

# Community Owned Electrical Vehicle Chargers.

*Opportunities, considerations and experiences.*

Electrical Vehicles (EVs) are here and starting to offer opportunities for all corners of the energy sector. There could be an estimated 1,000,000 EVs on the road in the UK by 2020 and latest figures suggest there needs to be an extra 29,000 charging points (85% of which need to be rapid or fast chargers) across the UK by 2030 to cope with demand.

This document will explore what role community energy groups can play in this growing field which will revolutionise not only how we travel, but potentially where the energy we generate goes. It will give you some basic knowledge about EV charging, signpost to other resources and give insights from community energy practitioners and EV consultants who are actively working with this technology.



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The environmental benefits of a move to EVs are stark. Growth in electric vehicles alone could save 2,000,000 barrels of oil per day by 2025. But can it achieve more? BP and Shell have recently opened their first EV charging facilities in the South of England. Do we want the same old oil companies to benefit from this transport revolution or can communities benefit from this technological step forwards also?

There are mixed reports about the levels of investment in EV charging infrastructure. However, support mechanisms are falling into place. Philip Hammond, as part of the 2017 Autumn Budget statement, pledged £400m towards charging infrastructure along with tax breaks for workplace EV charging and a further £100m to be added to the plug-in car grant. For further information see [The Office of Low Emission Vehicles](#), [Homecharge Scheme](#) and [Workplace Charging Scheme](#).

Despite local authorities having access to funds to cover 75% of the cost of installing EV chargers, this seems to have only been taken up by a few local authorities so far. Couple this with the forecast EV adoption rate showing that 40% of homes will not have home parking, it becomes clear that a gap needs to be filled.

## Types of EV Charging Technology

There are three types of EV chargers, each representing the power output and charging speed offered to EV drivers.



**Rapid chargers** are available as AC and DC. AC chargers are rated at 43kW and Rapid DC are usually 50kW. Both will achieve an 80% charge in around 30 minutes. Rapid DC chargers have two different connectors – CCS and CHAdeMO. Tesla Superchargers are also Rapid DC and currently charge at around 120kW!

**Fast chargers** have outputs of 7kW and 22kW available and will typically charge an EV in approx. 3-4 hours.

**Slow chargers** offer up to 3kW of output and are best for overnight charging. They take between 6 and 12 hours for a pure-EV, or 2-4 hours for a PHEV.

## Insights from the Community Energy Sector

We caught up with Phil Powell from Gwent Energy CIC about the outstanding work they are doing in South Wales and asked him some questions about the EV charging stations they have recently installed.



### *What were your initial motivations for investing in EV charging stations?*

Gwent energy was formed with the purpose of helping communities benefit from renewable energy as well as reducing our carbon emissions. Initially we had used the FIT and RHI to good effect in building 300 kW of solar and biomass on community centres in deprived areas. These had been funded by our investor club but the recent drastic drop in Feed-in tariff rates meant these could not be done any more as the tariff was insufficient to repay a loan. We were struggling to find ways to continue our aims. Electric cars have much lower emissions of both carbon and other pollutants and there was a perceived lack of charge points in Wales. We believed there was a market in providing chargers that were open to the public and not part of a proprietary network. So, we experimented with a couple of chargers on community centres. It soon became apparent that in general community centres were not a good place for a charger unless they were near a town, with facilities nearby.

### *What technology have you installed and how effective have you found it?*

We have installed a mix of charger size and payment system, partly to gain knowledge as this was a new area and there was not much prior knowledge on car charger location. We had felt that there was a market for destination chargers. In fact, most people were telling us that we had to install rapid chargers only even though they were very expensive. Ultimately whatever route you take, the payment system is a big issue that has many complications. We have recently decided to make our own chargers with a unique and easy to use payment system that is open to everyone and not part of a proprietary network, as is so often the case.

### *What generation capacity do you have installed and what medium?*

We have typically installed either 4 or 10 kW of solar on buildings with car chargers.

### *How did having generating capacity help with this process of installing EV technology?*

It was not important technically but does seem to impress some users that they are charging their vehicle using low carbon electricity, as well as reducing their fossil fuel consumption.

### *Does your technology connect to any other smart devices or grid infrastructure?*

Currently our technology does not connect to other smart devices as with our chosen size of charger it has not been necessary, and additional technology will reduce the availability of the equipment, which we were keen to avoid. Most of our chargers are on buildings with at least 10 kW of solar, so there is a possibility of controlling the output to when solar power is available. We have several chargers for private individuals and have installed solar and battery storage to allow most car charging to be done on surplus solar power. There is a smart controller in these.

### *Can you explain how the finance for this project has been arranged and what sort of returns you are receiving and forecasting?*

The finance has been our own surplus income from earlier solar systems. We are expecting a 7-year payback before any return.

### *How supportive has your local authority been with the project?*

Very supportive in our fully charged grant scheme funding where we have installed 20 chargers on local businesses and they have allowed us to install chargers in the town car parks.

### *How have you promoted the whereabouts of the charging stations?*

Each business is required to publicise it on their website and social media. They are also on several electric car charging websites and the council have been promoting them.

### *What community benefits has this project produced?*

The project has raised our profile and enabled us to be involved in more community projects where our funding has helped promote good community practice.



*A charging station installed by Gwent Energy CIC*

## How Community Energy Groups Can Support EV Charging

We asked Cenex, an independent, not-for-profit organisation specialising in low emissions vehicles and the associated energy infrastructure for some advice for community energy groups considering EV charging. Cenex has been supporting the development and use of low emission vehicles over the last eleven years. They also runs Europe's premier low carbon and connected vehicle event on behalf of the UK government.



Electric and plug in hybrid vehicle sales are increasing rapidly, with most new vehicles set to be electric by 2030, this growth is only going to rise. This change is being driven by the need to improve air quality and reduce carbon emissions at a global level. A wide variety of electric cars and vans are now available, prices are starting to fall and ranges are increasing. A new Renault Zoe will drive for at least 140 miles on one charge. It is already cost effective to **operate an electric car or van**, as the total cost of ownership over three to five years is positive.

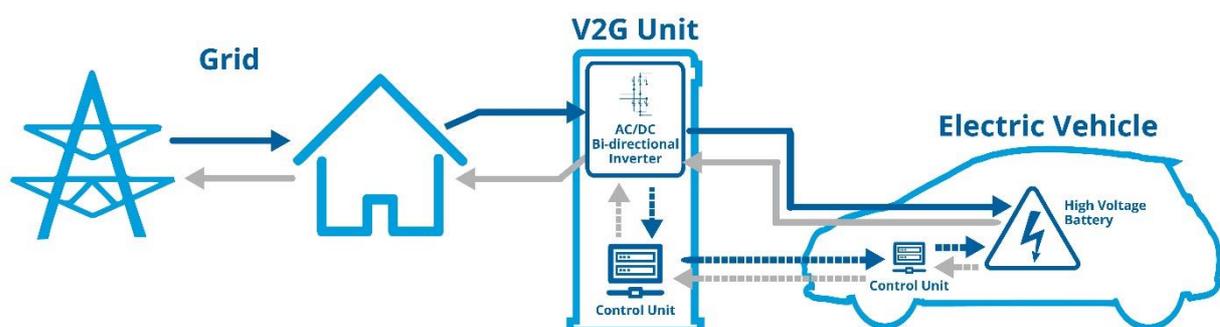
What can a community energy company do to support this change? If you have your own renewable energy installation teams, consider becoming an installer of electric vehicle chargepoints. Make sure you are **registered and authorised** with the Office of Low Emissions Vehicles and develop a commercial relationship with chargepoint manufacturers such as Chargemaster and Ropec to provide hardware and back-office systems.

If you own land next to a renewable energy generation asset, consider the potential for having chargepoints installed. First, assess the demand and travel patterns of your customers. Are they looking for a quick top-up charge while on a long journey? If so, install a 50kWh rapid charger. Are they looking for somewhere to park overnight as they don't have access to a chargepoint at home? Then install a 7kWh charger. For details of how to procure chargepoints, see Cenex's **procurement guidance**. Also make sure your site has enough power to meet the chargepoint requirements without the need to upgrade the local grid.



Another option is to help set up a community or private electric vehicle car club, powered by your community energy. Getting the right locations for the vehicles is essential. **Carplus** can provide support and advice on developing the business case, and Cenex can assist with advice on chargepoints and vehicles. You may also wish to partner with operators such as **E-car club** and **Co-wheels**.

Cenex is working on an innovation project to develop car clubs in disadvantaged, edge-of-city neighbourhoods. The **InclusivEV** project will demonstrate how electric cars can provide a practical, affordable alternative to private cars and minicabs. There are also opportunities for innovation, and using electric vehicles for short-term energy storage is a hot topic. Cenex is involved in numerous projects linking electric vehicles to local renewable systems to provide increased value. Its **EVAe** tool gives an idea of potential income. V2G chargepoints are not yet commercially available, so watch this space.



For more information on Cenex, please visit [www.cenex.co.uk](http://www.cenex.co.uk) and [www.cenex-lcv.co.uk](http://www.cenex-lcv.co.uk).

## Future Opportunities and Considerations

EVs will greatly increase electricity demand, but if future smart grids are engineered correctly from the outset, they can provide a huge amount of energy storage potential with thousands of mobile batteries being plugged into the grid for charging at different times of the day. It has been suggested that by 2030, this could be 11GW of flexible capacity to the grid. However, there are concerns that the bidirectional flow of energy when an EV is charging could result in low quality power being put back into the grid which causes problems. As such, this is far from the norm at present. However, solar carports and storage are proving to alleviate rural grid issues in trials across Europe.

Simultaneity of charging is an issue currently being researched. Many EVs charging at once could create too much demand on a grid network if not managed effectively. However, in a smart grid environment, when an EV starts charging, key data metrics could be transmitted to the grid which helps to balance demand: expected parking time (provided by the user), current state of the battery and how much charge is desired plus or minus 15%.

Future demands for EV charging should be considered and put in place from the beginning of all new building developments. Is there a new development in your community you can become involved with?



Signs explaining the rules!

The norm of filling up at a “station” may soon be over. “Filling up” will instead take place when a car is parked at supermarkets, shopping centres, multi storey car parks and workplaces. Can you see an opportunity in your community to work with these parking places?

Towards the end of an EV battery’s life, when the state of charge drops below 80% capacity, the battery is deemed as not suitable for use in a vehicle. They are however still suitable to provide bulk storage for grids, if removed from the car and set up within a static grid. We are already starting to see examples of this being trialled, particularly by Nissan. Might your future storage plans be able to make use of old EV batteries?

EV charging is a new social phenomenon and brings a set of perhaps unforeseen challenges. Etiquette regarding if someone can unplug a full, or nearly full car is not yet established. Any plans to install EV chargers should consider setting clearly signposted rules explaining etiquette which will hopefully prevent “charge rage” in the heart of your community!

## Recommended Reading

[The Electric Vehicle Revolution – Joju Solar](#)

[Plugin Vehicle 2025 Stakeholder Success Vision - Innovate UK](#)

[UK lacks infrastructure for self-driving electric cars, says Axa - The Guardian](#)

[What do we need for electric vehicles to be a success in the UK? - Innovate UK](#)

[Are UK councils doing enough to install much needed EV charge points? - Business Green](#)

[EV FORWARD VIEW: jobs, infrastructure, and a vision for the growth of Electric Vehicles in the UK – REA](#)

[Plugging the Gap: An assessment of future demand for Britain’s electric vehicle public charging network – Committee on Climate Change](#)

