

## Considering electric vehicles

The use of electric trucks as viable alternatives to diesel fuel will accelerate as more manufacturers add electric vehicles to their product lines. The NZTA's Open Data portal, <https://opendata-nzta.opendata.arcgis.com/search?tags=MVR>, showed that on 14 July there were 111 heavy goods vehicles (classes NB and NC) and 17 omnibuses that were either full electric or derivatives such as hybrids registered in New Zealand. In New Zealand Electric Vehicles (EVs) are defined as:

- **Battery electric vehicles (BEVs)** - these are a purely electric vehicle, powered only by the battery which is charged by connecting to an external source of electricity.
- **Plug-in hybrid electric vehicles (PHEVs)** – these have two engines – one powered by a battery which is charged by connecting to an external source of electricity, the other engine is fuelled from a fuel tank and generally uses petrol or diesel.

Conventional forms of petrol and diesel hybrids are not considered electric vehicles as they are not charged by 'plugging in'. Their batteries are only charged by re-capturing energy when braking or from electricity generated by the engine.

## Selection

As with the selection of any trucks there are several factors that must be taken into consideration when considering the electric option. Many of these factors are similar and well documented however there are some additional ones that must be taken into consideration. A Whitepaper available from <https://www.geotab.com/white-paper/going-electric/> suggests some of these. Whilst the Whitepaper is primarily focused on light vehicles some of the points raised apply also to heavy vehicles, one these been range anxiety. Range anxiety is the fear that an EV will not have the range to complete a cycle of work, a cycle of work being how much work the vehicle is expected to do during a normal day without the need to refuel. For a diesel-powered truck performing local deliveries this would normally be a full day. The current charging infrastructure for EVs may not make to easy to complete a full cycle of work but this will improve over time however duty cycle and recharging opportunities must be factored into any truck acquisition. Another factor that enters the acquisition decision is the fitting of accessories to the truck such as tail-lifts and chiller units that are powered from the on-board electrical supply and the electrical consumption of these accessories.

## High voltage awareness

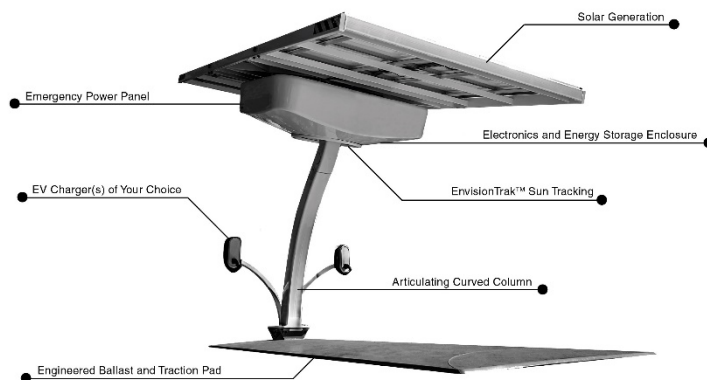
Whilst intrinsically safe the majority of EVs operate in the range of 400 to 1,000 volts DC. These high voltages create a potential danger to anybody who works on them and who does not take the necessary safety precautions. Good practice is that other than for routine charging anybody who does work on or around EVs has received the appropriate safety training which includes making the high voltage systems safe. Otago Polytechnic have an online course to gain an understanding of health and safety requirements when working on, or around, electric vehicles, see <https://www.op.ac.nz/study/engineering/electric-vehicles-short-courses/>. For automotive technicians the Motor Industry Training Organisation, MITO, has a New Zealand Certificate available in Electric Vehicle Engineering, see <https://www.mito.org.nz/get-qualified/our-industries/automotive/electricvehicle/>



## Charging options

In the United States 70% of electricity is created from fossil fuels. We are lucky in New Zealand as 82% of our power is generated from renewable sources but to be truly environmentally friendly EVs should be able to operate completely independent of any fossil fuel including any fuel that is used to generate the charging electricity.

EV charging stations are normally connected to the national power grid although some supplement this by having solar panels. As these stations rely on connection to the power grid, a grid tied charging station, once installed an EV charging station becomes a permanent fixture. If you move your operation, or the installed station impedes site development, relocation can be an expensive and time-consuming activity. An option therefore is to consider a charging station that is entirely solar powered. Solar powered stations operate free from supply fluctuations and outages thereby giving you improved security of supply. By capitalising on the free energy provided by the sun the overall cost benefit of using EVs is improved. Having your own on-site charging station means that you can recharge your vehicles when you want and at your convenience reducing or eliminating your dependence on third party providers. Example, if your driver has downtime during the day, lunch time perhaps, they can plug the vehicle in for a recharge and when their break is over the vehicle is recharged and ready to earn its keep.



Layout of a typical solar powered EV charging station. (Retrieved from <https://www.envisionsolar.com/gallery/> July 2020)

## Summary

The number of electric vehicles entering the New Zealand fleet will increase.

As with any vehicle acquisition decision there are a number of factors that have to be taken into consideration before introducing EVs.

Introducing EVs into your fleet can bring with them additional safety responsibilities.