

Webinar – Charging Infrastructure for Fleets

Questions and Answers

What is the effect on KVA charges and the power factor?

Bede Doherty, Consultant - Generally large sites are billed by the electricity retailers based on what they call peak load. So that's if you exceed the agreed level of electricity usage they will increase the size of your bill with an extra charge. It's unlikely to be a problem in charging electric vehicles because they don't use too much load.

Stuart Nesbitt, Moreland Council – demand management hasn't been a problem from the cluster of chargers that they have there because prior to doing the charging Moreland had an aggressive energy efficiency program. Our peak demand requirements for this building have almost halved over the agreement with the distributor. Also have voltage power optimisation at the site as well, so it hasn't impacted it at all. Given energy efficiency work the electrical supply to the building greatly exceeds the capacity required to add the extra load.

What has been the frequency of use and what is the occupancy/time that an EV is charging or seen to be charging?

Rob, Banyule – Vehicles are charged up during the day and overnight, only 2 vehicles within the fleet. Soon have another two Renault Zoes. Only council vehicles.

Stuart, Moreland – 2 fleet specific chargers, used very frequently, 4 EVs being run from the centre with 3 chargers. 10 additional electric vehicles will be coming when can get the vehicles. Prior to software upgrade, lost the data on use, so don't have all the details. But in total 23 megawatt hours of electrons have been used to charge. Not monitoring council charging infrastructure, doing what already done with fuel. Network only working at about 3% of its capacity.

Usage is quite frequent. Fast charger is one of only two in Victoria. Frequent users were relying on it so when it was down got feedback directly.

What are the costs involved?
 How much do the different chargers cost?

TABLE 1: APPROXIMATE COSTS, PROVIDED BY EVERTY

Home and private car parks (AC 7-22KW)		\$1,700 - \$3,000
Commercial car parks, car dealerships, retail centres, etc. (22AC and 23-25DC)		\$5,000 - \$17,000
Public charging locations (outdoor, robust, fast (50KW)		\$35,000 - \$50,000

Stuart, Moreland – Had an easy run at the start with the 2012 Victorian Government EV Trail, they provided and carried costs of providing sub circuits and installation. During the trial put the proposal in to get the first fast charging station. Very close to site substation so was easy. Future proofed the sub circuit, 100amp sub circuit, so can plug and play with new chargers.

\$8,000 – 10,000 for sub circuits.

Recent examples and upgrades:

- Installed Schneider EV Link where the fast charge station is, installed 22kW, type 2. Just a tad under \$6,000 to install.
- Rolec units, newer dual bollards 32 amp on both sides, 7kw each. Typically installed around \$3,500 - \$4,000 to buy. Costs of installation determined by where you put it. Planning electrical infrastructure for future development has been helpful.

- Upgrade of the DC fast charge, Tritium, CCS type 2, dual bollard, typically pay low \$30,000, installation costs relatively minor as just an upgrade. In 2012 would pay about \$4,000 to get the electricity there. Need to be closely matching electricity supply point to installation location.

What are the operating and maintenance costs?

Operational costs

Stuart, Moreland – Pay a supplier for networked operations of the chargers, costs approximately \$330 per year per station for Level 2 chargers on a 3 year contract basis.

Rob Powell, Banyule – Costs have been absorbed into the general budget.

Maintenance Costs

Stuart, Moreland - Of the infrastructure basically non-existent, has only have been vandal damage, not significant but also not particularly insignificant. Not really vandals, mostly done by EV users who were using it incorrectly, have fixed with signage.

Rob, Banyule – No maintenance costs either, all internal use and have had no damage. No problem even with the locations open to public in the evenings.

What are the costs for communications and smart networked EVSE (electric vehicle service equipment)?

Carola Jonas, Evertly – It really depends on the software, what do you want the system to do, if billing is involved then higher costs, without billing lower costs. Also peer pricing occurs so if you need it for only one or two stations slightly higher costs than if you have 100 stations. Economies of scale does come into it, can't provide costs as it does depend on functionality. Happy to talk to people directly

Stuart, Moreland – They pay ChargePoint approximately \$330 per year per station for Level 2 chargers on a 3 year contract basis.

How can charging infrastructure be planned for new developments?

Stuart, Moreland - Moreland have had a nominal requirement in Moreland Planning Scheme which expects developers to provide or future proof a development for zero emissions vehicle charging. Basically means putting sub circuits in that are capable of EV charging at a later date.

This has been interesting with some developers thinking that a standard 10amp GPO in a garage is EV ready. Response to this from the Council has been to consider at least one dedicated 32 amp single phase sub circuit ready to accept a vehicle charging station.

Strategic planning unit currently heavily involved in an overarching integrated transport planning across Moreland, moves afoot to look at mandating new residential developments of a certain size, must have EV charging infrastructure actually installed. Early stages at the moment.

For Council development have a Sustainable Buildings Policy, recently updated, which mandates any new developments over \$1.75 million must have EV charging infrastructure as part of car parking that is made available to that building. Buildings also must be drawing 20% of its peak load from renewable energy generated

on site, this mandates the link between solar and charging infrastructure. New Aquatic Centre in Oak Park is the first example of this.

What is the most appropriate charging infrastructure for fleet vehicles and public vehicles?

The most appropriate infrastructure for these categories depends on a range of factors including the number and use of the vehicles required to be charged, and their driving and range patterns. Below are some tables that provide some information to help make a decision. These tables are from [Hobsons Bay Discussion Paper on Electric Vehicle Charging Infrastructure](#).

TABLE 2: CHARGING INFRASTRUCTURE CATEGORIES, PROVIDED BY HOBSONS BAY

Where EVs are charged	Charger power	Ideal locations	Activities enabled
Inter-regional	50kW+ DC fast chargers	Convenient locations	Long distance travel
Destination	7 – 22 kW chargers	Tourist destinations, shopping centres	Widespread travel and EV tourism
Workplace	7 – 22 kW chargers	Park and rides, workplaces	Complete EV ecosystem
Home	7 – 22 kW chargers	Off-street parking	Better grid utilisation

TABLE 3: CHARGER SPEEDS, PROVIDED BY HOBSONS BAY

Level	Charger power (kW)	Charger speed (time to recharge)	Range per hour (RPH)	Info
1	2.3kW	12+ hours	7.5 – 15km	Standard electrical power points suitable when long charging times are available e.g. overnight.

Level	Charger power (kW)	Charger speed (time to recharge)	Range per hour (RPH)	Info
2	3.5 - 22 kW	3.5kW c. 10 hours; 7kW c. 6 hours; 22kW c. 2 hours	18-40km	Requires expert installation and robust equipment due to faster charging speeds and higher heat generation. Higher speeds are suited to workplace or destinations such as shopping centres or fast home charging.
3	50kW+	20-30 mins to 80% charge	70km/10 minutes	Require specific EV units and upgrades to services as chargers require more power than a house. Recommended for highways or to allow quick charges on longer trips.

What is the experience of pairing solar with renewable energy sources?

Stuart, Moreland – Most of the buildings with charging infrastructure in Moreland have solar, but also essentially purchasing all green energy since 2012. With the initial chargers put in during the Victorian Government trail the chargers were paired with 100% Green Power for that particular site.

Now as part of the MREP (Melbourne Renewable Energy Project) with the City of Melbourne, from the 1st of Jan, all electricity used by the council is renewably generated. Including when not on site. For Council development part of the Sustainable Buildings Policy, recently updated, mandates a link between charging infrastructure and on site renewables. All buildings over \$1.75 million must have EV charging infrastructure as part of car parking, and must be drawing 20% of its peak load from renewable energy generated on site.

Rob, Banyule – The Greensborough office installation of the charger happened at the same time as a big redevelopment and installation of solar there on site. Difficulty of pairing it with the solar, unless it's dedicated to the power outlet that is feeding the charger.

What information is required to ensure that a location is capable of installing charging stations?

Everyt have created a guide on charging infrastructure for local councils looking to provide public infrastructure. This guide gives a great overview of the information required to select a site, and is attached to the original email. Some key points are:

- Find the source of electricity and electrical panel/circuits and confirm that the existing infrastructure is capable of handling the load. A dedicated circuit is required for all installations. Choosing a location with panels and circuits close to the intended bays will significantly reduce installation costs.

- The physical size of the charging space matters. Ensure that the site selected has ample room to move around the vehicle.
- Ensure the site meets all the requirements for an ideal user experience. This includes making access easy by not obscuring it visibly, having bi-directional road access, near elevator access if necessary.

The City of Yarra has several EV parking stations established for its fleet vehicles and is considering further expansion of these sites; however, the power capacity is near the maximum at some sites.

Is charging technology able to smartly adapt power drawdown to enable additional stations to be added, without incurring major costs of increasing power capacity?

For example, can the Collingwood Town Hall EV charging station (two bays with moderately fast charging capability, which charge a vehicle in 2-3 hours) be expanded to add extra overnight trickle charging stations without overstressing the system?

Carola, Evert – It is definitely possible, most of the times when you have multiple charging stations, you set up what is called a master and slave arrangement, so you have one master that controls the others. To keep it simple with 2 stations, 1 master and 1 slave, second vehicle is added then the load gets equally distributed, but can build on to combine extra hardware. Most of the hardware have inbuilt load management within a master slave agreement. Can build schedules, different order overnight etc. all through the backend management systems. Depends on the location and the electricity constraints.

Stuart, Moreland – Also for worse case scenarios can use load shedding technology, which basically says you have current transformers monitoring the demand levels and then, almost like the utility operators do, you switch things off to make sure you don't have a blackout.