636 Vehicle Charging Infrastructure
A Buyers Guide

Before contacting suppliers on this framework regarding Electric Vehicle Charge Points (EVCPs) on Lots 1 and 2 of the framework, you may wish to consider the following. There is also excellent guidance available on the internet e.g. UK EVSE Procurement Guidance and BEAMA Guide to Electric Vehicle Installation.

Key considerations

What are your goals?
- What are you trying to achieve by installing EVCPs?
- Charge employees/visitors/public electric vehicles or plug in hybrids
- A public need has been identified for an EVCP
- Received funding for EVCP charging
- Short term trial of EVCPs
- Strategic rollout of EVCPs

By establishing your goals, you will know what you are looking to achieve and can narrow down what you need to purchase.

What vehicle(s) do you need to charge?
- Plug in hybrids (PHEVs), extended range electric vehicles (E-REVs), battery electric vehicles (BEVs)

Which connectors do they use?
- Type 1 (J1772)
- Type 2
- CHAdeMO
- CCS Combo (combines a Type 2 AC and DC charger pins in one plug)
- Tesla – use their own uprated Type 2 connector on DC power

Often the Japanese car manufacturers use CHAdeMO and European and American manufacturers use CCS Combo. Therefore your choice of charger could mean exclusion of certain electric vehicles. However, don’t despair, there are multi-standard chargers available which cater for both.

Which electric vehicle charging modes does the charger use?
- Mode 2 (Alternating Current) Non-dedicated circuit and socket outlet, cable-incorporated RCD e.g. from 3 pin domestic plug. Not recommended
- Mode 3 (Alternating Current) Dedicated EV charging system, dedicated outlet
- Mode 4 (Direct Current) Dedicated EV charging system, dedicated outlet

What are the battery capacities of the vehicles to be charged (in kWh)?
Typically, smaller vehicles and PHEVs will have smaller batteries. Some customers therefore prefer low powered (and less expensive) EVCPs, so that a car can be left to charge for a long period e.g. during the working day for an employee.
Size of the vehicle’s on board charger?

For example, a vehicle equipped to charge at 16amps, when attached to a rapid charger, will still only charge at 16amps. Some EV manufacturers tend to make batteries small to save on weight and size, but this limits the speed at which they can take the charge. Future vehicles are looking to incorporate high rated on board chargers for AC to allow faster charging. However, if charging via a DC charger an EV’s on board charger may be bypassed and therefore it can be charged at full output of the EVCP.

How many vehicles will need to be charged at any one time?

Dual chargers are available which can charge two cars simultaneously from one EVCP. Recommendations from suppliers vary but one view is that for the first 10 electric vehicles in a workplace site, a 1:1 ratio of sockets to drivers is optimal. Thereafter a 1:3 ratio can be adopted. With too few charge points available to electric vehicle drivers, this can lead to conflict.

What is your mix of fleet? e.g. commuter cars for work, staff, public, site visitors?

The average journey of a UK driver is around 21 miles per day. The type of use will inform your choice of EVCP.

Do you have sufficient electricity supply to enable installation of your chosen EVCPs?

- Determine the maximum output your electricity supply can maintain for EVCPs.
- Then determine the power output of the EVCPs. This info can be found in the product data sheets available on request from ESPO.
- Do you wish / are you able to use single phase or three phase electricity supply? If you’re not sure, ask the supplier to advise.
- Look at the distribution board (or ask an electrician or your supplier to check) to ensure there is enough capacity to accept the chosen EVCPs at the output you require. A residential property will likely use a single-phase supply whilst commercial buildings may use a three-phase supply. Different chargers draw from different phases, with the higher powered normally being 3 phase.
- If there is enough capacity, is it likely that any other electrical fittings or further EVCPs will need to use the supply in the future? If so it may be worth upgrading your board / supply now to try build in some capacity.
- If extra capacity is required – will this be a new distribution board and / or a new feeder pillar? For basic upgrades an electrician or the framework.

Suppliers may be able to assist, but for larger supply upgrades your Distribution Network Operator (DNO) will be needed. If you don’t know who this is a list is available here: http://www.energynetworks.org/info/faqs/elec-tricity-distribution-map.html

Note that the DNO is likely to take time to upgrade the supply and there will be an additional cost, which could be substantial. The EVCP supplier will not have control over this time or cost so plan to build it into your project. Your supplier will manage the engagement with the DNO if required.

How quickly do you need the vehicle(s) to be charged?

- Slow (2.4-3kW single phase) 8-12 hours to fully charge*
- Fast (7kW single phase) 4-6 hours to fully charge*
- Fast (22kW three phase) 1-2 hours to fully charge*
- Rapid (43kW AC three phase) 30 minutes to charge to 80%*
- Rapid (50kW DC three phase) 20-30 minutes to charge to 80%

Why do you need to know the charge time that you need?

Many suppliers will not recommend a rapid charger for an average customer charging at a work-place for example, unless there is a real need for fast charging, e.g. motorway services, bus charging, etc and may recommend a 7kW AC, which is a good balance between speed and cost.

*NB charging times available to users vary depending on many things, e.g. EVCP power output, battery capacity of vehicle (figures above based on 24kW capacity) – bigger batteries will take longer to charge and vice versa, vehicle battery charger capacity (a consideration if charging via AC), power capacity of the charging cable, ambient temperature, the current state of the battery’s charge (the battery’s ability to charge at a high rate diminishes as it gets nearer to full capacity). Also note that the rate at which rapid units charge reduces substantially after 80%, hence figures generally only show the charge up to 80% for these units.
Who do you want to access the EVCP?

- Do you want the general public to be able to use the EVCP or only selected private users? There are options available on the framework for both publicly accessible and private networks, speak to the suppliers to advise.
- Employees - are they on a company car scheme or is it the employee’s privately owned vehicle? There may be benefit in kind tax implications. Contact HMRC for more information.
- Each employee could be given means of access e.g. RFID card, key, etc.
- Visitors to the premises – RFID cards for visitors could be kept for example at your reception and given to visitors to use for charging.
- General public – could access via a national network (e.g. via RFID card or app) or Pay as You Go.

How will they access? RFID card, key, app, telephone, SMS? Will they need to be a member of your selected network, or can they use pay as you go?

Do you want users to pay for charging at the EVCPs or not?

- No – note if it’s free to charge for employees driving private vehicles, there may be benefit in kind tax implications for the employees to charge.
- Although a free service may be desirable and encourage uptake of EVs, what if many people decide to have EVs, would you continue to provide free electricity? Also, drivers of traditional ICE (internal combustion engine) vehicles may be unhappy with free EV charging.

- Yes – Pay As You Go (PAYG) or credit account options available.
- If yes, decide how much you wish to charge – set a tariff (your supplier can help advise on this but the main models are recovery of energy cost, recovery of energy and unit cost, and profit generating).
- Tariffs can be set by time of day e.g. free to charge after 6pm.

Do you need a ‘back office’? What benefits can the back office provide to you?

- A back office is software which helps to run the EVCP on a network and keeps a register of all users. The EVCP communicates with the back office system and can provide data for users, initiate and terminate charging etc (see below). Your EVCP can be pre-fitted with a back office, the hardware provider will fit a SIM card and modem which connects to the network via secure mobile communication. All of the standard ESPO specified products are connected to a back office.
- Without a connection to a back office, faults cannot be reported automatically by the EVCP and you may not be able to remotely diagnose, monitor, maintain or upgrade the charger / software.
- Shows the current status of EVCPs on your network.
- Shows energy consumption data / management.
- Allows remote user authorisation.
- Users / start and end times / dates.
- Charging technical issues.
- Benefit in kind implications.
- CO₂ emissions savings.
- Software updates remotely.
- Ability for users to see stats, availability of the EVCP etc.
- Remote diagnostics for fault finding.
Where will the EVCP be located?

- How close is this location to the electricity supply? Installation is likely to cost more the further away the EVCP is from the supply. If you’re not sure, speak to suppliers.
- Where would the users normally park? Is the space you are allocating easily accessible to them?
- If these spaces are dedicated to EV drivers, will there be enough space remaining for traditional ICE drivers to park?
- Can the EVCP serve two parking bays simultaneously? There are options available on the framework for dual chargers.
- Can the cabling for the EVCP be easily routed to the location? E.g. will a trench need to be excavated, can it be routed across a wall?
- Are any permissions required? E.g. planningpermission, landlord’s permission etc.
- Is there sufficient mobile signal strength? EVCPs are often fitted with a modem which has to connect over the mobile network, so remote areas may struggle to receive a signal. The standard site survey includes a mobile signal test where required (see ESPO specification item 6.8). Suppliers can advise on how to adapt if the signal is poor (e.g. wired phone line connection, signal boosters, aerials etc) but there is likely to be additional costs incurred.
- If on-street, traffic management is likely to be required (e.g. coning off the area, temporary signage, traffic lights, etc) which will add to the cost of the quotation.

How do you want to purchase the EVCP?

**Outright purchase**

- There will be up-front capital costs to pay for EVCPs, plus annual payments for maintenance, access to the back office, etc.

**Lease agreement**

- No upfront payment is required and this option lets you spread the cost over the term. However, you don’t own the EVCPs and you may not be eligible for government grants (see above). Period – generally leases are over a 3 year to 5 year period, but could vary.

Price

Although a 3kW 16a EVCP may be an inexpensive option, cars may now be able to charge at 32a, so it may be worth investing a little more now to cover future needs. Prices of EVCPs for direct award call-offs are available from ESPO. However for a general guide the table below shows what you might expect to pay:

<table>
<thead>
<tr>
<th>Lot 1</th>
<th>Lot 2</th>
<th>Lot 3</th>
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<tbody>
<tr>
<td>Purchase price</td>
<td>Lease prices</td>
<td>Back office prices</td>
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<tr>
<td>(per unit not including services)</td>
<td></td>
<td></td>
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<tr>
<td>Slow AC (3.7kW)</td>
<td>From £400</td>
<td>From £400</td>
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<tr>
<td>Fast AC (7kW)</td>
<td>From £21.85 per month</td>
<td>From £21.85 per month</td>
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<tr>
<td>Fast AC (22kW)</td>
<td>From £46.40 per month</td>
<td>From £46.40 per month</td>
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<tr>
<td>Fast AC/DC (920kW)</td>
<td>From £53.60 per month</td>
<td>From £53.60 per month</td>
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<tr>
<td>Rapid AC/DC (43kWAC/50kW DC)</td>
<td>From £12,000</td>
<td>From £12,000</td>
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<tr>
<td>From £12,000</td>
<td>From £463.14 per month</td>
<td>From £463.14 per month</td>
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<tr>
<td>From £18,500</td>
<td>From £580.08 per month</td>
<td>From £580.08 per month</td>
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How do you want the EVCPs to be fitted?

- Everything to be done by one supplier (a turnkey solution)
- Will fit in-house using your own team (e.g. an FM team)
- Does the in-house team have the required skills or do they need any training?
- ‘Mix and match’ - purchasing some elements from the supplier and nominating your own suppliers to do other work (e.g. installation). Make sure the supplier (main contractor) can work with the partners you wish to nominate. Most suppliers are willing to do this, please ask them for further details.
- Do you need a site survey to be undertaken? It is recommended that for all non-domestic installs a site survey is carried out. NB a standard site survey is included in the ESPO specifications (see specification section 6.0 for details of what suppliers shall cover).
How will you keep the EVCPs in good working order?

- Maintenance is recommended for EVCPs within and outside of the warranty period. Standard parts and labour warranties are 3 years for the products offered under the framework. Full maintenance packages are also available – see specification item 12.0 for further details.
- In-house teams may wish to maintain the EVCPs. Contact suppliers to ask how this works with the warranty they offer (some suppliers may stipulate that their maintenance teams must be used to maintain their equipment, especially those being leased).

Is there any existing infrastructure and/or a network operator which your EVCP needs to integrate with?

- Who is the existing Charge Point Network Operator? Will their network communicate with the EVCP you desire? Some suppliers’ EVCPs are compliant with a universal charge point communication protocol called ‘Open Charge Point Protocol’ or OCPP. There are different versions, the latest to come on board will be OCPP v2.0. You can see which models are OCPP compliant in the product datasheets available upon request.
- Will the EVCP need to communicate with other networks (if you wanted to switch to another CPNO in the future)?

Are you interested in future proofing or looking for a short term solution?

- How long do you intend to keep the EVCP for? What will you do once it reaches the end of its useful life? Note suppliers are obliged to dispose of the EVCPs under the WEEE Directive at the end of their useful life.
- Do you want to try the technology now and replace in a few years’ time?

Payment Handler Fees

Customers wishing to access the framework are advised that suppliers will charge the user of the EVCP a transaction and banking fee per charging session. This is to cover the suppliers payment handler fee, and is in addition to the tariff set by the customer to the end user.

Customers conducting a further competition are advised to ask suppliers to clarify their transaction and banking fee per charging session in their tender submission.

**NB:** supplier transaction and banking fees are not included in the pricing schedules therefore customers must make their own arrangements directly with the supplier if using the direct award call-off option.

Contact ESPO for more details on vehicle charging infrastructure including specification details, email place@espo.org

For details on awarded suppliers, how to use the framework, please refer to the Framework 636 User Guide, downloadable from: https://www.espo.org/Frameworks/Highways-vehicles/636-Vehicle-Charging-Infrastructure