Worksheet 2: Charging electric vehicles

How to charge an electric vehicle

Charging an electric vehicle (EV) is done via a charging cable. The connectors on the cables can vary depending on the type of vehicle and the type of charger. The main connectors you will see are CHAdeMO, CCS, Type-2 (7-pin) and Type-1 (5-pin). The CHAdeMO and CCS connectors are cables used for DC or rapid charging. The Type-1 and Type-2 connectors are used for AC charging using slow or fast chargers.

On the vehicle side, European models (including VW, Volvo, Audi etc) usually have Type-2 inlets and the associated CCS connection, whereas Asian and US models (including Nissan and Mitsubishi) have a Type-1 and a CHAdeMO connection. This usually varies between vehicles, so it is best to check which type of connector your vehicle uses.

Charging at home

When charging at home, the charging method will be dictated by where you are able to park and your access to an electricity supply.

Charging cars overnight at home is usually cheaper and more convenient for consumers in comparison to charging in public. If you plan to regularly charge your electric vehicle at home, it is recommended that a dedicated EV chargepoint is installed. These chargepoints can either be 3.7kW or 7kW chargers.

Time taken to charge using a home chargepoint

			
Vehicle type	**Nissan Leaf (24kWh – 120 miles)**	**Kia e-Niro (64kWh – 282 miles)**	**Tesla Model S (100kWh – 375 miles)**
3kW charging time*	6 hours	17 hours	27 hours
7kW charging time*	3 hours	7.5 hours	11 hours

* charging from 0-80%

Installation

The typical cost for a home chargepoint and installation is approximately £1,000. The Electric Vehicle Home Charge Scheme provides a 75% contribution up to a maximum of £350 per household towards the cost of a dedicated home chargepoint. You need to demonstrate that you either own or lease an EV to be eligible for the scheme. In addition, drivers of company owned vehicles are eligible, subject to them being the allocated driver. Many vehicle manufacturers also offer a free home charger when purchasing a vehicle.

A home chargepoint needs to be installed by a qualified tradesman. The Office for Low Emission Vehicles (OLEV) provide a list of approved chargepoint suppliers and installers. All home chargers eligible for the grant must include smart charging capabilities. Smart charging allows EVs to be charged at the most advantageous times to the energy system.

Electricity tariffs

Many energy companies have introduced energy tariffs specifically tailored for EV drivers to help cut the costs of home charging and save you money. The Go Ultra Low website offers an EV energy tariff tool to help you find the best option for you.

On street charging

For those who live in properties that do not have dedicated off-street parking, charging an EV at home can be more challenging. However, action is being taken to make sure that residents of households without off-street parking still have convenient access to cost-effective charging infrastructure near to their homes. The On-street Residential Chargepoint Scheme gives local authorities access to grant funding to support the installation of on-street chargepoints and to meet the charging needs of residents without off-street parking.

Charging on a public network

The network of public chargepoints is rapidly increasing. Chargers can range from fast chargers (7/22kw) to rapid chargers (50kW+), in a range of locations from supermarkets, town centre car parks, shopping centres and service stations.

Access to charging is usually provided by a RFID card or via a mobile phone app, although an increasing number of chargepoints will accept payment from a regular contactless credit or debit card.

Public chargepoint operators and chargepoint map providers give details of the types of public chargepoints available and their location. This includes rapid chargepoints available at service stations on the strategic road network, which includes motorways and major A roads.

Most chargepoint map providers have search functions where you can input your postcode and a selection of chargepoints that are closest to you will be flagged. Some other popular sites include Zap-Map.

How to work out the cost of charging (public network vs. home charging)

The cost of charging will vary depending on whether you are charging at home or on the public network.

	Home Charging	Public Charging
Average unit price (pence per kWh)	14.40p (Ofgem January 2020)	20p per kWh
Total cost when charging 0-100%	£7.20	£10.00
Pence per mile cost	3.5p-4p per mile	5-6p per mile

(Based on the Peugeot e-208 50kW electric vehicle, with a WLTP range of 217 miles on a full charge.)

The best way to calculate the cost of charging an EV is to multiply the battery size in kW and the cost per kWh of the charger. For example, a Nissan Leaf with a 24kWh battery would cost £4.80 to charge, based on a public network charge of 20p/kWh.

Workplace charging

Workplace charging allows staff or fleet vehicles to be charged either during the day whilst drivers are at work or overnight when fleet vehicles return to their base.

Workplace chargepoints can range from 7 to 22kW and be either wall mounted or on a standalone charge post.

Time taken to charge using a workplace chargepoint

			
Vehicle type	**Vauxhall e-Corsa**	**Nissan e-NV200**	**LDV EV 80**

	(50kWh – 209 miles)	(40kWh – 174 miles)	(56 kWh – 120 miles)
7kW charging time*	7.5 hours	5.5 hours	8 hours
22kW charging time*	2.5 hours	2 hours	2.5 hours

* approx. charging time from 0-80%

Installing a workplace chargepoint

A workplace charger must be installed by a qualified tradesman. The Office for Low Emission Vehicles (OLEV) provide a list of approved chargepoint suppliers and installers.

How much will it cost?

The cost of installation of a workplace chargepoint will start at approximately £1,000 and will depend on the type of charger and its location. Many installers will offer a site survey in advance of installation which will assist with finding the most cost-effective location.

The workplace charging grant scheme can fund 75% of the total cost of installation, up to a maximum of £350 per socket installed, funding a maximum of 40 sockets for each applicant. The workplace does not have to show evidence they own/lease any EVs to apply for the grant.

Taxable benefits

From 6 April 2018, where an individual is provided with workplace facilities for charging a battery of a vehicle used by them (including as a passenger), no taxable benefit arises in respect of costs relating to the provision of electricity. Further details are available from HMRC.

Quote from business from Haringey?

If you are thinking of making the switch to a low emission vehicle, visit **www.energysavingtrust.org.uk/transport/electric-cars-and-vehicles** to see what support is available.