

The My Electric Avenue project has delivered significant learning through installing, monitoring and modelling the impact of electric vehicles (EVs) on low voltage networks. This is our Top 10 Tips for managing electric vehicle uptake.

1. Appreciate the scale of the challenge

We've shown that EVs cause technical problems for about 30% of LV feeders due to an increase in peak demand per customer to around 2 kW. Reinforcement may be also needed for secondary transformers and at higher voltages. Problems occur when a 'cluster' of EV users forms on a network – starting when approximately 40% of customers on a feeder have an EV.

2. Think about the rate of progress in EV development

Automotive OEMs are looking to EVs as part of the future of low carbon vehicles. Total EV registrations are rising exponentially, and typical charging power has doubled during the My Electric Avenue project to 7 kW. With all this activity, it's vital to stay ahead of EV uptake curve.

3. Get a feel of customer expectations

Evening peak is a popular time to charge EVs, which is why they can push the design parameters of LV networks. Customers also largely expect to use their cars like petrol or diesel cars, although they avoid using EVs for longer journeys and adapt their behaviour during the first week of usage.

4. Understand when you need to start planning

Firstly, don't panic! Most LV networks need at least 40% of customers to own an EV before problems occur. Secondly, start planning now. Exponential increase in uptake means some networks will need reinforcement between the current regulatory period (2015 – 2023), with many more in the next investment period. Challenges in identifying networks and cost effective solutions means preparations should start now.

5. Consider the type of network problems which are caused

EVs can cause both thermal and voltage problems on LV networks, but thermal problems usually happen first. This means LV design can focus on managing or shifting the evening peak.

6. Focus on the susceptible networks

Processes need to be flexible enough to meet specific needs of each network. EVs are most problematic on urban networks, and where capacity per customer is less than 1.5 kW. Using this rule of thumb, focus on LV networks which are more susceptible.

7. Plan your approach to finding LV networks with problems

It's difficult to know whether an LV feeder has EV related problems. Information on LV network demand, particularly for feeders, is sparse. Monitoring every LV feeder isn't practical. Customer engagement and data from EV charger installers is the best way of anticipating problems.

Project leads



Project partners



My Electric Avenue has received support from Ofgem through the Low Carbon Networks (LCN) Fund.

8. Consider the solutions

My Electric Avenue showed that Esprit can effectively shift load and manage thermal problems and customers have responded well to demand response of their EV charging. But a solution can only be used when it is the most cost effective option. A selection of well-understood tools to overcome EV usage will allow DNOs to best serve customers.

9. Check for EV related problems before acting

If a network *might* need reinforcement then install low cost monitoring as a quick and effective method to understand if action is needed. In particular, peak load and load profile can show whether action is needed, without waiting for the winter peak.

10. Get customers engaged

My Electric Avenue has shown that EV uptake is a challenge to be met in the current regulatory period. But it's a challenge which has proven solutions. For the solutions to be effective, customers need to be engaged in order problems on LV networks to be located and mitigated. My Electric Avenue has shown that customers are open to this approach, as it continues into business-as-usual.

How can EA Technology help you?

Partnership brokering and management

Identify and engage project partners at bid stage; managing those partner relationships throughout project lifecycle.

Project management

From inception to completion we'll manage and report on the whole project view of recruitment of customers for trials or other activities.

Training your staff

Ensure the right skills are available to your team, from LV design to project management and customer engagement, we will support development of the necessary skill sets.

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