Electric Vehicle Charging: Key Considerations

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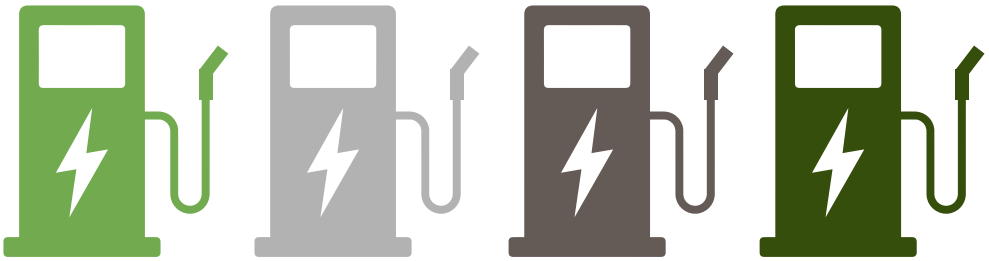
When commissioning Electric Vehicle Charging infrastructure, your business should consider:

Type of vehicle

Type of charger



Electric vehicle charging is dependent both on the technology built into the vehicle and the charging infrastructure.

For example, when the charging capability of the vehicle is less than that of the charger, the vehicle will charge only at the maximum speed allowed by the vehicle.

When the charging capability of the vehicle is greater than that of the charger, the vehicle will charge at the maximum rate allowed by the charger.

Charging rates vary from slow chargers (which can take more than 12 hours to completely replenish a battery) to rapid chargers (which can provide 80% charge in less than 30 minutes).

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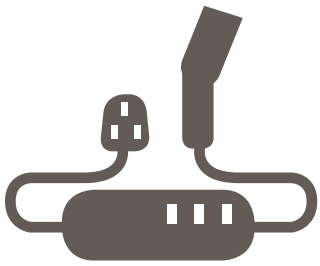
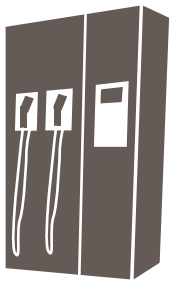
Key facts on EV chargepoint types

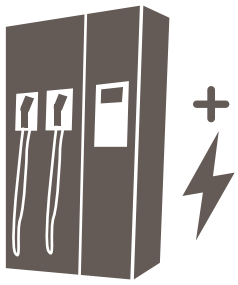


Three-pin socket - 2.3kW, 12+ hours

Slow charger - 3.5kW, c. 10 hours
Fast charger - 7kW, c. 6 hours
Semi-rapid charger - 22kW, 2 hours



Rapid charger - 50kW,
20-30 minutes to 80% charge



Ultra rapid charger - 150kW+,
< 20 minutes (estimated)

	Slow	Fast	Rapid
Power Rating	3.5kW - 7kW	7kW - 22kW	43kW - 50kW
Electrical Supply Type	AC	AC & DC	AC & DC
Charge Time	4 - 8 Hours	2 - 4 Hours	25 - 40 Minutes (80% Charge)
Vehicle Range Added in 15 Minutes	3 - 6 Miles	6 - 20 Miles	35 - 40 Miles

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Compatibility with chargepoints

Charging an electric vehicle requires compatibility through a connecting cable between the charger outlet (also known as a socket) and vehicle inlet.

The connecting cable can either be tethered to the chargepoint or detached entirely.

The most common connectors are type 2 and CCS.

Connector Type	Profile	Typical Charge Speed and Current	Associated Manufacturers
Type 2 (Menekkes)		3.5kW, 7kW, 22kW, 43kW AC	Compatible with most vehicles, but not all. Will be capable of utilising the higher rates of charge (charge speed dependent on vehicle on board charger)
Combined Charging System (CCS)		50kW DC (150kW DC being trialled)	BMW, Audi, Volkswagen, Porsche, Ford
CHAdeMO		50kW DC	Nissan, Kia, Citroen, Tesla (via adapter), Mitsubishi, Peugeot

Daily mileage

Typical daily mileage is arguably the most important consideration when deciding on which chargepoint type is most appropriate for your fleet.

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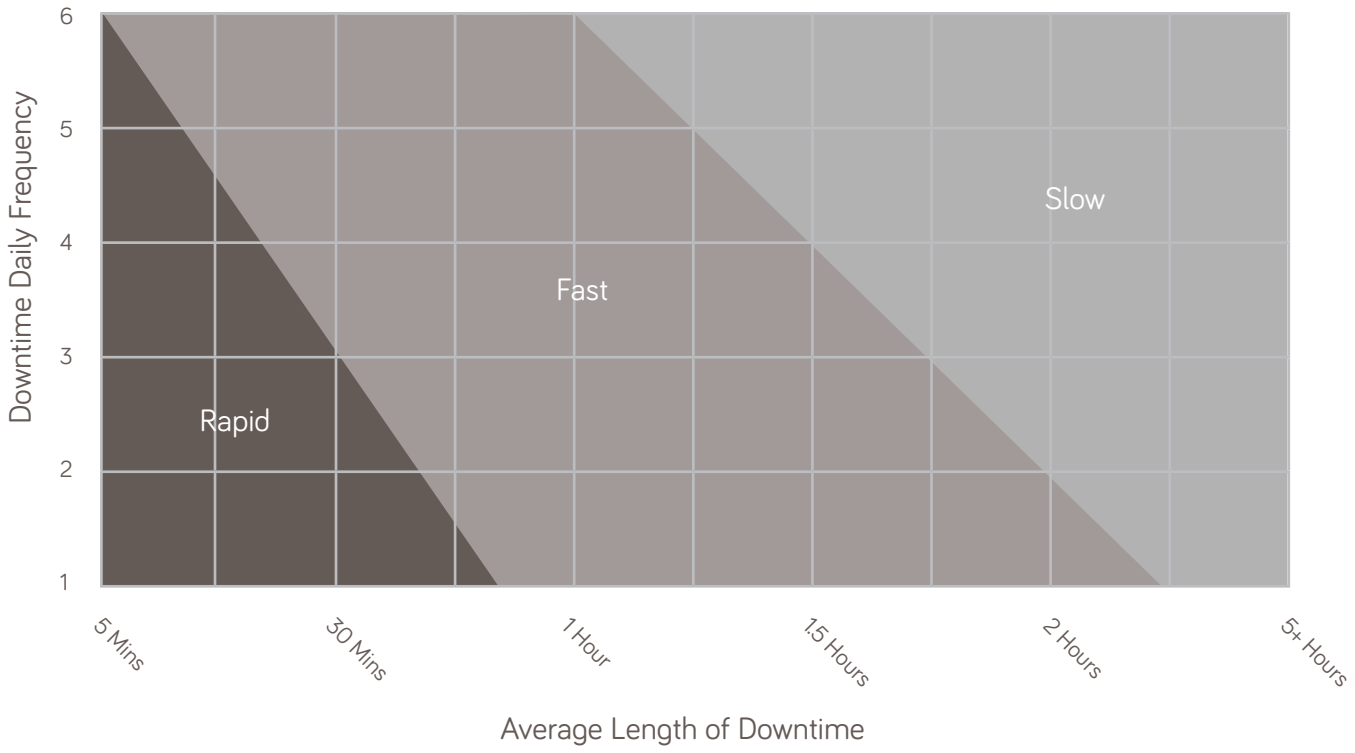
Downtime

In some organisations, vehicles may regularly or routinely spend time stationary during their working day. If this downtime naturally exists in the operation of a fleet, it represents an opportunity to charge an EV with little or no change to driver behaviour.

Topping up charge by 15 minutes, could provide up to 40 miles range using a 50kW rapid charger.



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Load management

Load management systems offer a potential solution for multiple chargepoints to be operated, without exceeding the maximum power capacity of a site

Dynamic power management to chargepoints reduces the speed of charge, to moderate total electrical demand.

Load management systems can also be configured to limit the proportion of a site's total energy supply that EV chargepoints can use, to prevent capacity being exceeded.

The principle of load management is that when a chargepoint is being used, the vehicle is charged at the fastest speed permitted by both the chargepoint and vehicle.

When several chargepoints are being used, the speed being delivered to each can be reduced.

Organisations running fleets with a number of vehicles requiring quick top-up charges during shifts, and slow charge overnight at the end of a shift, almost always benefit from a load management system.

Fleet Managers should consider the likely future growth of their EV fleet, as installing flexible load management technology at the outset can save on infrastructure replacement and upgrades.

Chargepoints with features including remote access functionality, back office integration and load management, can be used to monitor and minimise costs.

They can also include the ability to remotely control chargepoints (including ending a charging session), and to monitor the usage of charging infrastructure.

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Vehicle-to-grid (V2G)

V2G is a system in which plug-in electric vehicles, such as battery electric vehicles (BEV) and plug-in hybrids (PHEV) communicate with the power grid to sell demand response services by either returning electricity to the grid or by throttling their charging rate.

V2G storage capabilities can enable EVs to store and discharge electricity generated from renewable energy sources such as solar and wind, with output that fluctuates depending on weather and time of day.

V2G can be used with gridable vehicles - plug-in electric vehicles (BEV and PHEV), with grid capacity.

Vehicle to grid technology allows EV batteries to store energy and discharge back to the electricity network when most needed (such as peak usage times).

This 2 way exchange of energy provides your business with a number of economic, environmental and operational benefits.

V2G uniquely lowers the cost of running your business's EV by generating revenues through participation in local energy markets.

T 01246 290 490 E Sales@ecaBusinessEnergy.com
ECA House, 1 Dronfield Court, Civic Centre, Dronfield S18 1NQ
ecaBusinessEnergy.com