



# A BRIEF GUIDE TO ELECTRIC CAR CHARGING

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## Introduction

This is one of a series of short guidance notes on the technologies which can help the Church move towards net zero carbon. It has been written on a pro-bono basis by [Briar Associates](#), on behalf of the Cathedral and Churches Buildings Division, with input from the Diocesan Environment Officers Energy Group.

Churches, church schools, and diocesan offices may be interested in installing electric vehicle charging points in their car parks. Clergy may want to install them at their homes.

Charging points allow electric cars to be plugged in to recharge their batteries. This can be a quick pit stop using a rapid charger, where the driver is only stopped for 20-30 minutes, or it can be a more gradual charge over a few hours, whilst the driver is at work, school, or church.

Additional information on the Government's drive to create an electric vehicle infrastructure published by the [Office for Zero Emission Vehicles](#) (OZEV).

## Why should a church install electric vehicle chargers?

A church, church school, or office might choose to install electric vehicle chargers for several reasons:

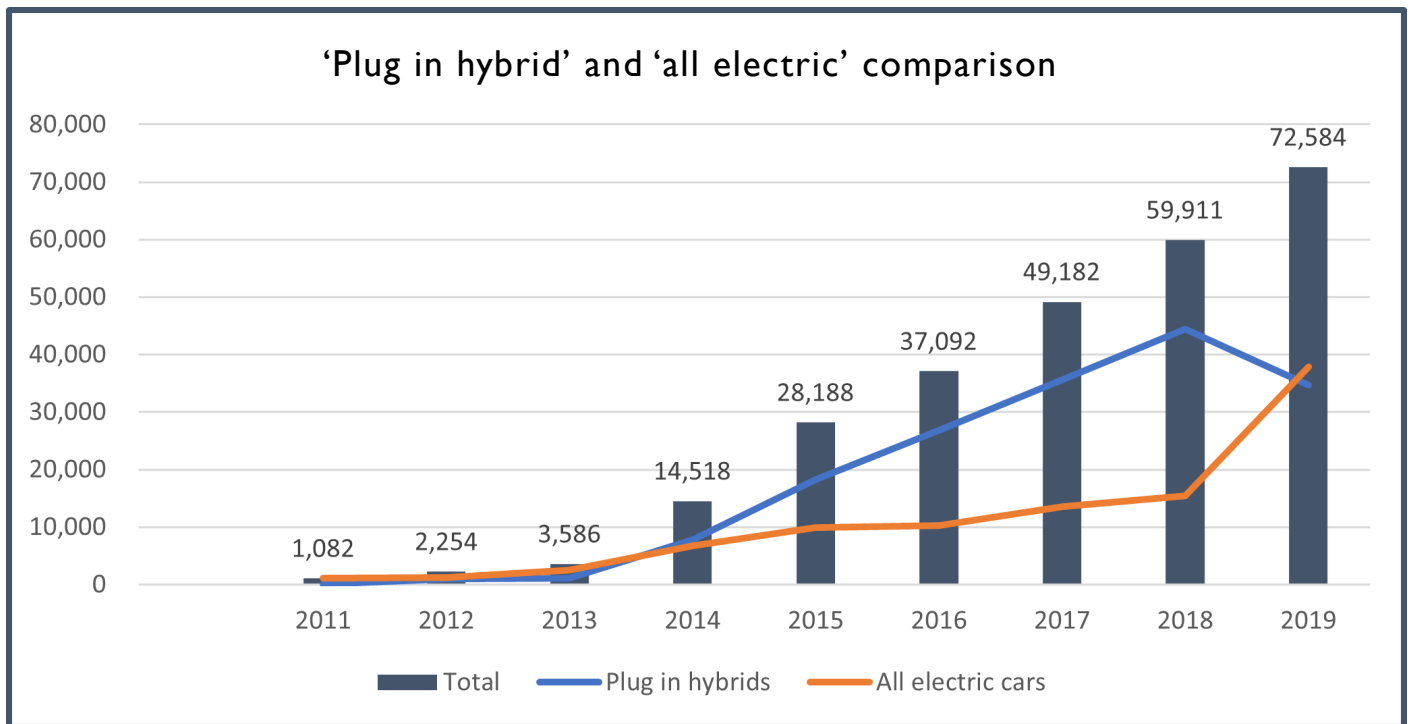
- They wish to encourage and help parishioners and community to cut their carbon footprint by switching their petrol or diesel cars to electric. This is especially relevant if most local housing fronts on to the street, without private driveways, and so residents are put off buying an electric car because of difficulties charging.
- They may want to help lower the emissions from cars in the vicinity of their building, improving local air quality.
- They may want to maximise the use of electricity generated on site from solar panels.
- They may aim to generate some income for the church by charging users for the electricity.
- They may want to provide a useful low carbon option for those parishioners unable to walk or cycle to church.
- They may want a way to visibly demonstrate their commitment to the environment and encourage others within the community, and, through their visible leadership, encourage their parishioners to consider a switch to an electric car.

It's important to remember that electric vehicles only really help deliver carbon reductions when the chargepoints are supplied with renewable energy, either purchased from a 'green' tariff or from onsite solar panels. Otherwise the car is simply being charged from electricity created by burning fossil fuels in a power station rather than petrol/diesel.

## A growing market

Electric vehicles are now becoming more mainstream. In 2019 there were nearly 73,000 electric or hybrid vehicles owned in the United Kingdom. This will only speed up, now that the government has committed to phasing out the purchase of new electric cars by 2035.

This has led to an increase in electric vehicle owners that require charging points. If owners have driveways, they may install chargers at their homes, but many cannot do this, and institutions and businesses are seeing an opportunity to provide vehicle charging to their customers.



Some businesses, such as shops, are offering this facility free of charge as they see that it can attract electric vehicle owners to their premises, allowing them to invest in other parts of their business whilst they are charging the vehicle. However, most facilities charge for using the service, providing a revenue stream for the owners.

## Cost to charge comparison

The following is an example of the cost to charge based on various electricity price rates which may be charged in various scenarios. This table also shows the comparison of fuelling a family diesel car.

Number of miles driven per year	5,000 miles per year	7,500 miles per year	10,000 miles per year	12,500 miles per year	15,000 miles per year
Charge at home - off peak (7p cost per kWh charged and c.4 miles/kWh)	<b>£85</b>	<b>£128</b>	<b>£171</b>	<b>£213</b>	<b>£256</b>
Charge at home - peak (14p)	<b>£171</b>	<b>£256</b>	<b>£341</b>	<b>£427</b>	<b>£512</b>
Pay to charge in public (30p)	<b>£366</b>	<b>£549</b>	<b>£732</b>	<b>£915</b>	<b>£1,098</b>
2 litre diesel (50mpg and fuel at £1.20/litre)	<b>£546</b>	<b>£818</b>	<b>£1,091</b>	<b>£1,364</b>	<b>£1,637</b>

## Things to consider

There are different types of charger, different reasons for charging, and constraints which effect what is possible at your church.

### Different types of charger

There are large capacity **rapid chargers**, like you see in motorway service stations, standard **fast chargers**, and lower rated chargers suitable for overnight '**trickle charging**'.

- Rapid chargers are used for 'pitstops' of say 20-30 minutes. You use them as fast as possible, then move on. Rapid chargers work at 50kW+.
- Fast chargers can be thought of as 'destination' chargers; you have arrived at a place you plan to spend time, and your car can sit and charge whilst you are there. Destination chargers typically work between 7kW and 22kW.
- Trickle chargers are generally domestic, and assume you are parked overnight.

There are several types of charging plug designs used in the UK, however the majority of electric vehicles available on the UK market plug into fast chargers and use the Type 2 'Mennekes' units. A good guide can be found on [ZapMap](#).

### Different reasons for charging

To decide which type of charger would be best for your location you should ask yourself, "What does the *user* of the charger need? Why are they here and using the charger?" Depending on the answer, you will be guided to the type of charger best suited for your site.

- If they are visiting your church for a quick pit stop of 20 to 30 minutes, before continuing on their journey, then they are likely to need a large capacity rapid charger like you see in motorway service stations, with 50kW+ of charge per hour.
- If your church is at their destination, and they spending a longer time, perhaps at a church service, a nearby office, or heading into town for shopping, then they are likely to only need a standard fast charger, with 7 kW or 22kW of charge per hour. **This is the default option that most churches are likely to consider.**
- If they are parishioners who live nearby but have on-road parking, they may want to charge their car overnight. This would mean a standard 7kW or even lower rated charger would be suitable.
- If they are a local electric taxi driver looking for a place to rest and have a tea break whilst their car charges, you may want to explore an option offering seating and EV charging. They are likely to want a rapid charger, to get back to work quickly.

#### Driving miles added per minute of charging

Home slow charger	~1.4 kW	0.1 miles
Fast charger	~7.5 kW	0.4 miles
Large Fast charge	22 kW	1.3 miles
Rapid charger	50 kW	2.9 miles
Tesla Supercharger	125 kW	8.2 miles
Tesla Supercharger upgrade	250 kW	15.0 miles
Ultra-fast chargers	350 kW	20.0 miles

As a church, think this through, and also think about whether you are happy for the charge points to be usable 24 hours a day, 7 days a week. If your car park gets locked at night this might reduce the offering you can provide.

### What is possible?

The power of the charger will need to be designed to suit the size of the electrical supply that will be charging it.

Rapid chargers may need their own electricity supply to be installed, making for a more complicated and expensive installation, whereas standard 7kW chargers are likely to be able to be installed on your existing electrical supply.

Most UK domestic supplies, including some churches, are single phase and are therefore limited to 7kW. To deliver higher powers (up to 22kW) then your church will need to have a three-phase power supply.

### Cost to install

The cost to install electric vehicle chargers is variable depending on the availability of the correct power supply, the amount of electrical infrastructure upgrades required, the type of ground they are being installed on and many other factors. However, here is a rough guide on the sort of prices likely.

	Slow	Fast	Rapid	Ultra Rapid
Power rating	3.5-7kW	7-22kW	43-50kW	100-350kW
Installation cost	£500-1000	£2-3k (AC)	£20k	£25k+

### Funding options

#### Third party installation with rental to the church

There are companies who offer to install electric vehicle chargers free of charge. They cover the total capital expenditure of equipment and installation and recoup their investment by charging by the minute for each charge. The company would in effect rent part of the car park from you and would recompense you for the use of the space. This is done in various ways but can include a fixed ground rent or a % of the income gained by the charging point.

Third party charging rates are around 30p per kWh as opposed to around ~14p per kWh cost of electricity.

#### Church installation — paid for by drivers

To maximise the financial returns from electric vehicle charging a church could invest in installing vehicle chargers at their own expense and charge customers for their use, setting a fee structure that they feel covers the investment.

#### Church installation — free to drivers

If a church feels that they should provide this service to its parishioners free of charge, then they can pay for the installation. Whilst the investment would not be recovered through charges, grants may be easier to obtain, such as OZEV workplace vouchers.

#### Government funding schemes

There are various government schemes available to provide funding or part funding for the installation of car charging points. Churches could try the OZEVs work-based grant scheme or the On-street Chargepoint Scheme (ORCS).

As these are open to change it is best to refer direct to the government website which can be found here:

<https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles>

## Operations

By choosing the right charger that has an “intelligent management system” behind it, your electric car charging can be available to the wider community. Systems are available that allow accounts to be set up with various user charge rates and availability times. (For example, you could make the charger free for your clergy and church warden, but charge the general public.)

These systems can be configured to your own requirements which will allow them to be available and ‘visible’ on car charging mobile apps to offer your services across the whole electric vehicle charging user network, not just your parishioners.

This is a great way to show your commitment to providing services to the wider community as well as generate income from a wider audience.

## Permissions

Installing an EV charging point in a church car park will require a full faculty application. Your DAC Secretary will need to know about the cabling, the type of post, any excavations needed to provide electricity to the charging point, and any impact on the church’s own electricity supply.

## Suggested first steps

Discuss at the PCC the objectives you have from installing an EV charging point, and how you think it would be used. This will help you think through which kind to install. Discuss with your treasurer whether the church could afford to install charging points themselves, or would be better to look at the rental model. Discuss feasibility with the DAC. These conversations will help you know what to ask an EV installer to quote for.

An independent energy audit can be a good place to start, to put a project like this in the context of all the changes you could make. Parish Buying offers energy audits, as do some dioceses.

Our [Net Zero Carbon webinar programme](#) includes a session EV car charging.