R744, have a low or zero GWP, and are much better for us and our environment.

HEAT PUMP HYDRONIC SYSTEM

Best | Good | **Ok**
Suitable for: **Townhouse**

If you live in a townhouse and your budget allows, a hydronic radiant system connected to a heat pump could be an option for you.

A heat pump hydronic system is similar to a reverse cycle airconditioner, however, instead of heating air and blowing it into a space, it heats water which is then circulated through pipes and radiates heat into the space through panels.

Radiant heat is perhaps the most comfortable and healthy heating approach available.

Installation considerations and advice

- There will be increased peak electrical demand so check your system requirements with an electrician
- Requires a dedicated 3-phase electrical circuit
- Requires a specialised installer and electrician
- Internal pipework and radiant panels need to be allowed for
- Hydronic heating is effective but it can take some time to warm a space. It is best suited for well insulated homes with some thermal mass
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R744 (see page 30)

Benefits

- Radiant heat reduces air movement which is conducive to reduced allergies and asthma

Upfront Costs

- Typically starts at \$25,000 - 30,000

Running Costs

- Comparable to gas ducted heating



Image: Wall mounted hydronic heating panel.
Photography courtesy Melbourne Hydronic Heating ©

ELECTRIC RADIANT PANEL HEATERS

Best | Good | **Ok**
Suitable for: **Apartments or townhouses**

If you are on a tight budget, an electric radiant panel heater might be an option for you. Panel heaters come in a range of sizes and can be mounted on a wall or freestanding and plug directly into a standard power point.

Panel heaters are a relatively inexpensive option to buy and do not require a specialised installer, however, they can have high running costs if being used to heat large spaces or all-day heating.

Panel heaters are best for small to medium sized rooms where heating is only needed for a handful of hours each day (e.g. bedrooms). Using a panel heater where there is good insulation, prevents the air from escaping and help the room stay warm.

Installation considerations and advice

- Increased peak electrical demand
- Fairly inefficient and have high energy use
- Can be purchased at any appliance store

Benefits

- No moving air, therefore good for allergies and asthma
- Doesn't require a qualified tradesperson for installation
- Small, compact units can be placed almost anywhere within an apartment
- Affordable option when on a budget

Upfront Costs

- Electric Panel Heater: \$200-600

Running Costs

- A 2.4kW panel heater: \$0.72 per hour
- Up to \$778 per year if used as the main heater for a home

OIL FILLED COLUMN HEATERS

Best | Good | **Ok**
Suitable for: **Apartments or townhouses**

Oil-filled column heaters are relatively inexpensive to buy however, they are generally inefficient and have higher running costs than other heating appliances.

These heaters provide a slow and steady heat so it takes some time to warm a room. They generally work best in smaller, contained spaces.

Installation considerations and advice

- Relatively high energy use and operational costs
- Surfaces can be very hot to touch and will cause burns if touched
- Consideration of placement required to minimise risks to children

Benefits

- No moving air, therefore good for allergies and asthma
- Doesn't require a qualified tradesperson for installation
- Small, compact units can be placed almost anywhere within an apartment
- Small units are cheap and easy to buy

Upfront Costs

- Column Heater: \$80-\$400

Running Costs

- 2.4kW Column Heater: \$0.68 per hour
- Used for 90 days of the year: \$735

Hot water systems are the second highest user of energy in Australian homes. In Australia, about 48% of the energy used for water heating comes from gas, 45% from electricity, 3% from liquefied petroleum gas (LPG) and 4% from solar (DCCEE 2012).

Start by having a look around your apartment to identify if you have an individual unit or if hot water is coming from a centralised building system.

If it's in your apartment, great, keep following this section, otherwise pass this onto your committee to investigate the centralised hot water options.

INDIVIDUAL HEAT PUMP

Best | Good | Ok
Suitable for: Townhouse

- Similar to a centralised heat pump system, an individual unit can be installed at a dwelling level, however, is most appropriate for single dwellings or townhouses due to the larger outdoor unit size.
- Heat pumps are also subject to government rebates which can provide additional incentives for installation.

Installation considerations and advice

- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings
- Easy replacement option for gas storage units (or electric storage), with similar footprints
- If replacing an instantaneous unit, consideration needed for increased outdoor area for heat pump unit
- Consider selecting a unit with low or zero global warming potential (GWP) refrigerants such as R32 and as technology improves R744 or R290 (see page 30)

Benefits

- Ability to add solar booster in the form of PV panels or solar thermal collectors
- Lower running costs

Upfront Costs

- Supply & Install: Range \$2500-5000

Running Costs

- \$200 savings per dwelling per year when compared to a gas storage unit, savings will be greater if you also have a solar PV system
- \$420 savings per dwelling per year when compared to an electric storage unit



Freestanding integrated DHW Heat Pump Unit ©

ELECTRIC INSTANTANEOUS

Best | **Good** | Ok
Suitable for: Apartments or townhouses

An electric instantaneous unit can be installed internally and heat water as it is required using a resistive electrical element. These units are more ideal for new buildings where the electrical infrastructure can be planned for, however, are also useful for point of use demands such as kitchens and bathrooms.

Electric Instantaneous units are a great option for replacing small gas storage units at an apartment level where space is at a premium.

Installation considerations and advice

- Most systems will require a dedicated 3-phase electrical supply which will require new switch boards and metering
- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings

Benefits

- Small unit footprint, can be housed under a sink or in a cupboard

\$230

Saving per unit per year when compared to an electric storage unit

- Water is heated as you need it, so no storage losses or water wasted waiting to heat up
- Small pipe runs and minimal infrastructure

Upfront Costs

- Single Unit Cost: \$1,400
- Installation Cost: Varies significantly depending on whether the electric infrastructure needs upgrading. Be sure to get a quote for installation prior to purchasing

Running Costs

- Comparable to a gas storage unit, depending on usage patterns
- \$230 saving per unit per year when compared to an electric storage unit
- No payback on gas storage unit
- 6-year payback on electric storage unit



Electric Instantaneous DHW Unit.
Photography courtesy Stiebel Eltron ©

INSTALL SOLAR PV

Installing solar PV will increase the desirability of your building, reduce running costs over the long-term and power your building with clean, renewable energy.



The vast majority of Australian's want their homes powered by renewable energy. The 2021 Climate of the Nation research report found that 8 in 10 Australians (79%) rank solar energy in their top three preferred energy sources, compared to 15% for coal and 19% for gas.

When investigating solar for your home, remember to [check the Solar Victoria website](#) to see if you are eligible for a rebate.

Solar for apartments

Historically, solar PV has only been available to power common areas of apartment buildings. However, new technology is making it possible for owners corporations to install one solar PV system to power the common area and individual apartments. This makes installing a solar system more desirable as residents will see a tangible reduction in their personal electricity bills.

To share the benefits a solar PV system amongst residents and the common area, a distribution system is needed to allocate solar energy to apartments as needed. [Allume's SolShare system](#) is the locally available solution which couples solar PV with a distribution box, directing the solar energy to multiple apartments behind-the-meter simultaneously. It optimises the solar delivery based on who needs the energy at any point in time, while also ensuring that every apartment receives the same amount of solar over the course of each month.

If you are interested in getting solar, raise the idea with your committee.

For more information, download the [Yarra Energy Foundation's Guide to Solar for Apartments](#).

Solar for townhouses

If you own the roof of your townhouse, installing solar will be no different to a standard house. You can simply obtain a few quotes from local installers and move ahead with your preferred quote.

If however, your roof forms part of the common property, you will have to work with your Owners Corporation to obtain permission to fit the system on the roof. Start by contacting your committee or Owners Corporation Manager.

79%

of Australians rank solar energy in their top three preferred energy sources

PURCHASE RENEWABLE ENERGY

To complete your clean energy revolution, switch to renewable energy by purchasing GreenPower.

When you buy Greenpower through your electricity retailer, you can tap into clean, reliable renewable energy.

When you buy accredited GreenPower, your retailer will purchase the equivalent amount of electricity from accredited renewable energy generators, which generate electricity from sources like wind, solar, water and bioenergy.

By purchasing GreenPower, you will support Australia's renewable energy sector and the transition to a green economy.



Embedded Networks

Historically apartment residents and owners corporations have had limited access to GreenPower due to long-running contracts with embedded network operators. The Victorian Government is in the process of rewriting the rules and regulations around embedded networks.

The Victorian Government has set clear regulations for new embedded networks which will commence at the start of 2023 and require operators to ensure:

- 100% of electricity consumed at the site by residential customers is met from a mix of on- and off-site renewable sources; and
- a minimum of 5% of electricity consumed by residential customers at the site is met from on-site renewable energy generation.

Unfortunately updated regulations for existing embedded networks will not be developed until 2024. However, early indications are that the updated regulations for existing embedded networks will also make it easier for residents and owners corporations to access renewable energy and more competitive energy offers in general.

Some embedded network providers are already offering GreenPower. Contact your embedded network retailer to enquire about how your owners corporation and residents can purchase GreenPower through the embedded network.

If your provider does not currently offer this, let them know that once their current contract is up, your owners corporation will move to a retailer who can provide GreenPower.

Standalone Contract

If you are on a standalone electricity contract, you can simply contact your current retailer and ask them about their GreenPower offers. Alternatively, you can switch retailers to make sure you are buying from a highly reputable renewable energy retailer. The [Green Electricity Guide](#) can help you find a retailer that fits your energy goals.

This report has drawn on insights from previous research along with past and current apartments programs.

References

- [LETI Climate Emergency Retrofit Guide](#) (London Energy Transformation Initiative) October 2021 Edition
- [A Practical Guide to Electrification for Existing Buildings](#) (Green Building Council of Australia) September 2022
- [A Practical Guide to Electrification for New Buildings](#) (Green Building Council of Australia) February 2022
- [Victoria's Gas Substitution Roadmap](#)
- [EVs: Electricity Bills, Energy Use & Carbon](#) (Renew)
- Victorian Default Offer for Electricity in the CitiPower network: \$0.2170 per kWh
- Victorian Gas Price from AGL: 3.01 cents per MJ



UNLOCKING
**SUSTAINABLE
STRATA**

 **HIP V. HYPE**

