

ELECTRIC VEHICLES

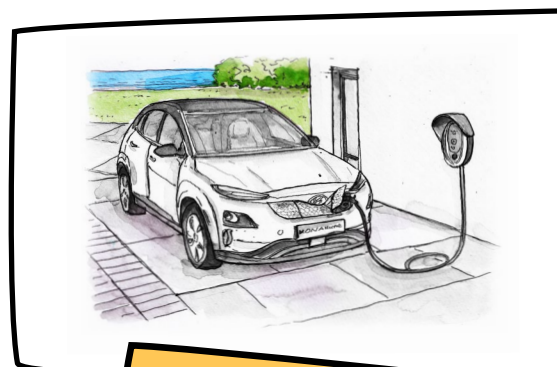
FACT SHEET

Rewiring Aotearoa



INTRODUCTION

The average New Zealand home has 1.8 cars parked in the driveway and spends over \$3,000 every year filling them up and around \$1,000 servicing them. Vehicles are by far the largest energy use for New Zealand homes at over 60% of the total and the largest source of emissions. Your first option should be to use active and public transport - electric bikes are really hitting a sweet spot for short trips - but many of us need a car and if that's you, then you should make it electric.



**RECOMMENDED:
BATTERY ELECTRIC
VEHICLE**

Electrifying your vehicles is the single biggest impact your household can make from both a bill savings and emissions savings perspective. With prices dropping rapidly, it won't be long until EVs are also cheaper to buy new than fossil fuel cars (price parity is expected in the next few years and by 2030, EV prices are expected to drop to around 80% of the price of their petrol counterparts). EVs are not only cleaner, healthier and cheaper to run, their ability to work as giant storage batteries could play an exciting role in our energy future. Win-win-win-win!

BREAKDOWN

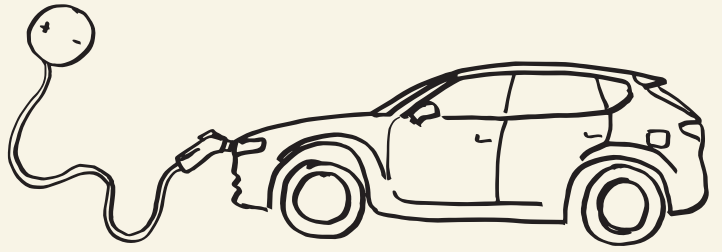
Average upfront cost	\$30,000 - \$70,000	new (low - mid range) / much less for second-hand EVs
Average annual costs (with solar)	\$1,703	
Average annual costs (without solar)	\$2,230	
Emissions Saved	Extremely high	Over 15 years, switching to an electric vehicle can save over 42,000 kg of emissions if charged with solar
Lifetime	20 years	
Savings over 15 years	\$19,000	vs petrol car when charged at home with solar
Rebates available	No	
Difficulty of installation	Easy	
Electrical upgrade required	No	
Installers Required	Yes	An electrician if installing a home charger (about \$1500 - \$2500 for a smart charger installed)



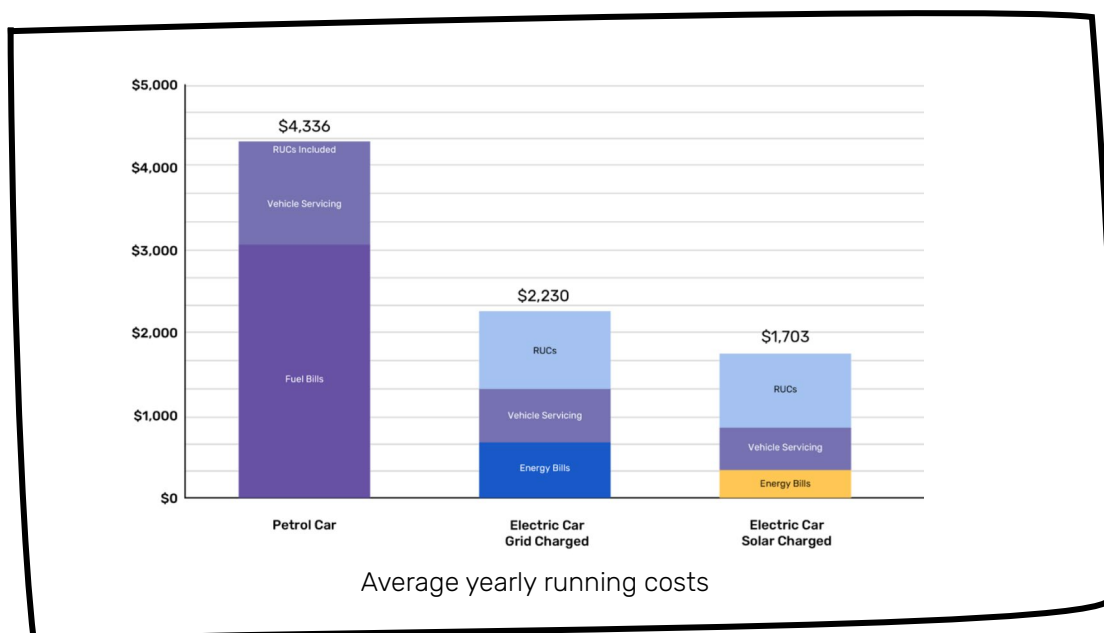
**PLUG IN YOUR NUMBERS AND SEE THE SAVINGS
WITH OUR HOUSEHOLD ELECTRIFICATION CALCULATOR
[REWIRING.NZ/CALCULATOR](https://rewiring.nz/calculator)**

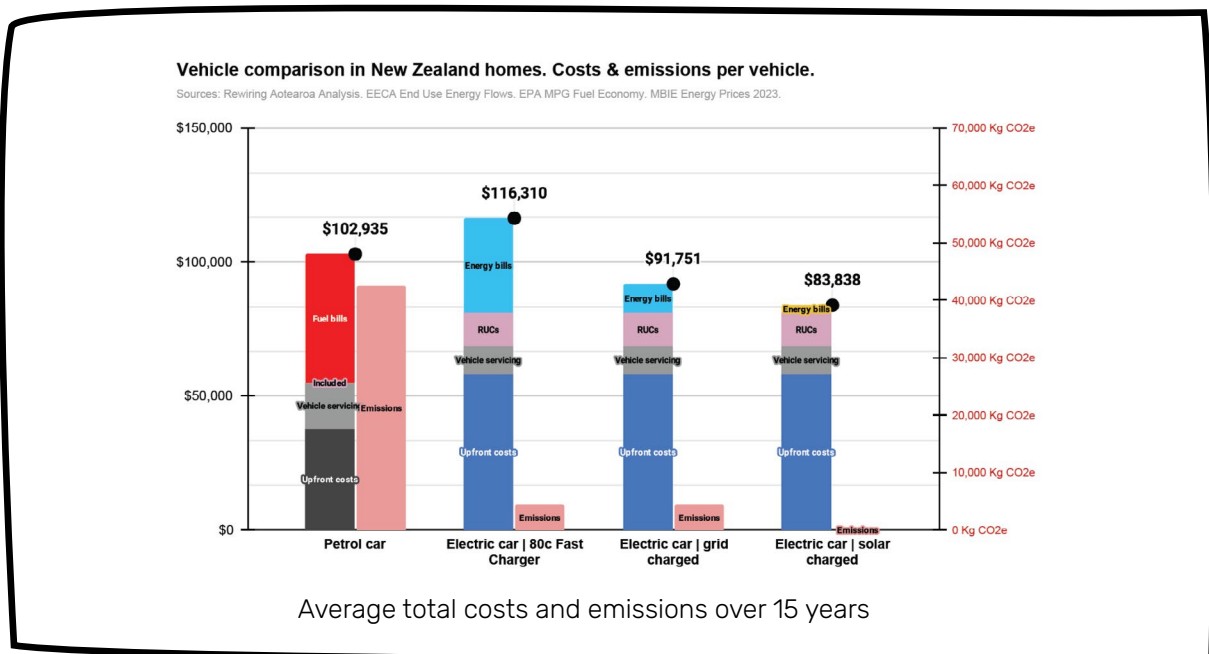
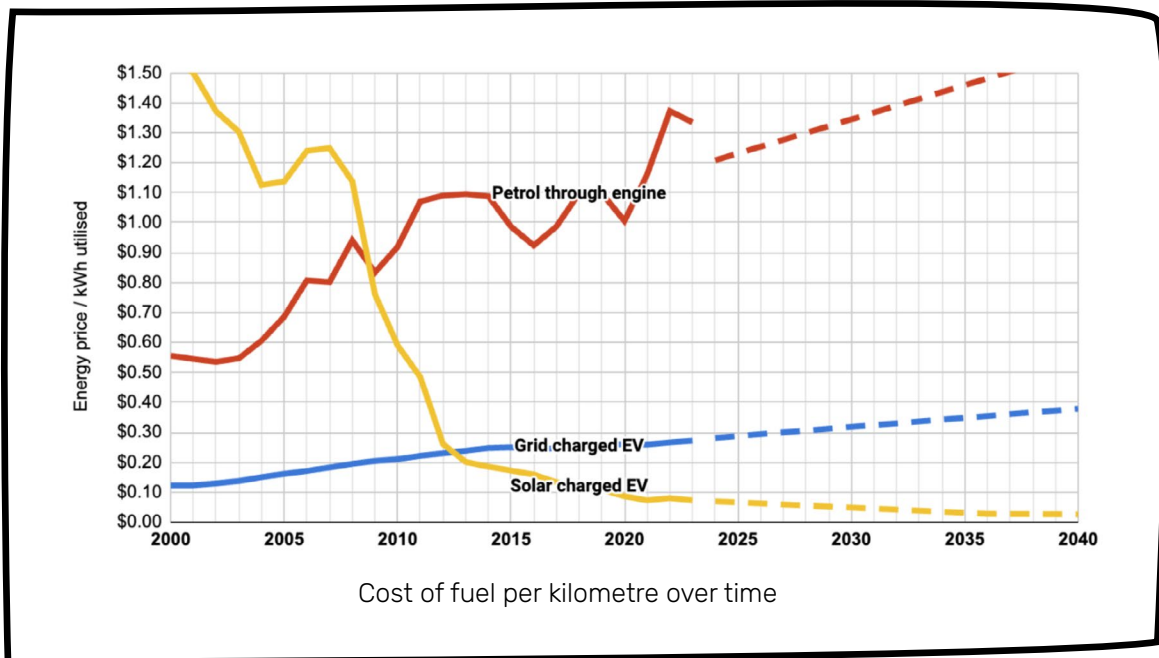


WHY CHOOSE AN ELECTRIC VEHICLE (EV)?



- **They use less energy.** EVs are about 3-4 times more efficient than petrol and diesel vehicles (aka internal combustion engine or ICE vehicles). This is mostly due to an ICE car losing around 80% of its energy from the engine converting fuel into heat, noise and vibrations.
- **They're cheaper to run and service.** EVs have higher upfront costs but even with the new road user charges (RUCs) added, they cost around two-thirds less to drive per year if you charge them from rooftop solar and around half as much to drive if you charge them with the grid. Fast charging is much more expensive, but the bulk of charging tends to happen at home. As more EVs are purchased and upgraded, there are more second-hand options available, which makes electric driving even cheaper.
- **They're better for our climate.** Even if you take the embodied emissions of making the new EV into account, they are a huge game changer for reducing carbon emissions, especially when charged by renewable energy. Over 15 years, switching to an electric vehicle charged with solar can save over 42,000 kg of emissions and 38,000kgs if grid-charged.
- **They create less pollution.** Research from ESR shows that pollutants from cars cause over 2,000 premature deaths in New Zealand every year (many times more than car accidents), nearly 9,400 hospitalisations, over 13,200 cases of childhood asthma and more than 330,000 restricted activity days each year in Aotearoa New Zealand at a cost of more than \$10.5 billion.
- **They're quieter.** The reduction of noise pollution is another added benefit for our neighbourhoods.
- **They're fun to drive, perform well and newer models offer other benefits.** Instant torque delivery provides smooth acceleration and many EVs have attractive functional features such as pre-cooling cars before you enter them or being able to plug in your fridge during blackouts or when camping. Newer models also offer vehicle to home or vehicle to grid capability so you can power your home or send energy back during times of high demand and get rewarded for it.





WHAT TO CONSIDER

- Options. The two main options are:
 - Battery Electric Vehicles (BEVs or just EVs) which are pure electric vehicles powered solely by batteries – *recommended*
 - Plug-in Hybrid Electric Vehicles (PHEVs): These combine a petrol or diesel engine with an electric motor and battery. If choosing a plug-in hybrid, look for ones with extended electric-only driving ranges to limit the use of petrol/diesel.

Note: There are also common hybrid vehicles that are plugless or 'self-charging'. These have a smaller battery capacity and therefore rely more on fuel-powering, so it is therefore better to choose one of the above if possible.

- **Range.** Range anxiety is becoming a thing of the past, both because of improvements in the cars and the charging infrastructure. There are many who have driven across New Zealand in an EV and haven't been left stranded! One of the cheapest new EVs in New Zealand, the BYD Dolphin, has a range over 340km and the very popular Tesla model Y has a range of over 500km. But you may only need a smaller range if you don't drive long distances, which means the car will be cheaper to buy and older second hand EVs are more viable. There are plenty of apps available to help you plan your charging route, like Chargenet or Plugshare. Always remember to take into account factors that may reduce your range such as towing a trailer or carrying bikes.
- **Charging.** You will experience considerable savings if you can charge your car via rooftop solar during the day or at night on lower rates. You can charge it slowly off a regular power point or you can purchase a charger to make it faster (about \$1500 - \$2500 for a smart charger installed and more if wiring needs to be changed). Most cars only need charging once a week or so, which means that even if you drive to work you may be able to coordinate weekend charging or do regular shorter charges. If you don't have solar, time your charging for cheaper energy rates (some retailers offer rates specifically for EVs).

A cheap timer [like this](#) can automate your charger to turn on at night and off in the morning and allow you to get cheap night rate electricity for \$0.14 per kWh, which is almost as low as the cost of solar (though it will rise and solar won't). That works out to be roughly 30 cents per litre when using a petrol price equivalent (and petrol is \$2.70 a litre).

Even if home charging isn't an option, EVs can still be for you. There are an increasing number of workplaces, shopping centres and street chargers being installed (lobby your council for more). Fast DC chargers are good for long distance driving (few people only use fast chargers). Note: not all EV models charge at the same speed.

- **Batteries and Warranties.** Concerns about EV batteries wearing out and requiring expensive replacements have turned out to basically be a non-issue. Most battery warranties are about 8-10 years but batteries typically last the life of the car and recent research has shown batteries lasting 40% longer in the real world than in the lab. Depending on factors like quality of battery, charging and driving habits, there can be some degradation. One estimate is that on average, batteries lose about 2-3% of their capacity each year, which means a 240 km range car might lose 27 km over five years. You should ask the dealer about the most up-to-date warranties for all aspects of the vehicle you're considering, including basic coverage, battery, and roadside assistance.

FAQ

Should I start with a hybrid?

While hybrid cars may give peace of mind for those with range anxiety, hybrids have limitations compared with full EVs, including more moving parts and maintenance, generally less power and efficiency and, most notably, the car will still be responsible for emitting pollution. In short, if you can, go straight to an electric vehicle.

How do I make the most of it?

Some useful tips from EV owners include: keep your battery topped up between 20-80% to keep it in the best condition, utilise regenerative braking (which takes the energy from the process of slowing down and uses it to charge the battery) and remember that extra weight and bulky items (eg bikes on roof racks) will affect your range so take that into consideration when calculating your charging.

What about the environmental impact of batteries?

Mining of any mineral or materials should be done as ethically and responsibly as possible. In the past, there were some issues with mining of cobalt for batteries. As the industry has matured, however, so has the traceability and sustainability of mining for critical minerals. Today, more batteries have transparent mineral production or using alternatives such as lithium iron phosphate (LFP) batteries. Australia is a world leader in ethically and environmentally produced critical minerals. The best news is that most of the components in an EV battery can be recycled, and the rate of recycling will only improve as the industry expands. In sum, even considering battery production, the environmental impact of EVs are light years ahead of fuel-powered cars.

KEEN TO LEARN MORE? VISIT [REWIRING.NZ](https://rewiring.nz)

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