EV Fleet Charging in System Emergencies

The following problem statement has been developed by the innovation teams within the UK's Gas and Electricity Networks for the 2024 Energy Innovation Basecamp.

Theme: Decarbonising Network Operations

Network Areas: Electricity Distribution, Electricity Transmission, Gas Distribution, Gas Transmission

What is the problem?

When electricity networks are affected by severe weather events this can cause widespread damage that takes multiple days to be restored. Currently few of the vehicles used by staff engaged in restoring supplies are electric vehicles, but as we decarbonise our operations this is likely to increase. With the possibility that batteries for vehicles on site will be required to power lighting, heating etc. then there will be a need for these vehicles to recharge. However, in a major system emergency local recharging stations may not have power and driving to recharging stations further away would cause significant delays to restoration work and risk vehicle stranding. While we would expect to retain some non-electric vehicles to reduce this risk, what are the options to manage electric fleet recharging in system emergencies? How can we optimise our mix of vehicles, generators, etc. to achieve an acceptable balance of risk and cost? What information and systems are needed to understand the likely requirements? How would the charging requirements for other emergency services need to be taken into account when devising a solution? What are the trade-offs between security of supply for charging infrastructure connected to different networks (Transmission /132kV, EHV, HV) and therefore likelihood of the chargers having a secure supply vs. the distances to access the chargers?

What are we looking for?

We are not necessarily looking for a full fleet charging management system to be delivered, but rather to understand the solutions and/or services could be employed to ensure that restoration staff can continue working and using their vehicles when local EV charging facilities may not be available. We are looking to understand the full range of options (including counterfactuals and scenarios with significant non-electric vehicles) , risks, carbon impacts and costs and the high-level strategies and policies that need to be put in place. We are also looking for a view of how the optimum solution may change over time with the expectation that over time the proportion of the fleet that is electrically powered will change but also that the availability of charging locations capable of rapid and ultra-rapid charging will improve.

What are the constraints?

As there will be a degree of uncertainty associated with the assumed inputs to the analysis, the analysis should be presented as an updateable tool rather than a static report. This should allow recalculation as assumptions are updated and should support modelling multiple scenarios.

Who are the key players?

The Electricity Distribution Network Operators are the main stakeholders in this project, but EV fleets operated by transmission network operators and gas distribution networks will also be affected by widespread or long-lasting power interruptions as well as water and telecoms utilities. Similarly, there will be a need to ensure that where EV charging facilities are limited that other essential services e.g. ambulances, fire engines, police vehicles can continue to operate.

Does this problem statement build on existing or anticipated infrastructure, policy decisions, or previous innovation projects?

Previous innovation projects have examined the impact of electric vehicles on the network rather than operation of EV fleets in system emergencies.
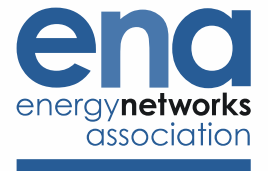
Innovator submissions to this problem statement will be open <u>here</u> during March and April, but we encourage you to submit your response as early as possible, as networks will be able to review submissions as soon as they come in.

You can also use the virtual Q&A on the Smarter Networks Portal to ask for more information about this problem statement. Questions may be answered online or at the ENA Problem Statement Launch in March 2024. More information on last year's Basecamp programme can be found <u>here</u>.