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| Fleet management |
| Planning for electric vehicles in the health sector |

# Introduction

Electric vehicles and charging stations are becoming more common in Australia. There are multiple models of electric vehicle available in Australia across most vehicle types and almost 450 charging stations.

The benefits of electric vehicles include lower operating costs, removing the need to use liquid fuels, reduced maintenance requirements, reduced localised air and noise pollution and the ability to be zero-emission when charged with renewable energy. Studies have also found that the lower centre of gravity makes them less likely to roll over in a collision and they have a reduced risk of a major fire or explosion when compared with conventional vehicles.[[1]](#footnote-1) The benefits of electric vehicles can be maximised by preferencing short to mid-range trips where vehicles can be charged at destinations, en route or overnight at off-peak energy costs.

Electric vehicles face unique issues in terms of energy supply because power outages can disrupt charging. This issue is especially relevant for rural and regional locations where the energy supply may be less reliable. In cities, blackouts are less common, and brownouts tend to be localised and short term and therefore unlikely to affect vehicle charging. This risk can be mitigated by charging during off-peak times when blackouts and brownouts are less common, which has the additional advantage of lower electricity costs, or linking batteries to charging stations.

As electric vehicles increase in popularity, issues of power availability may further disrupt charging. However, the parallel development of similar technologies including microgrids and battery storage will help mitigate these risks in the future. Conversely, Australia has an increasing reliance on foreign liquid fuel imports. Electric vehicles would help mitigate the risk of service disruption by introducing a diverse fuel mix for operational fleets.

This fact sheet provides guidance on the issues health services should consider when planning for electric vehicles, including vehicle models and availability, vehicle use (trip types), driver training and behaviour and charging infrastructure.

# Vehicle models and availability

Electric vehicle selection should consider both upfront and operational costs as well as characteristics of vehicle use including trip types, frequency of use and range requirements. The market should be reviewed annually to remain up to date on new vehicles available and new policies applicable to electric vehicles. This is particularly relevant as of 2019, and new policies may come into effect as lower cost vehicles enter the Australian market.

Table 1 summarises some of the lowest-cost vehicles available or planned for release in the Australian market as of April 2019. Many of the models listed have limited availability in Australia at present due to a lack of government incentives but indicate the types of electric vehicles that will be available in Australia.

Annual CO2-e emissions for internal combustion engine vehicles are approximately 15 per cent lower than that of electric vehicles if they are charged using the Victorian electricity grid. As the Victorian electricity grid decarbonises in the future, electric vehicles will have lower emissions than petrol vehicles. If the grid decarbonises by 25 per cent, electric vehicles charged using the grid will have lower emissions by around 12 per cent. Utilising renewable electricity to charge electric vehicles would make them carbon neutral.

Table 1: Suitable electric vehicles in the marketplace (April 2019)

| Manufacturer | Model | Type | Range (km) | Price (indicative) | Type |
| --- | --- | --- | --- | --- | --- |
| Mitsubishi | Outlander | SUV | 50 (EV alone) | $35,000 | PHEV |
| General Motors | Chevy Bolt | Hatchback | 383 | $40,000 | BEV |
| Hyundai | IONIQ | Small sedan | 200 | $43,000 | PHEV / BEV |
| Renault | Zoe | Small sedan | 300 | $51,000 | BEV |
| Nissan | Leaf | Small sedan | 240 | $55,000 | BEV |
| Tesla | Model 3 | Medium sedan | 350 | $60,000 | BEV |
| Hyundai | Kona | Small SUV | 312–480 | $60,000–65,000 | BEV |
| Kia | Niro electric | Compact utility | 310–480 | $60,000–65,000 | BEV |

BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle (with combustion engine); SUV = sports utility vehicle

# Charging infrastructure

The process of selecting a suitable location for an electric vehicle charging station is based on a range of key factors such as facilities, access, regulations, safety, sustainability and power.

New charging stations can be rolled out in existing carparks. To date, car manufacturers have not been consistent with the location of charging ports on the vehicle. In general terms, if the charging cable can reach both sides of the front of the carparking space, then it should be able to cater for all electric vehicles. Furthermore, all charging bays should be standard carpark spaces (as opposed to being angled, parallel or reverse-in only) with space beyond the front of the bay to allow charging hardware to be mounted on a wall or in the ground.

Charging bays should be in an area that does not have potential trenching implications, and surface drainage and flood risk should be considered. The potential for vandalism should also be considered when locating charging infrastructure. The number of charger points to install will depend on the mileage of electric vehicles per day, as well as the type of charging station selected. For example, if basic AC charging is selected, it may be necessary to have one charger per vehicle because these typically charge overnight, since vehicle range is approximately 80–300 km.

Consider whether charging stations are public, staff or fleet vehicle access. If they are public or staff, a decision will need to be made about whether they are free or fee-for-use. Free charging would encourage the broader uptake of electric vehicles, but as they become more common, this would become cost prohibitive. A well-utilised public charging station could be profitable.

The location of charging stations in high-trafficked areas would help promote the health service’s commitment to electric vehicles, as well as encouraging uptake through priority parking spots. However, due to the high cost of electric vehicles, preferential parking spots could pose equity issues for those who cannot afford them.

Four main types of charging stations and details on their implementation are presented in Table 2. Go online to find out the [locations of charge stations](https://myelectriccar.com.au/charge-stations-in-australia/) <https://myelectriccar.com.au/charge-stations-in-australia/>.

Table 2: Charging station types and features

| Charging station | Overview | Characteristics | Site selection | Cost |
| --- | --- | --- | --- | --- |
| Basic AC charging | Basic AC chargers are the minimum recommended solution for charging and require a charging unit to be installed on a dedicated circuit by a licensed electrician | Power: 2.4–7 kW  Approx. charging rates: adds 10–45 km range per hour  Typical charging time: 2 hours to overnight  Charging Mode 3 (IEC 61851-1) | Suitable for retail centres, council carparks and multi-residential buildings | $1,000–$2,500 |
| Destination AC charging | These chargers are an ideal public charging option for locations where visitors can partake in an activity while charging | Power: 11–22 kW  Approx. charging rates: adds 50–130 km range per hour  Typical charging time: 30 minutes to 2 hours  Charging Mode 3 (IEC 61851-1) | Likely locations include council carparks and service stations with dwell facilities, but also suitable for workplaces with multiple electric vehicles | $1,950–$3,000 |
| Fast DC charging | Fast charging stations are required in key strategic locations along major routes or in areas of high demand to provide easily accessible, fast charging facilities for drivers | Power: 50 kW–150 kw  Approx. charging rates: from 100 to over 300 km range per hour  Typical charging time: 20 minutes to 1 hour  Charging Mode 4 (IEC 61851-1) | Fast charging stations are best placed on major routes, key locations within cities or near major airports where there is high daily electric vehicle traffic | ~$55,000 |
| Ultra-fast DC charging | As longer range vehicles become more affordable, ‘ultra-fast’ charging is expected to allow an additional 300 km of range within 5–10 minutes | Power: 150–350 kW  Charging rates: 300 km of range within 5–10 minutes  Typical charging time: 5–20 minutes | Ultra-fast chargers will require a significant investment in the local electrical network, and therefore extensive planning is necessary | ~$160,000 |

Note: Pricing indicative as of May 2019.

# Driver training and behaviour

Training courses to learn the functions and use of electric vehicles are available in Victoria. Electric vehicles have different features to standard vehicles, and therefore training drivers may be necessary for ensuring a smooth transition from conventional vehicles.

Most electric vehicles do not have a gearbox, and some models only have an ignition switch with an accelerate and reverse option. Electric vehicles have an additional braking system that uses momentum to generate more power for its batteries. There is also little sound or vibration when driving, and drivers, along with people working around the vehicles, should be aware of this when operating the vehicle. This is particularly important in carparks, interfaces with cycling infrastructure and areas frequented by vulnerable people.

The process of recharging electric vehicles is different from refuelling standard vehicles. Electric vehicles are most convenient when they only require charging overnight when not in use. Drivers or fleet managers will need to get into the habit of plugging vehicles into charging points at the end of the day, as well as choosing, or allocating, vehicles based on the available range and length of trip.

Route planning will be required to ensure drivers can complete their trip within the vehicle range or access a charging station during the trip. This could be built into the booking system to preference electric vehicles for short trips and not provide them as an option for routes outside their range.

Health services could pilot electric vehicles for dedicated trips within specific departments with a high frequency of short trips. This would assist with familiarising staff with electric vehicles, provide primary data on costs and benefits and ascertain the opportunities for further rollout within the health service.

# Conclusion

Electric vehicles cost in the order of $3.00 per 100 kilometres to run, compared with around $10.00 per 100 kilometres for a standard petrol car.[[2]](#footnote-2) Despite this, the higher capital cost makes the payback for switching to electric vehicles as a standard fleet option unattractive. This is particularly the case where the VicFleet *Standard vehicle motor policy* requires lease terms of three years

Health services should, however, consider planning for the uptake of electric vehicles. This could include, for example, trialling electric vehicles to familarise them with staff, installing charging infrastructure to encourage use within the broader community, or future-proofing carpark infrastructure to enable charging stations to be installed at a later date.

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1. Ergon Energy 2019, [*Benefits of electric vehicles*](https://www.ergon.com.au/network/smarter-energy/electric-vehicles/benefits-of-electric-vehicles) <https://www.ergon.com.au/network/smarter-energy/electric-vehicles/benefits-of-electric-vehicles> [↑](#footnote-ref-1)
2. Assuming an average cost of electricity of 16 c/kWh and an average cost of ULP of $1.35/L. [↑](#footnote-ref-2)