WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales
Gwasanaethu Canolbarth a De Orllewin Lloegr a Chymru

The Economy, Infrastructure and Skills Committee inquiry into electric vehicle charging in Wales

Response by Western Power Distribution

Q1. To understand the current charging infrastructure in Wales, and to what extent it is fit for purpose.

WPD understands the locations and power requirements of registered EV chargers in South Wales, the current total stands at 939 (as of 22nd October 2018). However we think there may be more unregistered charge points in operation due to installers failing to notify us. WPD would like better to access to EV ownership data so we can fully assess the impact on the network. This could be done by interlinking charge point grant schemes or car sales with the DNO registration process; this is something which could be done on a national basis through the ENA as we believe other DNO's are experiencing similar issues.

We also have some concerns that customers are being told by manufacturers/retailers that they can charge a car from a household socket on a 13A plug. This can lead to potentially unsafe practices such as leads being left across public footpaths and users hanging leads out of first floor windows across to their vehicles. Plugging in EV's from household sockets also contradicts the IET code of conduct with regards to safety compliance including electrical earthing. The installation of a dedicated EV charging point is a similar to the reasons why an electric oven in a house which is typically wired on its own dedicated circuit. Large constant loads are not suitable for connection to a general ring main.

Currently the South Wales distribution network has enough capacity to connect additional EV chargers without the need for intervention or reinforcement. There will however be some occasions where clusters of EV connections exceed available capacity. In these cases the network would be reinforced.

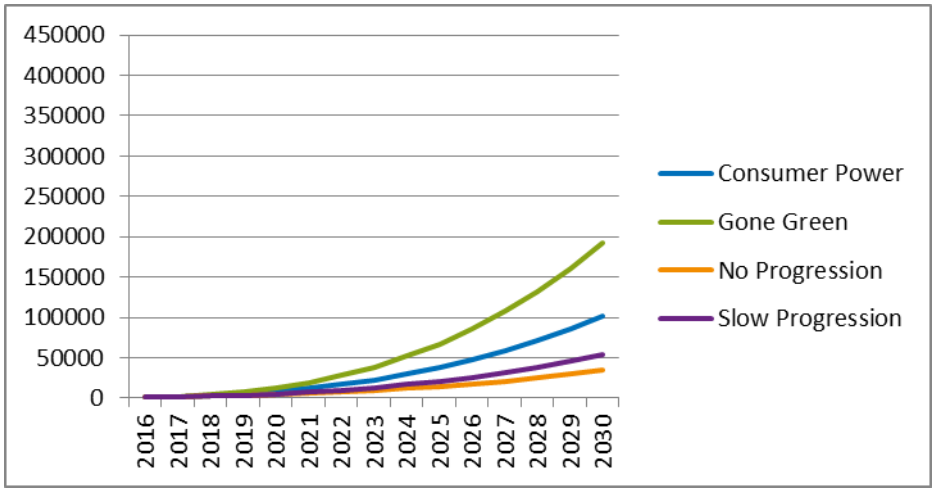
With a rollout of chargers, rural areas may see an impact first as typically the transformer size and cables are smaller so will require upgrading with significant EV uptake. Such works are not major at an individual substation level, costing typically £10,000 per transformer. Where network reinforcement is necessary, transformer and network upgrade costs would under current regulations be socialised between the 1 million customers in South Wales.

Our modelling is showing that we will also see an impact on urban networks once uptake exceeds 15% in certain locations. Further, we believe that up to a 40% uptake in EV's could be managed effectively by modest levels of smart charging.

The impact cannot just be measured on the numbers of chargers installed, but when they are used to charge EV's, for how long and size of battery. Time of Use Tariffs will have a big impact on solving this.

Q2. How the infrastructure needs to develop to support an increase in EVs on our roads. How the Welsh Government, private sector and third sector can work together to develop EV charging infrastructure.

Western Power Distribution is planning for several scenarios with regards to EV uptake. We have a dedicated regional set of future energy scenarios for South Wales. We have been working with REGEN to predict the EV uptake levels in Wales. Currently, the number of electric vehicles in South Wales stands at approximately 2,200 (REGEN) out of 1.5 million total vehicles (Statista). As shown in the graph below, there could be as many as 100,000 EV's by 2030 under our mid-case 'consumer power' future energy scenario. The graph below was taken from the WPD 'Shaping Sub transmission in South Wales' report published in January 2017.



We have been re-running the results for a round 2 report that is due to be published in early 2019. Due to the shifting policy and consumer landscape we are now predicting an increased uptake in EV's, with EV numbers at about 300,000 by 2030 under the same scenario.

We regularly carry out technical electrical analysis on each of our four licence areas to determine any network capacity issues on the 132kV, 66kV and 33kV network up to 2032. The first round of analysis for South Wales was published in 'Shaping Subtransmission' in January 2017 and can be viewed on our website here https://www.westernpower.co.uk/our-network/strategic-network-investment/south-wales. These reviews are carried out in turn on a 2 yearly basis, the round 2 'Shaping Subtransmission' report for South Wales will be published early 2019. WPD is also working on a new 'Network Assessment Tool' to assess the impact of EV's on the Low Voltage network, which is detailed in the answer to the question below.

These reports propose major long term investments in our network in areas that will be most affected; this includes new Grid Supply Points and Bulk Supply Points. Sites that have been identified for potential upgrade in South Wales as highlighted in the 2017 'Shaping Subtransmission' report include Rassau GSP near Abergavenny and construction of a new GSP at Ferryside near Carmarthen.

We have recently committed to testing all new reinforcement of significant value against market led flexibility services. This is being conducted under our Flexible Power work and will allow us to ensure we continue to deliver network requirements at minimum costs.

With any new infrastructure or roll out of EV chargers, we attempt to engage with local authorities to ensure that the chargers are being put in the most efficient place possible with regards to transport needs and our network. In some cases we may advise against the construction of new infrastructure as there may be ample capacity within the existing network. We welcome a co-ordinated approach between WPD, local authorities and third party chargepoint providers to ensure that the charging network is rolled out without incurring unnecessary costs or lengthy delays. In November 2018 we are holding a series of EV workshops with local authorities including representation from South Wales.

WPD is also preparing new innovation projects on EV fuelling stations and EV on-street charging. We have recognised that there will be a need to install service stations with rapid chargers to facilitate longer journeys. We have already connected banks of rapid chargers at several motorway services areas for Tesla and are in discussion with other operators. Our innovation projects aim to explore more effective and tailored methods of connection for the specific needs of an EV filling station. These sites may also include energy storage.

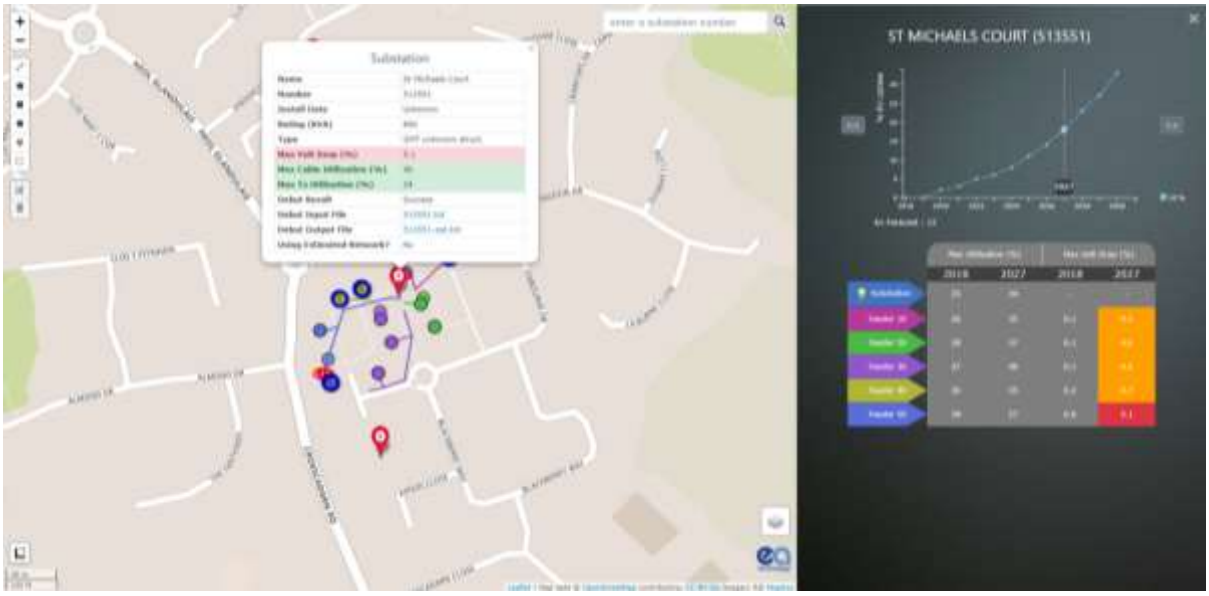
There are currently very limited places where chargers can be retrofitted to existing street furniture. This is because of the small size of existing cables and safety requirements, making locations limited. We aim to work with partners to explore new technologies and connection methods to enable on street charging and a simplified connection process.

Q3. Whether the electricity grid in Wales is able to deal with a significant increase in EV infrastructure, particularly in rural areas;

Inevitably there will be situations where mass connections of car chargers will cause network issues, particularly if EV users charge at common times such as the tea-time peak (as proven in WPD's Electric Nation initiative – see response to next question). However, this depends a lot on charger sizes and charge timings. Options to alleviate the additional stress could include the introduction of smart charging in areas where the network is at full capacity, or the introduction of time of use tariffs to incentivise users. Vehicle to Grid is another option that is being looked at to relive network stress.

Charging in rural areas will likely have a bigger impact. In rural areas it is more likely that EV users will have bigger batteries due to the user consuming a higher percentage of range in the batteries on journeys.

WPD is producing a 'Network Assessment Tool' as part of Electric Nation. The aims of this tool are to assess the condition and capacity of our LV networks and the individual assets on them. The tool uses REGEN data to then predict EV uptake in network areas up to 2030, with the percentage of EV's applied; the tool then models the applied load to the network and assets and produces new capacity values. This tool is due to be completed by October 2019 and will provide our network planners with a tool to be able to plan ahead for EV uptake now in works that they may be completing.



Where additional infrastructure is needed to support electrification of vehicles in rural areas, Western Power Distribution will welcome early engagement with local authorities and stakeholders to ensure that appropriate capacity is available.

Q4. To explore the potential for electric vehicles to promote behaviour change, for example in terms of vehicle ownership and car sharing initiatives.

The innovation projects that we are currently running are not testing a modal shift of transport from cars to car clubs; however WPD is leading Electric Nation – The world's largest domestic EV charging trial (www.electricnation.org) The aims of the trial are to see how drivers charge their EV's and how smart charging affects customer satisfaction.

Initial findings from the 'charge at will' part of the trial show that most EV users plug in and start to charge in evening around tea time, this causes us issues as we already have a 'tea time' peak in domestic loadings, adding an EV peak on top may cause network overloads. (See Graph Below).

Customers were then put into demand management (smart charging) where we could either limit or pause charging during periods of high network stress, this was done using two systems to control the chargers, Greenflux and CrowdCharge. All of the participants were invited to download and use an app for their system which would notify the user when their charge is being limited or paused, and with an override facility to request a priority charge. Only 48% of the 248 participants on the Greenfux system downloaded the app and of those 15% only used it once. On the CrowdCharge System only 38% of the 209 invited to use the app downloaded and used it. This could be an early indication that smart charging doesn't concern users as much as might be expected. We carried out initial surveys and one of the questions asked was "Are you happy with your current charging arrangements?" pre demand management 75% answered with a yes, compared with a 78% who answered yes in the survey during smart charging period of the trial.

The final part of the trial which has just commenced, is to impose a simulated 'time of use' tariff onto the trial participants to see if we can change their behaviour and push the EV demand peak later into the night. We hope to understand if a monetary incentive, i.e. saving money on time of use or economy 7 tariffs would be enough to change customer's behaviour and in turn help balance the network.

'Connect and Manage' is another WPD led project which manages EV chargers to within the availible capacity of the networks. In this system, the LV network is monitored and the available capacity autonomously shared equally between all of the customers on that network. This system is deployable on a temporary basis by fitting a Load Controller in front of the Charger. Once the network has been reinforced, the load controllers could be re-deployed and used again on another network.

Q5. To what extent the Welsh Government has acted upon the recommendations in the Low Carbon Vehicle Report.

No Response.

Q6. Examples of best practice from Wales and further afield.

Please see earlier responses.