



Guide to Electrifying Apartments and Apartment Buildings

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Motivation and Considerations for Apartment and Apartment Building Electrification

- The desire to move away from gas in recognition that gas is detrimental to our health, environment and now back pocket.
- From a cost perspective the best time to upgrade to efficient electric infrastructure is either:
 - o In alignment with the end-of-life of existing gas systems or upon failure
 - o In alignment with the timeline of other major planned works e.g. façade, structural works or major renovations (this can save on trades, equipment, roof access equipment)
- If funds are available, retrofitting of all-electric systems in recognition of efficiency, environmental, health, and long-term economic benefits may be expedited by the committee or individual owner.
- This document provides a broad guide for both common areas and individual apartment electrification.

Process

Step 1: Review & Engage

- Get an understanding of what systems in the building/apartment run on fossil fuels and the complexity of the possible electrification.

Step 2: Plan & Prepare

- Determine the technology to be retrofitted.
- Map out a timeline for upgrades.
- Get an understanding of the electrical capacity of the building/apartment – engage an electrical contractor to review the electrical services, switchboards, and substations.
- It is important to consider the building as a whole when estimating future electrical loads against the building's electrical capacity, as over time individual apartments will electrify their appliances and vehicles in addition to the electrification of the common area infrastructure.
- If capacity is limited, energy efficiency opportunities can be explored, or electrical supply infrastructure can be upgraded.
- Check for available rebates.

Step 3: Deliver

- Source at least 3 quotes from reputable installers.

Step 4: Optimise

- If the upgraded services are major e.g. centralised heating or hot water, have them fine-tuned over the first 12 months to ensure they are working at their optimum.

Step 5: Turn off the Gas

- Once replacement of all gas services is complete, call your gas company to have the service disconnected.
- Owners corporation will no longer pay *gas supply charges* or gas bills but may have to pay a once off disconnection fee.

Typical Applications of Gas

- Heating
- Domestic Hot Water
- Cooking

	Heating	Domestic Hot Water	Cooking
Gas Appliances	Gas fired boiler supplying hydronic radiant heating or fan coil units	Gas fired storage	Gas stove
	Gas ducted heating	Instantaneous Gas	
		Condensing centralised plant	
Wall mounted gas heaters	Gas boosted solar HWS		
Electric Alternatives Ratings: Best Good Ok	Reverse Cycle Air Conditioning (Best) – suitable for single rooms that require heating (plus cooling)	Centralised Heat Pump Hot Water Systems (Best) – suitable for centralised systems in apartment buildings	Induction Cooktops (Best) – suitable for apartments, townhouses, shared kitchens. 90% efficient transfer of heat compared to 40% for gas. Usually single phase: 20 – 48A depending on size of cooktop. Larger cooktops in apartments with other high-powered appliances e.g. lots of air conditioning may require dedicated 3 phase electrical supply which for apartments would typically require circuit upgrades.

	<p>VRF Airconditioning System (Best) – suitable for large areas or multiple rooms, common areas, lobbies etc (basically larger version of split system – primary difference is VRF has ability to set different temps in different rooms)</p>	<p>Electric Instantaneous (Good) – suitable for localised facilities, shared kitchens, end-of-trip applications. Small footprint, water is heated as you need it at outlet – no storage and minimal piping losses. May require dedicated 3 phase supply</p> <p>Can't make use of time-of-use tariffs as there is no storage.</p>	<p>Electric Cooktops (Ok) – suitable for apartments & townhouses. Radiant/resistive heat generated via a current running through a metal coil underneath a glass or ceramic surface. Remains hot for a significant period after being switched off.</p> <p>Savings of ~\$46 per year (9 year payback) compared to gas</p>
	<p>Air-Sourced Heat Pump (Good) - suitable for large centralised heating systems (closest like-for-like replacement of a centralised gas boiler heating system.) Large space requirements</p>	<p>Electric Storage – while not as efficient a heat pump system, the storage enables utilisation of daytime solar energy to heat water or off peak time-of-use tariffs. Can be Ok if used as such</p>	<p>Electric BBQ (Best) – suitable for apartments, townhouses, outdoor kitchens, rooftops.</p> <p>Approximately \$0.65 per hour of use vs \$1.70 per hour for gas equivalent</p>

Induction Cooktops Overview

Induction cooktops are a highly efficient technology that transfers energy to the cooking vessel via an electromagnetic field as opposed to heat transfer via conduction used in electric cooktops or via a naked flame used in gas cooktops. Whilst they 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. When a ferromagnetic pot/pan is in proximity to the induction cooktop, the EM field induces “eddy currents” in the ferromagnetic material which generate heat in the pan through the electrical resistance of the material. Therefore, unlike electric or gas cooktops, the cooking surface doesn’t heat up, only the pan does, resulting in significantly less wasted heat energy.

This allows induction cooktops to operate at much lower costs than electric and 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:

- Increased peak electrical demand, may need to upgrade switchboard capacity in older buildings
- Larger cooktops with 6 burners may require a dedicated 3-phase electrical supply which will typically require electrical circuit upgrades

Cost:

- Typically \$600-\$2200 but luxury models can be up to \$8000.
- Installation cost can vary significantly depending on whether the electric infrastructure needs upgrading.
- Running costs resulting in \$95 per annum savings when compared to a gas equivalent cooktop. As little as 5-year payback period.

Appendix A: Relative Cost of Cooking with different heat sources

	Product Class			
	LPG cooktop	Electric coil cooktop	Electric smooth cooktop	Electric induction cooktop
Cooking efficiency	39.9%	73.7%	74.7%	84%
Annual energy consumption (AEC)	330 kWh/yr	240 kWh/yr	250 kWh/yr	190 kWh/yr
Cooking energy	131.67 kWh/yr	176.88 kWh/yr	186.75 kWh/yr	159.6 kWh/yr
Annual energy cost	\$61.55/yr	\$44.90/yr	\$46.77/yr	\$35.55/yr

Source: <https://www.scirp.org/journal/paperinformation.aspx?paperid=115734>