The ABC of ZEV

Driving the future of transport

Solar Victoria

VICTORIA State Government

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Ministers' foreword

The Victorian Government is super-charging the state's move to a ZEV future with an unprecedented investment to make this exciting technology more affordable.

Our vision is that by 2030, at least half of all light vehicle sales in Victoria will be ZEVs, and this program is part of our plan to fast-track that vision.

The $46 million subsidy program, announced on 2 May 2021, aims to help motorists and businesses make their next vehicle zero emissions, targeting low to medium-priced vehicles.

There are 20,000 subsidies available through the program, and we're already seeing strong subsidy uptake and increased ZEV sales this year, so we know our plan is working.

The transport sector is a significant contributor to our emissions and increased sales of ZEVs is the key ingredient to decarbonising our road transport sector by 2050.

It can also save you a lot of money.

On average, it's estimated that if you drive a zero emissions vehicle you can expect to save up to $1,600 a year on fuel and maintenance costs. If you've taken advantage of our Solar Homes Program to charge your car with solar from your own roof, this can be even more.

To meet the expected increase of ZEVs on our roads and give drivers confidence they will have a charging station when they need, the Victorian Government is also investing $19 million to rollout more charging infrastructure on major highways, at key tourist attractions and locations across Melbourne and regional Victoria.

This will more than triple government-supported fast-charging sites across Victoria, adding at least 50 charging points to the existing network of 24 sites.

Not only will this investment encourage the uptake of ZEVs, it's expected to support new jobs for Victorian workers installing charging stations across Victoria, including electricians and technicians.

A further $10 million will add ZEVs to the Victorian Government fleet, starting with 400 vehicles in the next two years. A $5 million innovation fund will work to support the uptake of ZEVs in the commercial sector.

The world is transitioning from fossil fuels to more sustainable options and that transition starts with you.

Hon Lily D'Ambrosio MP
Minister for Energy, Environment and Climate Change
Minister for Solar Homes

Hon Ben Carroll MP
Minister for Public Transport
Minister for Roads and Road Safety

Congratulations. You're driving the future of transport

Zero emissions vehicles, or ZEVs as we call them, are an important step in Victoria's transition to a clean energy future – a transition away from fossil fuel powered vehicles to a cleaner, greener and more affordable way of driving.

This is the future of transport, and you and the Victorian Government are driving it.

In this short guide we'll introduce you to the A, B and C of zero emissions vehicles.

Accelerate

to a clean
energy future

With the help of the Victorian Government's Zero Emissions Vehicle (ZEV) Subsidy, we hope many more Victorians will drive the future of transport, like you are, by choosing to buy a ZEV.

One of the biggest (and growing) sources of greenhouse gas emissions is the transport sector – in fact it accounts for 25 per cent of Victoria's total carbon emissions.

ZEVs are an important step in Victoria's transition to a clean energy future – a transition away from fossil fuel powered vehicles to a cleaner, greener and now more affordable way of driving. Especially when using clean, renewable energy, ZEVs can help significantly reduce emissions, while also reducing the amount of air pollution – making our cities and towns more liveable.

The Victorian Government's target is for half of all light vehicle sales in Victoria to be ZEVs by 2030. Its *Zero Emissions Vehicle Roadmap* delivers the long-term vision to roll out this key driver of our clean energy future.

The journey to 2030, and towards the goal of a fully decarbonised road transport sector by 2050, will involve significant challenges but also enormous opportunities for Victoria. These include social, economic, and environmental benefits beyond just emissions reduction – industry development, new jobs, lower transport costs, improved air quality and enhanced community well-being.

We're glad you're driving the future of transport. Thank you.

Helping more Victorians buy a ZEV

More and more people are choosing to drive a ZEV – and with many countries around the world setting targets to phase out the sale of internal combustion engine vehicles, the pace of the global switch to ZEVs will only accelerate.

Buying a new vehicle is a big decision. The Victorian Government's ZEV Subsidy reduces the upfront cost of a new vehicle to get more Victorians driving the future of transport sooner.

Its ZEV Subsidy is part of the *Zero Emissions Vehicle Roadmap*. $46 million of its $100 million dollar package of policies and programs is dedicated to helping Victorians purchase more than 20,000 ZEVs.

Please help spread the word

If you know someone who is considering buying a ZEV, let them know about the subsidy. And it's easy. The subsidy will be applied to their purchase, provided it meets the eligibility criteria.

They can ask their car dealer and find out more on the Solar Victoria website at: solar.vic.gov.au/zero-emissions-vehicle-subsidy

More ways to drive our clean energy future

You can drive the future of transport and our clean energy future even further with solar panels on your roof and a home energy storage system.

With solar panels, you have the potential to drive completely carbon neutral, charging your car from the clean power you generate throughout the day with affordable, renewable energy.

Install solar PV

Make the most of the sun by installing solar panels on your roof. Working with an inverter, they convert sunlight into electricity your household can use.

If you're an eligible owner-occupier, you can apply for a solar panel (PV) rebate with the option of an interest-free loan matching your rebate amount.

Scan this QR code to learn about the solar panel (PV) rebate on the Solar Victoria website[1]

Research home batteries

Is your household ready to take the next step and invest in an energy storage system* to make the most of the solar electricity generated throughout the day?

Solar panels with batteries don't suit all households just yet, but it might be a perfect combination for you, and could set you up for significant savings on energy bills for many years to come.

Scan this QR code to learn more about the battery rebate on the Solar Victoria website[2]

Charge your ZEV

Charge your ZEV at home with the power generated from the sun and stored in your home battery*.

Read Section C in this guide for Charging and getting about.

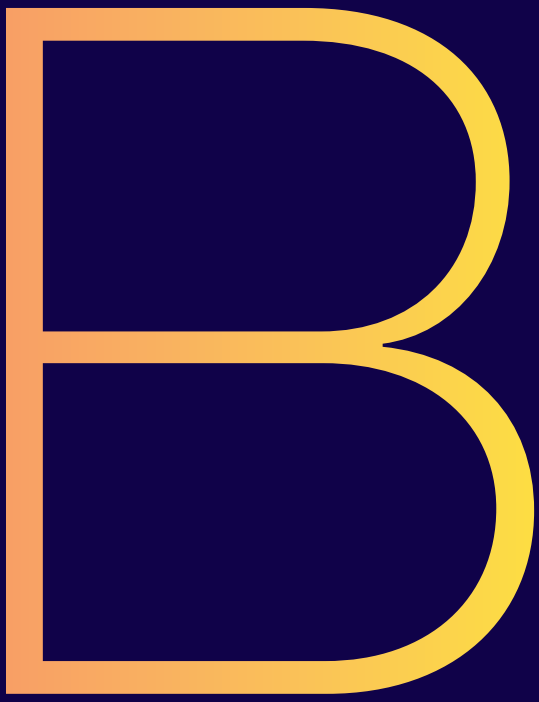
* You don't need a solar home battery to charge your ZEV at home.

Tap into our Solar Hub

Wherever you are on your solar journey – thinking of installing, looking to maximise your savings, or after maintenance tips – the Solar Hub has information and resources for you.

Learn more about solar at solar.vic.gov.au/solar-hub

1 https://www.solar.vic.gov.au/solar-panel-rebate
2 https://www.solar.vic.gov.au/solar-battery-rebate



Be surprised

about the potential of ZEVs

From performance to cost, you'll be surprised about the potential of ZEVs. Help spread the word. Scan this QR code to get more facts and updates about ZEVs on the DELWP Energy website[3]

Range

Many ZEV models currently available in Australia, such as the Nissan Leaf and Hyundai Kona, can travel at least 350–450 kilometres on a single charge – and with Victorians travelling an average of just 38 kilometres a day, that's more than enough to get you where you need to go through the week.

The Government is also investing in a further roll-out of ZEV charging infrastructure, adding to the network already on our highways, in regional towns and at our favourite tourist spots.

In fact, you can already drive from Adelaide to Melbourne and on to Sydney with easy access to ultra-rapid charging stations (found via an app on your smartphone, such as PlugShare), so you don't have to worry about running out of charge.

Affordability

Currently, there are around 15 passenger ZEV models available to buy in Australia and the ZEV Subsidy is helping bring these models into the reach of more Victorians who buy an eligible model.

Adding on the estimated yearly savings of $1,600 for fuel, maintenance and registration means you can expect to save over $10,000 in the first five years of owning your new car.

3 The information in this section is subject to change. Please visit this website for the most up-to-date ZEV facts: https://www.energy.vic.gov.au/zev-facts

Environmental benefits

Just as the name indicates, ZEVs have zero tailpipe emissions, making them better for the environment – and our health – than a fossil-fuelled internal combustion engine vehicle (ICEV). Research has shown that even if a ZEV is charged by our grid electricity (including coal-fired sources) it will still generate overall improvements in net emissions, due to their energy efficiency and ability to recharge when braking.

The cleanest and cheapest way to charge your ZEV is by using a renewable energy source, such as solar. And taking advantage of the Solar Homes Program, you have the potential to drive completely carbon neutral, charging your car from the clean power you generate through the day (see Section A).

Furthermore, ZEVs have proven to be more carbon-efficient than ICEVs over their lifecycle (even when powered by fossil fuels) including raw material extraction, manufacturing, fuel cycle and end-of-life recycling.

Take a look at this article explaining more about the efficiency of ZEVs.[4]

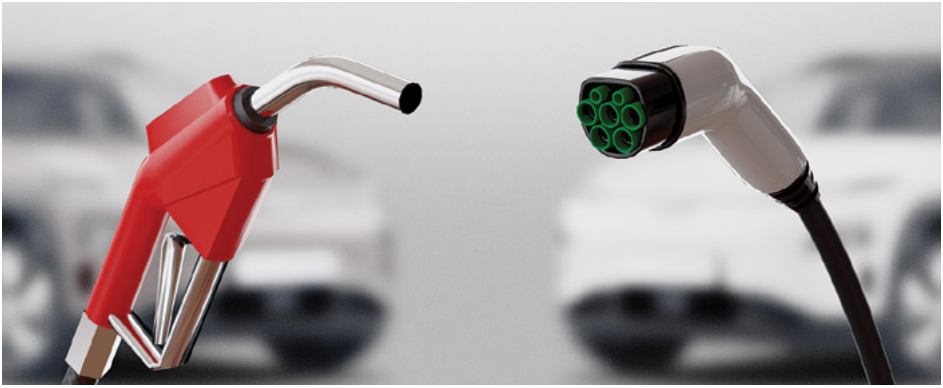
Fuel excise

Australian drivers currently pay a fuel excise – so when you fill up your petrol tank, a large portion of the cost (up to 42 per cent for some fuels) is a tax that helps maintain our roads.

The new distance-based tax for owners of ZEVs will be up to 2.5 cents/km – much less than the fuel excise – and ensures all motorists pay their fair share towards the maintenance of Victoria's road network. This distance-based tax helps fund the ZEV Subsidy – an important investment in Victoria's clean energy future.

Safety

Research has shown that driving a vehicle with a battery is just as safe as driving a vehicle that runs on petrol or diesel. In fact, a study by Hyundai has shown that the risk of a fire in a ZEV is lower than in an ICEV.



4 https://www.energycouncil.com.au/analysis/evs-are-they-really-more-efficient

Grid demands

The early stages of transition to ZEVs will allow our electricity system to be upgraded in an orderly manner and will even include the ability for electric vehicles to help with grid stability. For example, the widespread rollout of rooftop solar systems means that during the day there's more power than we need in some areas. ZEVs can help by absorbing some of this excess capacity.

Furthermore, in the future, ZEVs could act as another source of energy when they are parked in your garage – such as powering your home in a blackout – with current battery sizes said to be able to power your home for up to three days.

As a mobile source of energy, ZEVs have other possibilities – such as the potential to power your worksite or campsite, and the growing potential for them to put electricity back into the grid.

Take a look at this article explaining how EVs can support the grid.[5]

Performance

On top of the environmental and cost benefits of owning a ZEV, you'll also find that they outperform fossil-fuelled cars in other ways. Unlike ICEVs, ZEVs deliver great acceleration, making them nimble around town and giving confidence when merging onto the freeway.

EVs generally have their batteries mounted along the bottom of the vehicle and therefore have a lower centre of gravity, meaning better handling and cornering.

In addition, many are more spacious than a similarly-sized ICEV due to the placement of the batteries and the electric motor taking up less space than an ICEV drivetrain – leaving more room for groceries or the camping gear.

5 https://discover.agl.com.au/energy/how-electric-vehicles-can-support-grid/

Charging stations

and getting about

With an EV, you'll have greater flexibility for when and how you can charge the battery in your vehicle, compared to how you would fill up a traditional fuel operated car. This includes being able to charge your EV in the convenience of your own home using electricity from the grid or solar panels, as well as in public places while shopping or driving around metropolitan or regional Victoria.

So you can always top up on charge when you need it, the Victorian Government is building a network of public fast-chargers, in addition to a series of ultra-rapid chargers that can be found across Victoria.

In this section we refer to 'EVs' because hydrogen fuel cell electric vehicles, which are less common zero emissions vehicles (ZEVs), rely on different charging infrastructure.

The basics about charging

Before you decide how to charge your EV, it's useful to understand the different levels of charging – these are known as Levels 1, 2 and 3. We recommend you do some research about charging your EV and read the information provided by your car manufacturer first, as these are just the basics:

Level 1 – AC trickle charging

- This is basic home charging but also the slowest method of charging.
- Simply plug your EV into a standard 240-volt AC (alternating current) socket, which will provide about 2.0kW of charging power through a normal 10-amp socket.
- Using this method to charge your EV can take from four to 48 hours, depending on the battery size. To calculate an approximate charging time, just divide the battery capacity by two.
- You can also reduce the charging time by using a 15-amp 3.6kW socket.

Level 2 – AC fast charging

- If you need to charge your EV more quickly, consider installing a Level 2, or wall box, charger.
- This will increase the power coming out of a wall socket to 7.2kW with the standard 240-volt AC single-phase power in your home.
- With a Level 2 wall box charger, some EVs gain a full charge from empty in two hours, and others between 5.5 and 11 hours.

Level 3 – DC rapid charging

- Public DC chargers enable EVs to be driven long distances with little downtime for charging. They include the Tesla Superchargers with 480-volt/direct current.
- Rapid charging capacity ranges from 50kW and ultra-rapid chargers with up to 350kW capacity.
- Lower capacity EVs, such as plug-in hybrids and the Nissan Leaf, Hyundai Ioniq and Renault Zoe, are unable to use ultra-rapid charging. They are, however, okay with charging up to 50kW.

Take a look at this article to build your knowledge on charging levels.[6]

It's also important to consider the time it takes to charge your EV. If you're using your EV to travel more or less the same route each day and its single-charge range is enough for this, then you'll only need a car that can charge to full capacity in about eight hours or overnight. But for the days you need to travel a long distance, charging times become an important consideration over battery capacity because you'll most likely need to stop to top-up.

Take a look at this article to learn about charging times, what kilowatt-hour (kWh) means, and how the speed of charging is related to battery capacity – but not exclusively.[7]

Charging at home

Charging at home is easy. Most EV owners charge their car at home using a standard electrical powerpoint.

At home, the average charging time for a EV is 6 to 8 hours, so consider charging your EV during off-peak rate times. With some of the most popular EV models, a full charge will give you 450km of range, which for most people can last up to 10 days.

Remember to also check your current plan with your energy retailer and ask about off-peak deals to cost-effectively charge your EV. Your Distributed Network Service Provider (DNSP) can also answer any questions about the supply of energy to your home and connection to the grid.

DNSPs are the organisations that own and control the hardware of the distributed energy network such as power poles, wires, transformers and substations that move electricity around the grid. They also supply the electricity meter at your home and determine if your solar panels or solar battery can be connected to the grid.

Find your electricity distributor on the electricity distributor section of DELWP Energy's website.[8]

6 https://www.whichcar.com.au/car-advice/ev-charging-levels
7 https://www.whichcar.com.au/car-advice/fastest-charging-electric-vehicles
8 https://www.energy.vic.gov.au/electricity/electricity-distributors

Charging on the road and if you don't have off-street parking

You can search for EV charging stations using PlugShare's[9] database. You'll find over 800 public charging stations across Australia, located throughout a range of regional highways to major shopping and office complexes.

All you need to do is:

» Enter your location >
» Select the plug type you need >
» Get started on your trip

You can also filter charging stations by network.

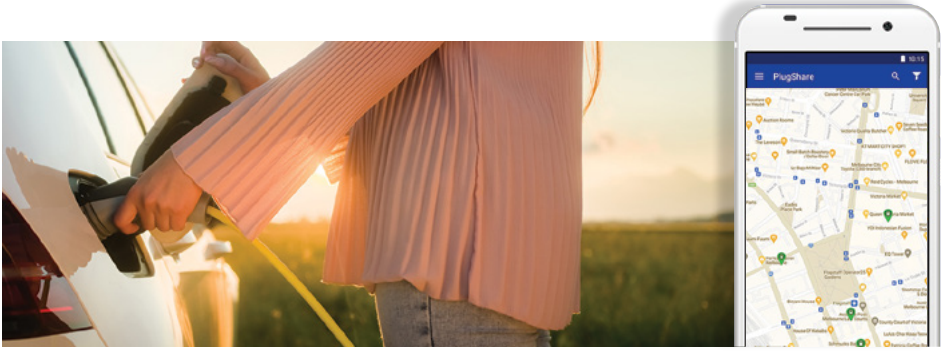
Scan this QR code to get going with PlugShare.

And options for charging your EV are expanding, with the Victorian Government accelerating the roll-out of EV charging infrastructure across Victoria. This will provide more options to Victorians who don't have access to off-street parking.

Read more about the Destination Charging Across Victoria program[10].

Make the most of your charge

Make time to research online and read the information provided by your car manufacturer on ways you can maximise your range. For example, try to keep your driving smooth and steady – increasing your speed uses more energy, which means you will have to charge your battery more often. The surrounding topography and weather conditions can also affect your EV's battery performance.



9 https://www.plugshare.com/
10 https://www.energy.vic.gov.au/grants/destination-charging-across-victoria-grant-program

Any questions?

If you you'd like to know more about the ZEV Subsidy, scan this QR code for information on the Solar Victoria website[11]

Or call 1300 376 393, Monday to Friday 8:00 am – 6:00 pm (except public holidays).

If you'd like to read more about how the Victorian Government is supercharging our zero emissions vehicle future, scan this QR code to take you to the DELWP Energy website[12]

11 https://www.solar.vic.gov.au
12 https://www.energy.vic.gov.au/zev-facts

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