



ELECTRIC  
NATION

YOUR  
ELECTRIC  
VEHICLE  
YOUR  
SMART  
CHARGE

# CUSTOMER INFORMATION PACK



Electric Nation is seeking to recruit between 500-700 people buying or leasing an electric vehicle (EV) (including pure electric and plug-in hybrids) to take part in the largest trial of its kind. Participants will charge their cars at home using a smart charger which can manage when and how their vehicle battery charges. The findings of the trial will help electricity network operators to manage the effect of the additional load caused by charging EVs on the local electricity network. This is essential for the security of electricity networks in the future and the decarbonisation of the transport sector which is responsible for approximately 21% of the UK's greenhouse gas emissions.

## PURPOSE OF THE TRIAL

The Electric Nation project has a number of aims. Firstly, it seeks to increase understanding of the impact of charging a variety of EVs on the local electricity network. This includes understanding the way that charging behaviour is impacted by different battery sizes and charging rates.

The trial will also investigate a smart charging system that may help local network operators manage car

charging on their networks to alleviate potential issues. This smart charging system will interact with participants' smart chargers (provided by the trial) to manage car charging. The smart charging system will balance the capacity of the electricity network with customers' needs to use their EVs. The project will then investigate the acceptability to customers of delaying vehicle charging or changing the charging rate.



# TAKING PART IN THE TRIAL

## CHECKLIST

To be eligible to participate in the Electric Nation trial applicants will need to:

- Have on order, or already be using, a suitable EV available for use during the trial. To check if a vehicle is suitable, please see the project website
- Be eligible for any available OLEV Home Charge Scheme grant\*
- Live in the Western Power Distribution (WPD) licence areas. To check if you live in the Western Power Distribution licence areas please see our website
- Understand the trial and agree to participate
- Have home broadband installed for the duration of the trial
- Have off-street parking

\* If the Home Charge Scheme grant is **NOT** available customers can still participate, however additional costs will be incurred

Participants will use their EVs normally, and be provided with a smart charger to allow them to charge their vehicle at home. We'll use the charger and a secure communications unit (connected to the internet via home broadband) to collect data about their car charging habits (when they charge, at what rate, how much energy is used and when the car is plugged in). For some participants we will also gather information about the length of journeys that they are undertaking and their battery charge state. This will be gathered from the electric vehicle.

Some participants will receive an app that will receive notifications when their charging has been controlled as part of the trial. The app can also be used by the participant to provide preference information that will help ensure that their car is charged when they need it.

Part of the trial will involve the simulation of network events that may require the car charge to be paused or the charging rate altered. This will take into account the participant's needs, and when they require their electric vehicle if this information is available. This may result in an electric vehicle not receiving a 100% charge, however the smart charging system will endeavour to provide a charge level suitable for participant's use.

We'd like to understand how participants react to the smart charging system, so participants will also need to complete a number of customer research questionnaires during the trial.



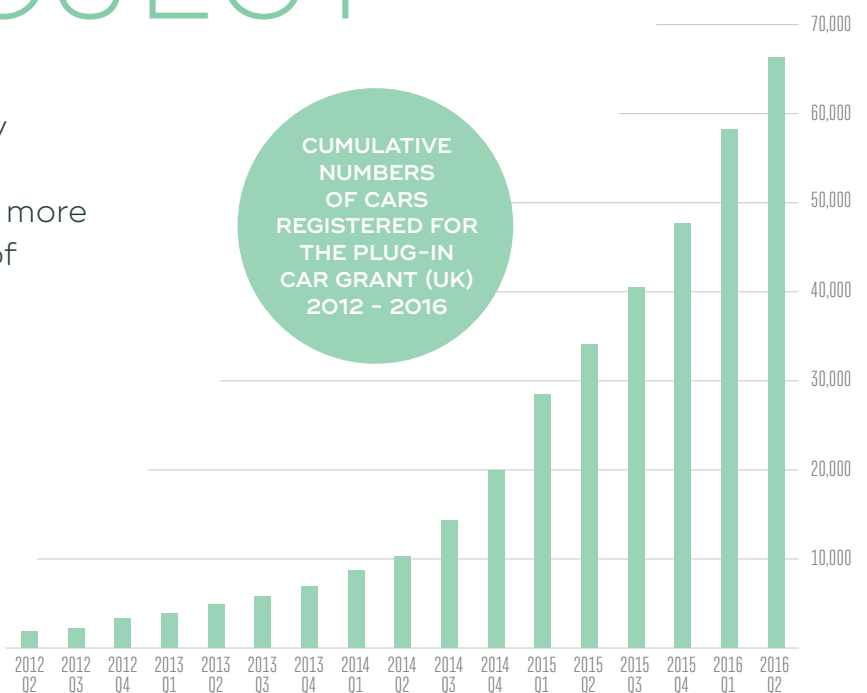


Image shows local electricity network from substation to homes with electric vehicles, including possible transfer of energy back from vehicle to grid (V2G)

# ABOUT THE PROJECT

EVs are becoming increasingly common on UK roads. Public charging points are becoming more widely available, new models of vehicles are being introduced with larger batteries, and home EV charging stations are being released which charge vehicles faster. This is reducing many of the barriers that have prevented wider EV ownership, making them a mainstream choice.

CUMULATIVE  
NUMBERS  
OF CARS  
REGISTERED FOR  
THE PLUG-IN  
CAR GRANT (UK)  
2012 - 2016



While the UK electricity system has plenty of capacity to deliver energy to EVs, local electricity networks may become overloaded, especially if clusters of cars develop, where lots of people in one area have an EV. Charging vehicles with larger batteries, at faster rates, and over longer periods could exacerbate this pressure.

Electric Nation is the customer-facing brand of CarConnect, a Western Power Distribution (WPD) and Network Innovation Allowance funded project. WPD's collaborative partners in the project are EA Technology, DriveElectric, Lucy Electric Gridkey and TRL. The project aims to provide local electricity network operators with the tools to be able to ensure that their networks can cope with this massive new challenge, whilst avoiding replacing cables and substations.

## THE GROWTH OF EVS

At the end of 2015 there were about 50,000 EVs on the roads in the UK. This included battery electric vehicles and plug-in hybrid electric vehicles. Forecasts suggest that by 2020 there will be over one million EVs. Between October 2013 and October 2015 registrations of EVs increased by 716%. In 2015 there were 32 types of EVs available to lease or purchase in the UK, this is set to increase to over 40 by 2017. EV charge rates and battery capacities are steadily increasing. This allows vehicles to achieve longer ranges and the customer base to increase.

## THE NEED FOR THE PROJECT

This growth of EVs presents a new challenge for the UK's electricity transmission and distribution network operators. As groups of neighbours acquire EVs, localised clustering is likely to cause problems for the electricity network. It has been proven by the My Electric Avenue project that at least 30% of GB low voltage networks (the cables and substations nearest to homes and businesses) will require investment by 2050 if adoption of electrified transport is widespread. This would represent a present day cost of £2.2bn.

Battery sizes and charging rates have increased since the My Electric Avenue project so the impact on the electricity network will be greater.

## THE LOCAL ELECTRICITY NETWORK

The Electric Nation project is focusing on the local electricity networks that supply homes and small businesses – the low voltage network. Electricity networks are run in a safe, secure, reliable and sustainable way to provide energy to local communities. This trial will help the Distribution Network Operators, who manage these networks, increase their understanding of the impact of EVs on their networks and how this impact could be reduced using smart chargers.

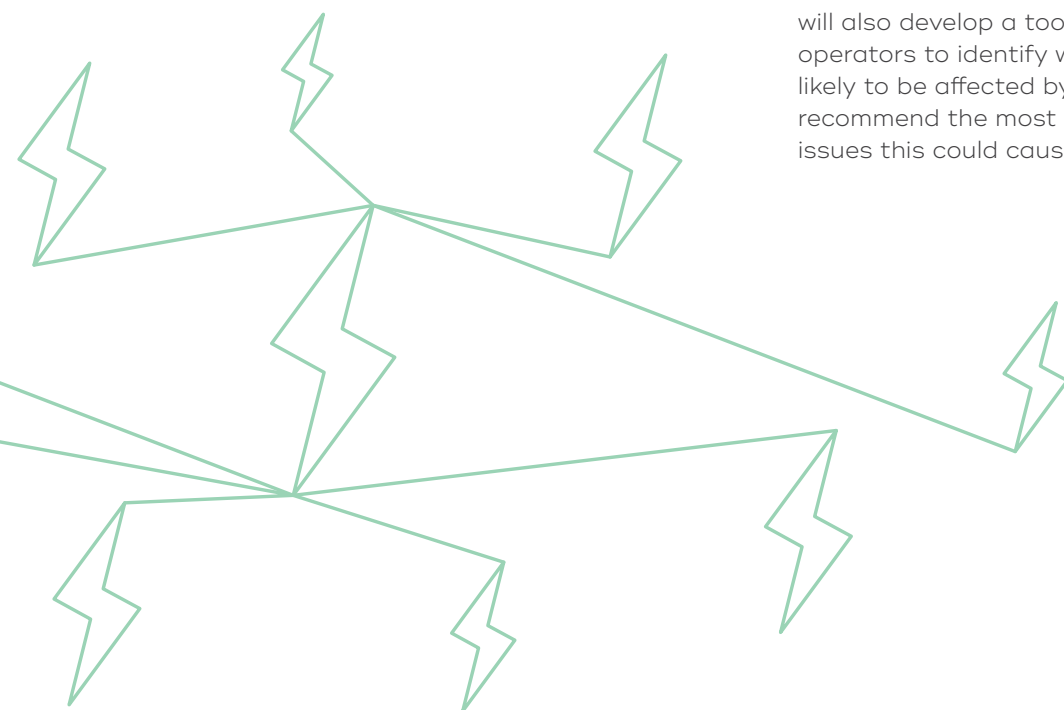
## OBJECTIVES OF THE PROJECT

**The Electric Nation trial aims to:**

- 1) Expand current understanding of the impact on electricity distribution networks of charging a diverse range of electric vehicles at home. The My Electric Avenue project was able to build up a bank of knowledge, however this trial was confined to one type of EV with the same battery size and charging rate. This project is seeking to discover how the impact will be altered by different types of vehicles with different sizes of batteries that charge at different rates.
- 2) Build a better understanding of how vehicle usage affects charging behaviour given diversity of charging rate and battery size.
- 3) Evaluate the acceptability to owners of EVs of smart charging systems and the influence these have on charging behaviour. This will help to answer such questions as:
  - Would charging restrictions be acceptable to customers?
  - Can customer preference be incorporated into the system?
  - Is some form of incentive required?
  - Is such a system 'fair'?
  - Can such a system work?

## WHAT WILL BE LEARNT?

The project will show how effective demand control using smart chargers is an alternative to costly network reinforcement. It will provide network operators with the information required to obtain a demand control service in the future. The project will also develop a tool that will allow local network operators to identify which parts of their network are likely to be affected by the future adoption of EVs and recommend the most economical solution to solve any issues this could cause.







# WHAT WILL YOU, AS A TRIAL PARTICIPANT, BE REQUIRED TO DO?

## BEFORE THE SMART CHARGER INSTALLATION

- We may need to survey your property to evaluate the cost of the smart charger installation. We will arrange this at your convenience and may require the following:
  - Access to property fuse box
  - Access for inspection of broadband router
  - Understand how the property's earth wiring is configured
  - Access for inspection of proposed smart charger location
- The project has a limited budget for each individual installation, therefore upon survey completion, if it is deemed that a smart charger installation is over this allocated budget, a customer will be informed of the cost of the additional work. The customer can then either:
  - Not proceed
  - Agree to fund the additional work and proceed

## WHEN THE CHARGER IS INSTALLED

- You will need to be at home on the arranged date the smart charge point is to be installed.
- We'll install a wall-mounted EV smart charger ready for you to charge your electric vehicle.
- All installations will be carried out by an approved, certified installer. They will complete all the necessary paperwork to obtain the OLEV Home Charge Scheme grant (where applicable), notify the network operator of the installation and get the charge point set up for the trial.
- The installer will require access to the property electricity distribution (fuse) board and may have to install an additional small distribution switch box.
- In addition to the installation of the smart charger, a power cable will be required to run from the distribution board to the smart charger.
- We'll also install some communications equipment which will consist of a small box the size of a broadband router that will be installed near your distribution box, an ethernet cable from the charger to the small box, and a unit which plugs into the back of the broadband router. The communications equipment means we're able to securely and reliably exchange information with the smart charger over the internet. In some circumstances this will require an additional cable to the router, however for the majority of participants this will not be required and communication will be wireless.
- After installation, you will be asked to complete two online surveys a few weeks apart providing information including contact details, some information about yourself and your household, how you charge and use your vehicle, and what you think about your new vehicle. Any information provided through the surveys will only be used for research purposes and will be kept confidential.

## DURING THE TRIAL

- You will charge your vehicle when at home using the smart charger provided
- Some trial participants will have access to a mobile phone app which allows them to enter information about their journey preferences and receive information about when they've charged their car and any demand control events they've been part of. All customers will have the ability to override charge control events to ensure that they can get their car fully charged when required
- You will also be required to take part in customer research designed to investigate your experience of owning an EV and of charging it, including the acceptability of the charge control solution. This will be offered as a number of online surveys, issued after each charge control solution trial. There will be one final online survey at the end of the trial to provide feedback on the trial experience and EV ownership.

# FAQS

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## Ⓢ What is the aim of the Electric Nation trial?

Ⓐ The Electric Nation project aims to build an understanding of the potential impact that the increasing uptake of EVs will have on local electricity networks. Cars with different battery sizes and charge rates may have different impacts and this needs to be understood. The impact of human behaviour on these different technologies will also be investigated.

The project will also trial a system that will be able to alleviate some of the anticipated problems that mass ownership and simultaneous charging of EVs could cause to local electricity networks.

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## Ⓢ What is the problem that needs solving?

Ⓐ The uptake of EVs is accelerating quickly and is expected to continue to do so. Between October 2013 and October 2015 registrations of EVs increased by 716%. While the UK can generate enough electricity to charge these vehicles, some local electricity networks may be unable to cope with the extra demand, especially if it coincides with existing peaks (e.g. after returning home from work in winter).

This trial is necessary to build an understanding of how different car battery sizes and speeds of charging may impact on this problem, and also to trial a potential solution.

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## Ⓢ What is the proposed solution?

Ⓐ By using smart chargers, a demand control provider could communicate with chargers to reduce the charging speed, or pause charging. Some EV owners will be able to programme some of their preferences and this information will be used to charge the car battery at a time or rate best suited to the network but within the car owner's tolerances.

Local network operators could use this type of service when local networks are stressed, as an alternative to replacing their equipment (e.g. cables in roads).

Data gathered from the trial will be used to help local network operators identify which parts of their network are most at risk as EV ownership increases. It will also develop a tool that will aid them to identify the most effective way to deal with areas of the network with problems.

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## Ⓢ Who are the collaboration partners?

Ⓐ The Electric Nation project is hosted by Western Power Distribution (WPD). **It is delivered by the following collaboration partners:**

- EA Technology
- DriveElectric (a brand name of Fleetdrive Management)
- Lucy Electric Gridkey
- TRL

**In addition, there are a number of supporting collaborators:**

- CrowdCharge
- Greenflux
- Impact Research
- e-Volt
- ICU Charging Equipment

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## Ⓢ Who is responsible for different parts of the project?

### Ⓐ Western Power Distribution

The host Distribution Network Operator, providing direction to the project.

### DriveElectric

Responsible for recruiting participants and all customer-facing activity.

### EA Technology

EA Technology is responsible for developing an EV charge point demand control system, working alongside CrowdCharge and Greenflux. This is the system that will change the charging rate or pause your car charge. EA Technology is also responsible for creating the event simulations that will be used to see if the system could be used to help the electricity network, as well as managing all aspects of customer research, PR, marketing and dissemination of learning for the project.

### Lucy Electric GridKey

Lucy Electric is monitoring local LV substations with the GridKey system with the aim of assessing the load profile of various types of electric vehicles and developing an algorithm that can automatically detect the presence of EVs charging on the network.

### TRL

Providing project oversight.



**CrowdCharge and Greenflux**

Providing the demand control service which will send signals to the smart chargers.

**Impact Research**

Conducting customer research.

**e-Volt and ICU Charging Equipment**

Providing the smart chargers.

**©How is the project funded?**

Ⓐ Electric Nation is the customer-facing brand of CarConnect, a Western Power Distribution (WPD) and Network Innovation Allowance funded project. WPD's collaboration partners in the project are EA Technology, DriveElectric, Lucy Electric Gridkey and TRL.

**©What subsidies and support have been provided?**

Ⓐ We will provide a top-up contribution towards a smart charger in addition to any applicable OLEV electric vehicle home charge scheme. Assuming the participant meets all eligibility criteria, the participant will pay £150 initially and this will be reimbursed upon completion of the trial. Trial participants that do not meet all eligibility criteria can still potentially participate in the trial, however there may be additional costs for them to do so. This would be agreed in advance with each individual.

Additionally, drivers will be given online gift vouchers worth £10 for each survey they complete during the trial, and £25 for completion of the post-trial survey. The two surveys conducted before the trials are a condition of participation and therefore there are no payments for completion of these.

**©What are the channels of communication for the project?**

Ⓐ More information about the project can be found at: [www.electricnation.org.uk](http://www.electricnation.org.uk).

Alternatively contact the project on our dedicated email address [electricnation@drive-electric.co.uk](mailto:electricnation@drive-electric.co.uk) or phone us on **0333 300 1050**.

There is also a 24 hour helpline available to participants.

**©What type of information will I be asked for during the trial?**

Ⓐ DriveElectric is the data controller for the Electric Nation project. Details of the data protection strategy for the project can be found in the Participant Library section of the Electric Nation website.

Impact Research will need information about participants and their households, for example contact details, age, gender, number of people in the household and number of cars etc. They will also ask about experiences using EVs, for example about the types of trips that are undertaken and decisions about when to charge the vehicle and about any problems or concerns when using or charging the EV. This will help the project to understand how different types of people and households use their EVs.

CrowdCharge and Greenflux may collect data regarding the charging of the trial participant's EV, journey data, vehicle specification data.

**©How often will Impact Research make contact and how will information be collected?**

Ⓐ When a person agrees to be part of the Electric Nation project they will be asked some questions about the household and circumstances as well as expectations about being an EV owner. This is most likely to be online, though they may make contact by telephone from time-to-time to remind people to take part in a survey or update information they hold. Participants will then be asked to complete up to eight short online questionnaires about experiences of being an EV owner before, during and after the trial, each one lasting no more than 10 minutes.

**©How long does the trial last?**

Ⓐ The trial lasts for two years from January 2017 to December 2018. Participants joining after the start of the trial will only participate for the remaining period.

**©Are there any potential inconveniences associated with taking part in the trial?**

Ⓐ As part of the Electric Nation trial a demand control system will be used to change the rate or pause when your EV is charging, simulating an event designed to prevent the network being overloaded. It is expected that this can be carried out whilst ensuring that EVs are still charged when required. The trial will seek to prove that this is the case. There is therefore a possibility that participants' cars may not be sufficiently charged, causing some inconvenience.

Should the charge point supplied as part of the trial fail, alternative transport can be arranged. The charger will be checked and if necessary replaced.

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### Ⓢ How long will the installation of the smart charger take?

Ⓐ The smart charger installation will be carried out by an OLEV-approved installer. Each installation is different, however a typical visit will take between 2-4 hours.

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### Ⓢ Will there be a disruption to my electricity supply while the smart charger is being installed?

Ⓐ There will be a short interruption to your electricity supply of no more than half an hour whilst the charge point is being installed. You will need to be at home when the charge point is installed, even if it is going to be outside.

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### Ⓢ Who will install my smart charger?

Ⓐ DriveElectric will be working with a preferred selection of OLEV-approved installers who will carry out the installation work.

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### Ⓢ Will the smart charger track other energy usage in my house?

Ⓐ The smart charger will only monitor the electricity supplied to your EV.

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### Ⓢ How will the data that I provide be protected? Who will have access to my data, to what extent will it be visible in project outputs, and what will happen to it after completion of the trials?

Ⓐ DriveElectric is the data controller for this project. DriveElectric has 18 years of experience in managing customer data through its car lease business and experience in implementing data protection procedures across project partners and suppliers. During recruitment DriveElectric will have collected some personal data from yourselves on behalf of the Electric Nation project. With your permission, your contact details will have also been shared with Impact Research who will be conducting the customer research aspect of the project. Impact Research is also a registered data controller as defined by the Data Protection Act 1998. Both companies are registered with the Information Commissioner's Office.

Your personal details will not be shared with any other project partner, sub-contractor or third party without your permission.

Data such as when you charge your car, how long for, and the charge rate will be collected via the demand control system. This data will not include personal data and participants will not be recognisable from this information. It will be encrypted according to strict protocols. In some cases, and with your permission, we may access data from your EV. This may include information such as journey lengths and the state of charge of your EV's battery.

At the end of the project all personal data kept about you by the project will be destroyed unless you provide us with express permission to keep it.

All results, data or analysis published by the project will be in an anonymous and aggregated format. The project will ensure that no trial participant can be identified from any trial publication unless an individual has provided express permission for their details to be made available, for example in a case study or newsletter.

A full copy of the Electric Nation Data Protection Strategy can be found in the Participants' Library section of the Electric Nation website.

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### Ⓢ What are trial participants obliged to do?

Ⓐ As a participant in the Electric Nation trial we want you to use your EV the way you want to – driving it where you want to go, when you want. Therefore plug in your EV at home as and when you need to charge it! If charging control changes your driving and charging habits – for better or worse – we would like to know what's changed.

If you are provided with an app to programme in your journey and charging preferences, please use it. It will help the control system to make better decisions. All participants will have the ability to override charge control events, through their mobile phone app. Please use this function if you need a full charge rate to give you enough charge to make a planned journey in the following few hours.

So that we know what you think about the demand control system that we are trialling, please complete the customer research survey whenever you are requested to (usually approximately every three months).

If for any reason you cannot carry on participating in the Electric Nation trial please let us know as soon as possible by contacting DriveElectric, either by email [electricnation@drive-electric.co.uk](mailto:electricnation@drive-electric.co.uk) or by telephone on **0333 300 1050**.

Please let us know if you change your contact details, either by email [electricnation@drive-electric.co.uk](mailto:electricnation@drive-electric.co.uk) or by telephone on **0333 300 1050**.







## FIND OUT MORE

FOR MORE INFORMATION VISIT  
[WWW.ELECTRICNATION.ORG.UK](http://WWW.ELECTRICNATION.ORG.UK)  
🐦 [@ELECTRICNATION\\_](https://twitter.com/ELECTRICNATION_)

Alternatively contact the project on our dedicated email address [electricnation@drive-electric.co.uk](mailto:electricnation@drive-electric.co.uk) or phone us on **0333 300 1050**

### COLLABORATION PARTNERS

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