Overview of My Electric Avenue's Technical Data

The My Electric Avenue project evaluated the impact of electric vehicles (EVs) on low voltage (LV) distribution networks and reviewed a solution called Esprit which curtailed EV charging when required to support the electrical infrastructure. As part of the project, we monitored the usage of over 200 EVs, a number of LV networks and the switching of the EVs to support those networks. This document summarises the available data, frequently asked questions and the license under which the data is published.

For more information about My Electric Avenue, including all of the published learning, please visit www.myelectricavenue.info.

Available Data

The data published by My Electric Avenue was collected from a number of sources. These are reflected in the way we have published the data. This sections sets out what data has been collected, and where you can find it.

My Electric Avenue Participants (participants.csv)

The trial participants have been anonymised, and are identified by a 'ParticipantID', this is used to link participants with collected data. We have recorded the date participants' EV lease began and ended, the installation and decommissioning dates for their equipment (if appropriate). If a participant left the trial early this is recorded in the ParticipantExitDate field. We have also recorded some information about their electrical connection. The participants' geographic locations have been indicated using the first half of their postcode.

My Electric Avenue Trial Clusters (clusters.csv)

Participants were grouped into clusters. For the technical trials all participants in a cluster were connected to the same low voltage feeder, these participants had their EV charging monitored and could have been curtailed, depending on vehicle usage and network conditions. The social trial participants were spread across Britain and did not have their EV charging curtailed. This data set links participants to their cluster and provides some additional information about the nature of each cluster. The first two letters of the participant ID identify their cluster, those participants prefixed by ST or SW were allocated to the social trial, other participants formed the technical trial.

Feeder Measurements (MCData.csv)

The demand on each phase of the LV feeders was monitored for each technical trial cluster using a monitor controller device. This is recorded in the MCData.csv file. In addition to measurements, the thresholds applied to initiate switching are also recorded here, with a hysteresis value. Switching started when the phase current exceeded its threshold, and stopped when it fell below the threshold minus the hysteresis value. Note that thresholds and hysteresis values were recorded periodically, not with each measurement. The most recent threshold recorded was applied during the trials.

Intelligent Control Box Measurements (ICBData.csv)

Each technical trial participant had an Intelligent Control Box (ICB) installed with their EV charger. This device was used to restrict EV charging and also recorded measurements of voltage and current associated with the EV charger.

Switching Measurements (SwitchStates.csv)

The monitor controller instructed ICBs to switch throughout the trials. A record of each change in switch state (from 'On' to 'Off' or vice-versa) is recorded in this data set. The ICB whose switch state changed, the new switch state and the time were all recorded. Switch state 'Off' corresponds to stopping EV charging. Switch state 'On' corresponds to allowing EV charging.

It's important to note that this is a record of a change in state. Instructions may have been sent at other times, but communication may have prevented the switch or its recording. Similarly, a switch may not have corresponded to a time when an EV was charging. Behaviour needs to be linked to the ICBData.csv data to establish if an EV was curtailed.

EV driving data (EVTripData.csv)

The trial participants' driving behaviour was recorded using the EVs' telematics systems. The distance, times, power consumption and odometer reading for each EV journey is recorded.

EV charging data (EVChargeData.csv)

The trial participants' charging behaviour was recorded using the EVs' telematics systems. The system recorded times and state of charge (expressed as a number between 0 and 12) each time the EV was charged.

Usage of the Data

This data was collected as part of a customer funded Low Carbon Networks Fund project. A condition of this funding is that collected data is released for further work by other parties. EA Technology is releasing this data under the Open Data Commons Open Database License (ODbL). This is roughly summarised as allowing access, sharing, use and adaption of the data on the condition that:

- It is attributed to the My Electric Avenue project.
- Any public use of the data, adapted data, or works produced from adapted data are offered under the ODbL.
- Any redistribution of the data, or an adapted version, is done so with open access.

Full terms of the ODbL license can be found at http://opendatacommons.org/licenses/odbl/1.0/

Care has been taken in the preparation of this Report and the supporting data, but all advice, analysis, calculations, information, forecasts and recommendations are supplied for the assistance of the My Electric Avenue Project and are not to be relied on as authoritative or as in substitution for the exercise of judgement by any reader. EA Technology Ltd. nor any of its personnel engaged in the preparation of this Report and the supporting data shall have any liability whatsoever for any direct or consequential loss arising from use of this Report, its contents or the supporting data and give no warranty or representation (express or implied) as to the quality or fitness for the purpose of any data, process, material, product or system referred to in the report.

Frequently Asked Questions

1. **Why are there journeys with zero distance recorded in the EVTripData.csv?**
   The Nissan LEAF records a journey if the vehicle's systems are activated, regardless of distance travelled. For example, the LEAF includes a feature where the car can automatically switch on to defrost and heat the car, with no distance travelled.

2. **What's the difference between participants prefixed ICBYH and YH?**
   The Your Homes cluster was our workplace cluster, the ICBs were installed at the participants' work address. To accommodate this, we recorded the Your Homes participants in the database with the YH prefix (to capture their car's telematics data). The ICBs were recorded in the database with the ICBYH prefix (to capture their electrical and switching data)

3. **Why are there more switches to uncurtailed charging than to curtailed charging?**
   The monitor controllers recorded switching to uncurtailed mode whenever restarting or re-establishing communications. This means we recorded a lot of these events.

4. **Why are there two sets of phase current measurements?**
   In order to verify the measurements collected by the monitor controllers, we installed units to provide secondary measurements (denoted by the prefix Rail350). One or both sets of data are recorded for different periods of time, depending on what data was being collected. In addition, a software fault for some measurement periods resulted in erroneous, very small, measurements for phase current.

5. **How were the current/voltage measurements recorded?**
   Measurements recorded in the ICBData.csv file are instantaneous RMS values. Measurements recorded in the MCData.csv file are RMS averages for the past 10 minutes.

6. **Why are there gaps in the data?**
   As with all trial data, there are samples missing. This is primarily due to communications problems, either between the monitor controllers and the ICBs or due to the EV not having sufficient GPRS signal to transmit data to the telematics system. In the case of the EV data, it is clear where this occurs as the increase in the odometer reading does not have a corresponding journey recorded to account for the distance travelled.

   Additionally, equipment for technical trial participants was removed and reinstalled during the project. This is captured by the 'ICBReinstallationDate' field in the Participant csv file.

7. **The numbers of participants I see when I search the data don't match the report I'm reading?**
   The number of trial participants varied over the course of My Electric Avenue. Some participants moved home or job, and withdrew from the trial. A small number of other participants' equipment suffered from poor communications and were not included in some analysis. Details of the attrition rates for trial participants are available in My Electric Avenue's six monthly progress reports.

8. **If I see a switch off event and then no switch on for several hours, was the participant really curtailed for that long?**
   No. Each ICB included a "maximum off time". This setting ensured that if communications failed, we didn't stop charging indefinitely. If no switch instruction was received by the time the "maximum off time" elapsed then the ICB reverted to unrestricted charging. Similarly, if no communication occurred during this period, it is unlikely that a switch event has been recorded.

9. **Do you have any other data?**
   We have published all the data available for My Electric Avenue. However, EA Technology has other IP and data associated with other projects. If you are interested in commissioning

further work to capture more data, please get in touch using myelectricavenue@eatechnology.com.

10. Have you analysed for … ?

We focussed our analysis on answering My Electric Avenue's learning objectives. But we recognise there is significant potential for further learning from this data. The outputs of our analysis to-date is included in the My Electric Avenue publications (http://myelectricavenue.info/project-library). If you have a specific piece of analysis you are interested in commissioning, please get in touch using myelectricavenue@eatechnology.com.

11. Are there any tools available to support use of this data?

Unfortunately, we are only able to publish the data. Due to Intellectual Property restrictions, the software tools used for analysis cannot be published.

12. Further questions?

The My Electric Avenue project finished at the end of 2015 and our availability to deal with queries regarding this data is now extremely limited. If you do have a question, please review the project outputs on the My Electric Avenue website (http://myelectricavenue.info/project-library) in the first instance. Otherwise, let us know by emailing myelectricavenue@eatechnology.com and we'll see if we can help.

Global Footprint

We provide products, services and support for customers in 90 countries, through our offices in Australia, China, Europe, Singapore, UAE and USA, together with more than 40 distribution partners.

Our Expertise

We provide world-leading asset management solutions for power plant and networks.

Our customers include electricity generation, transmission and distribution companies, together with major power plant operators in the private and public sectors.

- Our products, services, management systems and knowledge enable customers to:
- Prevent outages
- Assess the condition of assets
- Understand why assets fail
- Optimise network operations
- Make smarter investment decisions
- Build smarter grids
- Achieve the latest standards
- Develop their power skills

Safer, Stronger, Smarter Networks

www.eatechnology.com
Australia | China | Singapore | UAE | Europe | USA

Main reception: +44(0) 151 339 4181
EA Technology, Capenhurst Technology Park,
Capenhurst, Chester, CH1 6ES, United Kingdom