

## Points for consideration

These notes are prepared for those contemplating the purchase of a home charger for their electric vehicle and are considered correct at the time of writing autumn 2022. Those new to choosing a home charger need to be aware that 'wall box' and 'pod-point' are becoming the generic term for a home charger similar to the case with Hoover when referring to domestic vacuum cleaners.

## Solar panels

Firstly let's deal with the question for those that have some form of home electrical generation such as solar panels. For those my recommendation would be they should seriously consider the myenergi zappi.

## Price

If a low cost solution is your main consideration then consider these below, as of autumn 2022

Acknowledge – APi Electrical - <https://www.apielectrical.co.uk/electric-vehicles/charge-point-brands/>

Make	Cost	Rated	
Rolec	£485	3.6 out of 5	
Pod Point	£545	3.5 out of 5	
Project EV	£549	4.0 out of 5	
eo	£595	4.3 out of 5	
Wallbox	£599	3.5 out of 5	
Ohme	£649	4.6 out of 5	
Pilot	£695	5.0 out of 5	
zappi	£794	4.7 out of 5	
Hypervolt	£749	4.9 out of 5	
Easee	£795	5.0 out of 5	
EVBox	£895	3.7 out of 5	
Andersen	£1,045	4.8 out of 5	



Visit the APi Electrical web site (above) for full reviews and descriptions of these chargers

## Location

The choice of home charger can be effected by the location it will be placed. If it is to be placed in an unprotected location then a discrete unit like this EO Mini Pro 2 (above) might be desired. If the location is 'exposed' then in bad weather having the ability to 'set up the charger' while in the car or in the house via an app allows you to quickly 'plug in' then get under cover. Others might have the option of placing the unit inside a garage or shed with the lead coming out under the door this allows it to be used in all weather conditions. Also there is a tendency for installers to place the unit at waist height for ease of connecting the cable, for those units with a 'screen' see the Ohme and zappi above, ask the installer to install it with the screen at eye level for ease of reading the display.

## Tethered or Untethered

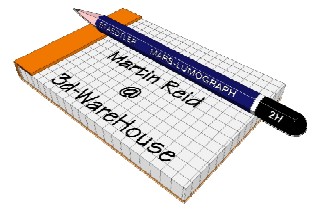
If you intent to use free or convenient charging stations when away from 'home' then you will need to carry an appropriate lead. If your unit has a tethered lead then you will need to purchase another one to carry with you. It can be said that a tethered unit can never be untethered. Any damage to a tethered cable or plug will require a qualified electrician to change it, remember during this time the unit might be out of use leaving you with no charging facility. Although it must be said that teathered units are quicker to connect, with not having to find the lead and connect it. In all cases you will need to consider how the lead will be stored as it is not recommended to leave them on the floor. Untethered charging units can look tidier. The Andersen tethered unit hides the lead inside its case – very neat.



Andersen with cable storage

## 5 or 7 metres

Generally charging cables come in two lengths 5 and 7 metres, but if you need longer then shopping around will find them up to 10 metres. So this again depends on the location of the charger and the position of the vehicle when charging.



## Points for consideration

### App or no app

Smart phone users can make use of the unit manufacturer's app to set and monitor their charger. With this in mind most home chargers have very little user interface on the unit itself, usually just having a light or two signalling the chargers status. It is worth reading the user's reviews on the APi Electrical web site to get a feel for how good the App is for any unit you are considering as this could be the deal breaker. For example; while considering the Ohme Home Pro verses the myenergi zappi user interfaces, and reviewing the manuals (available from the manufactures download pages) it became apparent that the Ohme is a tethered water proof sealed unit with a 3 year guarantee for both the unit and the 'free' sim card usage. When asked, the manufactured responded to the question "*what happens to the sim card in this sealed unit after the guaranteed three year 'free' period?*" responded by saying they were working on keeping it free! For those that don't want to rely on apps, wifi and sim cards then a few chargers have a user interface on the unit itself namely the Wallbox Commander 2 the Ohme Home Pro and the myenergi zappi. The zappi can use wifi or a radio signal from a unit connected to your home router so it has no issue of poor wifi or phone reception.

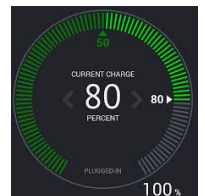


### Range / Mileage

Although your choice of home charger will not affect your cars range. The miles you do each day / week and month will effect your 'charging strategy' and this will definitely influence your choice of charger. For example;- for EV cars manufactured by MG Motors they recommend that to prevent battery degradation.

- (a) You don't regularly charge the battery to 100% and you don't store the vehicle with the high voltage battery charged to 100%
- (b) You don't regularly let the battery 'fall' below 20%
- (c) Their recommendation is to try and keep the battery SOC 'state of charge' between 40% and 80%
- (d) In order to assist in extending the service life of the high voltage battery pack it is recommended that an Equalisation Charge is carried out at regular intervals.

If you wish to abide by these recommendations you need a Car and Charger combination that will allow you to specify the maximum state of charge (%) or the charge time. Either via the app or by the controls on the charger. For example, for your chosen charger, check if you can specify the charge to take place between 00:30 and 04:30 or alternatively if you can start a charge at 00:30 and have it stop when the car reaches 80% SOC.



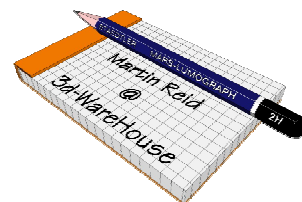
### Infrastructure

There was a time when home chargers may have needed an earth rod for electrical safety. Now you can check if your chosen charger has PEN fault detection (protective Earth and Neutral). *A device fitted to electric vehicle charging equipment that is able to detect a PEN fault and which will fully disconnect the live, neutral and earth supplying that equipment.*

Also your installer will of course inform you but you can check beforehand if there is a spare ways in your electrical consumer unit.

Again you can check before hand if the 'main fuse' on the incoming electrical supply is rated 100 Amp as is probably necessary when adding a charger to an existing installation. To get this 'fuse' up rated from 60 or 80 Amp to 100 Amp you will need your installer to complete an EVCP & HP Connections Form v3.4 "*The form is for Electric Vehicle Charge Points (EVCP) being installed in a premises with an existing Distribution Network Operator (DNO) electricity connection*". During my installation it was this 'upgrade' that took the longest to arrange and while waiting the two months it took, I set the charger to a maximum output of 5.0 kWh's rather than the standard 7.4 kWh's

One prospective EV owner after applying to have an EV charger fitted got an instillation date just over two months after accepting the quote. It would have been sooner but it was discovered the meter and main supply was attached to an asbestos backing board. He then had to arrange and pay £120 for the board to be tested to determine the type of asbestos and wait for a specialist team to be arranged.



## Points for consideration

### Electrical usage and Tariffs

Anyone considering the purchase of a domestic electric vehicle charge point will be aware that energy suppliers have split tariffs for peak and off peak usage. These entail the use of a cheap rate night time tariff, usually between 00:30 and 04:30 and a daytime higher tariff. This day time tariff is usually slightly higher than a standard variable or fix price tariff. **So is it worth it?** Well as with all things it depends on your situation but it is not too difficult to calculate comparisons.

Home use – you can use your electricity bills and statements to get a value for your annual usage. Here we are using 4782kWh

Car use - is your estimated yearly mileage  $10000 \div \text{car miles per kWh } 3.71$  (more on that below) giving 2695 kWh per year.

Peek (04:30 to 00:30) Off Peak (00:30 to 04:30)

Home:- At the moment 90% of the electricity used at my home is used at peak times and 10% at Off Peak (washing machine and dish washer). Unfortunately the heavy usage cooking and electric showers will always be at peak times

Car:- 30% of the time the car is charged away from the home charger. With 60% of the time the car being charged at home during off peak times with 10% being charged at home at peak times. (more on this below)

Home use =	4782.40			Car =	2695.41 kWh
<b>Compare</b>					
<b>Fixed Tariff</b>				<b>Rate</b>	<b>Cost</b>
Standing Charge	365	%	kWhs	0.41	150.38
Home	Peak	90	4304.16	0.27	1148.78
Car	Peak	10	269.54		71.94
Home	Off Peak	10	478.24	0.27	127.64
Car	Off Peak	60	1617.25		431.64
Car	Rapid	30	808.62	N/A	
Check Total			FALSE		1930.39
<b>Octopus Go</b>				<b>Rate</b>	
Standing Charge	365	%	kWhs	0.4	152.24
Home	Peak	90	4304.16	0.42	1791.82
Car	Peak	10	269.54		112.21
Home	Off Peak	10	478.24	0.12	57.39
Car	Off Peak	60	1617.25		194.07
Car	Rapid	30	808.62	N/A	
Check Total			FALSE		2307.73

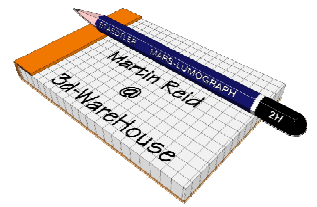
Rate:- the rates charged by the provider for 'fixed tariff' and in this case 'Octopus Go'.

Adjust the yellow cells to suit your situation. Change the Total home Energy Used and Car Miles and Miles per kWhs this will update the values here then adjust the %'s to your situation and Rates to those from the supplier for each tariff.

Example:- So for example here the 4304.16 kWh home usage is 90% of the 4782.40 total. With the 1714.29kWh being 60% of the 2857.14 total. The rates are changing by the minute but the best you can do is take a 'snap shot' of the rates on a particular day for comparison. You will see that at the moment using the figures shown it is best to stick with the standard variable tariff.

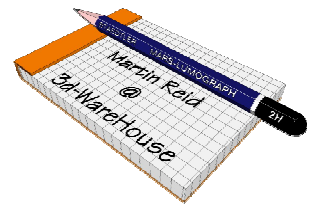
### How much electricity will the car use? and Miles per kWh

One of the first things you will do with a new electric vehicle is to work out how many miles per kWh you get. The car will give you a value for this. For reference in the first 7 month of having my car it was reporting an average of 4.1 Miles per kWh. But in fact all is not so simple; generally speaking, your EV may use 12 to 15 percent more energy than what you add to your battery. That number could be lower or higher depending on charging conditions. As I bought the car from new I've been able to note down the figures every time I charged the car. In those 7 months I 'sent' 1667.59 kWh to the car (excluding the last 100% equalisation charge, I haven't done those miles yet) and travelled 6225 miles that equates to an actual 3.71 miles per kWh. Therefore;  $100\% - (3.71 \div 4.1 \times 100) = 9.5\%$  lost between the charger and the battery pack, in heat and other electrical resistances. This 9.5% is for the summer months, I expect it to be higher throughout the autumn and winter. I can also see from my notes when and where the vehicle was charged and can see that 30% of the charging is away from home and that home charging is generally at off peak times 60% with the remaining 10% charging being at peak times.



## Points for consideration

Check List	make	make	make	make
£p inc Grant				
OZEV (Office for Zero Emission Vehicles Grant)				
Charger Power Output (Adjustable, 7kW, 7.4kW)				
Connectivity (wifi, 3G/4G, bluetooth, radio signal)				
Type (Type 1 & 2, Universal, Type 2 Only)				
Charging Cable included (Yes/No)				
Earth Rod Needed (Yes/No)				
Size (mm)				
Colour				
Cable dock / reel				
App Charge Scheduling (Yes/No)				
Time of use Tariff Compatible (No, Automatic, Yes, Soon)				
Power output adjustment (Yes, No, Via App, Via vehicle)				
Screen setting/user interface (Yes/No)				
Solar Function (Yes/No)				
Untethered (Yes/No)				
Tethered Option (Yes/No)				
Load Balancing (Yes/No)				
Support Rating				
Product Rating				
APi Review (stars)				



# Points for consideration

## Appendix

### Setting up a spreadsheet

Format a sheet like below. And use these formulae...

1	A	B	C	D	E	F
2	Home use =	4782.40		Car =	2695.41	
3						
4	<b>Compare</b>					
5						
6	<b>Fixed Tariff</b>			Rate	Cost	
7	Standing Charge	365	% kWhs	0.41	150.38	
8	Home	Peak	90	4304.16	1148.78	
9	Car		10	269.54	71.94	
10	Home	Off Peak	10	478.24	127.64	
11	Car		60	1617.25	431.64	
12	Car	Rapid	30	808.62	N/A	
13	Check Total			TRUE	1930.39	
14	<b>Octopus Go</b>			Rate		
15	Standing Charge	365	% kWhs	0.4	152.24	
16	Home	Peak	90	4304.16	1791.82	
17	Car		10	269.54	112.21	
18	Home	Off Peak	10	478.24	57.39	
19	Car		60	1617.25	194.07	
20	Car	Rapid	30	808.62	N/A	
21	Check Total			TRUE	2307.73	
22						
23						

[D8] C8\*B2/100  
 [D9] C9\*F2/100  
 [D10] C10\*B2/100  
 [D11] C11\*F2/100  
 [D12] C12\*F2/100  
 [D13] (B5+F5)=SUM(D8:D12)

[F7] B7\*E7  
 [F8] D8\*E8  
 [F9] D9\*E8  
 [F10] D10\*E10  
 [F11] D11\*E10

[F13] SUM(F7:F11)

[D16] C16\*B2/100  
 [D17] C17\*F2/100  
 [D18] C18\*B2/100  
 [D19] C19\*F2/100  
 [D20] C20\*F2/100  
 [D21] (B5+F5)=SUM(D16:D20)

[F15] B15\*E15  
 [F16] D16\*E16  
 [F17] D17\*E16  
 [F18] D18\*E18  
 [F19] D19\*E18

[F21] SUM(F15:F19)