

## Overview of Charging station technologies

### Charging Services

- *Destination or convenience* charging - One of the major benefits of electric vehicles is that charging can be integrated into the activities of the user. This means that the most convenient chargers that will attract the most use will be where people live, work and shop/eat.
- *Fleet charging and opportunity* charging - For businesses that are making the transition to electric vehicle fleets, charging must be effectively integrated into the duties of the vehicle. This might mean a combination of a dedicated charging bay at the business site and charging at trade centres or industrial estates.
- *Journey enablement* - For central New South Wales, fast or ultra-fast journey enablement charging infrastructure will provide an essential service for regional locals who must travel long distances between towns for other services. Journey enablement charging infrastructure opens the region to visitors and ecotourists who choose to visit the region by electric vehicles.

### Types/Levels of charger

The power of a charger is typically referred to by the rate at which the charger delivers power to an electric vehicle over time and is most usefully presented as the time to provide 100km of added range to an electric vehicle. To simplify the many types and charging powers available on the market, the industry uses terms such as slow, fast and ultra-fast, as well as grouping chargers into 'types' to describe the charger's charging rate.

The table below sets out the definition of levels and common names that we will use throughout the electric vehicle toolkit.

## Charger Terminology and Descriptions

Power Level	Common name	Charger Type	Power	Range delivered by charge in 15 mins*	Time to charge 100 km of range*	Application
Level 1	Slow charging	Wall socket	2.3 kW	2.9 km	8 hr 42 min	Home Charging
Level 2		AC Charger	3.5 kW	4.4 km	5 hr 43 min	Workplace charging, all day/night parking
	7.4 kW		9.3 km	2 hr 42 min	Public destination charging	
	22.1 kW		28 km	54 min	Public multi-purpose charging	
Level 3	DC fast charging, Rapid charging,	DC Wall Charger	25 kW	31 km		48 min
		DC Charger	50 kW	63 km	24 min	Public journey-enablement
	100 kW		125 km	12 min		
	Tesla Supercharging		120 kW	150 km	10 min	
Ultra-fast charging	up to 350 kW	440 km	less than 10 min			

\*For vehicles with typical driving energy efficiency of 20 kWh/100 km. Where AC charger used, assuming the vehicle internal hardware allows does not limit charging at the stated rate.

## Charger Design and Features

### Wall vs Pedestal Mounting

Many Level 2 electric vehicle chargers can be mounted on a wall or integrated into a pedestal, or post, installed on the ground. Functionally, there is little difference between the two, however pedestal mounted Electric Vehicle Supply Equipment (EVSE) provide more installation location possibilities and can be more expensive to install for a similar location due to additional civil works required.

### Connector Types and Tethering

AC and DC charging require different connectors, and within each category there are alternative connector types. The Type 2 plug is the standard AC connector and is compatible with most car manufacturers, while Japanese auto manufacturers generally favour CHAdeMO DC connectors and European and U.S. automotive manufacturers favour CCS DC connectors. Most DC charger units can be specified with either or both connectors.

An untethered charger features a socket and requires drivers to supply their own cable. A tethered charger on the other hand is one where the charging cable is permanently connected to the EVSE, providing convenience that is generally preferred by electric vehicle users.

### Networked Chargers and Open Charge Point Protocol

It is recommended that selected chargers can be configured with networking hardware such as 3G or WIFI. It is also recommended they are designed to be Open Charge Point Protocol

compliant. This means that the EVSE can communicate with a cloud-based management software, either stand-alone or as part of an electric vehicle charging network.

### Management software and billing services

Open Charge Point Protocol (OCPP) allows operators to use their choice of management software; however, most chargers are most effective when running on software that is installed by the distributor. Major charger brands offer management and billing software in Australia that can be installed on these chargers. Alternatively, if the charge station owner does not intend to charge for or monitor its use, then management software is not necessary.

### Types of Plugs

There are numerous types of plugs currently in use, however there is a move towards standardising charging plugs. For more information visit the [Renew website](#) or the [EVSE website](#).