

Home Electrification

Guidance for Selection and Installation

Introduction

This document provides comprehensive guidance on selecting and installing key home electrification systems. The information is based on training delivered by Econome in collaboration with Rewiring Australia. The primary areas addressed include:

- Heat pump hot water systems
- Heating and cooling solutions
- Solar photovoltaic (PV) systems, batteries, and electric vehicle (EV) charging
- Engaging qualified tradespeople
- Available rebates and financing options

*Should a householder require support in assessing their needs and managing the retrofit and electrification process, refer to the section in this MASG website for **Home Retrofits for Comfort, Climate and Community**.*

1. Heat Pump Hot Water Systems

Efficiency and Siting

- Gas hot water systems (HWS) operate at 80–90% efficiency, whereas heat pumps achieve 300–500% efficiency.
- Hot water typically accounts for 25% of household energy consumption.
- Proper siting is essential: ensure adequate airflow, position compressors in sunlight (to avoid frost), and locate units near plumbing and away from bedrooms to minimise noise.
- Compressors and tanks can be separated by up to 5 metres; tanks may be installed indoors if plumbing allows.
- Noise considerations: 43 decibels is a reasonable maximum for residential areas.

Installation Considerations

- A dedicated circuit for the HWS is ideal but not essential. Typically only 800W but may void warranty if other uses interrupt on the circuit. However it is likely they will only draw 3 amps and any power circuit should have 16amp available which would be ample..
- Ensure sufficient switchboard capacity.
- All exposed metal fittings must be covered with plastic “Valve Cosys.”

- Set tank temperature to 60°C to optimise efficiency and safety.

System Types and Rebates

- All-in-one systems offer higher efficiency but are heavier and less flexible in placement than split systems.
 - Rebates: Small-scale Technology Certificates (STC), Victorian Energy Efficiency Certificates (VEEC), and Solar Victoria rebates (income-tested) are available. Additional incentives may apply for Australian-made tanks. Refer to the https://reg.energyrating.gov.au/comparator/product_types/ for product comparisons.
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2. Heating and Cooling

Building Assessment and Energy Efficiency

- Assess the building envelope for insulation, draughts, and window/door seals before sizing systems.
- Recommended insulation: ceiling (R3.5–R5), floor (R2+), and draught-proofing measures.

System Types

Reverse Cycle Air Conditioners

- Single-room systems: cost-effective and efficient, but less suitable for multiple rooms.
- Multi-head systems: allow independent control of up to five internal units; note the risk of single-point failure.
- Ducted systems: visually unobtrusive, flexible venting, but require open doors for efficiency and are more expensive.

Wall-Mounted vs Floor-Standing Units

- Wall-mounted: most economical, but may cause uncomfortable airflow.
- Floor-standing: provide convection heating, more expensive.

Hydronic Systems (Retrofit)

- Retrofitting gas hydronic systems with heat pumps is possible but costly (often exceeding \$20,000) and may require plumbing upgrades.

Installation and Sizing

- Compressors require airflow and should be sited in sunlight, away from bedrooms, and near indoor units (<5m).
- Each external unit should have a dedicated circuit; typical load is 1/5 of rated capacity.
- Sizing: use 110W/m² as a guide, adjusting for lifestyle (range: 70–130W/m²).

Temperature Control and Remote Management

- Set thermostats to 18°C (winter) and 25°C (summer); each degree of deviation increases energy use by 5–10%.
- Remote controls (e.g., Sensibo Sky) can enhance convenience and efficiency.

Rebates

- STC and VEEC rebates apply. Solar Victoria offers up to 50% off solar PV installation (max \$1,400).
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3. Solar PV, Batteries, and EV Charging

Solar PV

- System output depends on panel efficiency, orientation, and sunlight exposure; a 6kW system typically generates 24–30kWh/day.
- Switchboard capacity is critical; dedicated circuits are required for PV, batteries, and EV chargers.
- Microinverters are recommended for shaded roofs, offering independent panel performance and longer warranties.
- Inverter capacity determines total generation; ensure compliance with local grid export limits.

Batteries

- Battery size should be matched to household load profiles, including future electrification (e.g., EV charging).
- Consider battery location (proximity to switchboard, weather exposure), enclosure rating (IP55/IP66), and fire safety.
- Warranties typically guarantee 70–80% capacity retention over 10 years.
- Features such as blackout protection (“islanding”) and thermal management may be important.

EV Charging

- Smart chargers are essential for dynamic load management and integration with household demand.
 - Chargers typically require a 32A dedicated circuit; standard power points are insufficient.
 - Vehicle-to-grid (V2G) and vehicle-to-load (V2L) technologies are emerging options.
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4. Induction Cookers

Advantages

- Induction cookers are 85–90% efficient, compared to 40% for gas.

- They offer faster cooking, lower running costs, improved safety, and reduced indoor air pollution.
- Suitable cookware must be magnetic (iron-based).

Installation

- Hard-wired installation is required (20–32A circuit).
 - Ovens are typically connected separately (15A).
 - Ensure adequate switchboard capacity and safety switches.
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5. Engaging Tradespeople

Process

- Multiple trades are involved (electricians, gas plumbers, certified installers).
- Accreditation is required for rebate eligibility.
- Obtain detailed, itemised quotes and verify installer references.
- Plan works to minimise disruption and maximise efficiency (e.g., upgrade switchboard first, coordinate insulation and appliance installation).

Expectations and Coordination

- Clarify responsibilities for repairs and finishing works.
 - Communicate timing constraints to optimise rebate eligibility.
 - Foster cooperation among trades for seamless project delivery.
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6. Rebates and Financing

Rebates

- STCs and VEECs are tradable certificates; values fluctuate.
- Solar PV: SRES and Solar Victoria rebates available (income-tested).
- Batteries: Federal “Cheaper Home Batteries Program” and STCs.
- Heat Pumps and Reverse Cycle Air Conditioners: SRES, VEEC, and Solar Victoria rebates.
- Induction Cooktops: VEEC rebates available, but processing costs may outweigh benefits.
- Additional rebates for insulation, weather sealing, and window glazing may apply.

Financing Options

- **Extended Mortgage:** Add retrofit costs to existing mortgage for long-term repayment.

- **Equity Green Loans:** Parallel to mortgage, with reduced rates (often supported by the Clean Energy Finance Corporation's Household Energy Upgrades Fund).
- **Limited Green Loans:** Lower rates but restricted coverage; may not include all retrofit costs.

Interest rates and terms vary; verify current offers with providers. Improved home energy ratings may be required for eligibility.

References and Further Information

- https://reg.energyrating.gov.au/comparator/product_types/
- <https://www.solarquotes.com.au/>
- <https://reductionrevolution.com.au/products/sensibo-sky>
- <https://cer.gov.au/schemes/renewable-energy-target/small-scale-renewable-energy-scheme/small-scale-renewable-energy-systems>
- <https://www.solar.vic.gov.au/>
- <https://www.dcceew.gov.au/energy/programs/cheaper-home-batteries>
- <https://www.energy.vic.gov.au/victorian-energy-upgrades>
- <https://www.cefc.com.au/where-we-invest/special-investment-programs/household-energy-upgrades-fund/>